
LIVERPOOL CITY REGION'S KNOWLEDGE ECONOMY:

DELIVERING NEW
OPPORTUNITIES
FOR GROWTH

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KNOWLEDGE ECONOMY

HIGHLIGHTS

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This Plan aims to develop a growingly successful knowledge economy based on the input, application and exploitation of the most relevant up-to-date knowledge, skills and innovation into the development of goods and services.

Knowledge Assets

The city region is home to a wide range of nationally and internationally significant knowledge assets. Over the last decade, employment in knowledge-intensive businesses in the city region has grown by over twice the rate of the rest of the economy. This Plan aims to secure more and more effective application of these assets in support of the growth and development of key sectors of the economy, so creating more jobs, higher productivity and higher GVA.

Focus on Key Sectors and Themes

The Plan provides a framework for achieving growth and development in the following areas:

- Life Sciences
- Creative and Digital Industries
- Advanced Manufacturing
- Financial and Professional Services.

In addition, four cross-cutting themes are addressed in support of economic growth:

- Innovation for Growth
- Branding
- Education and Skills
- Physical and Digital Infrastructure

The Plan also considers the public sector, a significant part of the economy, and addresses how better collaboration and joint working could help the sector meet its reduced spending objectives whilst maintaining high quality front-line services.

Priorities for Action

Of the nearly 40 areas highlighted for action, the following nine are the Key Priorities:

- Developing a productive long term relationship between Daresbury SIC, industry and the public sector across the city region.
- Developing a Strategic Relationship with the Technology Strategy Board across key sectors and developing Technology Innovation Centres (TICs), complementing the government's proposed Growth Hubs.
- Development of four major projects building on world class strengths in Life Sciences (Vaccine Research; Liverpool Science Park development; the BioInnovation Centre and the BioCampus).
- Developing proposals to tap into new market opportunities in digital advertising and marketing, gaming and new cinema technologies and the business generated through MediaCityUK and also developing a Creative Businesses Hub to encourage networking, collaboration and business development.

- **The Development of Fab Labs and an Advanced Manufacturing TIC.**
- **Development of a strategy to attract financial and professional services companies and relocating civil servants to the commercial core.**
- **The establishment of a Public Services Institute focussing on innovation in the provision of public services and stimulating policy thinking.**
- **Review the branding of the city region to more accurately reflect its strengths in science and technology, creativity and innovation, its dynamic commercial centre and quality of life.**
- **The development of a strategy to secure the provision of Super Fast Broadband and associated data centres/internet exchange.**

Outcomes

This is an ambitious Plan which aims to generate nearly 60,000 additional jobs by the early 2020s, to raise productivity and to move GVA closer to the national average. At this time of radical change, it represents an exciting opportunity for the city region to pull together and drive its economy forward to the benefit of all those who live and work here.

KNOWLEDGE ECONOMY

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. Introduction

1.1 Since this Plan was commissioned in March 2010, there has been a change of government, significant reductions in the level of public spending are underway and the policy context nationally and locally is changing radically, as is the role that the public sector can play in supporting the development of the economy. The government is no longer concerned with Multi Area Agreements; it is abolishing regional spatial strategies and the Northwest Regional Development Agency (NWDA) and is encouraging the establishment of private sector led Local Enterprise Partnerships (LEPs) to support the development of local economies. The Government has approved the establishment of a LEP for the Liverpool City Region.

1.2 In this rapidly changing environment, this Plan builds on the information contained in recently published reports and focuses on key sectors of the economy where there are existing strengths which have the potential to grow and contribute to the LCR's economic growth. The development of the knowledge economy is central to enabling the city region to compete more effectively in the global economy. There is a clear need to shift the balance of job growth to higher value, private sector knowledge-based businesses. Over the last 10 years (to 2008), whereas the total number of jobs in the city region grew by 6%, jobs in the knowledge economy grew by 13.6% – a rate of increase which needs to continue. The Plan relates to the whole city region and seeks to define the full range of 'knowledge assets' across the entire area and relate those assets to each of the key sectors – life sciences, creative and digital industries, advanced manufacturing and financial and professional services– highlighting the opportunities and actions needed to help drive their development and boost productivity across the whole city region.

Although the definition of the key sectors is not influenced by the radical changes referred to, the mechanisms by which the city region can support the development of these sectors are changing. Consequently, this Plan needs to retain flexibility to respond to the new emerging mechanisms effectively and efficiently.

1.3 The city region is home to a wide range of significant knowledge assets and, over the last decade, employment in knowledge intensive businesses has grown by over twice the rate of the rest of the economy. More effective application of these assets in support of the growth and development of those business sectors will create more jobs and raise productivity and GVA. This Plan provides a framework for achieving such growth and development.

1.4 For the purposes of this Plan the knowledge economy is defined as 'one based on the successful input, application and exploitation of the most relevant up-to-date knowledge (including skills and innovation) into the development of goods and services'.

2. The City Region Economy

2.1 With a population of 1.5m covering the boroughs of Halton, Knowsley, Sefton, St. Helens, Wirral and the City of Liverpool, and an employment base also of 1.5m, the city region generates a GVA of £19bn, 17% of the NW total. The area is closely tied economically to the wider functional area of Warrington, Cheshire West and Chester, North East Wales and West Lancashire. The city region exhibits a complex set of relationships and linkages:

- Liverpool is the economic, commercial, cultural and transport hub

- Sefton provides the primary port at Seaforth and the classic resort of Southport
- Halton, home to Daresbury SIC and The Heath, greatly strengthens the science and technology base
- Wirral complements Liverpool as the maritime centre of the North West (NW); has important private sector R & D strengths and provides important links with surrounding economic areas
- Knowsley and St. Helens provide key infrastructure in terms of the labour market, investment locations and the business base.

2.2 From 2006-9, the value of the city region economy increased by 4.8% to £19.11bn, faster than the NW (4.6%). The business base also grew over that period from 45,900 to 49,000. The employment rate improved in the years up to the onset of the recession and the number of self-employed also increased. GVA/head, however, remains low at £12,869 (UK average: £19,951). This is a key factor and one that this Plan seeks to help tackle by growing the knowledge economy where the GVA/head is generally higher than the national average, as is the rate of growth of knowledge economy jobs. Whilst there is a particular concentration in Liverpool, there is a balanced spread across the rest of the city region. The percentage of working age residents with NVQ level 2 was 63.8% in 2007 and 23.3% for level 4. Although both represent an increase over previous years, these levels still fall below the UK average.

2.3 A recent study by Pion Economics and Cambridge Econometrics forecast that economic recovery will be slow and fragile but that the core of the city region will recover more quickly. The city region suffers from low productivity, largely a product of the lack of scale of the economy, the predominance of low value-added industries and the relative shortage of leading-edge businesses and corporate HQs. This Plan, which is concerned with growing the knowledge economy, will support the strategic need to increase productivity.

2.4 Although, in the short to medium term, the economic recovery is expected to be a slow one, once that recovery is firmly in place there is every expectation that the city region can match, and even exceed, the rate of jobs growth which it saw between 1998 and 2008. If the recovery is in full swing by 2012/13, then, on the basis of previous growth, it would be reasonable to project a further 15% increase in the knowledge economy overall by 2022/23, with a particular emphasis on Life Sciences, Creative and Digital industries and Financial and Professional Services. A 15% rise over this period would see knowledge economy jobs total increase from 387,000 to 445,000 – an additional 58,000 jobs.

Across the city region there are many excellent opportunities to attract additional jobs directly in the key sectors and indirectly through the enhancement of supply chains. Improved digital infrastructure will support the development of these opportunities.

In terms of physical infrastructure, approved capital developments and those at an advanced stage of planning offer enormous potential. Major projects such as the expansion of Liverpool Science Park, the development of the 1m sqft biomedical campus, further development by the three universities, the continued development of the Liverpool Innovation Park, further development in Speke Garston and around Liverpool Airport; the development of over 1m sqft at Daresbury SIC, the continued development of The Heath, Knowsley Industrial Park, the further development of the Liverpool Commercial Business District and the massive opportunities presented by Peel's Wirral and Liverpool Waters have the capacity to help drive significant job growth. Wirral Waters, Liverpool Waters, Daresbury SIC and the Biomedical Campus alone have the potential to attract 60,000 jobs.

Opportunities exist across every part of the city region; the challenge is how best to realise these opportunities. This Plan sets out a series of proposals which will contribute significantly to creating the climate and the conditions within which this vital element of the city region's economy can grow and flourish.

3. The City Region's Knowledge Assets

Chapter 2 seeks to briefly describe the main knowledge assets which are distributed across the city region including private companies, the universities, the university and teaching hospitals, specialist research centres, the Daresbury Science and Innovation Campus (SIC) and several concentrations of knowledge economy jobs.

4. The Development of the Key Sectors of the City Region's Knowledge Economy.

Chapter 3 sets out the strategic context, current position and strengths, challenges, issues and opportunities for each key sector and the cross-cutting issues. Although not part of this Plan, the current position in respect of the work being carried out on SuperPort and Low Carbon is included for information in Appendices 3 and 4.

Life Sciences - The BioNoW Directory 2010 lists over 100 biomedical companies in the city region, employing over 5,000 people and contributing over £1bn to the economy. A further 2,000 people are employed in the life science base within the universities, hospitals and other research institutions. This sector represents one of the jewels in the city region's crown as well as being hugely important to UK plc. The research strengths in the sector are some of the strongest in the UK and Europe. Key strengths exist in the University of Liverpool (UoL), the Liverpool School of Tropical Medicine (LSTM), the Royal Liverpool and Broadgreen University Hospital NHS Trust (RLBUHT), Liverpool John Moores University (LJMU) and Daresbury Science and Innovation Campus (DSIC). Physical space for the development of the sector is limited; the only purpose built incubator, Mersey Bio, is small and has long been fully occupied and there is pent-up demand for additional space. There is also demand for grow-on space, particularly close to the research strengths in the Liverpool Knowledge Quarter. Space for established companies in the sector exists particularly at The Heath and the Liverpool Innovation Park but also in other industrial locations across the city region. The proposed Liverpool Science Centre and the Clatterbridge Innovation Park can both add further space.

In order to build on the considerable strengths in this sector, a package of inter-related proposals are to be taken forward (subject to resolving funding issues) including: the Liverpool Institute of Vaccines Research; further expansion of the Liverpool Science Park with a proposed new third Innovation building; the proposed new 80,000sqft BioInnovation Centre next to the Royal and the UoL Life Sciences building and the proposed Royal Liverpool Biomedical Campus to be developed on the current hospital site once the new hospital is completed. This combination will deliver additional incubation space, new grow-on space, a Development Centre to provide assistance and support to companies to become 'investor ready' and assist in the commercialisation of their IP, and a Biomedical Campus of over 1m sqft of health-related development attracting international companies with links to the adjoining research expertise and clinical trials capacity.

In addition, urgent consideration should be given to addressing how the leading edge research being carried out at the Royal Liverpool University Hospital can be successfully exploited both for the benefit of service users (a direct 'Big Society' benefit) and the development of the knowledge economy.

Creative and Digital Industries (CDIs) - from 1998 to 2008, although the number of companies in this sector fell from 4,004 to 3,222, the number of jobs increased by 3% to 23,724. The greatest concentration of jobs is in Liverpool, but all areas have significant numbers. The sector includes a significant number of well established businesses including Sony Computer Entertainment, Lime Pictures and Trinity Mirror. The vast majority, however, are micro-businesses occupying cheaper, flexible accommodation in locations like the Baltic Triangle, which has seen a major clustering of such businesses over recent years. Accommodation is also available at the Liverpool Innovation Park and Daresbury SIC.

NESTA estimate that the CDI sector will grow at more than double the rate of the rest of the economy. At the same time, new technology presents threats and opportunities, particularly with the development of digital technologies. It will be important to ensure that creative businesses fully exploit the opportunities offered by knowledge transfer. Recently, the Technology Strategy Board has shown that stimulating demand for services from outside the sector leads to greater innovation and the development of important long-term relationships between companies.

The research strengths across the city region are many and varied including: the recently established Open Lab to foster collaboration and interdisciplinary working; the Liverpool Screen School; the Centre for Cultural Leadership and the School of Computing and Mathematical Science (and the School's proposed joint development of an Innovation and Knowledge Centre with Lancaster and Salford Universities) all at LJMU; the Liverpool School of Art and Design; the Liverpool Hope Creative Campus; the UoL Semantic Web Technology Lab. The Institute for Cultural Capital, jointly established by the UoL and LJMU, opens this year. Daresbury SIC has strong relationships with many major international companies through its Computational Science and Engineering Group which will be further strengthened if the proposed £50m Hartree Centre secures funding approval.

At MediaCity UK in Salford, it is proposed that the Media Enterprise Centre (subject to NWDA funding) will provide incubation space and house the Framework in Innovation and Research at MediaCity UK (FIRM), a Useability Lab looking at how people use games and an Analytical Lab to aid business model analysis. It will be important for the city region's CDIs to take full advantage of these facilities.

In Liverpool, the Foundation for Art and Creative Technology (FACT) is pursuing proposals to develop a creative industries cluster, including incubation space, around an animated Ropewalks Square, and discussions are underway at Liverpool City Council to investigate releasing land at the Baltic Triangle for the further expansion of that important cluster. Opportunities exist to develop proposals to tap into new market opportunities in digital advertising and marketing, gaming and new cinema technologies and the business generated through MediaCityUK as well as developing the concept of a Creative Business Hub, which can link networks and locations, promote collaboration and provide support facilities for the many micro businesses in this sector.

In addition, it is proposed that the concept of a Digital Enterprise Network (fibre, data centres and internet exchange), developed by Wirral in 2009, is re-visited with a view to investigating alternative funding arrangements.

In order to ensure that the sector takes full advantage of MediaCity UK, it is proposed that the city region establish a presence at MediaCity UK to facilitate that process.

Finally, it is recommended that the opportunity should be taken to explore next generation technologies (e.g. smart materials, physical computing, additive layer manufacturing) and the potential business opportunities which could flow from their exploitation as well as taking full

advantage of specific research strengths such as the digitisation of film, heritage and library content and the commercial re-use of such material.

Advanced Manufacturing - The UK economy depends on effective involvement in the manufacturing sector which provides goods to the world's market place. A broader definition of manufacturing has become increasingly appropriate, recognising that the sector means far more than final assembly of finished products. It involves the full cycle of activities, from research, design, development and production through to logistics, after-sales service, maintenance and repair and end-of-life management. It embraces the development of the sophisticated materials that allow novel features to be included in products and advanced technologies that allow sophisticated final products to be designed and produced with fine degrees of tolerance, excellent quality control and optimum efficiency. The Liverpool City Region can participate in the manufacturing sector at all points of the supply chain from the design and supply of component materials to companies throughout the world, to the final assembly of finished products within the region.

There are 3,008 manufacturing companies in the city region employing nearly 35,000 people. They are spread across the city region with significant job concentrations in Liverpool, Wirral, Knowsley, Halton and St. Helens. Manufacturing has come through the recession and is now expanding faster than the economy as a whole and clearly has the support of the Coalition Government. Traditionally, manufacturing has been described through discreet sectors such as automotive, aerospace and chemicals. More recently, there has been a focus and emphasis on generic technologies which can drive manufacturing across such sectors (e.g. composites, nanotechnology, additive layer manufacturing and silicon electronics). The NW Science Council has set out a series of science and technology areas which can support sustainable growth including simulation, autonomy, performance materials and sustainable product design, all of which are relevant to advanced manufacturing.

Research strengths across the city region include: the Virtual Engineering Centre and the Engineering Technology Centre at Daresbury SIC along with their modelling and simulation facilities, their capabilities around autonomous/intelligent systems, the National Centre for Electron Spectroscopy and Surface Analysis and the Cockcroft Institute; LJMU's General Engineering Research Institute and the Built Environment and Sustainable Technologies Centre; the University of Liverpool's Ultra Mixing and Processing Facility; the Liverpool Institute for Nanoscale Science Engineering and Technology; the Centre for Materials Discovery; and the Agility & Supply Chain Management Centre. The support to business by the three universities through their Business Gateways and Business Schools is a further important asset.

There is an exciting opportunity for major firms across the region, along with the universities, Daresbury SIC and The Manufacturing Institute, to explore with the Technology Strategy Board the establishment of a Manufacturing Technology Innovation Centre, perhaps building on the Virtual Engineering Centre at Daresbury SIC and taking the opportunity to drive innovation including the exploitation of new technologies. Such a Centre could also host a business-led manufacturing sector group working across traditional boundaries.

The image of manufacturing continues to cause concern; the establishment of Fab Labs in the city region would promote innovation and creativity in communities (a key issue for the Big Society, providing an important community resource) and improve the image of manufacturing as well as supporting the development of emerging business ideas.

Finally, there is a strong case for expanding the scale of Knowledge Transfer Partnerships and other similar programmes between universities and manufacturing companies.

Financial and Professional Services (FPS) – according to the Annual Business Inquiry Statistics from NOMIS, employment over the period 1998 to 2008 increased by 53% to 71, 166 jobs and the number of businesses increased by 85% to 7,472. There is a significant concentration in Liverpool City Centre with strong secondary clusters in Sefton and Wirral. Notwithstanding this growth, the city region is not currently making maximum use of its assets or potential in this sector which underpins growth across the whole knowledge economy. Whilst banking is the most important sub sector, Asset and Wealth Management is a notable strength where the city region is the most important location in England, outside London.

Although the sector has clearly been adversely affected by the recession, the former government indicated that the liberalisation of EU markets could create up to 80,000 jobs in the UK. The recent return of the high street banks to profitability also points to their future growth. In addition, there will be major opportunities for the sector related to sustainability and the low carbon agenda.

Research strengths at the three universities include Corporate Governance, Management, Banking, Corporate Ethics, Social Responsibility and Law. In addition, the Liverpool Law Clinic is a community-based facility run by staff and students and the Social Enterprise Research Group at LJMU links teaching and research in the corporate sector to social enterprise, both important aspects of the Big Society agenda.

It is important that Liverpool's role as a commercial centre is more effectively reflected in its branding. It is also important that the city region develops an even more sophisticated approach to attracting inward investment, making full use of the expertise in the private sector and links to China and India, and ensuring adequate provision of Grade A accommodation.

Finally, it is important that the sector services the entire economy, that the HE sector offers the highest quality support through its teaching and research and that the sector builds on its strengths such as Asset and Wealth Management.

The Public Sector – the public sector across the city region provides nearly 168,000 jobs and makes a major contribution to GVA. Although there is a concentration of jobs (42%) in Liverpool, all areas have substantial public sector employment. Although employment is likely to fall over the next few years, the sector will continue to be a major force in the city region's economy, particularly as a procurer of services from business.

There are a range of relevant research strengths at all three universities including Urban Affairs, Health and Public Health, Citizenship, Public Administration, Sport and Exercise Sciences, the Child and the Family and a range of Social Sciences. Courses in differing aspects of public sector management are also provided. Liverpool Hope University is planning to establish a Health, Care and Science Centre to address the need for growth in the third and social enterprise sectors and the creation of new pathways to science-related jobs.

There are three major issues to be addressed. First, the public sector through focussed and co-ordinated procurement has the capacity, not just to improve its efficiency, but also to underpin the development of the local economy. Over a third of public expenditure is delivered by the private sector.

Second, the wide-ranging cuts in public expenditure will require the need for fundamental reviews of what services the sector should provide and the method of provision. The establishment between the Universities and the public sector of a Public Services Institute to address these

issues, with the potential to involve communities in its work, could focus on innovation in the provision of public services as well as stimulating policy thinking across the sector.

Thirdly, the city region needs to address how it can best attract relocating civil servants to the area, working closely with relevant private sector developers.

Cross Cutting Issues

Innovation and Enterprise - The establishment of an effective innovation infrastructure is of the highest importance; NESTA refers to the need not just to create new knowledge, but to enhance the capacity for ideas to be accessed, absorbed, spread and applied. Dr. Hauser's recent report identified Technology Innovation Centres (TIC) as having an important role; the Technology Strategy Board is seeking to pursue a national programme of TIC development and also plans to increase support for emerging technologies which have the potential to lead to new products, services and industries.

Building on the expertise at Daresbury and the knowledge quarter, it is proposed that the development of a city region Innovation Hub at the Daresbury SIC be explored. This would be an important contribution to the UK's innovation architecture and would enhance the ability of businesses in the city region to access and apply ideas in support of business development and growth, both within and across sectors, and to support the development and application of emerging technologies. There is a high priority opportunity for the city region to work closely with the Technology Strategy Board to address this and other important national and city regional issues.

It is strongly recommended that the existing programmes such as the Knowledge Transfer Partnerships be expanded by all three universities across the city region, focusing on all the key sectors of the economy.

It is essential that the loss of business support services following the demise of NWDA and Business Link in its current form is recognised and an appropriate private sector driven alternative introduced. A proposal has been made to DBIS that a 'Growth Hub' be established in the city region to provide business support to SMEs with serious high growth aspirations. Such a hub would draw extensively on private sector expertise and services and with basic government support would also seek to generate income to help secure sustainability. It is intended that urgent discussion take place with DBIS to further this proposal.

Branding - Although widely recognized as an important visitor destination, the city region is not well known as an important Gateway City, with major knowledge assets, strong in science and technology, with a dynamic commercial centre, a reputation for creativity and innovation and an attractive quality of life.

Partners across the city region need urgently to review branding policy to ensure that the brand and related marketing strategy supports the development of all key sectors across the area. This is a high priority and should build on the excellent city region-wide material assembled for the Shanghai Expo.

Education and Skills - The coalition government's approach to education and skills seeks to mesh enterprise with training, learning and research. There is also a renewed emphasis on workplace learning and an additional 75,000 apprenticeships. The proposal by STFC to develop a Technical Skills Centre at Daresbury SIC focusing on apprenticeship and CPD training is highly relevant in this regard.

As resources for skills development will be constrained, available funding will need to focus on the skills required for the future economy, including all the key sectors set out in this plan.

The 2010 National Skills Audit particularly emphasized the need for improved skills in Management and Leadership, STEM skills, Technician skills and Customer Service and Employability skills. It is important that the city region Employment and Skills Board addresses these and other local demand-driven skills needs if the labour pool is to be able to support the growth in the knowledge economy which this Plan is seeking. The experience of the LJMU 'World of Work' (WOW) programme is also particularly relevant.

Developing appropriate links between industry/commerce and the HE/FE sectors across the skills agenda to ensure that courses are all relevant, focused and up to date is very complex indeed. The Knowledge Economy Group, the Employment and Skills Board and Merseyside Colleges Association will need to consider how this complex landscape might be simplified to the benefit of all concerned. It will be particularly important to take maximum advantage of the intended increase in KTPs and apprenticeships.

Physical and Digital Infrastructure - Effective infrastructure is integral to the success and competitiveness of UK businesses. The Plan emphasizes the opportunity for the city region, via the emerging LEP, to play its full part in determining infrastructure priorities across its area in support of the development of the knowledge economy. **It will also be important to ensure that the city region benefits to the maximum extent from national and regional infrastructure investment including High Speed Rail, the Atlantic Gateway initiative and the Mersey Gateway at Runcorn.**

The need to ensure that the city region has the most effective, up to date digital network is a key requirement for the development of the knowledge economy. **The opportunity needs to be taken to use existing spare capacity and ducts in the city to create an open access network which could deliver a significant improvement in connectivity. This mapping work needs to be extended across the city region and the outcome inform the priorities for action.**

The provision of superfast broadband (minimum 100Mbps) and associated data centres and internet exchange serving the city region is a key requirement. Every sector in this Plan requires such broadband access and resilience and high priority needs to be given to determining the priorities for provision by sector and geography, and to exploring different mechanisms for funding the required infrastructure. It is vital that the city region management arrangements, and particularly the LEP, have the capacity and resources to pursue this important issue.

5. Key Priorities for Action

Work is currently underway to establish a Local Enterprise Partnership (LEP) for the city region. It will be extremely important for the LEP, on behalf of the city region, to have the expertise, capacity and resources to drive forward this Knowledge Economy Plan and the wider economic plan. The LEP will need to be able to develop and maintain a time series database for the city region's economy to highlight trends and opportunities; to co-ordinate the development and delivery of projects across the city region; to ensure that the city region secures its appropriate share of all available resources (including: the funding from the Technology Strategy Board; the Merseyside Loan and Equity Fund utilising funds from investments realised by the Merseyside Special Investment Fund; the Regional Growth Fund; EU funds, the JESSICA Fund; the Regional Venture Capital Funds etc); monitor performance and roll out the Economic Plan and policies for the city region, including this KEP. In addition, a business-focussed LEP would be able to spot opportunities arising from convergence between the sectors and take action to exploit those

opportunities. Once established, it is assumed that the LEP will want to review the mechanisms for delivering the Plan's proposals including the following Key Priorities for Action:

5.1 The development of a close and long term relationship with Daresbury SIC including promoting its particular strengths to industry across the city region.

5.2 The development of a strategic relationship with the Technology Strategy Board across the Creative and Digital, Advanced Manufacturing and Life Sciences sectors, and the proposed development of an Innovation Hub at Daresbury SIC.

5.3 Life Sciences: The development of the package of projects (Vaccine Research, LSP Development, the BioInnovation Centre and the BioCampus) which builds on the LCR's world class strengths in life sciences.

5.4 Creative & Digital: The development of proposals to tap into new market opportunities in digital advertising and marketing, gaming and new cinema technologies and the business generated through MediaCityUK and also developing a Creative Business Hub to encourage networking, collaboration and business development.

5.5 Advanced Manufacturing: The development of Fab Labs in the city region to promote innovation and creativity and improve the image of manufacturing, and the establishment of an Advanced Manufacturing TIC, building on the VEC at Daresbury (see 2. above)

5.6 Financial & Professional Services: The joint development of a city region strategy to attract inward investment into the sector (and the attraction of civil servant relocations), particularly utilising private sector knowledge and the opportunities which new and refurbished accommodation in the Commercial Business District and the Liverpool and Wirral Waters projects present to provide the necessary range and quality of accommodation needed both now and in the long term.

5.7 Public Sector: The establishment of a Public Services Institute providing both a public services Innovation Centre and a Public Policy Institute.

5.8 Branding: A fundamental review of the branding of the Liverpool City Region so that it more effectively reflects the knowledge assets across the city region, its strength in science and technology, its reputation for creativity and innovation, its dynamic commercial centre and its quality of life, in addition to its importance as a visitor destination.

5.9 Digital Infrastructure: The development of a strategy to secure the provision of superfast broadband and associated data centres and internet exchange is a key requirement for the successful development of the knowledge economy and the city region will need to give high priority to taking this agenda forward if the area is not to fall behind other cities in the UK.

N.B. An Implementation Plan for this knowledge economy plan is being prepared, defining (inter alia) who is to lead the action required.

CHAPTER 1

CONTEXT

CHAPTER 1: CONTEXT

1. Introduction

1.1 Liverpool City Region (LCR) is home to a significant number of nationally and internationally important knowledge assets. Over the last 10 years, employment in knowledge intensive business sectors has grown at over twice the rate of the rest of the city region economy. More effective application of all relevant knowledge assets in support of the growth and development of these business sectors offers the opportunity for the city region to increase the scale of knowledge-based economic activity, creating more jobs and raising productivity and GVA. At the same time, this growth can help to offset pending public sector job losses, altering the balance of the economy in favour of the private sector.

1.2 The city region has the critical building blocks in place for an effective innovation infrastructure, including physical assets, networks and expertise with the added inherent advantage of innovation offered by an urban environment, namely proximity, density and variety. This Knowledge Economy Plan (KEP) and the Knowledge Economy Group (KEG) which has promoted its preparation and will oversee its delivery as part of the LEP arrangements, offers a framework for connecting and catalysing the value of the city region's knowledge assets in support of developing its knowledge-based economy.

1.3 This plan recognises that:

- A demand driven approach to high value growth is a pre-requisite for success.
- Innovation is a source of comparative advantage and a primary driver for growth and job creation. A city region-wide holistic and demand-driven approach to the application of innovation policy now needs to be implemented.
- Convergence between the application of technologies across key knowledge economy sectors will drive new market opportunities. Whilst these opportunities cannot be predicted, it is possible to create the framework conditions to enable their potential to be realised.
- SMEs will be responsible for driving a significant proportion of future knowledge economy growth.
- Access to finance is a key issue (a key framework condition) which needs to be addressed as a high priority.
- Joint public/private sector leadership, facilitation and delivery will be at the heart of the successful implementation of this plan.

1.4 Effectively implemented, this plan can deliver up to 60,000 jobs over the next decade and continue to raise GVA at a rate in excess of the national average. Growth in high value SMEs, increased productivity, increased business start ups, greater graduate retention and the attraction of inward investment will all contribute to a significant strengthening of the private sector economy across the city region, reducing the current over-dependence on the public sector, thereby securing a more resilient economy capable of responding more effectively to changing economic circumstances.

2. Background

2.1 The Knowledge Economy Group commissioned the preparation of this Knowledge Economy Plan in March 2010. (See Appendix 1 for the composition of the KEG, its supporting Steering Group and the Economy Panel set up by the Economy Board). Since then, there has been a change of

Government, significant reductions in the level of public spending are underway, and the policy context nationally and regionally is changing radically, including the role which government is now likely to play in supporting the development of the economy. In addition, the government has indicated that it is no longer concerned with Multi Area Agreements and that both the regional strategy and the RDAs are to be abolished, with Local Enterprise Partnerships (LEP) being created to support the development of local economies. Discussions are underway to establish an LEP for the Liverpool City Region.

2.2 In this rapidly changing political, structural and policy environment, this Plan builds on existing information and intelligence gathered over recent months and years and focuses on specific key sectors of the city region's knowledge economy which have the potential to grow. The definition of these sectors is not influenced by the changes referred to. What has changed, and is still changing, are the mechanisms whereby the city region can support the development of these key sectors. In this regard the Knowledge Economy Plan, and, in particular, its form of implementation, needs to retain flexibility to respond to the new emerging mechanisms (both structures and funding and the localism agenda) and the national economic development agenda, effectively and efficiently, for the benefit of developing the local economy.

2.3 **It is important to emphasise that this plan is not an all-embracing economic strategy for the city region. It is a plan dealing principally with four business sectors. It sits alongside and complements a range of other plans and strategies, such as the work of the Employment and Skills Board and separate private sector led groups addressing the Visitor Economy, Low Carbon and the Liverpool SuperPort. The Plan specifically aims to reflect the knowledge and experience of all those consulted during its evolution. It aims to relate the many knowledge assets of the city region to the four sectors and to promote greater collaboration and cross-sector working between industry and those assets. It also aims to define a range of actions, strategic and operational, which will help to catalyse the further development of the four key sectors with resultant job growth and increased GVA.** Although nine priorities emerge from the nearly forty actions outlined, further work is needed to translate those actions into an implementation plan with clear responsibilities assigned and timelines and outputs quantified, which can then be effectively monitored and evaluated. It is anticipated that the Implementation Plan will be completed early in 2011.

2.4 **For the purposes of this Plan, the Knowledge Economy is defined as one based on the successful input, application and exploitation of the most relevant, up to date knowledge (including skills and innovation) into the development of goods and services. By developing a successful Knowledge Economy the city region will be able to improve its competitive position both nationally and internationally and enable the key sectors to grow, adding jobs and higher levels of GVA to the city region economy.** Not to develop the Knowledge Economy would have the opposite effect.

2.5 For each of the key sectors the Plan sets out the issues and opportunities which have emerged from a review of all relevant existing reports and from the many discussions which have taken place with key sector companies, representatives and support groups since March 2010. Appendix 2 sets out all those individuals and organisations that have been directly consulted on the preparation of the Plan since March, and also all those consulted on the Draft Plan during August and September.

2.6 The coalition government has made it clear that it intends to deal with the public sector deficit in this parliament and that it is looking to the private sector to increase output, jobs and GVA to at least offset the inevitable reduction in public sector jobs which will take place. The objective of

this Plan is to secure the development of the Liverpool City Region as a dynamic, creative, innovative place with a flourishing private sector delivering the goods and services of the future, supported by an efficient and effective public sector, and where the economy has made the transition away from dependence on the public sector. All concerned need to foster a culture which supports and encourages creativity and innovation across the private and public sectors.

2.7 In addition to supporting the key sectors themselves, acknowledging and adjusting to the reductions in the size of the public sector and pursuing the provision of essential supporting infrastructure, the Plan requires the application of innovation to all sectors and, importantly, urges the development of a brand for the city region which reflects its importance as a focus for knowledge and, particularly, for science and technology, and a city region with a dynamic commercial centre as well as it being an important visitor destination. The image of the city region needs to reflect the realities of its strengths and its branding must relate to the audiences with which it needs to communicate. The messages to potential visitors are inevitably different from the messages to potential investors.

2.8 Future growth in jobs will come mainly from SMEs. According to the Federation of Small Businesses (FSB) (with 213,000 members nationally and 20,000 in the North West), 99% of all companies employ under fifty people. Companies employing up to 250 staff account for nearly 60% of the nation's workforce and those companies generate 50% of the country's GDP. In 2009, 70% of all new jobs created were by SMEs; the greatest growth is from new and emerging SMEs. It is clear from this FSB analysis that the limited public funds likely to be available for business support should focus on new and emerging SMEs (including those from the key sectors described in this report, but not exclusively so) who have the propensity and the desire to grow, reflected in a robust business case. Once companies are firmly on the expansion route, any dependence on public funding support should focus on key stages of their early development, and then be progressively withdrawn.

2.9 Nearly forty opportunities for action have been defined, many of which will need to be considered by the LEP once it is operational, to determine how they should be dealt with. Out of this long list, a short list of 9 particularly important proposals has been identified.

2.10 Responsibility for securing the implementation of this Plan will lie with the LEP once it is established and operational. It is assumed that the KEG (with its membership revised as necessary) will oversee the delivery of the Plan, reporting to the LEP as required. A separate Implementation Plan will be produced early in 2011.

3. The Liverpool City Region

3.1 The Liverpool City Region Multi Area Agreement was submitted to the former government in June 2009, setting out a vision to establish Liverpool's status as a thriving international city region by 2030. Although the *MAA* process has been abandoned by the new government, it is agreed that the basic objectives contained in the chapter on the economy remain relevant.

3.2 Around 1.5 million people live in the city region which encompasses the boroughs of Halton, Knowsley, Sefton, St. Helens, Wirral and Liverpool. Importantly, the city region forms part of a larger economic zone, extending into West Lancashire, Warrington, Cheshire West and Chester and parts of North Wales as well as across to the Manchester City Region.

3.3 There is a significant gap in overall economic value in the city region compared to the UK average, alongside a relatively low business base and a significant skills deficit. Realising the vision rests on closing this gap, increasing the business base and raising skills levels.

3.4 The agreement sets out an integrated suite of proposals geared towards delivering a step-change in economic growth to close the gap. The Economy Platform put forward four transformational actions in areas in which the city region has a competitive advantage in order to deliver this step-change:

- Culture and the Visitor Economy
- Liverpool SuperPort
- Low Carbon Economy
- Knowledge Economy

These were supported with a series of actions to improve the broader ‘enabling’ environment for accelerated growth, set out in the Employment and Skills, Housing and Transport platforms.

3.5 The Knowledge Economy Plan has been prepared by the Knowledge Economy Group, supported by a Project Director and a Partner Steering Group. Details of membership are set out in Appendix A.

4. Knowledge Economy Plan

4.1 In relation to comparator–competitor urban economies, the city region has a lower concentration of knowledge-based economic functions. The development of the City Region’s knowledge economy is central to enabling the city region to compete more effectively in the global economy and there is a clear need to shift the balance of job growth in the city region towards higher-value, knowledge-based sectors and clusters.

4.2 This Knowledge Economy Plan (KEP) identifies opportunities and sets out practical measures towards realising the vision for the Knowledge Economy for an international city region of knowledge and science, renowned for its creativity and innovation.

4.3 The Plan identifies a number of key knowledge sectors where the city region has the assets, capacity and opportunities to build critical mass, establish an international competitive advantage and deliver growth in employment and GVA. These are:

- Life Sciences,
- Creative and Digital ,
- Advanced Manufacturing (including connections to Environmental Technologies) and
- Financial and Professional Services (including business management).

The expansion of these sectors of the Knowledge Economy will also make an important contribution to re-balancing the city region economy and reducing its dependence on the public sector. In addition, the plan also highlights the opportunity to support the development of an increasingly efficient public sector across central and local government, the NHS and other public agencies and the attraction of further central government activities to the City Region.

NB Liverpool is a mercantile maritime city. The maritime ‘cluster’ cuts across all four transformational areas set out in 3.4. For the purposes of this Plan, the Shipping and Ports and the Distribution and Logistics areas are covered by the separate work on Liverpool SuperPort. Maritime Services are reflected in the Financial and Professional Services sector and Marine Engineering in the Advanced Manufacturing sector.

4.4 There is considerable convergence and complementarity between these economic sectors and the other economic platforms where the development of high-value businesses and jobs will be crucial to the delivery of key objectives. Knowledge-intensive industries and knowledge workers will, for example, be integral to achieving the City Region's ambition to become the biggest low carbon goods and services city region economy in the UK.

4.5 Growing the knowledge economy demands an effective supporting environment. Engaging with businesses to understand and anticipate skills demands will be crucial, as will the delivery of high-quality public realm for both business and leisure. More broadly, the development of a cohesive brand for the city region as a major science and knowledge base will be fundamental to positioning Liverpool within the broader UK and international context. This will be most effective when meshed with the ongoing, broader programme of establishing Liverpool's destination brand.

4.6 This KEP also identifies a series of cross-cutting enabling activities in support of the vision, ambitions and development of the key knowledge economy sectors:

- Innovation for Growth
- Education and skills
- Physical and digital infrastructure
- Branding.

4.7 By focusing on key sectors and the broader environment for high-value growth, the KEP aims to make a significant contribution to Britain's ambition to be a world leader in the key global sectors of the future. Led by the Local Enterprise Partnership, partners will work together to implement its actions, which are geared towards attracting inward investment, enabling high value growth and creating jobs to sustain and secure the City Region's future economic competitiveness.

4.8 The actions set out in this Plan require a co-ordinated approach and alignment of effort across sectors and spatial levels. Whilst the knowledge economy will be central to accelerating the performance of the city region and increasing its competitiveness and productivity, this Plan should not be interpreted as an overarching economic strategy for the city region.

4.9 This KEP is, rather, one crucial strand within the city region's broader objective to increase the scale of activity in the economy by creating more jobs, growing the business base and raising productivity. The KEP will make a significant contribution to the delivery of all of the City Region's key indicators: more jobs, higher-value business opportunities, more investment, greater innovation, higher quality of life for residents and lower carbon emissions.

4.10 Although the recommendations for action in this KEP are confined to the five sectors referred to in 4.3 above, the plan also briefly summarises the position in respect of the development of the SuperPort and the Low Carbon economy, as both of these transformational actions are essential ingredients in the development of the city region's knowledge-based economy. (See appendices 3 & 4).

4.11 In preparing this plan over a tight timeline, the decision was taken at the outset to work on the basis of known and published information coupled with some additional background work commissioned by Liverpool Vision. However, as the KEP evolves and is developed further in the future, it will be necessary to improve the evidence base and to put in place arrangements to analyse and report on the development of the city region's economy on a time series basis, both overall and by sector.

4.12 This KEP has been prepared over a period of great change in the national political and economic context. The new coalition government has brought substantial change to the context within which the plan has been prepared both in terms of its developing economic policy and the radical action being taken to deal with the budget deficit. In addition, there is uncertainty over the organisational architecture within which economic development and regeneration is to be supported and facilitated nationally, regionally and sub-regionally. The KEP is, therefore, primarily concerned to highlight areas of action which are needed to assist economic growth.

5. Economic analysis

5.1 The data

5.1.1 Producing robust data for the purposes of the Knowledge Economy Plan has proved challenging as standard definitions of sectors using SIC codes focus upon *what* goods and services organisations produce. By defining the Knowledge Economy as one based on the successful input, application and exploitation of the most relevant, up to date knowledge into the development of goods and services, the focus of data capture should move towards presenting an understanding of *how* products and services are fabricated and delivered.

5.1.2 Existing systems are not currently sensitive to this distinction. This means that the data presented here constitutes an imprecise picture, which is likely to overestimate the current state of maturity of the city region’s knowledge economy. Whilst providing a general overview and suggesting some broad trends, figures should therefore be treated with a degree of caution.

5.1.3 Effective intelligence-gathering and analysis will be crucial to the city region’s capacity to grow a competitive knowledge economy. The KEP, therefore, supports the proposal in the LEP submission for a streamlined policy and intelligence function to provide the necessary intelligence for future economic growth.

5.2 Current shape of the Liverpool City Region economy

5.2.1 With a resident population of 1.5m, the city region’s employment base makes a GVA contribution of c.£19bn, accounting for some 17% of the North West’s total GVA. Around this area lies a broader functional area covering Warrington, Chester, Ellesmere Port and Neston, Vale Royal and extending out to North Wales (Flintshire, Wrexham) and West Lancashire (Skelmersdale).

5.2.2 With 441,100 residents, Liverpool is the fifth largest city in England by population. 227,230 jobs are located there, making it a major centre of employment opportunities in the city region and one of the North West’s two economic drivers. Liverpool contributes around 40% of the total GVA for the city region.

Table 1 Liverpool City Region Economy

	Population	Employment¹	GVA (£bn)
Halton	118,500	51,946	2.1
Knowsley	149,700	56,398	1.8
Liverpool	441,100	227,230	7.2
Sefton	274,200	90,766	2.0
St Helens	176,700	61,063	2.8
Wirral	308,500	96,256	2.9
Liverpool City Region	1,468,700	583,660	18.9

Source: Cambridge Econometrics

¹ Employment statistics in this and all further tables in the KEP correspond to data produced for ABI - workplace

5.2.3 A recent Northern Way report² identified the city region as having a polycentric structure. Many residents in the city region commute to Liverpool for employment (e.g. 26% of working residents in Sefton; 13% in Wirral). Halton has been characterised as being 'independent' from Liverpool to a degree, given the relative quality of its business base, including key knowledge assets such as The Heath and Daresbury Science and Innovation Campus. The report noted that changing patterns of sectoral specialisation meant that Sefton, Wirral and Halton in particular had more potential to create complementary links with Liverpool.

5.2.4 Nevertheless, the city region exhibits complex underlying economic relationships and linkages:

- Liverpool is the economic, commercial, cultural and transport hub of the City Region and home to the Liverpool Knowledge Quarter.
- Sefton provides the primary port on the River Mersey (Seaforth) and the classic resort of Southport
- Halton, home to Daresbury SIC and The Heath, underpins science and technology within the city region
- Wirral complements Liverpool as the maritime centre of the North West, has important private sector R & D strengths, and provides an important interface with surrounding economic areas (e.g. Ellesmere Port, Chester and North Wales)
- Knowsley and St. Helens provide key infrastructure in terms of the labour market, investment locations and the business base.

5.2.5 **The value of the total city region economy increased by 4.8% between 2006 and 2009. The growth over this period was faster than that of the North West (4.6%). Business density grew from 19.6% in 1997 to 24.3% in 2007.**

5.2.6 Data from the Betamodel database suggests that the business base in the city region increased throughout the recession period, growing from 45,900 in April 2007 to 49,000 in April 2009. However, in July 2009, analysis suggested that 16% of city region firms were classified as being at maximum risk with another 9% defined as high risk; this compared to 14% and 8% respectively in the North West. Of note for the Knowledge Economy, sectors with high/maximum risk ratings included aviation and creative and digital industries. Similarly, the proportion of businesses reporting that they were operating at less than full capacity has continued to grow rather than decline.

5.2.7 The employment rate in the city region stood at 63.3% in 2007, a 4.8% increase on 1999 figures. There has also been growth in the number and proportion of residents who are self-employed. 62,700 people were self-employed in 2008.

5.2.8 Despite certain improvements, GVA per head remains low at £12,869; the UK average is £19,951. The City Region's low levels of productivity affect its competitiveness and are a key factor in its poor economic performance.

5.2.9 The key sectors of the Knowledge Economy (including low carbon for the purposes of this overall analysis) contributed some 44% of the City Region's GVA in 2007 compared to 33% of all employment in 2008. In the past decade, these sectors have accounted for a significantly greater percentage of job growth than other areas of the economy.

² Northern Way (2009) City Relationships: Economic Linkages in Northern city regions – Liverpool City Region

GVA Sector Total	Liverpool City Region
Advanced Manufacturing	£2,085.8m
Low Carbon	£344.6m
Financial and Professional Services	£4,310.2m
Creative and Digital Industries	£1,436.8m
Life Sciences	£201.4m
Total	£8378.8m

Table 2: Estimated GVA contribution of key Knowledge Economy sectors³ in 2007

Sector	1998		2008		% change 1998-2008
	Jobs in LCR	% of all jobs	Jobs in LCR	% of all jobs	
Advanced Manufacturing	47,101	8.6%	34,589	5.9%	-26.6%
Low Carbon	6,864	1.2%	6,172	1.1%	-10.1%
Financial and Professional Services	44,887	8.2%	71,166	12.2%	58.5%
Creative and Digital Industries	23,074	4.2%	23,724	4.1%	2.8%
Life Sciences	47,743	8.7%	57,110	9.8%	19.6%
Total	169,669	30.8%	192,761	33.0%	13.6%
All jobs	550,388	100.0%	583,660	100.0%	6.0%

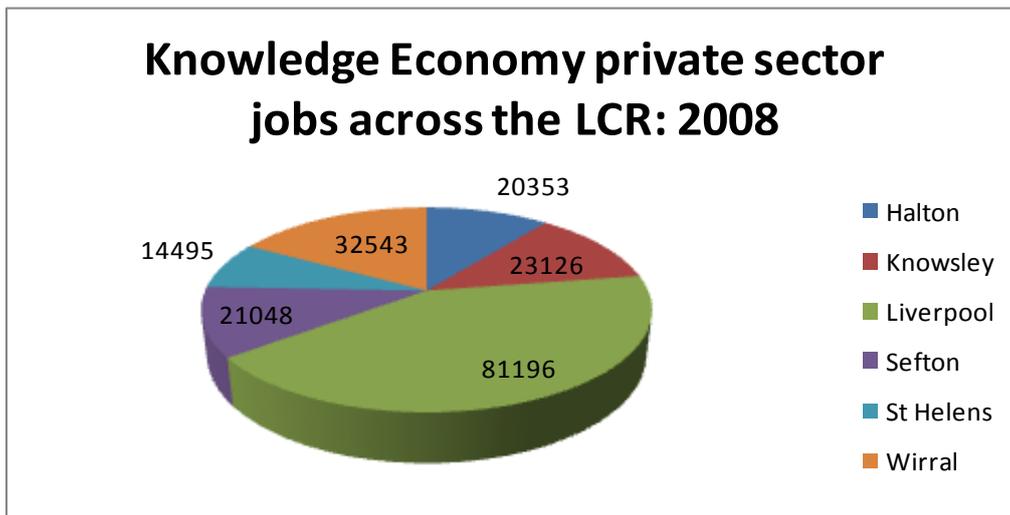
Table 3: Job Growth in the Liverpool City Region Knowledge Economy 1998-2008⁴

The Public Sector contributed £3,846.8m in terms of GVA in 2007. Employment increased by 15.9% from 1998-2008, with jobs rising from 144,896 to 167,947 during this period.

5.2.10 Whilst the total number of jobs in the city region increased by 6% between 1998 and 2008, those in the Knowledge Economy (including Low Carbon) grew by 13.6%. During this period, the number of jobs in some sectors, notably Financial and Professional Services (FPS), increased significantly (58.5%). Although overall employment in Advanced Manufacturing declined, it remains a sector of major importance with only FPS and Life Sciences employing more people. Employment levels around Low Carbon and Creative and Digital Industries remained broadly constant in relation to the overall economy and there remains a concentration of significant knowledge assets in these areas.

⁴ The data presented in Table 3 and the remainder of section 1 has been created using codes relating to the SIC 2003 coding system. Appendix 11 sets out which codes have been used for each of the priority sectors set out in this Knowledge Economy Plan. All data has been sourced from the 2008 Annual Business Inquiry, ONS Crown Copyright, from Nomis. It is highly likely that the data here overestimates the level of 'knowledge economy' activity in the City Region as it looks at *what* businesses and jobs fall under a particular SIC code rather than *how* they function.

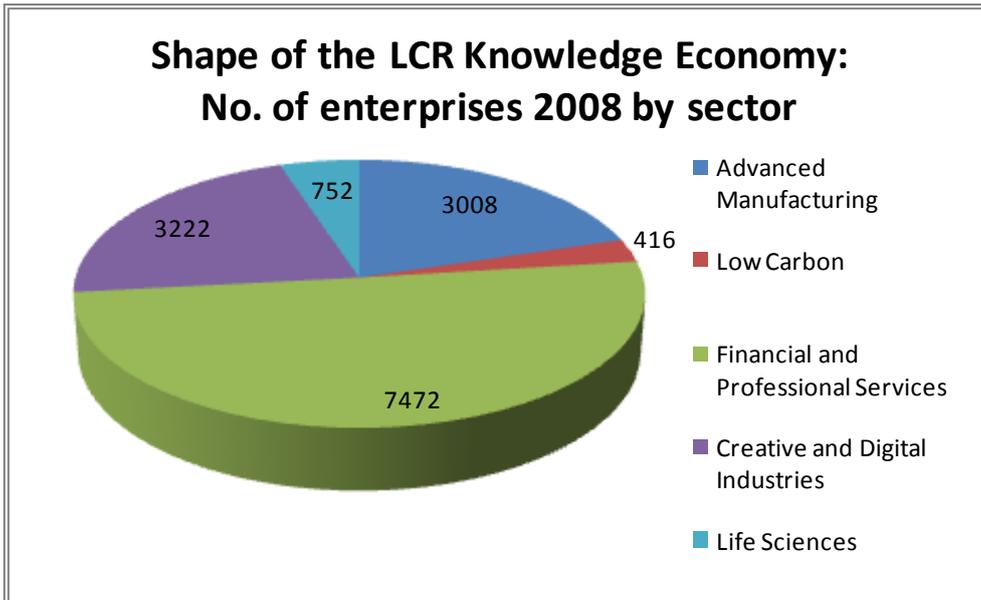
5.2.11 In terms of the current distribution of private sector knowledge economy jobs, analysis reveals that whilst there is a notable concentration of activity in Liverpool, there is a balanced spread of employment across the City Region. Wirral accounts for the second highest percentage of jobs (16.8%), whilst Halton is the location for one of the most significant Knowledge Economy assets in the city region – Daresbury Science and Innovation Campus. In Knowsley, knowledge economy jobs increased by 58.3% between 1998 and 2008. This was due to significant growth in FPS, Life Sciences and Creative and Digital Industries. By means of comparison, Liverpool recorded an increase of 22.2% over the same period.



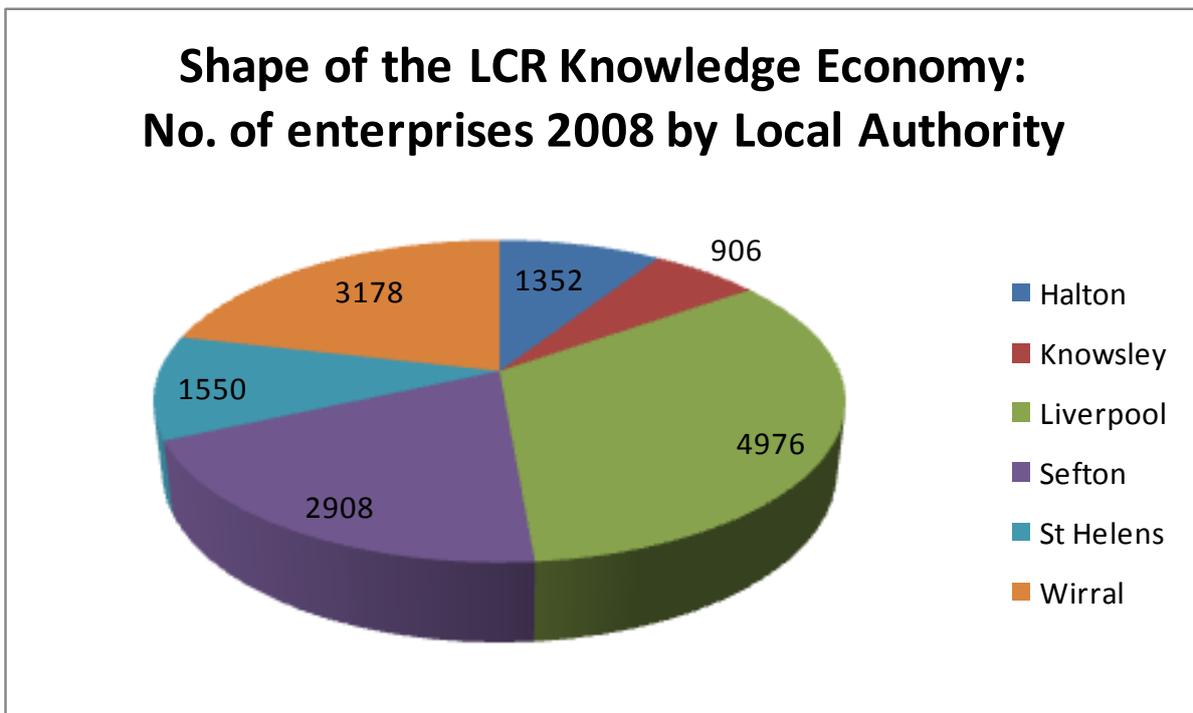
A similar picture emerges with regard to public sector employment, where Liverpool accounts for 42% of jobs and there are notable secondary clusters in Sefton and Wirral.

	Public sector jobs
Halton	9667
Knowsley	12299
Liverpool	70382
Sefton	34081
St Helens	15644
Wirral	25874
Liverpool City Region	167947

5.2.12 **Knowledge Economy – enterprise development:** The FPS sector, which comprises a large number of micro-businesses, accounts for a significant number of all knowledge economy private sector businesses (50%) across the City Region. Whilst there are comparatively few enterprises in Life Sciences, it is estimated that more people work in producing pharmaceuticals in Liverpool than in any other European city.



5.2.13 In terms of the distribution of enterprises, there are notable concentrations of activity in Liverpool (34% of all businesses), Wirral (21%) and Sefton (20%). Although there are a lower number of enterprises overall in Knowsley, Halton and St Helens, there are ‘hotspots’ of Knowledge Economy activity in each area around Advanced Manufacturing, Life Sciences and Low Carbon respectively.



5.2.14 **Knowledge Economy – skills development:** The percentage of working age residents with NVQ Level 2 stood at 63.8% in 2007; a 4.5% increase from 2001. At NVQ Level 4, a 2.8% increase was recorded over the same period with 23.3% of the working age population having this level in 2007. However, despite these improvements, LCR remains behind the UK average at both levels.

5.2.15 LCR's student population grew by 4,000 between the 2005/6 and 2006/7 academic years. Liverpool John Moores University (LJMU), the University of Liverpool (UoL) and Liverpool Hope University currently attract 53,000 students; a further 34,000 study at the Universities of Chester and Edge Hill.

5.2.16 The Employment and skills strategy for the city region focuses on the need to ensure that there are the skills available to match the changing requirements of the evolving economy. It will be important for the Employment and Skills Board to review the Strategy in the light of this plan.

5.2 Projected shape of the Liverpool City Region Economy

5.2.1 A recent study by Pion Economics and Cambridge Econometrics forecasted that, as with previous recessions, recovery will return more quickly in the core of the City Region. Projections indicated that Liverpool would be the driver for much of the growth in employment and GVA, although more so in the latter than the former. However, it was suggested that, whilst future growth would be more vigorous here, other areas in the city region would continue to have relatively higher levels of productivity, reflecting their mix of knowledge-intensive industries.

5.2.2 Nevertheless, the most probable projection is for a slow and fragile recovery, with the possibility of further retrenchment. Low productivity in the City Region caused, to a degree, by the lack of scale in the economy, remains an issue and reflects the predominance of low value-added industries as well as the lack of leading-edge businesses and headquartered corporations. Increasing productivity has, therefore, been identified as a strategic concern for the City Region.

5.2.3 It is highly likely that there will be a period of jobless growth in the short-term, with pre-recession job levels unlikely to return, without intervention, until at least 2015. The precise length of this period will be determined by the broader national and global economic context.

5.2.4 The intended reduction in public sector spending will have a notable impact upon the private sector via a reduction in public sector procurement of goods and services. More broadly, the constrained economic environment will make it significantly more difficult to tackle the deep-rooted structural weaknesses in the core of the city region.

5.2.5 Whilst forecasts have identified the potential for substantial growth in jobs in the medium-to-long-term, a concerted shift in strategy towards higher value activities will be required in order to boost productivity relative to that of the UK, allied with improved business performance. If no action is taken, projected job growth will have no significant impact on productivity although it will, importantly, help to reduce unemployment in the city region's many disadvantaged communities. Attracting high value-added employment is viewed as necessary to support sectors which can be the source of initial employment opportunities for the less skilled. The current economic context means that projects with the potential to generate the greatest economic impact, particularly those leading to larger-scale, high-value activity, need to be prioritised. Without these, the prospects for closing the GVA gap with the wider region and UK are likely to be limited.

5.2.6 It is anticipated that there will be a continued reduction in the City Region's manufacturing base. However, productivity is generally higher in this sector than others and it remains a major knowledge-intensive employer (see Table 3). Furthermore, GVA is projected to increase by £0.6bn, according to the baseline scenario produced by Cambridge Econometrics. In the CBI Industrial Trends Survey (October 2009), 10% of manufacturing firms were more optimistic about the overall business situation than three months earlier – the first improvement since April 2007.

5.2.7 Nevertheless, the projection for advanced manufacturing means that the city region must also focus on other Knowledge Economy sectors in order to continue overall productivity improvement. It is anticipated that between 60% and 70% of new jobs will be in managerial, professional and associated professional occupations. These higher-value occupations will require higher and intermediate level skills.

5.2.8 The baseline projection produced by Cambridge Econometrics forecasted that GVA change from 2008-30 would be £3.1bn for Finance and Business Services and £3bn for Public Services. The overall risk rating for Financial and Professional Services was marginally higher than that for the North West, with Knowsley having a significantly higher rating than the rest of the city region.

5.2.9 Creative and Digital Industries also had a high risk rating. This profile was skewed with significantly higher risk ratings attached to Liverpool and Knowsley. Future prospects are dependent on the future direction of third parties with key areas of demand for the sector, notably design, public relations and advertising.

5.2.10 Analysis conducted by Cambridge Econometrics concluded that the Life Sciences sector would remain stable over the next 6-12 months, whilst noting concerns at the prospects for infrastructure development. The prospects for the maritime and SuperPort sectors were viewed as positive, especially in the light of exchange rate movements and anticipated growth in volume.

5.2.11 The Low Carbon sector (see appendix 4) has not shown any evidence of being affected significantly by the recession. Envirolink forecasts indicate 2008/9 growth at 4.4% for the overall sector, with the anticipation of improved performance of up to 5.8% p.a. by 2014/5. The national and global policy emphasis on low carbon means that the general outlook for the sector is highly optimistic.

5.3 Understanding the city region's economic base

5.3.1 A lack of effective, consistent local intelligence at city region level has been identified as a matter of pressing concern. Issues raised include a lack of data to examine the path of the current recession and to compare it with previous recessions, notably the lack of clarity surrounding where job losses have occurred. It has similarly been acknowledged that a better understanding is urgently needed of both the underlying reasons for poor productivity and future demand for higher level skills. Intelligence on the dynamics of the business base, whilst improving, is also judged to be limited. Such tools would clearly benefit the ongoing implementation and review of the Knowledge Economy Plan.

5.4 The national policy environment

5.4.1 The KEP is being prepared during a period of radical public policy reform and public funding austerity. The Coalition Government's priorities of reducing the national deficit and of driving growth are inter-linked and interdependent. The emerging new model of more balanced and sustainable growth has, as its central aim, a larger and more dynamic private sector, with more business investment. Reliance on debt and on growth driven by the financial services must now be replaced by increasing foreign exports. The focus of policy must be on the UK's strengths in the global marketplace – for example, in design, creative industries and innovative manufacturing and in making the transition to a 'greener' economy.

5.4.2 Making the most of the UK's scientific excellence, so that innovation becomes a motor for long term growth and change, is central in the Government's 'Strategy for Sustainable Growth'⁵. In this context, the city region has much to contribute to UK Plc's new growth agenda through the realisation of the significant opportunities and potential for knowledge, creativity and innovation identified in the Knowledge Economy Plan.

5.4.3 The Sustainable Growth Strategy is built on three inter-linked areas: promoting the efficient operation of markets to support growth; smarter public and private investment in the economy, including a highly skilled workforce; and encouraging entrepreneurialism and individual engagement in the economy to support growth.

5.4.4 Government analysis identifies the growth of emerging economies as massive opportunities for the UK. The removal of barriers to global trade is the cornerstone of the growth strategy opening up even greater potential to earn the best possible returns on areas of high-value capability in which the UK has a competitive advantage.

5.4.5 In the immediate term Government investment and intervention in the economy will have a sharper focus – necessarily more limited in scale – on those aspects of the country's productive capacity which are absolutely essential to growth, which tackle market failure or in which there is current under-investment. Future priorities for public investment include higher education, science and innovation.

5.4.6 A highly educated and skilled workforce is an essential component of the UK's growth potential. It contributes directly to the creation of high-value goods and services within a knowledge-based economy, delivering high-quality public services. The Government plans to expand the apprenticeship programme and to provide incentives to encourage take-up of training in priority areas. A growth and innovation fund will support sector-based joint investment with employers in high growth and dynamic areas of the economy. The Independent Review of Higher Education has led to a review of funding and student finance. Considerations include: the need to increase social mobility and attract more students from disadvantaged backgrounds; the impact of student debt; ensuring a properly funded university sector; improving the quality of teaching and advancing scholarship. The implications of the Browne Review and Government's subsequent decisions are still being assessed.

5.4.7 Investment in science, research and innovation is essential to the UK economy because new products, services and processes will be the major source of growth in the long term. Research investment supports skilled workers, delivers improvements to existing businesses and creates new ones based on novel products and services. UK R&D is a magnet for inward investment. For these reasons Government intends to continue to fund the best science and research. Whilst respecting the independence of the Research Councils and universities, Government will seek to make investment work harder, particularly to strengthen absorptive capacity. The Government has recently announced its intention to consult businesses later this year to review the taxation of IP (including the 'Patent Box' proposal by the former government) and R&D tax credits for innovation, following the publication of the report 'Ingenious Britain' by Sir James Dyson in March 2010. The outcome could be of particular value to the development of Life Sciences and other key sectors in the city region.

5.4.8 With the goal of capturing a significant share of high-value activity in large global markets in mind, Government intends to articulate a long-term commitment to research, to ensure access to

⁵ Department for Business Innovation and Skills; 'A Strategy for Sustainable Growth', July 2010.

finance for high-tech companies and incentivise business investment in innovation. Important components of the growth strategy will include continuing support for collaboration between universities and building relationships between institutions and businesses which foster knowledge exchange.

5.4.9 Innovation policy will focus on realising the benefits of better links between key institutions and activities, for example, between universities, enterprise, skills and access to finance but also from maximising the benefits of public investment, better co-ordinated use of regulation and public procurement. Government will also look at what facilitating role it can play in developing a network of innovation infrastructure and supporting innovation for more effective public sector services.

5.4.10 Of equal importance and relevance to the KEP is Government's intention to look at the further opportunities for the UK's existing strengths, recognising the fast-changing nature and patterns of global demand. In practical terms, Government has also decided to support the development of Technology and Innovation Centres which provide a bridge between universities and business. A clear and accessible intellectual property framework will also be rolled out.

5.4.11 Manufacturing is identified as a major driver of growth. A Manufacturing Framework will be published later in 2010 to address constraints such as access to finance and weak intermediate technologies and engineering skills.

5.4.12 The growth strategy gives particular emphasis on strengthening the conditions in which enterprise can flourish and businesses can grow. Of particular importance for the KEP are proposals for a more collaborative approach to business growth through partnership work with business and encouragement for businesses to work together to remove barriers in specific markets and sectors. Exemplars include the Automotive Council and similar national sector or cluster organisations. The establishment of private sector led Growth Hubs is also under active consideration by DBIS.

5.4.13 A key element of the reform plan are major changes in the institutional landscape. The existing layer of regional organisations including RDAs, Government Offices and other regional bodies will cease to exist by April 2012. Functions currently organised and delivered at the regional level will move either up to Whitehall, at least for planning and overall management, and down to Local Enterprise Partnerships (LEPs) – voluntary business-led partnerships with local authorities and others. LEPs will have the opportunity to play a role in 'nationally significant' activities such as innovation, sector development and inward investment and it will be very important for the city region LEP to secure significant devolution of powers in all these areas. The role of bodies such as the Technology Strategy Board will become more important. Public sector funding is being reduced and the delivery of services is likely to be the subject of more competitive bidding in order to secure better value for money.

5.4.14 In summary, national policy is broadly supportive of the opportunities and potential identified in this KEP, albeit in the context of severely limited public funding. Devolution to LEPs opens up the possibility of a much greater role for city regional partners in determining priorities for action. Equally, the considerably fiercer competition for public investment and, indeed, for a role in national innovation and sector policy will require strengthened leadership, strategy and delivery capacity between the key knowledge economy partners. Perhaps most importantly, the principles of Coalition policy are clear and well understood. The details – including many material issues – remain to be developed. The KEP can play a major role in the contribution which the city region makes to Government in helping to shape the new sustainable model of growth in the immediate future.

CHAPTER 2

KNOWLEDGE ASSETS

CHAPTER 2: KNOWLEDGE ASSETS

The Liverpool City Region has a significant array of knowledge assets, ranging from individual institutions/organisations to geographical concentrations. These form the essential building blocks to drive forward future growth of the city region's knowledge economy. They contain a significant percentage of the city region's skills and expertise whilst supporting the networks which connect these to national and international market opportunities. The principal assets are described briefly below and the chapter closes with a short overview of some of the major knowledge-intensive private sector players.

1. The University of Liverpool

The University of Liverpool (UoL) is a research-based university with 18,000 students pursuing over 400 programmes spanning 54 subject areas. Its 3 faculties – Health and Life Sciences, Humanities and Social Sciences, and Science and Engineering – are organised into 35 departments and schools. Turnover for 2008/09 was £364 million, including £130 million for research. 5,000 people work at the University, including nearly 1400 academic and 800 research staff.

The University is a member of the Russell Group and is ranked by The Times as the UK's 14th largest research university, with a top ten rating for research productivity and industrial grant income. It has over 2,000 research projects in progress in fifty research centres and is a centre of excellence in many disciplines, including engineering, medicine, business and law.

In 2008, 68.8% of the University's students achieved a first or 2:1 classified degree. Course development is strongly informed by industry and professions and, in the most recent survey, 95.6% of graduates were engaged in employment or further study. A partnership with Laureate Inc. has enabled the University to support lifelong learning and become Europe's leading supplier of online postgraduate programmes. Over 3,545 students from 140 countries now study for a University degree online with this number expected to exceed 8000 in the next four years.

The University has significant international reach with a global network of 150,000 alumni, living in 159 countries. 20% of the University's current students come from outside the UK and it is expected that this figure will exceed 25% by 2014. Its research collaborations extend worldwide and address many of the most pressing global challenges across medicine and veterinary science, technology, science, engineering and social and environmental sciences.

Working in partnership with Xi'an Jiaotong University in China, the University has created Xi'an Jiatong-Liverpool University (XJTLU) on Suzhou Industrial Park, where 77 Fortune 500 companies are located. XJTLU currently has 2500 students registered on fourteen different programmes in the fields of science, engineering and management. Its student population is expected to more than double in size to 5400 by 2014 with many students spending a year in Liverpool.

A Liverpool Laureate network has also been established, which includes institutions in Madrid, Mexico, Chile, Peru and Istanbul. The network will increase student flow and create opportunities for students to study for a university degree with options for periods of study in Liverpool.

In partnership with Kaplan International Colleges, the University has established Liverpool International College, which offers Foundation Certificates and Graduate Diplomas to international students preparing to study at the University. It currently caters for 750 students per annum from over 43 countries with this figure forecasted to exceed 1000 in the next 4 years; on average 42% of students progress to academic programmes at the University.

The University of Liverpool has a successful track record of harnessing its knowledge, expertise and equipment to help commercial and public sector organisations meet the challenges entailed in innovation. In the USA, the University is forging collaborations with a number of Higher Education providers in and around Atlanta, Georgia, which is also a focus for city region collaboration around related knowledge transfer and economic development programmes.

Knowledge can be exchanged via people, tangible products and processes and a variety of more abstract forms, such as data and algorithms. The University of Liverpool deploys a wide range of mechanisms to foster knowledge exchange – for instance, enabling students to undertake projects or placements within the curriculum, encouraging staff to make their expertise available to government advisory groups and promoting the public understanding of science through public events.

In 2008-09 the University engaged with business via research, business and community services such as consultancy and CPD, regeneration and development programmes and the licensing of intellectual property. These interactions generated a combined income of £43.3m for the University, and the businesses involved contributed a further £22m from their own resources - bringing their combined investment in knowledge exchange to over £65m in a single year.

More specifically, the University was engaged in collaborative research (co-funded by government and business) with UK-based businesses on projects costing £16.7m, and with businesses across Europe on projects costing over £18.9m, bringing the total for the year to £35.7m. The University attracted contract research commissions worth £13.6m, with many clients placing multiple contracts with the University. Examples include 29 commissions from a single pharmaceutical company and thirteen from a single household products company. In the same period, the University provided consultancy services worth £9.1m; facilities and equipment-related services totalling £2.1m; and over £1m worth of courses for businesses and other organisations.

2. Liverpool John Moores University

Founded in 1825, LJMU is now one of the UK's most dynamic and progressive universities. The tenth largest university in the UK, LJMU has 25,900 students in Liverpool plus a further 4,500 students enrolled on accredited LJMU courses around the world.

The University has around 2,700 staff and is organised into six academic Faculties with supporting professional services under the remit of six Pro-Vice Chancellors. Annual turnover is approximately £180m. Core HEFCE research income funds are strategically deployed within LJMU to support world-leading research and the rate of growth of external (non-HEFCE) research income in recent years remains the highest of NW universities and amongst the highest in the UK overall (well ahead of the sector average of 7%).

In the ten year period 2003 – 2013, the University will have completed a £180m capital development programme, including the £30m Art and Design Academy, which opened in 2009 and, this year, has already won the prestigious RIBA award as well as the World Architecture News Best Educational Building prize.

Further specialist buildings have been created including the Tom Reilly Building, which opened in 2010. This £25.5m science centre for the School of Sports and Exercise Sciences and the School of Natural Sciences and Psychology, has outstanding facilities including appetite laboratories, psychology testing labs, neuroscience labs, an indoor 70-metre running track, physiology suites, a

DEXA scanner for measuring body fat, muscles and bone density, a driving simulator and a chronobiology lab. In addition, a £37m development is taking shape at the Clarence Street site for the Faculty of Business and Law, the Screen School and a new Professional Centre incorporating The Automatic, the University's unique creative facilitation space, which designs and delivers bespoke training events for organisations from the public, private and third sectors. The six-storey Clarence Street building will transform the area and provide a gateway to Liverpool's Knowledge Quarter.

In 2007, LJMU launched its World of Work (WoW®) initiative, a globally unique approach to higher education based on extensive research on what is required from a university and its graduates in the 21st century. Now firmly embedded, this new model of higher education places industry and employer engagement at the heart of the student experience, delivers ground breaking research that has real impact on the economy as well as on the lives of ordinary people, and ensures that commercial thinking and good management practice influence all decision-making.

Employer engagement – internationally, nationally and regionally – is central to WoW and representatives from organisations such as the IoD, the CBI, Marks and Spencer, Sony, Ford and the NHS sit on its Employer Advisory Board. WoW is incorporated into every degree, ensuring that all LJMU students gain eight transferable graduate skills and complete work-related learning alongside their academic studies. In addition, all students are encouraged to have their higher-level 'world of work' skills verified by employers by the time they graduate.

LJMU understands that the creation of sustainable graduate businesses is a key facet of the knowledge economy and established the Student Enterprise Team in 2003 to support students and graduates to develop and apply enterprise skills. The team train and support over 1200 students per year in both in- and extra-curricular activities. It also partners with Young Enterprise to create thirty student teams per year working on business proposals. The team have become leaders in the field and created an innovative 'Enterprise Fellows Programme' that has enabled over 130 graduates to receive a training bursary, establishing over 100 new enterprises. This is underpinned by an accredited module in graduate development at Masters level. LJMU is unique in HE having appointed a full-time, accredited business adviser to meet rising demand from students. It has a growing Start-Up network with over 900 members, which uses social networking to connect new student entrepreneurs with more established mentors from the local business community.

The Economic Challenge Investment Fund was launched by HEFCE in January 2009 to enable universities to respond rapidly to the needs of employers and individuals during the economic downturn. LJMU secured £385,000, which was matched-funded by the University, and the Graduate Accelerator Programme (GAP) was launched in April. Open to all graduates living in Merseyside, this two-pronged programme focused on two core groups: fledgling businesses started by graduates and graduates looking for employment.

The businesses represented on the Graduate Accelerator Entrepreneurship Programme reflect the diversity of talent in the region: film production, interior design, outdoor education and a dance studio. The related Graduate Accelerator Programme has so far enabled over 200 graduates in the region to engage in an intensive skills-related activities programme to boost their employability. Networking lunches with employers also provide contacts and insider information on what the different sectors of the economy are looking for in today's graduates.

In 2009, LJMU conducted research with Malaysian employers who reported that the LJMU graduate skills and higher level WoW skills are required by Malaysian graduates in order to be competitive job applicants. As a result, LJMU is now piloting WoW in Malaysia's largest public university UiTM (Universiti Teknologi MARA), home to almost 120,000 students. Over the next twelve months, staff

from LJMU will take a group of students through the WoW certificate and develop it across the whole institution with senior managers.

As well as an established presence in South East Asia – the University has an office in Kuala Lumpur and has been working with partners in the region since the 1950s – international commercial activities have been grown in recent years with bespoke contracts in Shanghai, India and Libya as well as with professional organisations such as FIFA. An innovative contract has been developed with the Saudi Ports Authorities to deliver professional maritime training to its employees, leading to diplomas in Port Operations, Local Pilotage and a degree in Marine Science.

LJMU's world-leading research strengths include Sport and Exercise Sciences, recognised as 'being amongst the very best departments in the world', the Astrophysics Research Institute, which owns and operates the Liverpool Telescope and is ranked in the top 1% world-wide for space science research, and General Engineering, which for twenty years has been at the forefront in ground breaking research. In addition, its influential 'think tank', the European Institute for Urban Affairs, is shaping the way that government agencies and partnerships think about their cities and plan for their development; the Centre for Public Health has been designated a World Health Organisation Collaborating Centre for Violence Prevention.

Recognised for its revolutionary best practice in governance, leadership and management, LJMU is the first and only university to have adopted the EFQM European Excellence Model as a framework for planning and management across the institution. This has enabled the Institution to evolve into a forward-thinking, modern, commercially-aware university, with sound leadership, a clear and unambiguous strategic plan, and an effective human resource strategy. LJMU is currently the only university in Europe to have won a business excellence award under the EFQM framework.

3. Liverpool Hope University

Liverpool Hope University is a research-informed, teaching-led Ecumenical university with 7500 students pursuing a range of programmes across the arts, humanities and sciences. Almost nine hundred people work at the University, including 330 academic staff. Turnover for 2008/9 was over £50m.

The University is located on two campuses. The Education, Sciences & Social Sciences and part of the Arts and Humanities Faculties in addition to the main administrative departments and the Sheppard-Worlock Library are located at Hope Park. The Creative Campus in Everton is spearheading education and culture-led urban regeneration and is home to the creative and performing arts.

3.1 Liverpool Hope University's Core Commitment to the Knowledge Economy - Liverpool Hope's mission has been established through a history of over 160 years in the higher education sector addressing issues of widening access and social justice as well as a continued enhancement of its academic offer in both research and learning, and teaching and training primary and secondary school teachers. All of this has created a very special mission, which emphasises a social and ethical responsibility and has resulted in working with a wide range of SMEs and companies in the third and social enterprise sectors as well as some large employers in the North West. Liverpool Hope can play an important role in helping to create the right environment for a thriving knowledge economy via its Faculty of Education. This will help to raise aspiration amongst the city region's potential knowledge workers and improve standards in schools.

Liverpool Hope University recognises the importance of the knowledge economy as one of the key drivers for ensuring the continued growth of the Liverpool City Region and has, over the past five

years, made a considerable capital and revenue investment (£20m+) to ensure that it makes a meaningful contribution to this critical area of economic development.

This commitment to the knowledge economy comes from the most senior level and involves embedding employer engagement and enterprise activity right across the University community. This can be evidenced by the following examples:-

3.1.1 The establishment of a **Hope Business Gateway**, led by a senior manager of the University, Dr. Martin Carey, and a core team with the responsibility of being the first point of call for employers in the LCR for provision of support for embedding employer engagement into the community of Hope University.

3.1.2 Embedding knowledge economy activity into university faculties through the designation of seventeen Enterprise Fellows with a specific remit to undertake activity which is related to knowledge transfer and to employer-related continuing professional development (CPD), defined by employers' needs. The University has also appointed Mr Ken Pye to act as an external ambassador for CPD in order to generate new opportunities and to reach a much wider network base. Finally, the University is committed to appointing, in Autumn 2010, three new posts in the three University Faculties with the specific responsibility for developing employer-related CPD together with a further nine members of staff across the university dedicating a third of their time to CPD development.

3.1.3 Supporting the creative and digital industries through the £30m development of the **Creative Campus** culminating in a £6m investment in the new **Capstone Building** (completed in March 2010) which received funding from both HEFCE and the NWDA to support employer engagement and regeneration activity as well as to impact on widening participation. The **Creative Campus** now has a designated suite of incubation areas utilised already by five new start-up businesses. In addition, this campus also provides a base for three creative industry companies: the European Opera Centre; Collective Encounters Theatre Company; and Milap, the South Asian cultural organisation. A three-year independent research and evaluation project has been set up with a specific remit to assess the impact of this initiative on the knowledge economy and disseminate good practice throughout the higher education sector.

3.1.4 Supporting finance and the business sector through the **Education, Innovation and Enterprise Centre**. This new £8m+ capital initiative was completed in October 2010 and houses the **Faculty of Education** and the **Hope Business Gateway team** with designated incubation space as well as a high-quality business quarter with conference and business support facilities. It has been designed in consultation with a number of business partners to ensure a highly business-sensitive environment. The new centre will also house **Urban Hope**, the University's award-winning regeneration arm, which is currently seconding its Chief Executive to provide 50% of his time to work with Chester & District Housing Trust, a leading North West housing trust, in a key knowledge transfer initiative related to regeneration in the housing sector. The new centre will also house: **Hope Solutions**, a dedicated team who work with employers to resolve their training needs; **PSS**, a successful social enterprise in the care sector; and a number of new start-up businesses. Hope's Business School will work closely with this initiative to continue to deliver innovative approaches to employers' needs, evidenced by its recent successful delivery of a Hope Business Recovery Programme which included an additional programme for BME companies. Many of the Universities activities are fundamentally supportive of the Big Society agenda

3.1.5 Hope's incubation strategy has been specifically designed to support start-up businesses formed by Hope graduates and those living in the immediate neighbourhood of the Creative Campus

in Everton. This involves locating incubation space close to related University curriculum areas and to staff in Art Design, Dance and Music. To support this strategy, the University introduced a successful O2 Graduate Enterprise Award Scheme last year. This scheme provides up to four awards for Hope Graduates setting up new businesses, this includes a £10k interest free loan, free incubation space for twelve months as well as bespoke business support. A Design graduate was one of the winners for entrepreneurship for her jewellery business. Finally, the University is to develop an enterprise undergraduate programme as part of its degree offer and give support for the development of a Student Enterprise Society. All of this aims to support the development of knowledge economy in the North West.

Plans for the future with a **Health, Care and Science Centre** seeking to address, equally, the need for growth in the third and social enterprise sectors to develop businesses which address the issue of health and care as well as addressing the critical issues relating to a shortage of scientists. This initiative involves an expansion of work with PSS to develop a national dementia centre of excellence and create an incubation centre for new businesses addressing health, care and science challenges. The centre will also provide desperately needed new approaches to developing education and training pathways for UK scientists. Hope University has a long-standing track record in education and training and is committed to utilising this knowledge base to inform the development of creating new scientists for the future. This development is being supported by Liverpool Vision, which is keen to showcase the development.

3.2 University Faculty activity in the knowledge economy – research and teaching - The University's Research strengths are based on a long tradition of working with a wide range of employers and include:-

- Computer Science and Informatics
- Social Work and Social Policy Administration
- Education
- Drama, Dance and Performing Arts
- Music
- Politics and International Studies
- Business Management
- Health and Care
- Corporate Responsibilities

The University also has three research institutes in India – The Bishop Heber Institute for Applied Social Sciences (in Tamil Nadu), the Hope-Bangalore Institute for Business, Management and Leadership and the Institute for Research into Education and Society (in Mumbai). The city region should make maximum use of the university's strong ties with India in order to promote the city region in that country and expand trade and inward investment.

4. The Royal Liverpool and Broadgreen University Hospitals Trust (RLBUHT)

RLBUHT is one of the largest teaching hospitals in the North West of England and traces its history back to 1745 when The Liverpool Infirmary was founded in 1745 on the site of what is now St George's Hall.

The Trust has an annual income of £400 million and is a major local employer contributing significantly to the local economy with over 7,000 staff (5,500 WTE) as well as 1000 staff who work in shared services or for a sub contracted service e.g. catering. Approximately 230 medical consultants are employed by the Trust and many of these have honorary senior lecturer contracts with the University of Liverpool.

The Trust provides a full range of medical, surgical, diagnostic, rehabilitation and therapy services and there are one million patient contacts every year in its three hospitals. Several nationally and internationally recognised services are provided such as ocular oncology, pancreatic surgery, gastroenterology and pathology. The Trust's range of specialist services is provided to people across the North of England; it is a regional centre of excellence for nephrology, renal transplantation, nuclear medicine, haematology, lithotripsy, vascular surgery, tropical and other infectious diseases and dental services. The Trust is a regional cancer centre for pancreatic, urology, haematology, ocular oncology, testicular, anal, oesophago-gastric, specialist palliative care, specialist radiology, specialist pathology and chemotherapy

The majority of patients are cared for at the Royal Liverpool University Hospital, where emergency and the majority of specialist services are based. In addition, specialist services for older people are provided at Broadgreen Hospital which is also the base for elective surgical care in the new surgical centre.

With well established links with both the University of Liverpool and Liverpool John Moores University, the RLBUHT is one of the country's top teaching hospitals. Each year it provides a large number of placements for student doctors, dentists, nurses and allied health professions and there are currently in excess of 200 undergraduate medical students receiving training at its hospitals. The Trust takes its commitment to the training and teaching of students seriously and is proud of its status and its links with local universities and colleges.

The Research & Development Department is a central corporate function within the Trust and the Trust is unique in England in having two National Institute Health Research funded departments; a Biomedical Research Centre for Microbial Disease (with UoL and LSTM) and a Biomedical Research Unit for Pancreatic Disease (with UoL). The Trust opened a Clinical Trials Facility in 2009 and hosts the Liverpool Experimental Cancer Medicines Centre and the Comprehensive Local Research network for Merseyside and Cheshire. The Trust actively engages with many large and small pharmaceutical, biotech and medical devices manufacturers and Commercial Research Organisations including AstraZeneca, Bristol-Myers Squibb, Pfizer and GSK.

Notable University collaborations include the Cancer Research UK Clinical Trials Unit, Centre for Medical Statistics and health Evaluation, Clinical Trials Research Centre and the medical Research Council North West Hub for Trials Methodology Research.

The Trust is planning a new hospital to replace the existing Royal Liverpool University Hospital. This is being planned with 100% single bedrooms – the first major hospital in the country – and best in class performance both clinically and environmentally. The new hospital – through demolition of the existing - will enable the development of a BioCampus on site. This is ideally situated being co-located with the University in the heart of the Knowledge Quarter of the city and will build on the Trust's existing strengths in biomedical research and its clinical trials capacity and capability. Planning for a BioInnovation Centre is already underway and the target date for completion is 2013/14. (See also 2.4.4.5. Ch 3.)

5. The Wirral University Teaching Hospital NHS FT

The Wirral University Teaching Hospital NHS FT is an active member of the UK Clinical Research Network, established to support research and to facilitate the conduct of clinical trials and other studies across the UK. As part of the UK Clinical Research Collaboration, it works towards the development of a world-class infrastructure to support clinical research in the UK. The Trust has links with the following research networks:

- Cancer
- Dementias and Neurodegenerative Diseases
- Diabetes

- Medicines for Children, Primary Care and Stroke.

The Trust, along with the University of Chester, is pursuing the development of the **Clatterbridge Innovation Park**, focussing on the multiplicity of factors, services and products important to healthy living/healthcare and their management, for patients and non-patients alike. The Park will become the University of Chester Campus for health studies and related research and training. The Innovation Park will also provide an important focal point in Wirral for the development of its knowledge economy, further enhancing its contribution to the economy of the city region.

6. The Aintree University Hospitals NHS FT

The Aintree University Hospitals NHS FT is a centre of excellence for multi-disciplinary R&D. Successful collaborative links have been developed with academic partners (e.g. the Universities within Liverpool, Salford and Manchester) with Aintree also providing research accommodation for part of the University of Liverpool's Faculty of Medicine. Research activities focus on diseases of national and local significance (e.g. cancer, coronary artery disease, stroke, ageing, respiratory diseases, rheumatology, diabetes, obesity and arthritis). The Trust also continues to be a major player in research themes in Cheshire and Merseyside, namely diabetes and endocrinology, musculoskeletal diseases, head and neck, respiratory health and rheumatology, and collaborates fully with the local Cancer Research Network.

Research is hosted in The Clinical Sciences Centre for Research and Education, the result of a partnership between the Aintree Trust, the Walton Centre for Neurosciences, the University of Liverpool, the Pain Relief Foundation and Edge Hill University. The Centre is also home to comprehensive conference and medical education facilities.

The Trust's portfolio of multidisciplinary NHS R&D continues to grow. Links have been established with commercially-sponsored clinical trial recruitment organisations to maximise sponsorship opportunities for clinical trials for new drug treatments and medical devices. The number of active research projects increased to 246 in 2006/7, associated with external funding between collaborators of over £17m. There were 340 NHS research articles published in peer review journals.

7. Alder Hey Children's NHS Foundation Trust

Founded in 1914, Alder Hey Children's NHS Foundation Trust is one of Europe's biggest and busiest children's hospitals, providing care for over 200,000 children and young people each year. It is one of only four stand-alone paediatric trusts in UK and is staffed by 2,600 employees at its main site in West Derby and across 600 community clinics.

Alder Hey offers 20 specialist services including being the designated national centre for head and face surgery and a Centre of Excellence for children with cancer, heart, spinal and brain disease. It is a teaching hospital and trains 550 medical and 400 nursing students each year.

Over the past year, the Trust increased its research income to £3.8m and was a participating centre in 92 clinical research studies. It hosts the UK Medicines for Children Research Network (MCRN) with a Department of Health grant worth £22m and is also the lead centre for the Cheshire, Merseyside and North Wales MCRN.

The Trust recently established the Children's Nursing Research Unit, an Alder Hey-led consortium comprising Liverpool John Moores University, University of Central Lancashire and Edge Hill

University. It leads the field in paediatric pharmacovigilance, being recently awarded the only paediatric NHS programme grant (£2m) for work in this area.

Alder Hey is a top-performing Trust, rated 'Excellent' by the independent Healthcare Commission for the last six consecutive years, which puts it in the top two per cent of Trusts nationally. It is also England's first paediatric health-promoting hospital accredited by the World Health Organisation. The forthcoming Children's Health Park development will reinforce its reputation for world-class research and paediatric healthcare.

8. The Liverpool School of Tropical Medicine (LSTM)

LSTM was the first institution in the world dedicated to research and teaching in tropical medicine. Sir Ronald Ross, Professor of Tropical Medicine at LSTM, became the first British winner of a Nobel Prize for medicine when, in 1902, he was recognised for his discovery that malaria is carried by mosquitoes.

LSTM now trains over 500 students a year from more than seventy countries and holds research contracts to the value of £130m. Over the last ten years its annual turnover has increased from £7m to £50m and there are firm plans to continue to grow at around 20% a year, doubling their turnover to £100m within five years. The school has doubled its staff over the last ten years and currently employs c. 400 people and is aiming for a steady state of around 650.

The School has a strong, internationally excellent research profile with notable strengths in entomological research and drug development. The World Health Organization (WHO), in consultation with the UK government, recently designated the LSTM a WHO Collaborating Centre for Evidence Synthesis for Infectious and Tropical Diseases. The School has also worked in partnership with the University of Liverpool on the Biomedical Research Centre. The School attracts the best researchers internationally and is an important growing asset contributing significantly to the city region's knowledge economy.

The School's new Centre for Tropical and Infectious Diseases (CTID) has considerably expanded its facilities and capacity to research and develop new drugs, vaccines and pesticides to combat some of the world's most devastating diseases. Meanwhile, it has established Liverpool International Health Ventures Ltd to take forward commercial spin-outs from its activities, such as the travel clinic service, Well Travelled Clinics Ltd.

The bulk of the work of the School is translational research resulting in products which are trialled and used in the Tropics but researched and produced in the UK. Its products are drugs and public health tools, such as diagnostics.

LSTM involves the major pharmaceutical companies throughout its processes. The School carries out the basic research with companies carrying out the basic toxicology tests; the School then manages the clinical trials and the companies manufacture the product. Project Boards are established with the involved companies for each project. The School, therefore, has very close working relationships with the major pharmaceutical companies.

On diagnostics, the School can also work with smaller companies and will support local companies wherever it can. The School also has expertise and equipment which can be used by local companies.

The School prides itself on being very business friendly and easy to work with and has established three major spin-out companies, one of which now has a turnover of \$50m. The School has a Commercial Manager, drawn from industry, who handles their IP and is having a significant positive impact.

Finally, LSTM attracts people from all over the world on a regular basis. This could present a real opportunity for LCR to promote itself as a Science and Technology city region – a good place to do business. This opportunity needs to be pursued.

9. The National Oceanography Centre (NOC)

Formerly the Proudman Oceanographic Laboratory, NOC is owned by the Natural Environment Research Council (NERC) and is joined with the NOC facility at Southampton. NERC provides c. 70% of its funding with the balance coming from a variety of sources including the Environment Agency and the Framework 7 Programme.

The NOC has 15 to 20 research students at any one time, usually registered with the University of Liverpool, but also with other Universities across the country including Nottingham, which has particular GPS expertise, and Sheffield, which is developing sea wave information using radar.

The former government was keen to see the economic impact of research given a much higher priority and it is assumed that the Coalition Government will adopt a similar stance. The NOC has an applications group and sells information developed out of their scientific work, for example, tidal predictions and water temperature predictions are of interest to various industries, newspapers, yacht clubs etc. The NOC carries out regular measurements in the Irish Sea and coastal observatory information is collected for use by local authorities and the Environment Agency. The NOC will also act as consultant – for example, they are currently acting as consultants to an advisory team working for Peel on the tidal barrage feasibility work. More generally, they contribute to the wider consideration of tidal and wave power with BIS support. The insurance industry makes use of NOC assessment of risk.

The NOC runs the **British Oceanographic Data Centre** for the NERC, which serves the whole of the UK. It holds a wide range of marine data and is the main UK environmental marine data source. The NOC holds a special data bank on sea levels across the world. It also operates the **National Tidal and Sea Level Facility**, holding information on a range of physical variables, sediment dynamics and marine ecosystems. The NOC also runs the **European Regional Seas Ecosystem** model which is supported at the Plymouth Marine Laboratory.

The NOC has particular expertise in measurement and develops marine instruments as well as buying them (Daresbury SIC also has expertise in instrumentation). Although the market for marine instruments is small, the NOC is interested in what other markets might be relevant.

The NOC has developed techniques for measuring water depth using ships radar and has carried out proving trials with a German company. NERC owns the IP.

10. Daresbury Science and Innovation Campus (Daresbury SIC)

Daresbury SIC occupies a strategic position between the major economies of the Liverpool and Manchester City Regions and North Wales, close to the M56, to Manchester and Liverpool Airports and to the West Coast Main Line. A regular destination for international delegations as well as UK visitors, the campus is a significant gateway, which brings UK and international knowledge, skills and

ideas into the city region whilst enabling excellence to be exported across the UK and beyond. The campus is, therefore, of major significance not only to the knowledge economy in the city region, but also to the UK's international competitiveness.

A joint venture company has recently been established between Langtree, the private sector developer, STFC, Halton Council and NWDA to drive forward the development of the campus for business and research purposes. The joint venture company can play a key role in generating jobs and GVA in the key sectors of the city region economy, on objective of the highest priority.

Daresbury SIC was established with an initial £50m investment from the NWDA to help drive regional and national competitiveness in science and innovation. Now occupied by over 800 people, it is one of only two Government-funded science and innovation campuses in the UK and, as such, is a focal point for the UK Government's science and innovation strategy and multi-partner projects where major corporates, blue-chip companies and start-ups are able to converge with leading research in a neutral, business-friendly environment. Its primary stakeholders are the STFC, Halton Borough Council and the Universities of Liverpool, Lancaster and Manchester.

Named Outstanding Science Park 2009 at the UK Science Park Association (UKSPA) Awards, the campus provides a high quality environment for innovation and business growth, with knowledge sharing, collaboration and networking. It has direct relationships with 400 high-tech companies and key strategic partnerships with a number of corporates including IBM, Cisco, Microsoft, Astra Zeneca, BAE Systems and Unilever.

Companies at Daresbury SIC have seen their sales double in 2 years, with an average growth of 27% in 2009. Investment also doubled during the same period to £30m, including a growth of £10m in 2009. Companies on the campus have also raised some £15m from Venture Capital funds or business angel networks.

Daresbury SIC has a critical mass of expertise in the following areas:

- 4th Generation Light Source
- Modelling and Simulation
- Virtual drug discovery and toxicity
- Prototyping
- Circular Dichroism
- Computational Science & Engineering
- Single Molecule Fluorescence
- Instrumentation & Engineering
- Accelerator Science

The current mix of businesses in the **Daresbury Innovation Centre** includes strong representation from the healthcare, digital/ICT and electronics and instrumentation sectors. However, rapid growth is now bringing about an increased level of diversity and a broadening of the range of sectors represented.

The campus' combination of assets and expertise means that it is potentially the location for a large presence of significant, technology-intensive blue chips or SMEs seeking access to technologies and, equally, for small, strategic groups wishing to connect to key activities, such as High Performance Computing (HPC).

Daresbury SIC has sought to implement an 'open innovation' model and, in 2009, 64% of companies on campus developed over 200 new products and services. The campus runs very successful

business breakfast events on a monthly basis. Through this network, which has grown to more than 2,000 individual members in a little over three years, the campus team acts as an independent broker, facilitating the right connections to help SMEs address challenges and maximise their growth potential.

This has resulted in over 50% of Campus companies collaborating with each other delivering £500,000 of value in terms of sales creation and cost savings. Similarly, 70% of Daresbury SIC companies are engaging with at least one University or STFC, delivering £400,000 of value in terms of sales creation and cost savings. These existing capabilities are very powerful tools and can support the development of the city region economy if effectively accessed.

The SIC houses:

10.1 **The Daresbury Laboratory**, which is one of Europe's largest multidisciplinary research organisations, supporting scientists and engineers world-wide. Part of the **Science & Technology Facilities Council (STFC)**, the Laboratory's 550 staff support the work of over 5,000 scientists and engineers, mainly from the university research community. STFC provides the UK large-scale science facilities and programmes, mainly for higher education institutes. It is a National Centre for 'science-technology' expertise.

The Daresbury Laboratory's critical areas of expertise are of direct relevance to the city region's aspirations in terms of Life Sciences, Advanced Manufacturing, Creative and Digital Industries and Low Carbon. It has world-class capabilities in areas such as:

- accelerator science
- high performance computing
- modelling and simulation
- micro and nanotechnology
- sensors and sensor networks
- detectors

as well as core skills in:

- prototyping
- systems integration
- engineering
- project management

Finally, through their Futures team, the STFC has expertise in relevant application areas of technology including:

- energy
- healthcare
- the environment.

STFC's ability to develop technology from concept through to prototyping (Technology Readiness Levels 1-7) affords it a unique position. The Daresbury Laboratory has a growing portfolio of collaborations with industrial and commercial partners. This is facilitated by STFC Innovations Ltd, a dedicated knowledge transfer arm, which operates a dedicated marketing team with a group of highly qualified technical sales managers. There are over 14,000 registered users of the laboratory's facilities and it has links with every research university in the UK.

10.2 **The Cockcroft Institute**, which is a National Centre of Accelerator Science providing the intellectual focus, educational infrastructure, and the scientific and technological facilities for accelerator science and technology research and development. The objective of the Institute, which is a partnership between Liverpool, Manchester and Lancaster Universities, is to develop a major international presence in research and development in accelerator science and technology with four broad themes:

- Electron-positron colliders
- Proton and ion accelerators, including neutrino beams
- Photon sources
- Neutron sources

10.3 **The Daresbury Innovation Centre**, which provides 24,000 sq ft of business creation, growth and acceleration space. Opened in April 2005, its facilities include laboratory and office space, specialist support for growing businesses, high-speed internet access and a range of other business services. Since opening, over 100 high tech companies have located in the innovation centre, with particular concentrations in Biomedical (21 companies), Digital/ICT/Telecoms (50), Advanced Engineering and Instrumentation (22) and Energy and Environmental Technologies (9). A new facility, Vanguard House (see below), will offer a further 36,000 sqft of grow-on space from early 2011.

10.4 **The Innovations Technology Access Centre (I-TAC)**, which provides the ideal research environment both for start ups and established companies. The Centre provides flexible and affordable labs with £3m of state-of-the-art equipment for high end laboratory sample preparation and analysis. With users engaged in biology, imaging, materials and physical science, I-TAC offers truly flexible terms, ranging from 'lock and leave' long-term lab space to 'hotlabbing', where lab space can be rented by the hour, day or week. In addition, a wide range of support is available on site, including the STFC's highly-skilled scientists. There are two labs: **I-TAC** provides a fully-equipped and functional wet chemistry and materials lab for chemical preparation; **I-TAC BIO** offers a fully equipped and functional lab for biological preparation.

10.5 **The Virtual Engineering Centre, (VEC)**, financed by £2.5 million from the Northwest European Regional Development Fund (ERDF), £1.18 million from the Northwest Regional Development Agency (NWDA) and £1.64 million from the University of Liverpool has been established to catalyse virtual engineering activities within regional SMEs and encourage joint research programmes between industry and academia.

The VEC is located at Daresbury, facilitating access to the high performance computational facilities and scientific expertise in specialist software development. VE skills and capabilities are being developed through a number of aerospace case studies, creating virtual prototypes that can be used to exercise design options and validate requirements across the life cycle from manufacturing and assembly to operations and upgrades. The ability to test and model new products and production processes virtually reduces both risk and cost. The VEC has been established to assist the North West aerospace sector and wider industry by providing a focal point for world class virtual engineering technology, research, education and best practice with the aim of improving business performance throughout the supply chain. It has key strengths in digital simulation and modelling and managing simulation, an area of increasing demand for industry.

The VEC's offer connects to the **Engineering Technology Centre's** strengths in prototyping. Located on the campus, the Centre's capabilities, which include detectors and sensors and surface analysis, are relevant to aerospace and other sectors, such as security.

The VEC catalyses virtual engineering activities and joint research programmes across the sector and between industry and academia. It provides:

- a physical virtual engineering centre with ‘best practice’ facilities, which display integrated, interactive simulation and modelling software across the full range of virtual capabilities
- a research partnership that will add value to existing research activities within the region by providing a commercially relevant focus
- a knowledge exchange centre to increase awareness and give potential users an opportunity to ‘try before they buy’ so that they can become more confident of the business advantages that can accrue from using VE tools
- an educational centre to help meet the current skills shortages in VE in the UK.

The VEC comprises 7 research staff and a business team of 4. With £5.3m for its first 3 years of operation, the intention is to make the VEC self-sustaining after this period. It is envisaged that the VEC’s future funding mix will comprise contributions from both industry and public funding (for example Research Councils and TSB).

Strategic Partners of the VEC include the Science & Technology Facilities Council, North West Aerospace Alliance and BAE Systems. The VEC has established partnerships with industry, including Airbus and there are ongoing discussions with a number of other Primes. It has also forged connections with the other businesses at Daresbury:

- a CASE studentship was recently awarded with a Daresbury SME
- the VEC is bidding into the current Nuclear Feasibility TSB call with another SME located on the Daresbury campus.
- links have been established with the Nuclear Skills academy to explore VE training opportunities
- one of the VEC beneficiary companies has already relocated to the Daresbury campus and several others are considering the move to be closer to the VEC facilities.

The VEC has made use of the supercomputer facilities at Daresbury; it is now incorporated within tours for UK and international delegations visiting the campus. It is connected to research expertise at UoL via six academic leads at UoL, and is also connected with UoL’s Agility Centre and recently made a bid to the EPSRC (in collaboration with the Agility Centre) for a £5m IMRC Centre in Virtual Verification and Validation for Manufacturing.

Although it has a current focus upon aerospace, the VEC’s overall ambition is to establish a centre of excellence in and hub for Advanced Manufacturing and other sectors; there would be the potential to position the VEC as a Technology and Innovation Centre for Advanced Manufacturing in the North West – investing in ‘Virtual’ Advanced Manufacturing would be a logical position before investment in large capital facilities.

10.6 Planned future developments

10.6.1 The planned £50m **Hartree Centre** will be an International Centre of Excellence in Computational Science and Engineering (CSE) and a focal point for high performance computing, modelling and simulation. Tackling large-scale challenges facing the UK economy, the Hartree Centre will partner with industry, academic and government researchers to boost competitiveness by maximising the impact of CSE and HPC in business, R&D and operations.

The Centre will comprise some 250 people, including 100 on-site collaborators. It will run up to 12 concurrent projects, each with a multidisciplinary team to bring state-of-the-art modelling and simulation to bear to solve challenges in medicine, science and engineering. The Centre will be used by HPC and software vendors seeking to future-proof their offerings as well as medics and industrialists seeking to resolve complex problems in their respective domains.

10.6.2 **Vanguard House**, a grow-on building with 36,000 sq ft of mixed office, lab and workshop accommodation will come on-stream in the first quarter of 2011. It will provide the next step for companies already on the campus whilst also being able to attract companies nationally and internationally.

Whilst some connections between the Universities of Liverpool and John Moores and Daresbury exist, there is clearly significant potential to exploit the relationship more fully and a more proactive and structured approach could be taken.

The principal point of contact with UoL has been via its Management School. The Innovation Academy, a partner in the recent IDEAS at Daresbury project involving the Universities of Manchester and Lancaster, now has a desk at the Innovation Centre and there have been MSc placements around logistics as well discussions around leadership with relevant academic staff.

Daresbury is an exceptionally important economic asset for the city region and beyond. Not only does it offer opportunities for the HEIs in the area, but it also offers potential as:

- **An exceptional science park with the capacity to act as a major catalyst for economic growth, attracting new/emerging and established companies to the area,**
- **A major and growing economic hub with the potential for over 1m sqft of further development,**
- **A centre of outstanding scientific excellence of national and international importance,**
- **A potential focal point for the development of a strategic relationship between universities and businesses in the city region with the Technology Strategy Board, the Research Councils and relevant government departments,**
- **A broker at the interface of business and research, with the capacity to radically improve the ability of the research base to tackle practical problems faced by businesses and the added capacity to forge successful Business-to-Business relationships, and**
- **A location for large technology-intensive blue chip companies who want access to technologies from STFC and partners and for companies wanting to link into key STFC facilities such as High Performance Computing.**

The city region must develop a much closer long-term strategic relationship with Daresbury SIC including raising awareness among businesses in the city region of its current strengths and potential areas for engagement. This needs to be given very high priority. This strategic relationship will provide a platform to build on existing successful collaborations, such as the VEC and Cockcroft Institute and launch further ambitious multi-partner initiatives bringing together HEIs and a range of commercial partners. The formal establishment of the joint venture company including the selected private sector developer partner, Langtree, is of key importance in this regard.

11. The Heath Business and Technical Park, Runcorn

Located on the former site of ICI's Runcorn headquarters, The Heath Business and Technical Park (The Heath), provides 60 acres of serviced office and laboratory space, a range of business and

specialist scientific support services, new build opportunities and a dedicated conference centre to a broad spectrum of business sectors. Office space ranges in size from single offices to 4,000sqft. More than 185 different organisations, ranging from bio-science firms and IT specialists to government agencies, are located at the Heath, employing a combined workforce of over 1,700 people.

In terms of Knowledge Economy priorities, the numbers of companies by sector are:

- FPS (marketing, consultancy, finance, business services) (58)
- Chemicals and manufacturing-related (24)
- Creative and Digital (IT, web and telecoms) (23)
- Life Sciences (medical and healthcare) (6).

The Heath's Site Operating Group (SOG Ltd) owns and manages The Heath and is the UK's largest commercial operator of multi-occupancy science facilities, providing excellent opportunities for scientific companies coupled with a wide range of support services. Formed from a division of ICI which managed the company's Runcorn headquarters, SOG has driven growth at The Heath whilst retaining much of the highly specialised expertise associated with ICI, such as scientific glassblowing and experimental work with blast-proof laboratories. Serviced lab space can be adapted to individual company needs. The Heath offers small lab facilities for new spin-outs and larger-scale facilities for established firms; flexibility is the key.

SOG delivers a high-quality facilities management service for businesses at The Heath as well as a range of specialist consultancy services, including:

- Design and fabrication of scientific and lab glass ware to a firm's requirement
- Precision engineering services
- Engineering technician support
- High pressure facilities
- Safety, health and environment consultancy services etc
- Pay-as-you-use services, including conference facilities, catering, occupational health, archive storage and many others.

SOG Ltd is now embarking on a development phase to extend office and laboratory space at The Heath and has also taken over the facilities management of the Hexagon Tower at Blackley, Manchester, which serves as global headquarters of speciality chemicals company Avecia.

The conference facilities at The Heath include seventeen fully-equipped conference and meeting rooms; a 120 seat lecture theatre; exhibition space; theatre-style seating for up to 400 and free car parking.

LJMU has a very strong relationship with The Heath. Its Business Development Centre has worked on a number of projects with the MD and also with a number of businesses at The Heath. It was observed that there is a great deal of complementarity between The Heath's operating culture and ethos, based on private sector principles, and LJMU's strategic approach to business engagement and support. UoL, however, has less effective contact with The Heath and its companies, and there is scope to develop these relationships.

The primary function of SOG Ltd is to provide a wide ranging facilities management service, which is not normally concerned with fostering Company/HEI engagement. The extent of collaboration between companies on The Heath is unclear although information about all companies is included on The Heath website.

There is a case for exploring with The Heath (SOG Ltd) the opportunity for further mutually supportive collaboration between the city region knowledge assets and companies on their site, to help promote economic growth and jobs.

12. Knowsley Industrial Park (KIP)

KIP is a key economic asset for the region, currently home to 800 businesses with over 15,500 employees on a 1200 acre site. It is the second largest industrial estate in the NW with anchor tenants such as QVC, Delphi and Vertex. The Park currently generates £214m of value to the local economy. A study by DTZ commissioned in March 2010 projected the potential of this site to attract 1,700 additional jobs, 950,000sqft of additional floor space and an additional £20m annual contribution to GVA. The council is looking to secure investment of up to £58m into the Industrial Park over the period to 2021. The DTZ review also confirmed that the nature of the businesses on the KIP is changing, with diversification into Financial and Professional Services, advanced engineering and materials, food and drink, environmental technologies, green industries and other service based industries around a strong manufacturing core. There is a growing nucleus of businesses in renewable energy and KIP has the potential to be a 'Green Energy Hub', a concept which the Council is developing a public/private partnership to drive. It is important that the work on Low Carbon takes full account of this situation and the potential at Knowsley.

13. Liverpool Science Centre

Located on the former 20 acre GSK site (now Southern Gateway) off Speke Boulevard in Speke, the Liverpool Science Centre (LSC) is due to open for business early in 2011. It will offer fully serviced pharmaceutical manufacturing facilities, specialised 'clean room' facilities, labs and offices. The LSC building extends to 97,000 sq ft in units of 800 to 5,500 sqft. The building has 26 separate clean rooms, a 5,000 sqft research lab and associated offices and meeting rooms. The facility will add an important additional dimension to the significant concentration of pharmaceutical manufacturing in Speke, close to Eli Lilly, Medimmune, Novartis and the National Biomanufacturing Centre, and compliments the existing and proposed facilities in the Liverpool Knowledge Quarter and at The Heath and Daresbury SIC.

14. The Liverpool Knowledge Quarter

Located in the eastern part of the city centre, is home to a number of the city region's key assets including the campuses of the University of Liverpool and Liverpool John Moores University, the Creative Campus of Liverpool Hope, the Liverpool School of Tropical Medicine, the National Oceanography Centre, Liverpool Science Park, MerseyBio Incubator, Royal Liverpool University Hospital, Liverpool Community College and Liverpool Institute for Performing Arts. This concentration of knowledge assets, alongside the Hope Street Quarter including the two cathedrals, Blackburne House, the Philharmonic Hall and the Everyman Theatre, constitutes a unique combination of knowledge and cultural assets which sets Liverpool apart from other core cities and has the potential to grow and develop the city region's knowledge economy. Hope Street is also home to some of the best hotels and restaurants in the city.

In 2007, the Knowledge Quarter Prospectus⁶ identified that the Knowledge Quarter Institutions generate £1bn GVA each year, representing some 15% of the city's output at that time. They support 14,000 full-time jobs – equivalent to 7% of the city's jobs. A large proportion of these are highly-

⁶ Knowledge Quarter Prospectus, Liverpool Vision, 2007

skilled, highly-paid jobs but there are also numerous administrative and other support service jobs. This major economic impact is concentrated within a compact and distinctive area accounting for just 1% of Liverpool in spatial terms.

15. Liverpool Science Park (LSP)

LSP provides a first-class environment for knowledge-based companies. It exists to provide a home for developing science and knowledge-based companies by offering a combined package of first-class accommodation, business support, and links to the region's specialist experts. LSP operates a gateway policy meaning that only companies operating with the Knowledge Economy can occupy space.

Innovation Centre 1 (ic1), which provides 36,000 sq ft of space, has attracted over 50 companies, primarily in the Life Sciences and IT sectors, and maintained full occupancy for more than 6 months. A second building of similar size, Innovation Centre 2 (ic2), was launched in April 2009 and more than 30% of the building is already occupied. A third Innovation Centre (ic3) is currently being brought forward on a nearby site to offer a further 40,000 sqft of grow-on space and laboratory space.

LSP is owned by Liverpool City Council, the University of Liverpool and LJMU. Discussions are currently underway with the Royal Liverpool University Hospital Trust to explore their becoming a fourth partner in the Science Park. It has entered into an MOU with the Liverpool Innovation Park – see **1.18** below.

16. The MerseyBIO Incubator

The MerseyBIO Incubator was opened for business in 2003. Its 1728 sqm of floor space provides labs and offices for early-stage and growing business with a life science or chemistry focus. The laboratories are sub-1000 sq ft in size and capable of supporting the activities of a team of up to 6 people in a lab environment. Up to 15 companies can be housed at any one time, although with staggered fill-up rates and internal growth of companies, the maximum number of companies occupying the building and utilising all the capacity has been thirteen. To date, since first opening its doors for business, the Incubator has been home to thirty-eight businesses, twenty-five of which have been brought in to the Liverpool City Region from elsewhere. A brief history of the performance of these companies shows that whilst three have failed, there have been two listings of companies on the AIM Market in London, three trade sales to larger companies, and the rest remain viable businesses today. In total, these companies, whilst in Liverpool, created 150 jobs (GVA at £63,000 per job), sold more than £20.5m of goods and services, secured £33.5m of private equity investment and (based on the last valuation when they were resident in MerseyBIO) have a combined estimated value of £150m to UK plc. Unfortunately lack of grow-on space in the area has contributed to 16 companies moving away from the city region.

Clearly, MerseyBIO has been an engine for growth in high-value company stock. This, in part, is due to the model adopted at the outset which was to embed a business-experienced team to manage and create networks to support the operation of MerseyBIO from not just a facility aspect, but also a business generation and growth point of view. This team, now called 2Bio Ltd, has developed processes to engage the businesses at more than a landlord-tenant level to ensure that the opportunity for success of the tenant companies is maximised. This team engages in all aspects of company support and growth, including technology transfer, commercialisation, intellectual property strategy and due diligence and, more latterly, company valuation and assessment for third party investors. These skills are all applied in the day-to-day operation of the MerseyBIO Incubator

taking the model beyond just ‘bricks and mortar’ to a development environment to provide LCR with a competitive advantage in this area of business creation. MerseyBio works closely with LSP and expects to also develop a close working relationship with the proposed new BioInnovation Centre.

17. The Baltic Triangle

The Baltic Triangle is an historic port area bordered by Rope Walks, Liverpool One, Kings Waterfront and the adjacent cathedral. It contains a large number of SMEs and micro-businesses, notably in creative and digital industries. The website www.baltictriangle.co.uk provides more detail as does Chapter 3, paragraph 3.6.3.

18 The Liverpool Innovation Park (LIP)

LIP is a significant infrastructure asset to the city region’s knowledge economy as it offers essential expansion space for knowledge-intensive companies. Operated by Space Northwest (a joint venture between Ashtenne Industrial Fund and NWDA), the Park comprises a 110 acre post-industrial site incorporating 500,000 sq ft of accommodation and twelve acres of development plots. Currently home to over 70 businesses employing over 3,000 people, the Park offers businesses space to grow in a very accessible location, with excellent digital connectivity and close to the world class R&D in the Liverpool Knowledge Quarter. The Park has a particular focus on healthcare-related technologies, digital, ICT and manufacturing and is able to accommodate companies with up to 1,000 staff.

Space Northwest are planning to further upgrade amenities, including an internet exchange and data centre, to encourage investment. It will seek to attract companies applying technical, process and business model innovation to develop their business. Marketing will focus on companies from the digital, ICT, telecoms-dependant and advanced manufacturing sectors.

LIP has entered into a Memorandum of Understanding with LSP to facilitate collaboration on a non-competitive basis, to nurture the development of knowledge-intensive and technology-based businesses from concept to manufacture.

19. RopeWalks

Closer to Liverpool’s city centre, the RopeWalks district is the location for a number of creative and digital businesses alongside the Foundation for Art and Creative Technology (FACT), which focuses on delivering exhibitions, education and research projects around video, film and new media arts. FACT is also the location for one of the city region’s three Media Access Bureaux.

20. The National Biomanufacturing Centre (NBC)

NBC, run by Eden BioDesign, became part of the American Watson Group in 2009. It is located on the Estuary Commerce Park in Speke, Liverpool. Liverpool’s strong traditions in biomanufacturing allow the NBC to build on the concentration of expertise, skills, and experience which is unrivalled in the UK.

The NBC facility contains state-of-the-art biotech manufacturing technologies and its adaptable design permits early phase clinical trial manufacture across a wide range of innovative medicines. The Centre offers a range of services, including:

- Guidance and advice
- Biomanufacturing process design and development

- Preclinical manufacturing
- Early stage clinical manufacturing
- Formulation
- Clinical trial supply logistics.

Since 2009 NBC has dealt with businesses from around the world: 10% from the UK, 50% from elsewhere in Europe, 20% from Japan and 20% from the US. NBC is now also winning work from major pharmaceutical companies in biologicals. The company believes that LCR is a good place to do business but that more could be done to communicate the very real strengths which the city region has in life sciences. More also needs to be done to encourage start-ups in life sciences.

21. NHS Blood and Transplant Centre

The NHS Blood and Transplant Centre in Speke, was opened in 2006 and serves LCR and North Wales. It provides a base for the largest tissue bank in Europe, collecting and storing tissues such as skin, bone and tendons to supply hospitals across the UK. The site is also the base for blood collection in the region and issues blood to local hospitals.

Scientists working at the centre provide support to hospitals throughout the North West including antenatal testing, blood grouping and antibody screening. Other services at the site include the National Frozen Blood Bank which provides stocks of rare blood for patients from all over the world, and a project manufacturing 'artificial tears' for patients with severe dry eye problems.

22. The Foresight Group

The Foresight Group was created by the University of Liverpool with support from the Merseyside Transport Partnership. Chaired by Phil Redmond, the primary aim in its first phase of existence was to bring together key people from a wide range of organisations to discuss the future of transport with a view to drawing some conclusions about their aspirations for the city region to influence the next Local Transport Plan.

The Group met four times between June 2009 and February 2010 and agreed upon three core principles:

- promoting cycling and walking, connecting the health and environmental agendas
- leapfrogging existing technologies, including the introduction of sustainable transport modes and smart ticketing
- facing challenging governance issues in order to deliver real change.

A delegation from the Foresight Group was then charged with meeting key public and private sector bodies in order to begin to agree a way forward to tackle these issues. The Foresight Group provides a strategic, cross-policy forum and an opportunity for creative and non-conventional thinking. The suggestion is that the Group could become an 'honest broker' and a catalyst for change, sharing a vision of what the city region could be like and putting forward innovative solutions. As an HEI, UoL is well placed to provide a neutral focus for the debate.

There is opportunity to expand its remit from transport to a range of other issues which relate to the key sectors of the Knowledge Economy Plan, adding value to the existing groups and networks in the city region which currently relate to these sectors.

23. Other HE Providers beyond the Liverpool City Region

The wider economic area around the city region, stretching to Manchester and Lancashire, northwards to Lancaster and also towards Chester and North Wales, is the location for a further seven major Higher Education providers, offering a range of learning options of relevance to the KEP as well as opportunities for knowledge economy businesses to access additional research expertise and innovation. In addition to the individual universities, the North West Universities Association is the collaborative body where it is appropriate to engage with the universities collectively.

23.1 University of Chester - Spread across its campuses in Chester and Warrington, the University of Chester offers a range of foundation, undergraduate and postgraduate programmes as well as undertaking academic research in areas relevant to the KEP. Around 25% of the University's student population are mature students.

The University's Faculties of Applied and Health Sciences; Arts and Media; Business, Enterprise and Lifelong Learning; and Health and Social Care provide a range of programmes of direct relevance to Life Sciences, Creative and Digital Industries, FPS and the Public Sector respectively. The University has a strong commitment to making a positive impact upon its wider community and beyond; its Law School is now an established part of the legal community in Chester and the surrounding area, with over 300 undergraduate and post graduate students.

23.2 Edge Hill University - Over 23,000 students are enrolled on Edge Hill University's courses, which can be studied on additional sites including Liverpool and Bromborough (Wirral) as well as on the main campus in Ormskirk. Based on an ethos of opportunity through excellence, Edge Hill has been recognised as a Centre for Excellence in Teaching and Learning by the Higher Education Funding Council and is in the UK top ten for graduate employment.

Edge Hill's Faculty of Arts and Sciences includes the Business School, Performing Arts, Law and Criminology and Media, whilst its Faculty of Health offers learning options in Health and Social Care. In terms of research, the **Centre for Local Policy Studies** has a strong track record of providing support and innovative solutions for the public and voluntary sectors in areas of management, strategy and policy development, community engagement, regeneration and equality. Its recently expanded consultancy team can offer a broad range of consultancy, training, policy development and management services.

The **Centre for Sports Law Research** is engaged in funded consultancy for both public and private bodies on issues relevant to the legal regulation of sport. The centre has a particular focus on the intersection between sport and European law, but is also engaged with questions on both global and national levels.

23.3 Glyndŵr University - is located in Wrexham, North East Wales. Around 6,000 students study at the University, including over 2,000 from outside the UK. It is the youngest University in Wales and champions the spirit of enterprise and an outward-facing philosophy. Employability is central to the University's activities and courses are designed to respond to employer needs; many have been designed with their direct input. Project work is often based on actual situations and frequently involves working with a company to develop solutions to real commercial problems.

Glyndŵr has close links with employers and professional bodies at local and national level across its areas of provision. These include:

- School of Science & Technology, which covers options in Engineering, Science and the Built Environment. The **Engineering Research Centre** is active in the modelling and simulation of aerospace and automotive applications, and the study of signal, power systems and control engineering. It has close ties with Airbus UK and strong links with other industries including Toyota, Jaguar and Siemens. A new part-time foundation degree in Automation, Instrumentation and Control has been added to the portfolio with the support of United Utilities aimed at employees of utility and process-based industries. The School's science research is recognised internationally through its centres for water soluble polymers, advanced materials, modern optics, solar energy, and hydrocolloids. In terms of the Built Environment, a new specialised bachelor degree in Sustainable Development has recently been launched. The University operates the Optic Glyndwr facility (housing research teams and an innovation centre) at St. Asaph.
- The recent opening of the Advanced Composites Training and Development Centre with Deeside College for Airbus.
- School of Business, which has professional links with the Chartered Institute of Marketing, the Chartered Institute of Personnel and Development and the Chartered Institute of Management Accountants
- North Wales School of Art & Design
- School of Health, Social Care, Sport and Exercise Sciences, which includes the Social Inclusion Research Unit and the Centre for Health and Community Research.

23.4 Manchester, Salford and Lancaster - The Universities of Manchester, Lancaster and Salford, alongside Manchester Metropolitan University, possess further significant strengths to help drive the knowledge economy in the city region. For example, a range of activities are already undertaken by these providers with businesses located at Daresbury SIC.

The close proximity of these universities to the LCR provides considerable scope for businesses to access new opportunities and areas of expertise, including:

- The University of Manchester's position as a leading centre for biomedical research, science and engineering.
- Manchester Metropolitan University's expertise in materials science and its strong professional bias in the provision of learning options
- The University of Salford's presence at MediaCity UK, incorporating 100,000 sqft of space with state-of-the-art technology and its research strength in the built environment.
- The triple-accredited Management School at Lancaster University.

24. Private sector

This section is not meant to provide a comprehensive list of major companies, but is intended to reflect the range and scope of major companies in the city region which are relevant to the key sectors.

24.1 Unilever - Unilever R&D Port Sunlight is the source of many of Unilever's most successful products for home and personal care. More than 700 scientists and engineers, from various backgrounds and nationalities, work at the facility to create innovative products for consumers around the world. Success is achieved by working across a network of Unilever R&D centres, with scientists at R&D Port Sunlight working daily with colleagues from São Paulo to Shanghai.

The global brands the teams contribute to include Dove, Sunsilk, Lynx / Axe, Cif, Persil / Omo and Domestos. Each year this work results in more than 100 patent filings and approximately 140 peer-reviewed papers and conference presentations.

Unilever is currently reviewing its R&D facilities in Europe. Unilever at Port Sunlight is planning to extend its facilities to include an R&D Park based upon the cosmetic personal health care sector, to consolidate its position as the leading centre for this activity. TMP and Wirral MBC are working with the company to help facilitate this important development.

24.2 Airbus - Over 6000 staff work at Airbus' site in Broughton in Flintshire. With capabilities in airframe component manufacture and composites, it is a global centre for excellence for Airbus wing manufacture and large component machining. The facility has also manufactured and assembled fuselages and wings for Raytheon Hawker Jets.

In 2009, Airbus received a £28m grant from the Welsh Assembly Government to develop composite wing technology, which will be used in the next generation of aircraft, and to create an "environmentally-friendly" facility for the assembly of wings at Broughton.

24.3 Jaguar Land Rover - The Jaguar Land Rover plant at Halewood in Knowsley employs around 2,500 people. The Land Rover Freelander is manufactured here alongside the new low-carbon "baby" Range Rover, whose production has created 800 new jobs, securing a further £2,000 in the wider city region economy. The new model, which has secured the plant's future for at least the next ten years, will be sold to more than 100 countries worldwide from 2011.

24.4 Vauxhall - The Vauxhall Motors plant at Ellesmere Port opened in 1962. In 2009, owners General Motors secured a deal that would see the Astra Ampera being produced at the plant, securing its future beyond 2016. Production at the plant is expected to grow significantly over the period to 2011.

24.5 Pharmaceuticals - Pharmaceutical production has very strong representation in the city region with **Eli Lilly & Co** (c. 350 staff), **Novartis Vaccines and Diagnostics** (c. 800 staff) and **MedImmune** (part of Astra Zeneca) (c. 150 staff) being particularly important.

24.6 INEOS Chlor - Many of INEOS ChlorVinyls' products hold market leading positions in Europe or worldwide. It is the largest producer of chlorinated paraffins in the world and is Europe's leading polyvinyl chloride (PVC) manufacturer. INEOS is also a leading manufacturer of sulphur chemicals and a key player in the field of electrochemical technology. INEOS' chlor-alkali cellroom at Runcorn is the second largest single unit in Europe and employs around 1,500 people.

24.7 Sony - Wavertree Technology Park is the headquarters of the video game development house Sony Computer Entertainment (SCE) Studio Liverpool. Originally founded in 1984 as Psygnosis, the company became a wholly owned subsidiary of SCE Worldwide Studios in 1993. It currently employs roughly 100 individuals, comprising two development teams. Evolution Studios, which is located in Runcorn, is also owned by developers SCE. SCE's network of studios (UK, Holland, Japan and US) develops new products for its traditional market of core gamers alongside an expanding audience of casual and social gamers.

24.8 Pilkington - The UK is one of the NSG Group's major manufacturing centres. Pilkington Group Limited is based in St. Helens and has offices at the NSG Group's European Technical Centre, situated nearby in Lathom, Lancashire. The company, which is the largest glass manufacturer in the UK, was formed in St. Helens in 1826 and employs around 1,400 people across its five Merseyside

sites. It recently introduced the Pilkington Activ™ Self-Cleaning Glass, which is both environmentally friendly and easy to maintain. The company is also exporting solar panel glass from St. Helens.

24.9 **Lime Pictures** is one of the UK's largest independent producers; Channel 4's Hollyoaks is produced on its ten-acre site in Childwall, Liverpool. Formed in 1982 by Phil Redmond and originally known as Mersey Television, Lime has a staff of over 500 working on its flagship output and a wide range of drama projects and development. The company has ambitious plans to increase output in the rapidly growing production sector. As part of the Lime Pictures Group, its associate company, Conker Media, produces content for emerging digital platforms including digital television, online, broadband internet, mobile and digital radio. This includes cross-platform projects linked to Hollyoaks as well as others for ITV and BBC.

24.10 **Maersk** - Since 2009, Liverpool has been the headquarters for international shipping business Maersk Line UK & Ireland, part of the Global Fortune 500 firm A.P. Moller. The Maersk Group, whose global headquarters are in Copenhagen, employs some 115,000 people in around 130 countries across the world.

The Maersk Line fleet comprises more than 500 vessels and a number of containers corresponding to more than 1,900,000 TEU (Twenty foot Equivalent Unit – a container 20 feet long). Maersk Line operates key container services from the Port of Liverpool, as well as passenger and freight links through its Norfolkline services based at Birkenhead's Twelve Quays berth.

24.11 **Stobart Group** - Stobart Park at 3MG (Mersey Multimodal Gateway) in Widnes is a major warehousing and distribution location. The site has excellent communications with direct links to the West Coast Mainline, the M62 and M56 motorways, the River Mersey and the Manchester Ship Canal. It is supported by the Stobart Group's provision of a full multimodal logistics service, including Stobart Rail and Eddie Stobart road transport services. Its Ports Division operates a container port directly adjacent to Stobart Park, which provides direct rail access, and this currently handles six trains per day and around 120,000 containers per year.

The Group also controls Mersey Gateway Port at the entrance to the Manchester Ship Canal. In partnership with NWDA, it recently cleaned up 48 acres of derelict brownfield land to make way for the development of a Tesco distribution warehouse.

24.12 **Bristol-Myers Squibb Pharmaceuticals Ltd (UK)** - The company recently secured a \$6m investment from its US parent company into its Wirral-based R&D facility and is looking to expand its research and clinical trials activities. BMS had worldwide sales in 2008 of \$20.6bn and worldwide R&D investment of \$3.5bn.

24.13 **Knauf Insulation** - This St. Helens-based company sell their products in over 30 countries worldwide. Their products include insulation manufactured from naturally occurring and recycled raw materials.

24.14 **The Flamco Group** - With its HQ in St. Helens, Flamco produces heating, ventilation, drinking water, air conditioning and refrigeration systems. With over 500 employees and seven production sites (Netherlands, Germany and China in addition to the UK) the company has invested in an R&D centre and a low carbon demonstration unit in St. Helens and also provides a training centre for their products and other low carbon products in the area.

24.15 **H2O Networks (part of the i3 Group)** - The company have patented technology which allows the use of sewage and waste water pipes to lay 'dark fibre' cables which can deliver superfast broadband to areas, communities, business and the public sector. They have moved their operation to St. Helens from North Wales and have the capacity to contribute to developing the digital infrastructure in the city region.

24.16 **Kleen and Green** - This company recently won the Merseyside Innovation Award for their system to reduce fuel use by vehicles. The company claim that fuel use can be reduced by between 25% and 75% on petrol engines and 18% to 25% on diesel engines and that the system also improves performance and reduces harmful emissions.

24.17 **Financial & Professional Services** - Ernst & Young defined six tier 1 firms in the city region (se 5.4.9) of strategic importance, including: **Royal Liver Assurance**; **Hill Dickinson** (National law firm of the year 2010, with c. 600 professional staff); **DWF LLP** (full service law firm with 1,000 staff and 124 partners); **Weightmans Solicitors**(800 staff and 100 partners); **SSS Holdings Corporation Ltd** (Strategy Systems Solutions – an international company delivering sustainable IT solutions) and **Brabners Chaffe Street LLP** (a major corporate and commercial law firm).

N.B. There are of course a wide range of knowledge assets close to the city region such as the Shell Technology Centre in Cheshire West; EA Technology at Capenhurst, the offshore energy park at Mostyn and the Sharp Solar Centre at Wrexham, and many more.

CHAPTER 3

THE KNOWLEDGE ECONOMY

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1. Background

1.1 The Liverpool City Region has the assets, capacity and opportunities to build greater critical mass in its science, technology and knowledge-based economic functions, with more leading edge R&D excellence, more innovative businesses and a larger talent pool supporting more highly skilled jobs. This will enable the city region to compete more effectively for investment, ideas and trade in an increasingly competitive global environment. This Knowledge Economy Plan is seen as an important mechanism for promoting the development of the knowledge-based economy, building on the strengths of the City Region's many knowledge assets so that Liverpool develops, and is seen to develop, as an internationally significant city region based on science and technology.

1.2 Although not part of this Knowledge Economy Plan, the opportunity has been taken in Appendices 3 & 4 to describe the work carried out to date to develop the Liverpool SuperPort concept and the Low Carbon Economy, as both have an important role to play in supporting and developing the LCR knowledge economy.

1.3 This chapter describes each of the key sectors including the strategic context, their current position and strengths and the opportunities those sectors present. The chapter also sets out four important cross-cutting issues which are of key importance to the successful development of the economy, particularly the application of innovation to growth. Innovation is a source of comparative advantage for UK businesses in the global market place and the city region is home for many innovative assets of national and international significance. Leveraging these strengths effectively and integrating them with the city region's wide range of other knowledge assets offers the opportunity to secure significant private sector growth both for the city region and the nation.

2. Life Sciences

2.1 Strategic context - National

2.1.1 The Life Sciences sector is understood, for the purposes of the KEP, to incorporate the pharmaceutical, medical technology and medical biotechnology sub-sectors. There are significant crossovers with manufacturing activity, particularly around medical technology. Britain's position as a world leader in cutting-edge areas of life sciences such as regenerative medicine has led to it being identified as an area of significant future growth potential.

2.1.2 In support of this, the former Government established the Office for Life Sciences to facilitate cross-departmental strategy-making. A number of key actions were formulated to help boost the sector, including:

- Making the NHS an innovation champion. Plans were set out for an Innovation Pass to give patients access to innovative medicines. There was also to be a greater emphasis on research and clinical trials in the next NHS Operating Framework. A Patent Box was also introduced to apply a reduced 10% rate of corporation tax to income from patents.
- Building a more integrated life sciences industry. An Industry and Higher Education forum was established to address skills gaps. A Life Sciences Super Cluster was to be piloted with support from the Strategic Investment Fund to boost collaboration across industry, Higher Education and the NHS, enhancing leadership in translational research and increasing the international profile of the sector.

- Introducing measures to improve access to finance and stimulate investment. These include a £21.5m 'RegenMed' programme of investment from the Technology Strategy Board to support key areas of commercial R&D and the development of R&D collaborations
- Marketing life sciences more effectively to attract inward investment and build reputation.

2.2 Strategic Context – Regional

2.2.1 The North West is one of the UK's top three biomedical clusters, based on a major global pharmaceutical presence, and has a rapidly expanding biotechnology community, many healthcare technology companies, a strong analytical and clinical supply presence and internationally renowned academic and clinical research strengths. The *Northwest Science Strategy* recognises regional strengths in the Pharmaceutical, Medical and Health sectors and particular growth potential in Biotechnology. BioHealth is, therefore, identified as an area of strategic focus, and integral to achieving the strategy's vision to establish the North West as an area of world-class scientific achievement which attracts talent and investment, drives innovation and enterprise and delivers benefits to the environment and society. *Atlantic Gateway* similarly recognises the critical mass in the city region, based upon University Teaching Hospitals, Astra Zeneca and other major and specialist companies.

2.3. Strategic Context – Sub-Regional

2.3.1 The establishment of a Bio-Medical / Health Park (now called the BioCampus) was identified as a primary building block within the City Region's Knowledge Quarter, responding to the frameworks set out at national and regional level by:

- bringing together research facilities, health services, clinical practice and leading-edge business
- attracting top international researchers and research investment
- generating significant spin-out and spin-in businesses as well as attracting leading-edge businesses to the City Region
- providing a top quality environment with state of the art facilities.

2.3.2 Within the City Region, there is a severe shortage of incubation space within the Liverpool Knowledge Quarter and also a complete lack of grow on space for incubated/emerging companies. It is of critical importance that these shortages are addressed if the city region is to maximise its generation of new businesses in this sector. The development of the Daresbury Science and Innovation Campus (already the home for 20 bio-medical companies); the continued development of The Heath; the scope for further development at the Liverpool Innovation Park and (in early 2011) at the Liverpool Science Centre, all offer important opportunities for business growth in this sector.

2.3.3 The city region has many notable assets in life sciences, but it should not be forgotten that linkages outside the region and internationally are of key importance. In international terms, compared to major clusters in Boston, Singapore and the Golden Triangle, for example, the city region does not, on its own, have critical mass. Active consideration needs to be given to how the complementary nature and greater mass which collaboration across the NW and the North of England can be galvanised to secure global reach and underpin global aspirations. There is a need for a **Life Sciences Globalisation Strategy** driven by business and science sector specialists, drawn from across the North of England.

2.4 Current position and Strengths

2.4.1 Definitions for what constitutes the Life Sciences sector vary significantly and it is, therefore, possible to produce radically different accounts of activity. To demonstrate this, a narrow focus on 'Biotech' only includes pharmaceuticals and the manufacture of medical and surgical equipment and orthopaedic appliances⁷. Employment statistics, using this definition, are:

	No. of jobs		% of all jobs		% change 1998 -2008
	1998	2008	1998	2008	
Life Sciences: LCR	3856	3607	0.7%	0.6%	-6.5%
Life Sciences: UK	128243	137402	0.5%	0.5%	7.1%

A broader definition extends to include, amongst other areas, technical testing and analysis and research and experimental development on natural sciences and engineering⁸.

	No. of jobs		% of all jobs		% change 1998 -2008
	1998	2008	1998	2008	
Life Sciences: LCR	47743	57110	8.7%	9.8%	19.6%
Life Sciences: UK	1669997	1901015	6.8%	7.1%	13.8%

A final, much broader conception of the sector has been used, which incorporates all activities relating to the manufacture of chemicals and chemical products (SIC code 24) and health and social work (SIC code 85), alongside those included in the previous definitions. This grouping of activities produces the following statistics:

	No. of jobs		% of all jobs		% change 1998 -2008
	1998	2008	1998	2008	
Life Sciences: LCR	92785	112499	16.9%	19.3%	21.2%
Life Sciences: UK	3085480	3810996	12.6%	14.2%	23.5%

For the purposes of the KEP, the middle definition for Life Sciences has been used on the basis that the final definition is too broad as to produce a meaningful representation of the sector, whilst the first excludes some notable activity. Nevertheless, it should be noted that with each definition, the Life Sciences sector consistently accounts for a greater percentage of employment in the city region than the UK average. Over the past decade, the city region has consistently contributed around 3.0% of all UK Life Sciences employment, compared to a contribution to the overall UK employment base of around 2.2%.

Taking this middle definition of Life Sciences, jobs have grown by almost one fifth (19.6%), whilst the number of businesses has remained largely constant. It is estimated that more people work in producing pharmaceuticals in Liverpool than in any other European city.

⁷ SIC codes: 2441, 2442, 3310 and 5146

⁸ SIC codes: 1588,1589, 2441, 2442, 2922, 3310, 5146, 7310, 7430, 8511, 8520, 246 and 281

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
Life Sciences	47743	57110	8.7%	9.8%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
Life Sciences	774	752	2.0%	1.7%

2.4.2 Liverpool, in particular, accounts for the highest percentage of Life Sciences businesses and jobs. Wirral is a notable location for activity, although this is due to a large number of jobs falling under SIC code 8511: Hospital activities. Whilst Halton accounts for a lower percentage of businesses and jobs, these are strongly concentrated around pharmaceuticals and the activities covered by the Biotech definition above. Daresbury is a critical location for these activities and, using this narrower definition, it accounts for 42.5% of all Life Sciences jobs in the city region.

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	97	12.9%
Knowsley	72	9.6%
Liverpool	202	26.9%
Sefton	130	17.3%
St Helens	77	10.2%
Wirral	174	23.1%
Total LCR	752	100.0%

Jobs by Geographical Distribution 2008

	No. of jobs	%
Halton	3,634	6.4%
Knowsley	7,331	12.8%
Liverpool	26,019	45.6%
Sefton	4,526	7.9%
St Helens	2,294	4.0%
Wirral	13,306	23.3%
Total LCR	57110	100.0%

2.4.3 Facilities strengths for this sector across the city region can be summarised as follows:

2.4.3.1 Mersey Bio offers 20,000 sqft gross of lab and incubation space for new and developing Bio companies, within the Life Sciences building on the UoL campus. The accommodation is fully occupied and has been for some time. The facility is not advertised but there is a steady level of interest in securing accommodation. Many of the firms located in Mersey Bio are ready to expand. Since it opened in 2003, 38 companies have been incubated, 25 of which were attracted from

outside the city region. 16 companies have moved out of Mersey Bio and the city region because of the lack of suitable grow-on space. There is a pressing need to both increase the amount of incubation space available for Bio companies and to develop suitable grow-on space.

2.4.3.2 Liverpool Science Park (LSP) exists to provide a home for developing science and knowledge-based companies by offering first class accommodation, business support and links to specialist experts. It is fundamental to the growth of the knowledge economy across the city region. All the sectors covered by the Knowledge Economy Plan are represented in the LSP Innovation Centres (IC 1 and 2). The Soft Landing Centre at LSP provides significant support services for new and emerging businesses. The LSP is currently developing proposals to convert space in IC2 to labs which will enable decanting to take place from Mersey Bio and so allow expansion of companies in Mersey Bio into the vacated space. Mersey Bio and LSP are working closely together to support the development of new businesses in the city region knowledge economy.

2.4.3.3 The Heath (see Chapter 2 for more details) offers 60 acres of serviced office and lab space and a wide range of business support services. It is the UK's largest commercial operator of multi-occupancy science facilities with flexible serviced lab space which can be adapted to individual company needs, including life sciences.

2.4.3.4 The Science and Technology Facilities Council (STFC) is committed to Bio Science at both its Daresbury and Harwell Campuses. STFC operates interdisciplinary collaborative programmes using its large scale computing and accelerator science facilities and the application of spectroscopy and laser/microscope imaging to biological and medical research. STFC Innovations Ltd operates a Technology Exchange which facilitates access to the facilities and services managed by its leading research groups, which are active in a number of bio-medical areas.

The capabilities at STFC, and those on the campus more broadly, complement the proposed BioCampus via relevant expertise in medical devices, medical diagnostics and imaging and technology for drug development as well as delivery and monitoring systems. Strengths include:

- Simulation and modelling, including molecular interactions to whole organ systems to improve targeting of drugs and treatments
- ISO qualified engineering capabilities across mechanical, electrical and electronic engineering as well as a dedicated instrument prototyping capability
- A wide range of sensor technologies in physical and electro-magnetic applications to drive innovation in medical monitoring and diagnostic applications
- Surface imaging technologies via ALICE, SuperSTEM, NCESS and MEIS
- Access to optical and imaging technologies with applications in medical diagnostics
- Access to micro, nano and imaging technologies.

Daresbury SIC is also home to the Medical Technology Exchange Centre (MedTEC) and enables rapid engagement of the NHS and other health-related organisations on the campus. NHS TrusTech, Medilink and MRC Technology have a strategic base on campus and there are strategic partnerships with firms such as Waters, Shimadzu and Thermo Fisher. The campus is also a strategic access point to technology from the European Space Agency, from which a number of applications into the biomedical sector have already been identified. The concentration of these assets, coupled with the presence of nearly 40 biomedical companies across the DSIC and the Heath, provides a strong platform for further collaborative opportunities in Life Sciences across the city region.

2.4.4 **Research strengths** in this sector include:

2.4.4.1 The key biomedical strengths of UoL:

- drug safety (Centre for Drug Safety Sciences)
- personalised medicines (Wolfson Centre for Personalised Medicine) jointly with RLBHHT
- infection and vaccine science (NIHR Biomedical Research Centre in Microbial Diseases) jointly with RLBHHT and LSTM
- pancreatic disease (NIHR Biomedical Research Unit for Pancreatic Disease funded by the NHS) jointly with RLBHHT
- oncology (including Liverpool Experimental Cancer Medicine Centre; CR-UK Liverpool Cancer Trials Unit)
- clinical trials and evidence synthesis (including Clinical Trial Research Centre; North West Hub for Trials Methodology Research; Centre for Medical Statistics and Health Evaluation)
- paediatrics and child health (NIHR Medicines for Children Research Network; Clinical Trials Unit)
- gastrointestinal health (NIHR Biomedical Research Unit for Pancreatic Diseases)
- appetite, obesity and weight management (Liverpool Obesity Research Network)
- ophthalmology (Ophthalmology Research Unit)
- veterinary science and zoonosis (National Centre for Zoonosis Research; Tesco Dairy Centre)
- bio-nanotechnologies, biomaterials and tissue engineering
- bioinformatics (Centre for Genomic Research).

2.4.4.2 LHMU complements the activities of UoL and RLBHHT with expertise in:

- research in drug targeting (Drug Delivery and Materials Science Research Group)
- authentication and screening of active ingredients; pharmacological investigations into drug treatment; the study of free radicals; chemical synthesis of pharmacologically active compounds and methods of environmental monitoring (Medicinal Chemistry, Drug Design & Discovery Research Group)
- Biomechanics (Movement Function Research Lab)
- Chronobiology (Chronobiology Research Group)
- Muscle and cell biology (Muscle Physiology and Proteomics Lab)
- Cardiovascular physiology (Exercise and Health Research Group)
- Behavioural neuroscience (Perceptual Motor Research Group)
- Ageing (Research Unit into Human Development and Ageing)
- Stem cell biology (Stem Cell and Molecular Physiology Lab)
- Informatics (Centre for Health and Social Care Information)

In addition, graduates from the University's School of Pharmacy and Chemistry provide a significant source of expertise to the biomedical sector. The Computer Assisted Teaching and Assessment in Pharmacy and Chemistry (CATAPAC) research group is developing interactive software to teach and assess students in a variety of learning environments.

2.4.4.3 The proposed **Hope Health, Care and Science Centre** will contribute to research, including into dementia.

2.4.4.4 The **Liverpool School of Tropical Medicine** (LSTM) was the first institution in the world dedicated to research and teaching in tropical medicine and remains a world-leading facility, training over 500 students a year from 60 countries. Activities include the development of new drugs, vaccines and pesticides to combat some of the world's most devastating diseases with research into

the transmission and treatment of malaria being a particular strength. The School has new laboratories (£26m) funded from a number of sources including the Bill and Melinda Gates Foundation and has grown from 164 staff in 2001 to nearly 400 staff in 2010, attracting talent from across the globe. That expansion has been matched by securing significant research contracts. The School's annual turnover has risen from £7m to £50m over the last 10 years and it has clear plans for that turnover to double over the next 5 years.

2.4.4.5 The **Royal Liverpool & Broadgreen University Hospital NHS Trust** (see paragraph 4 of Chapter 2) is the leading NHS Trust for research and education in the city region and Cheshire. Key areas of Trust research include infectious disease, pancreatic disease, pharmacology (the only NHS Chair in Pharmacogenetics in the country), cancer (Haematology, breast and pancreatic) ophthalmology and biomarkers of disease. In 2006, the funding budgets of the DOH and the MRC were combined under the National Institute of Health Research (NIHR), resulting in a fundamental change in the balance of the distribution of research across the regions coupled with a broadening of the scope of research. As a result, Liverpool became uniquely recognised for its collective excellence by the award of two research centres (see below). The Trust has also just installed a PET/CT scanner funded through NIHR. This enables both the appointment of a new Chair in Imaging and further expansion of cancer research and, in conjunction with the imminent appointment of a new Chair of Oncology, strategically positions Liverpool to capitalise on its designation by Cancer Research UK as a Cancer Centre. As an indicator of the current level of research activity, the Trust is undertaking 374 active studies/trials and has a further 74 pre-trial studies underway all supported by an annual research budget of c. £20m. Current industry funders of clinical studies include Astra Zeneca, Eli Lilly, Bristol Myers Squibb, Gilead, Pfizer, Novartis, Schering Plough, Medimmune and Glaxo Smith Kline.

2.4.4.6 The **Aintree University Hospital Trust**, the **Wirral University Teaching Hospital Trust** and **Alder Hey Childrens NHS Foundation Trust** are all involved in a wide range of research activity as set out in paragraphs 5, 6 and 7 of Chapter 2.

2.4.4.7 In terms of notable specific initiatives, UoL will be the location for the **Liverpool Institute of Vaccines Research (LIVR)**, which will exploit the regions unique research, clinical and industrial configuration and create a world class centre for vaccine development.

LIVR will build upon the region's existing strengths in infectious disease research, clinical trials resources and industrial vaccine manufacturing, providing the final component for a complete, comprehensive and internationally competitive vaccine R&D capability.

The Institute will engage with collaborators in the research and development of new vaccines in response to the needs of industry and public health. Vaccines developed through LIVR will save lives and improve health and wealth on a global scale.

LIVR will support the vaccines, biomanufacturing and related industries in the NW, providing access to specialist knowledge and expertise, R&D support, and training and up-skilling of employees. A sustainable LIVR will stimulate vaccines industry cluster development, attracting new companies to the region and driving sector growth.

LIVR will help to establish the city region as a global centre for vaccine development and will become the flagship facility for vaccine development partnership within the UK.

2.4.4.8 The Royal Liverpool University Trust in conjunction with UoL and the LSTM, has been awarded the **NIHR Biomedical Research Centre in Microbial Diseases (BRC)**, a translational facility

for development of new drugs, vaccines and diagnostic to combat microbial diseases, in collaboration with industry partners. The BRC is completed by a Medical Microbiology facility, a Bioanalytical facility and a Sample Repository. Pharmacological aspects of infection control are engaged in collaboration with UoL's Wolfson Centre for Personalised Medicine and the Centre for Drug Safety Science. The BRC also connects to UoL's Centre for Materials Discovery.

2.4.4.9 The **NIHR Biomedical Research Unit for Pancreatic Diseases**, awarded to the Royal Liverpool University Hospital Trust in conjunction with UoL, is dedicated to the development of new drugs, diagnostics and preventative strategies for management of pancreatic diseases, particularly pancreatic cancer and pancreatitis. Outputs will be translated into the clinic for improved patient care. Collaboration with industry for commercialisation of developed products is implicit in the remit of the Unit.

2.4.4.10 The **NIHR Medicines for Children Research Network** supports pharmaceutical and biotechnology companies and contract research organisations (CROs) through all research and clinical stages. This includes development of paediatric clinical trial feasibility studies, trial site identification, trial implementation, costing, ethics approval, staff training, patient recruitment, data collection and addressing of new paediatric regulatory requirements.

2.4.4.11 Within LJMU, the **Institute for Health Research (IHR)** provides a cross-faculty structure for all the university's health and health-related research. The network has four sub-groups: Organisation and Delivery of Services; Health Promotion, Policy and Inequalities; Quality of Life; and Medical Sciences and Therapeutics. IHR researchers have brought forward major innovations in non-invasive medical devices, drug delivery systems, infection control therapies and wound-healing products. Some of these products have been taken to market through spin-out companies. The IHR also encompasses the work of two related research institutes. The **General Engineering Research Institute (GERI)** has worked in collaboration with Christie Hospital in Manchester developing non-contact body position and measurement systems that can be utilised during treatment delivery.

2.4.4.12 The second allied institute, LJMU's **Research Institute for Sport and Exercise Sciences (RISES)**, has expertise in numerous aspects of health research. In RAE2008, the School was ranked joint first in the UK on the basis of its world-leading (4*) research and was described as "amongst the very best departments in the world". RISES' expertise covers three main themes: Exercise and Chronobiology (including physical activity and human circadian rhythms); Exercise and Health (including cardiovascular physiology, muscle proteomics and stem cell biology); and Human Performance (including biomechanics and behavioural neuroscience).

2.4.4.13 The new **Health Innovation and Education Cluster**, in which both UoL and LJMU partner, will consolidate and build upon existing critical mass.

2.4.4.14 As outlined in Chapter 2 and in 2.4.3.4 above, the STFC carries out collaborative research in life sciences utilising its major science facilities, including working with Liverpool's Universities and major North West-based companies.

2.4.4.15 The UoL **School of Veterinary Science** was the first such school to be incorporated into a University. 45% of the School's research is world leading or internationally excellent. In 2008, UoL and Tesco launched a National Dairy Centre to offer expertise in cattle health and welfare. Wood Park Farm at the School Field Station at Leahurst on the Wirral is now a national resource centre for farmers. The School is a major national and international provider of CPD. See Appendix 5 for more details.

2.5 Opportunities

According to the BioNoW 2010 Directory, there are over 100 medical companies in the city region employing over 5,000 people and contributing £1bn to the economy. In order to contribute significantly to the development of this sector in the city region, it will be important to:

- tackle the severe shortage of incubation space
- tackle the complete lack of grow-on space
- provide more effective innovation and commercialisation support processes, and
- develop the concept of the Royal Liverpool BioCampus adjacent to the new hospital once it is built.

2.5.1 In addition, it will be important to:

- build on the leading-edge research and applications work taking place at the **Royal Liverpool University Hospital Trust**, including: the development of a digital platform for pathology; the use of robotics in surgery; the development of immunology to offset the rejection of transplants; and the rapidly developing field of pharmacogenetics (where the Trust has the only Chair in the UK), developing mechanisms to ensure the correct drug and dose are given to each individual patient. Further discussion is needed to determine how these and other innovations can best be harnessed both for the benefit of service users and the development of the knowledge economy.
- explore the possibility of securing TSB and private sector support for the development of a **Technology Innovation Centre in Life Sciences** promoting collaborative research and development.
- support the work underway to explore the development of the **Clatterbridge Innovation Park** in the Wirral focussing on healthy living and healthcare and involving the **Wirral University Health Trust** and the **University of Chester**, who intend to make the Park their campus for health studies, related research and training.

2.5.2 In order to deal with the issues raised in 2.5.1, the following package of projects is being actively pursued:

2.5.2.1 The **Liverpool Institute of Vaccines Research (LIVR)**, to be established by UoL to exploit the city region's unique research, clinical and industrial configuration and create a world class centre for vaccines development (see 2.4.4.7) and so help establish the city region as a global centre for vaccine development and a flagship facility for vaccine development partnership within the UK.

2.5.2.2 The **Liverpool Science Park (LSP)** is urgently pursuing the conversion of space in their second Innovation Centre into laboratories which will enable the relocation and expansion of companies from Mersey Bio which will, in turn, release space within Mersey Bio to allow the remaining companies to expand. LSP is also actively pursuing the development of a third Innovation Centre to further increase the amount of space available for incubating science- and technology-based companies and which will have one floor of labs for general science-based companies to use, but which can also be used (certainly in part) to effect further relocations from Mersey Bio to provide expansion space in that incubator and the ability to once again attract new/emerging companies. Subject to clarifying the funding arrangements in the current uncertain circumstances, the conversion of IC2 could take place in 2011 and the new IC3 building could be completed in 2012.

2.5.2.3 The proposed new **BioInnovation Centre** - this Centre will have two equally important components, namely incubation and grow-on space and a Development Centre to provide assistance and support to help both resident companies and others become 'investor ready' and assist in the commercialisation of their IP. Plans for this new Centre are currently being developed by a multi-organisational group led by the Royal Liverpool University Hospital Trust and involving the LSP, the

University of Liverpool and Mersey Bio. A detailed business case was completed by October 2010. It is proposed that the new Centre be designed to enable a two-phased development with a first phase of 80,000 sqft (15,000 sq ft of incubation space; 45,000 sq ft of grow-on space and a 20,000 sq ft Development Centre) followed by a second phase of c. 60,000 sq ft of further incubation and grow-on space.

The recently published report by Dr. Hermann Hauser *The Current and Future Role of Technology and Innovation, 2010* clearly identifies a role for incubators in bridging the gap between R&D and commercialisation and developing a successful active and dynamic interface between industry, R&D and clinical activity. The Development Centre will be critical in establishing a fully integrated business creation environment which supports the development of new ideas, innovation and both new and growing businesses. The Centre will: support existing businesses through access to equipment and expertise on site; support the technical evaluation of commercial research ideas and the validation of other research and innovation (e.g. from the Universities, the Royal Liverpool University Hospital Trust and other Trusts); and support the delivery of high quality analytical services. The Centre will be able to provide services across LSP and not just for life sciences companies.

In determining the best mechanism for securing the necessary range of specialist expertise needed to manage the Development Centre effectively, LSP and its partners will need to work closely with all existing areas of expertise both in the two universities (U-Live and the Business Gateway at UoL and the Business Development Centre at LJMU) and in Mersey Bio (2Bio).

Again, subject to clarifying the funding arrangements, the new BioInnovation Centre will be located on Royal Liverpool Trust land adjacent to the new hospital and will effectively also act as a first phase of the proposed BioCampus (see below). The Centre will be procured, owned and managed by Liverpool Science Park. Discussions are currently taking place to explore the Royal Liverpool University Hospital Trust joining the Board of LSP as a full partner alongside the University of Liverpool, Liverpool John Moores University and Liverpool City Council.

2.5.2.4 The vision for the proposed **Royal Liverpool Biomedical Campus** is defined by the Royal Liverpool University Hospital Trust as:

‘A vibrant, internationally recognised campus, with health provision, related high profile research and innovation and associated businesses, attractive to top researchers from across the world.’

This vision will be realised by the rebuilding of the hospital, releasing the balance of the site for development. Outline planning consent has been secured for c. one million sq ft of health-related development taking the form of new city blocks around a landscaped public green space. The co-location of dedicated clinical trials accommodation within the new hospital, adjacent to new research facilities developed by UoL, together with commercial research organisations and associated industry, will be crucial to success. The project is being taken forward by a Steering Group established by the Royal Liverpool University Hospital Trust. An international competition will take place to commission consultants with experience of successful Biomedical Campus Developments across the world to define in more detail the role, scope and content of the Campus and options for procuring its development and for its management.

2.5.3. Turning to the opportunities referred to in 2.5.2:

- Further discussion is required in respect of the leading-edge research and applications work referred to, to determine how to exploit that work to best effect. **The Royal Liverpool University Hospital Trust and UoL** will establish a stakeholder group to pursue this. Further information on Pharmacogenetics is given in Appendix 6.

- The prospect of securing Technology Strategy Board (TSB) investment in a **Technology Innovation Centre in Life Sciences** is one of several areas in this Knowledge Economy Plan where TSB involvement may be appropriate. An urgent exercise is to be carried out involving the Universities, Daresbury SIC and other prospective stakeholders to explore the potential synergy between the development of the knowledge economy in the city region and the objectives of the TSB.
- The proposed **Clatterbridge Innovation Park** will bring together the Wirral University Health Trust and Chester University focussing on healthy living and healthcare and presents an additional opportunity to develop links between Higher Education and an NHS Trust. The Innovation Park will also offer Wirral a focal point for further enhancing its role as a driver of the knowledge economy including private sector R & D strengths.

3. Creative and Digital Industries

3.1 Strategic context - National

3.1.1 'Digital Industries' is understood here to mean digital content activities, including creative media, covering film, animation, commercials, pop promos and corporate production, as well as advertising, music and design. There is a strong interface with the creative sector, which is understood here to include companies in advertising, architecture, the art and antiques markets, crafts, design, fashion, film, computer games, music, performing arts, publishing, software and computer services, and TV and radio. For the purposes of the KEP, this definition of the sector would extend to encompass the creative elements of the city's many arts and cultural organisations.

3.1.2 The vibrancy of the UK's creative economy and its location between the US and Asia puts it in a strong position to become a global creative hub. Government policy has set out to strengthen this position, stimulating creativity and enhancing competitiveness through a range of enabling measures to drive investment and innovation.

3.1.3 *Creative Britain* sets out a vision for Britain in which local economies in the biggest cities are driven by creativity. In order to achieve this, it proposes to position the creative industries at the heart of economic and policy thinking. This policy and *Digital Britain* put forward measures to develop creative and digital skills at all levels, including new diplomas for 14-19 year olds in Creative and Media and support for the delivery of 5000 apprenticeships per year by 2013 (the eight members of the Liverpool Arts and Regeneration Consortium have all signed up to the latter initiative). To make sure that students are equipped with the right skills when they enter the industry, there will be support for the development of a new 'academic hub' facilitating collaboration between schools, FE and HE to provide a pathway for creative skills development for 14-25 year olds.

3.1.4 In terms of innovation, *Digital Britain* and creative industries are core programmes for the Technology Strategy Board (TSB), with £30m committed to research and a minimum of £10m to specific innovation programmes. The TSB's Creative Industries Technology Strategy identifies that key areas of focus are to:

- enable content data and meta-data infrastructure development
- achieve increased technical and service inter-operability between content, products and services, platforms, networks and devices
- promote knowledge-sharing and multidisciplinary collaboration via existing mechanisms, such as the Creative Industries Knowledge Transfer Network, making a significant contribution
- collaborate with other groups and agencies, including the Arts Council and regional bodies to exploit emergent opportunities.

3.1.5 Other notable initiatives to help encourage a more favourable growth environment include:

- a TSB-sponsored project to trial innovative projects on micropayments and other methods of monetisation of digital content
- a NESTA pilot for a simplified IP framework for digital media
- a £3m NESTA Creative Investors Programme to help identify what specific support is needed by creative SMEs
- the *Give Back* pilot programme to encourage young achievers in cultural fields to mentor and advise other young people.

3.2 Strategic Context – Regional and City Regional

3.2.1 *Atlantic Gateway* argues that there should be a focus upon MediaCityUK and that investment there should be used to drive further growth and development within the creative and digital sector across the Gateway area, including strengths in the computer game industry in Liverpool. In terms of creating a favourable environment for growth, it is recognised that investment in culture could help to reinforce the position of the city region as a location of choice for the creative industries.

3.3 Current position and strengths

3.3.1 The digital economy accounted for around 10% of UK Gross Value Added and employed more than 1.8 million people in 2007. The UK has the largest creative industries sector in the EU, with an estimated 157,400 businesses, contributing 6.2% to the UK economy and employing nearly 2m people. 70% of the value of the creative industries comes from content and advertising, which includes businesses like digital media, video games and e-publishing. The Creative and Digital industries permeate other sectors and are very fluid. Around one fifth of staff work outside the sector and nearly a quarter of the workforce is freelance.

3.3.2 The UK is a world leader in music, television sales, CGI, advertising, games, publishing and design. It is at the forefront of global sales of TV formats and is the second biggest exporter of TV programming hours. It has the largest music market in the EU and the biggest developer base of computer games in Europe, employing around 10,000 people. Identified key drivers of change in the sector include the growth of digitalisation, the development of user-led content and market fragmentation. The sector is characterised by small or micro-sized businesses which need to keep up to date with technology and market developments. Whilst this enables them to respond quickly to new opportunities, the sector is highly fragmented and businesses often struggle to raise capital at earlier stages of development. A few large media businesses frequently provide the route to market.

3.3.3 The North West is Europe's second largest media hub with 31,000 businesses employing 320,000 individuals. Since 1995, the sector has expanded at around twice the rate of the overall UK economy, with growth consistently outpacing national performance.

3.3.4 MediaCityUK at Salford Quays is one of only a small number of new media cities around the world. Its 20,000m² of office, production and post-production space will employ 15,000 people, housing 6 BBC departments alongside 1,150 creative and related businesses, including ITV Granada. It is understood that Sony Computer Entertainment Europe, Red Productions and Lime Pictures are all considering establishing a presence there. It is expected to create more than 10,000 jobs and generate £1bn in additional net value to the UK economy over five years, acting as a significant economic driver in the North.

3.3.5 Salford University is a key component of the wider regeneration plans for MediaCityUK and is engaging with other universities to explore potential collaborative initiatives. The Media Enterprise Centre will act as the enterprise and innovation hub for MediaCityUK, creating an international centre of expertise. Alongside businesses support, it will provide links to international expertise in industry and science. The Government is also investing in a centre of excellence at MediaCityUK to promote innovation, product development and skills for the UK video games industry.

3.3.6 Whilst the Creative and Digital sector accounts for a significant percentage of all businesses in the City Region, this is a reflection of the fact that many organisations are SMEs or micro-businesses. Over the past decade, the profile of the sector has changed: there are now fewer businesses and a larger number of employees, pointing to a notable increase in the number of small to medium-sized organisations:

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
Digital and Creative Industries	23074	23724	4.2%	4.1%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
Digital and Creative Industries	4004	3222	10.3%	7.4%

3.3.7 The greatest concentration of businesses and jobs are in Liverpool, although Wirral and Sefton are other notable locations for activity. However, closer analysis of clusters of enterprises at ward level reveals that, whilst Liverpool City Centre is a key location for the sector, there are pockets of intensity in the centre of Southport, Birkenhead and Daresbury at the Science and Innovation Campus.

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	288	8.9%
Knowsley	184	5.7%
Liverpool	1105	34.3%
Sefton	645	20.0%
St Helens	326	10.1%
Wirral	674	20.9%
Total LCR	3222	100.0%

Business hotspots

Ward	District	No of enterprises	% of enterprises in this sector
00BYFA : Abercromby	Liverpool	192	6.0%
00BYFQ : Everton	Liverpool	173	5.4%
00CAGG : Dukes	Sefton	91	2.8%
00CBFC : Birkenhead	Wirral	89	2.8%
00ETND : Daresbury	Halton	79	2.5%

3.3.8 The significance of Daresbury becomes more apparent when one considers current employment statistics. Whilst Liverpool and its city centre remain focal points of activity, 12.6% of jobs are located in Daresbury, accounting for the vast majority of all posts in Halton. The importance of Wavertree, the location of Sony Computer Entertainment, is also demonstrated by this 'hotspot' analysis.

Jobs by Geographical Distribution 2008

	No. of jobs	%
Halton	3799	16.0%
Knowsley	2157	9.1%
Liverpool	10562	44.5%
Sefton	2754	11.6%
St Helens	1893	8.0%
Wirral	2559	10.8%
Total LCR	23724	100.0%

Employment hotspots

Ward	District	No of jobs	% of jobs in this sector
00BYFQ : Everton	Liverpool	3,466	14.6%
00ETND : Daresbury	Halton	2,990	12.6%
00BYFA : Abercromby	Liverpool	1,933	8.1%
00BYGA : Picton	Liverpool	!*	!
00CAGG : Dukes	Sefton	732	3.1%

*cannot be disclosed for purposes of confidentiality

3.3.9 Analysis (Burns Collett for ACME) reveals that whilst there has been a significant increase in the number of businesses with 1-5 employees (56%) and those with 21-50 employees (69%), the total number of businesses with 51+ employees has declined by 16%. Despite this, these larger businesses now employ 32% more people. Businesses work predominantly in local and regional, rather than international markets.

3.3.10 As home to the European headquarters for games testing of Sony Computer Entertainment Europe, one of the world's biggest games manufacturers, as well as games studio Activision, Liverpool is one of Europe's focal points for the games industry (see Appendix 7). The city region is increasingly recognised for multi-platform content via firms such as Conker Media, part of Childwall-based Lime Pictures. Other notable industry brand leaders include Trinity Mirror, Cream, Deltasonic and Ad Lib Audio. There is also a strong core of local growth businesses, such as Paver Smith, Mando, Evolve, Integral and Ripple Effect.

3.3.11 The DSIC has an established cluster of fifty CDI and ICT companies and this will be strengthened with the arrival of more businesses with the opening of Vanguard House in early 2011. The strengths of the Computational Science and Engineering group at the STFC's Daresbury Laboratory include activities in modelling and simulation and also capabilities in data mining, tagging, archiving and data management as well as visualisation and virtualisation technologies, important in the digitisation of archive video content. These are complemented by the capabilities of the STFC's Technology Group, which encompass intelligent imaging and lighting systems, image tagging and exploitation. The DSIC has forged strong relationships between the campus and major corporates such as IBM, Microsoft, Cisco and Intel. These relationships and the strategic presence of blue chips in the city region will be strengthened if the proposed £50m Hartree Centre receives funding approval.

3.3.12 Liverpool Innovation Park is the location for more than forty creative businesses and its provision of grow-on space for incubated companies complements the offer for CDI firms at the Liverpool Science Park.

3.3.13 Merseyside ACME, established in 1997, was the first creative industries sector development agency in the UK and has worked to support the growth and sustainability of creative businesses in the city region. Much of this support has been geared towards developing small-scale industry activity. ACME is also responsible for chairing and hosting the city region's Creative Industries Support Services Network and has developed the Kin Creative Business Network. Its key mission in the next three years will be to support the development of more productive, higher-value businesses that will look increasingly at opportunities in external markets.

3.3.14 HE links have been supported by the opening of the LJMU Art and Design Academy, which provides an interface between the University's research and professional expertise and participants and practitioners within the artistic and creative sector via public facilities, exhibition spaces and galleries, as well as new creative networks.

3.3.15 LJMU also houses a Skillset Media Academy, which includes the Liverpool Screen School, combining undergraduate programmes with continuing professional development for business. At the same location on Liverpool Innovation Park, the Open Lab will continue and develop the work of the International Centre for Digital Content by providing an innovative vehicle to promote and support collaboration and interdisciplinary working between students, staff and regional SMEs and freelancers.

3.3.16 At Hope University, the Cornerstone for Creativity is a £7m capital development to support creative industry links, including dedicated incubation space for art, design, dance, music and drama. This builds upon the strong links between Hope and the music sector (e.g. Royal Liverpool Philharmonic, Steinway) and fine art and design sector (e.g. Crafts Council, Goldsmiths Company). The campus is a Steinway Piano Centre and home to arts partners including the European Opera Centre, Collective Encounters Theatre Company and the South Asian arts organisation MILAP.

3.3.17 Liverpool's arts and cultural sector, which has a strong creative dimension, has one of the most potent collections of assets outside London, including:

- The only National Museums in England outside London (National Museums Liverpool)
- Tate Liverpool
- Royal Liverpool Philharmonic Orchestra.

There is a strong track record in collaboration and innovation across the sector:

- Liverpool Arts and Regeneration Consortium (LARC) brings together eight of the leading cultural organisations in Liverpool to help ensure that the cultural sector plays a significant role in the regeneration of the Liverpool City Region
- The Small and Medium Arts Collective (SMAC – now COOL) is a network of some fifty organisations.

3.3.18 **Culture Campus Liverpool** is a partnership between the HE institutions and cultural sector in Liverpool which aims to help establish Liverpool as a centre for innovative, collaborative practice in arts and culture by attracting talent, enhancing employability and improving graduate retention.

Culture Campus seeks to operate as a strategic driver and catalyst, brokering collaborations between HEIs and the cultural sector, fostering a creative environment in which cross fertilisation and innovation occur naturally.

The Board of Culture Campus Liverpool includes representatives from Tate Liverpool, Liverpool Biennial, FACT, the Institute of Cultural Capital and the Universities of Liverpool, Liverpool John Moores and Liverpool Hope.

3.4 Issues and challenges

3.4.1 NESTA estimates that the creative industries will grow on average at more than double the rate of the rest of the economy. Employment is expected to grow by 150,000 until 2017, with new posts mainly in managerial, professional and highly-skilled occupations. Research by the TSB suggests that 70% of the value and most of the growth potential of the Creative Industries lies around content and advertising. New technology presents significant threats as well as very exciting opportunities for UK creative industry businesses. As digital technologies have developed, organisations using traditional business models and linear value chains from the analogue age are increasingly finding themselves ill-equipped to succeed.

3.4.2 Recent studies suggest that creative businesses are not fully exploiting the opportunities offered by knowledge transfer as they rarely have well-embedded knowledge transfer processes. It has been argued that a new approach and a new language are required in order to make the proposition of knowledge transfer more compelling.

3.4.3 Traditionally, interventions for the DCI sector have focused on supporting companies within the sector exclusively. However, recent innovation competitions from the TSB have shown that stimulating demand for services from outside the sector leads not only to greater innovation but also the formation of long term relationships between companies. The TSB's *Creative Industries Strategy 2009 – 2012* argues that:

- Technical talent alone is no longer enough to bring a product or service to market. Design, specialist domain knowledge, and a clear channel to market all increase success rates.
- Small companies, in particular, benefit from long-term partnerships that are created from this type of activity. This leads to greater company stability.

3.4.4 A survey for ACME of creative sector businesses in the city region revealed that only 6% were not confident about future prospects. It is anticipated that future workspace needs will focus primarily on small units of up to 250 sq ft. However, research undertaken by Centre for Cities noted that small companies on an upward trajectory often felt there was a lack of longer-term support for growth, leading to increased pressure to re-locate outside the city region. Businesses also noted that networks were more established in Manchester and London, particularly those associated with international markets.

3.4.5 Only six of the UK's 200 computer games degree courses are accredited by the relevant sector skills council, Skillset. None of these six are in Liverpool's universities, although LJMU delivers a computer games course and has secured media academy status as a centre of excellence in television and interactive media.

3.5 Research strengths

3.5.1 The **Open Lab** is an innovative new programme of interdisciplinary collaboration to support the region's SME and freelance communities. Working across LJMU, it will seek to encourage and promote a culture of collaboration and interdisciplinary working between students, staff and local industry. Open Lab will provide opportunities for these groups to engage with one another to explore new and emerging markets, technologies and trends.

Continuing and further developing the work of its predecessor, ICDC, Open Lab will develop opportunities for partnership working with the Creative Industries, other sectors in the region and the wider University. Amongst other objectives, it will aim to:

- ensure that LJMU students and graduates benefit from a range of work experience and employment opportunities, leading to the formation of new companies
- increase the innovative capacity of the city region economy so that companies are better able to compete on a world stage
- facilitate the development of innovative products and services
- enhance the knowledge capital within the participants.

3.5.2 The **Liverpool Screen School** is part of the national SkillSet Media Academy network. It delivers high quality, industry-relevant training, offering excellent learning resources and first-class student support, with teaching and CPD options delivered by professional, experienced and enthusiastic academic staff with extensive and current practical industry experience. As part of the SkillSet network, the School is developing credit-bearing CPD modules whereby any credit accumulated at one participating Academy can be 'cashed in' at another. A period of consultation with industry is near completion and it is anticipated that new CPD provision from the School will include modules in cross-platform production, new business/funding models and creative leadership development. Current CPD provision at Masters level includes:

- Convergence
- Digital Moving Image Production
- Directed New Media Project.

The School also offers bespoke training packages to wider industry including media handling training, covering areas such as media awareness, business writing for professionals, voice training and effective presentation. Clients are predominantly from the public sector, including NHS Trusts and Police Forces, both locally and nationally.

A commitment to Knowledge Exchange underpins the School's engagement with industry and emphasis on professional practice. Academic staff and students are regularly involved in

collaborative projects and the School has strong links with local, national and international media companies and institutions including the BBC, Trinity Mirror, Sony, Lime Pictures and MOFILM, worldwide distributors of creative mobile content. This network of partners allows students to forge professional links, establish work placements and deliver research projects.

The Screen School has recently established a production unit, offering a range of production services such as promotional videos, short films and multimedia, including website design and animation. The unit works both with current students and alumni to provide the most appropriate response to any client's brief and budget. It works for a range of clients, including public sector, social enterprises and charities. The School also incorporates the **Centre for Responsible Journalism**, which aims to develop good practice and foster a climate of responsible professional behaviour.

3.5.3 The School connects to LJMU's **Centre for Cultural Leadership**. The Centre's MA in Cultural Leadership is an innovative new programme targeted at the cultural and the creative industries, which focuses on the leadership needs of cultural organisations via a collaboration with employers within the sector, generating debate, critical awareness and a growing and shared knowledge base. Since cultural managers are often self taught and find it hard to make time for their own professional development, the programme has been designed to provide opportunities for personal and professional development without necessarily taking students away from their workplace.

3.5.4 The **Liverpool School of Art and Design** was first established as the Liverpool Mechanics' School of Arts in 1825. It is now housed in the new Art and Design Academy, a purpose built, state-of-the-art building, which won the International Architectural Press Award for the most significant educational building in the world in 2010. Over the past five years the School has undergone a significant transformation of curriculum and direction. It established its first R&D unit, the Art and Design Pod, a design-based facility engaging in graphic, textile, fashion, product and space design. Unlike many Art Schools, it has completed a number of KTPs and has assisted a number of new start-up companies, predominantly created by its graduates. It is equipped with the latest CAD technologies, including a 3D printer, laser cutting and milling machines. There is potential to explore opportunities around developments in advanced manufacturing, particular additive layer manufacturing, where there are existing research strengths (see 4.5.28 in this chapter). Further purchases will include virtual scanning and haptic technology combined with the most contemporary print facilities and software.

3.5.5 The **School of Computing and Mathematical Sciences (CMS)** at LJMU has a strong track record of undertaking advanced research in media and entertainment. In particular, CMS research has been at the forefront of research relating to home entertainment and networked appliances, having recently collaborated with major industrial partners such as Panasonic, Huawei Technologies and BBC Research. The School also has established expertise in content storage and sharing, with a number of projects looking at the long term management of digital "life memories", such as through the use of P2P networking as a mechanism for sharing memories involving AT&T and Panasonic. RAE2008 rated 50% of its research at 4* and 3* (world or internationally leading) within Computer Science and Informatics.

CMS enjoys a unique research strength in the area of Security Information and Forensics of digital content and services. The laboratory focuses on providing theoretically sound and practically effective solutions relevant to media and entertainment solution in three main areas:

- secure systems/networks composition
- secure and fair exchange of valuable information
- network intrusion detection.

CMS has a range of undergraduate and postgraduate courses catering for the fast moving media and entertainment technologies including: digital content creation through to its storage and management and onwards to its delivery to users, embracing software development; information and communication technologies; telecommunications; mobile solutions; and computer games.

Since 2001, CMS has been at the forefront of computer games education and research, with seven novel programmes in Entertainment Computing. Current work includes a major collaborative project with BBC research developing an internet-based game engine and networking platform. This builds on a series of collaborative projects with local and international organisations, including SCEE, Onteca, and the LMU Munich University.

LIMUs Faculty of Education, Community and Leisure hosts expertise in semantic web technologies. The Centre for Educational Research and Evaluation Services is leading a joint ESRC/EPSRC funded project under the Technology Enhanced Learning Programme, exploring the potential of the semantic web to support teaching in complex, controversial and rapidly evolving fields.

3.5.6 The BSc Creative Computing programme at Hope covers a number of complementary areas, including:

- advanced web technologies
- gaming technologies
- multimedia programming and production
- animation technology
- 3-D modelling

In terms of fine art and design, Hope also has considerable expertise in the fields of ceramics, metal, textiles and wood. In music, 65% of Hope's research was rated as being of national or international importance.

3.5.7 In partnership with Salford and Lancaster University, CMS is scoping the development of an **Innovation and Knowledge Centre**, in the heart of the exciting new development of MediaCityUK at Salford Quays, with a focus on media and entertainment technologies. Its activities would include:

- world-class research
- PhD by research and professional doctorate
- undergraduate and Masters-level provision
- industry-led provision and staff development
- enterprise activities, including KTPs and Innovation Vouchers.

3.5.8 UoL has strengths in **'informatics'**. There are no competitors in the North West and partnerships have been established with business and universities in several locations across the world, including UCLA. There is expertise relating to the tools and technologies required for preserving and analysing digital documents and media. Key elements include the use of high performance computers to drive the re-use of digital content.

3.5.9 UoL's **Semantic Web Technologies Laboratory** carries out research designed to support the development of the Semantic Web and the application of Semantic Web technologies.

3.6. Related Initiatives.

3.6.1 The **Media Enterprise Centre** (MEC) at MediaCityUK will provide incubation space and is also intended to house FIRM, Make Media, the Computer games Centre of Excellence and the Digital Content Lab.

NB. Although the building exists and Salford City Council has taken a lease, much of the funding support for the activities to take place within the MEC was due to be provided by NWDA. At the time of writing it is very unclear how much of this anticipated resource support will, in practice, still be available given the significant cuts faced by NWDA this year and next, and its closure at the end of March 2012. The proposed establishment of Local Enterprise Partnerships (LEPs) to replace much of the RDA's activities is at a very early stage of development and funding support has not yet been clarified. Other potential sources of funding also remain to be clarified.

Taking each occupier in turn, FIRM (Framework in Innovation and Research at MediaCityUK) is led by the University of Salford and also involves Cambridge, Lancaster and Goldsmith with some involvement from MIT. It is meant to be an 'open door' for industry; a resource to put industry in touch with universities across the world. Liverpool's universities need to address this opportunity and secure appropriate involvement.

Make Media is a community project led by Salford City Council and involving Radio Regen. The Games Centre of Excellence and the Digital Content Lab need to be considered together as the Media Lab. In practice this will take the form of two labs:

- A Useability Lab researching how people are using games, what they are looking for in games, how they play etc. A better in-depth understanding of these issues will help companies to develop games which respond to market demand and expectations. The major companies involved will do this sort of research themselves. The Useability Lab is aimed at smaller games companies, providing them with a facility and feedback which would otherwise not be available to them.
- An Analytical Lab, concerned with the whole range of online gaming opportunities. This lab will aid business model analysis, helping businesses to develop, whatever online activity may be involved. It is not just about console games players but, rather, any online digital content-related activity.

Business types are merging. Take the Doc Martin's website where you can design your own boot – it is a form of game, which brings content and digital technology together. The digital content lab, therefore, aims to help companies work better together to develop digital content. It will bring an understanding of the digital content market place to the North West. It will provide intelligence on:

- where the industry is going
- new markets developing world wide
- what makes money
- what the major players are doing.

It will aim to hold a comprehensive store of information about the digital content world, brokering applications to bring business to the North West. The key issue, therefore, is how best to ensure that companies and individuals can link into this source of intelligence. It is all aimed at small digital content companies (e.g. North West Vision & Media have brought a number of North West companies and the BBC together to explore potential applications which could feature on next generation TVs). This is an example of digital content companies and digital technology companies working together to keep ahead of the game.

Liverpool city region has a large number of small creative content makers. A key issue is how best to bring through talent which is at the leading-edge of technology. The industry needs three things:

- access to the right people
- access to market intelligence (via the Digital Content Lab)
- access to finance.

Regarding people, it is important to bring university graduates and businesses together more effectively – the Knowledge Transfer Principle, but involving much smaller businesses. This type of arrangement can also bring content providers and digital technologists together.

The city region needs to ensure that the Digital Content Lab intelligence is made available, perhaps through Digital City (see .6.5), so it can be accessed by the many small content and digital companies. For this to work effectively Digital City would need to be managed by someone who fully understands the fast-moving content and digital areas and who is from a business background. It should certainly be business-led and involve the highest quality people. The hub can trade and build on the strength of Liverpool’s brand in content and digital. In developing the hub, the experience of Daresbury SIC both as a business support and development organisation and with real expertise in mass data handling will also need to be ensured.

3.6.2 The origins of FACT, **the Foundation for Art and Creative Technology**, go back to 1985 with the establishment of ‘Merseyside Moviola.’ Moviola became FACT in 1997 and the new FACT Centre opened in 2003. It has had over half a million visitors since it opened.

On behalf of the Ropewalks Square Project Steering Group, FACT is now pursuing proposals to secure the redevelopment of Ropewalks Square which is the primary connective space between the Ropewalks and the Bold Street thoroughfare. The project comprises three distinct but connected elements:

- animation of Ropewalks Square
- creating a creative industries cluster around the square
- further development of the FACT Centre and its operations.

The project will establish a cluster of arts and cultural activity around FACT with surrounding buildings housing a wide spectrum of digital and creative businesses. Once completed, the project will

- provide a more visible presence for FACT on Bold Street, raising awareness, increasing public engagement and access to services,
- enhance Bold Street as a cultural heritage destination,
- contribute to the development of the CDI sector as a hub with a 100Mbps media access bureau, and
- improve public accessibility into the Ropewalks. Arts Council funding support is already in place and it is hoped that, notwithstanding the now very restricted availability of public resources, funds will be forthcoming to support this £1.5m project.

3.6.3 The area known as the **Baltic Triangle** lies between Chavasse Park/Liverpool One, the Albert Dock and the Liverpool Anglican Cathedral. Over the last three to five years the area has attracted a wide range of small creative and digital industries which now occupy over 400,000 sq ft of accommodation. Several hundred micro-businesses are in property which is 90% privately owned and managed. NWDA are refurbishing 40,000 sq ft which is to be transferred into a Community Interest Company, Baltic Creative.

The extent of the attraction of small creative industries (largely sole traders and freelancers) to this location has exceeded all expectations. It is important that the area is allowed to attract more and

more companies to this cluster of growing importance. The City Council owns the bulk of the vacant land in the area and, following discussions with council officers, is exploring how it can best make land available for further private sector development to attract more creative industries to the location. The opportunity also exists to improve the pedestrian linkages to the Hope Street Quarter and to the Knowledge Quarter to the north, which will, amongst other things, improve student links to this important creative hub.

3.6.4 The Games Industry has long been of real significance to Liverpool. Appendix 7 provides a short games industry briefing as background. The importance of the industry responding effectively to the social gaming opportunities which are fast developing cannot be overemphasised.

3.6.5 The CDI sector in the city region is very diverse, shows considerable dynamism and has a number of leading-edge specialisms. The sector is characterized by a small number of leading large companies such as Sony, Lime Pictures and Trinity Mirror and several others, alongside 4,000+ small operators and this mix needs to be recognized in taking forward sector developments. Proposals are currently being developed to achieve two principle objectives:

- The need to respond to the strong market opportunities in digital advertising, digital marketing and gaming and 'new cinema' technologies as well as the potential business generated by MediaCityUK, and
- The importance of developing some form of **Creative Business Hub** which can link networks and locations, promote collaboration and provide support facilities for the many micro businesses in this sector.

Focussing on these market opportunities in conjunction with the private sector, proposals are being developed to provide incubation space, technology research and development partnerships between businesses and the universities, mentoring, networking, support for collaborative consortia, showcasing the strengths of the CDI sector to national and international markets, supporting strategic and foreign direct investment into the city region and providing business support services to enable the city region's SMEs to realize their growth aspirations and potential.

In the development of these market opportunities, the potential and need for a focal point e.g. a **Creative Business Hub** (or perhaps more than one), is being actively pursued, together with the provision of better links between key business locations and the development of more effective cross sector relationships. Essential supporting infrastructure in the form of 100mb broadband access forms part of the action needed to enable the CDI sector to develop and compete effectively. (See Ch 3, section 10 (B), paragraph 10.35).

For some time now, the Trinity Mirror (TM) Group had been pursuing the concept of developing a networking/showcasing hub for the CDI sector in their City Tower accommodation in the city centre. TM themselves are moving from print to a multi-platform business and becoming a creator of content, developing new channels and web sites, web-enabled business systems and the like. In particular, TM have identified the considerable potential of digital marketing and the need to support the development of a major supply chain in the Liverpool City Region to realise the opportunities. This important market opportunity reinforces the need for effective facilitation for a 'network of networks', supporting connections between some diverse business sub-sectors around the whole array of creative digital technologies and applications.

It is important that these new and exciting market opportunities and the **Creative Business Hub** concept are driven forward by private sector champions, supported by the public sector where appropriate. Every support needs to be given to realizing these opportunities and to facilitating the growth and development of the sector.

3.6.6 The establishment of an **Internet Exchange** brings real and lasting value to its location. Manchester University established the first exchange outside of London in the late 1990's and, by 2004/5, demand had increased to such an extent that a second exchange was established nearby. As a result of this investment, internet access costs in Manchester are much lower than in Liverpool with inevitable business attraction consequences. It is important, therefore, that the digital infrastructure in the city region – fibre, data centres and internet exchange – is pursued vigorously. One obvious potential location is the Liverpool Innovation Park which has the major advantage of ample power supply to support the provision of such energy hungry facilities along with a tenant who already provides data centre capacity and is soon to deliver a cloud computing demonstrator project. There will be other locations in the city region with adequate power supply to enable the establishment of a network of data centres across the city region to help underpin the development and growth of the CDI sector. The unsuccessful application led by Wirral in 2009 involving the establishment of a **Digital Enterprise Network** for the city region with phase one involving Wirral, St.Helens and Liverpool set out the case in detail. The logic of that case is even more appropriate today and, although public sector funding support will be much more difficult to secure in the current climate, it is clear that the objectives behind that application remain valid and that alternative ways of taking the project forward need to be explored. Options might include the use of the JESSICA fund and the recently announced Regional Growth Fund.

3.6.7 The **Institute of Cultural Capital** is a jointly developed project by the University of Liverpool and LJMU which will be located in the Liverpool Science Park. The Institute will help to consolidate Liverpool's distinctive cultural identity which is critical to the way the city develops. Liverpool is showing the way in demonstrating how culture can create economic impact. The Institute will build upon the success of the 'Impacts08' research programme to evaluate the success of Liverpool's year as European Capital of Culture and aim to improve policy-making around cultural innovation in the UK and Europe. Drawing upon the city's experience, it will showcase how culture can be an engine for regeneration. The Institute will embrace the **NW Cultural Observatory** (also based at UoL) and will aim to develop that into a national role. It is intended that EU funding support will be sought with opening in the autumn of 2010.

3.6.8 The potential application of **Smart Grid** technology is described in paragraphs 5.5 and 5.6 of Appendix 4. As well as having the potential to accelerate the move towards a low carbon economy, Smart Grid is also capable of transmitting large volumes of data and the trial referred to earlier will also target companies in the telecommunications, IT, and the data and business processing sectors, to assess the potential for its exploitation in these areas. The STFC has relevant capabilities in this area, including data archiving, data mining and data management, via their e-science department.

3.7 Opportunities

3.7.1 The business profile identified in the Digital and Creative Study⁹ shows a sector which comprises some 4,500 very small businesses across the wider economic area stretching into West Cheshire, and a handful of nationally significant companies. There are some important niche specialisms and a very vibrant concentration of creatives in Liverpool's Baltic area. Amongst the key support needs which CDI businesses identify are support for networks, assistance with collaborative ventures, a range of skills gaps (particularly in post-production), mentoring in business leadership, access to finance, and channels into the new markets. ACME is the local sector network, working in partnership with NW Vision & Media to support D&C businesses in the city region. There is a clear need to focus the limited resources available to support and promote the CDI sector in a more effective way. The CDI Group involving ACME, Liverpool Vision, TMP and NW Vision & Media, also to

⁹ Liverpool City Region Digital and Creative Sector, Ernst and Young, for Liverpool Vision 2010

include Halton as lead local authority on digital issues, currently provides co-ordination. The establishment of a Local Enterprise Partnership for the city region offers the opportunity to consolidate support services which are currently provided both at regional and sub-regional levels into a more effective city regional package, and one which is closer still to the businesses it aims to serve.

That opportunity could also address the wider issues of business support including access to commercial finance, links to the Regional Venture Capital Funds, the new Merseyside Loan and Equity Fund (up to £25M) with a focus on the creative and media sectors, the capacity to effectively pursue JESSICA, Regional Growth and EU funding and the possibility of the LEP taking over the Business Link activity in the city region within the intended national framework. The sector needs a coherent voice and adequate capacity to provide support for new emerging and growing businesses. The LEP arrangements have the potential to deliver that coherence.

3.7.2 As in certain other sectors, partners need to explore the potential relationship between the development of the CDI sector across the city region and the objectives of the Technology Strategy Board, which, it is understood, is likely to take over the innovation and technology responsibilities currently exercised by the RDAs. There is a case for co-ordinated action here to maximise the impact of TSB funding involving the universities, Daresbury SIC and the sector support arrangements (see Appendix 6). Once again, the emerging LEP could provide an integrated vehicle to facilitate this process.

3.7.3 There is an issue around the provision of incubation space and subsequent grow-on space for the sector which needs to be addressed comprehensively. As already described, the Baltic provides affordable space on flexible terms and many new and emerging businesses occupy space there. The FACT scheme is proposing to include some incubation space and the **Creative Business Hub** (3.6.5.) concept could also provide space. The Hope University Creative Campus also has space for art, design, drama and music incubation. An opportunity certainly exists to develop a significant digital business location between the Ropewalks / Baltic area and the Knowledge Quarter, providing closer physical links between creative businesses and key university facilities such as the new LJMU Screen School. Further consideration needs to be given to business support for emerging businesses (whether in incubation space or above the garage) to ensure that the latent talent for which the Liverpool City Region is justifiably renowned is supported effectively and new business development encouraged (the role ACME has traditionally played to good effect). This needs to be taken fully into account in determining the wider arrangements for sector support outlined in 3.7.1 above.

3.7.4 The need to ensure that the supply side of the skills agenda meets the ever-changing requirements/demands of the sector is a key issue. Because of the rapidly evolving technological context within which the sector is developing, there is a real challenge for the HE and FE sectors to constantly adjust their provision to meet new and emerging requirements. There needs to be an effective dialogue between the CDI sector and the HE/FE sector to ensure that the city region is always producing the skills required, at all levels, to support the industry. The sector is highly dependent on skilled, creative, talented people and the city region needs to ensure that it continues to be able to provide such people to support indigenous and external investors. Once again, adequate support arrangements through the LEP could facilitate this.

3.7.5 Proposals to establish a Local Enterprise Partnership for the city region present an opportunity for the currently dispersed regional and sub-regional resources available to champion and support the development of the sector to be brought together to provide more effective support for CDI businesses.

3.7.6 In developing the city region's support for the development and growth of the sector, an integrated approach to working with the TSB should be explored by the sector support group, the universities and Daresbury SIC.

3.7.7 MediaCityUK presents a significant opportunity for the city region's CDI sector. The following opportunities need to be explored as a high priority:

3.7.7.1 Utilising the **Creative Business Hub** (and those private sector companies with an expressed interest in MediaCityUK) as a focal point for relating to MediaCityUK-generated opportunities and ensuring that the sector in the city region is effectively supported to take maximum advantage of those opportunities

3.7.7.2 Establishing a city region presence in MediaCityUK, possibly in the MEC depending on how that develops, to enhance the networking opportunities for city region companies

3.7.7.3 Supporting collaborative working between the city region's universities, Daresbury SIC and the University of Salford and other HEIs at MediaCityUK, to develop the collective capacity to work effectively with the private sector in supporting the development of the Media City concept and to maximise the opportunities which MediaCityUK will present to the city region's economy.

3.7.7.4 Securing involvement in the NWDA review of the Media Access Bureau business model, given the currently very low take-up, to ensure that maximum advantage can be taken of the technology which Northern Net represents and then ensure that further media access points are provided across the city region where there are concentrations of creative and digital industries

3.7.8 The opportunity should be taken to explore how the earlier Wirral-led proposal to establish a Digital Enterprise Network for the city region (see 3.6.6) might be taken forward utilising alternative sources of funding and taking full account of competition requirements.

3.7.9 The opportunity to continue the rapid development of the Baltic Triangle for occupation by creative and digital industries through the release of Liverpool City Council-owned vacant land for the purpose (see 3.6.3.) and the proposals to develop Ropewalks Square (see 3.6.2.) will assist the development of the sector and should be supported. Other initiatives, such as the FibreDrive proposal being pursued by Liverpool City Council to make business use of their fibre network, which was installed to provide connectivity for traffic cameras and information boards, should also be supported, particularly where more effective use can be made of existing infrastructure and in a way which can be applied across the city region quickly, pending the wider roll out of Next Generation Access.

3.7.10 The opportunity should be taken by the current sector support group to facilitate a structured dialogue between key companies and the universities to explore the potential for strengthening the city region's capability in the field of digital post-production (complementary to MediaCityUK) including addressing the skills needs in this area.

3.7.11 More broadly, there are opportunities for the evolution of a wider knowledge exchange hub linked to the recent major developments around the Art and Design Academy and the Clarence Street development at LJMU. Industry-focused, interdisciplinary working between local companies, academic/technical staff and students could deliver opportunities to explore and exploit new and emerging markets. Alongside access to specialist equipment and Skillset accredited training offered by Liverpool Screen School, this could create a focal point for interaction across the sector and beyond, stimulating more extensive knowledge transfer, innovation and commercialisation opportunities.

3.7.12 Finally, in addition to supporting the ongoing development of the sector, the opportunity should be taken to explore Next Generation technologies, such as smart materials and physical computing and the potential business opportunities which could flow from their exploitation. This should be undertaken in concert with relevant developments in advanced manufacturing, notably additive layer manufacturing (see 4.5.28 and 4.5.29), as well as existing strengths and assets such as those in the Liverpool School of Art and Design. Opportunities from current research conducted by the universities such as the digitisation of film, heritage and library content and the curation and re-use of digitised content should also be pursued. The importance of developing 'foresighting' capacity across all sectors to take full advantage of the leading-edge research and applications which the city region's knowledge assets generate needs to be addressed.

4. Advanced manufacturing

4.1 Strategic context – National

4.1.1 The UK economy depends on effective involvement in the manufacturing sector which provides goods to the world's market place. A broader definition of manufacturing has become increasingly appropriate, recognising that the sector means far more than final assembly of finished products in the production facilities normally associated with the term manufacturing. It involves the full cycle of activities, incorporating services as well as products. This spans activities from research, design, development and production through to logistics, after sales service, maintenance and repair and end of life management. It embraces the development of the sophisticated materials that allows novel features to be included into products and also the advanced technologies that allow sophisticated final products to be designed and produced with fine degrees of tolerance, excellent quality control and optimum efficiency. The value of the distinction between 'high-' and 'low-' tech manufacturing has also rightly been questioned, with some traditionally 'low-tech' firms now investing significantly in knowledge-intensive intangibles, such as branding and product design. LCR, which has particular strengths in efficient manufacturing processes, can participate in the manufacturing sector at all points of the supply chain from the design and supply of component materials to companies throughout the world, to the final assembly of products within the region. The development of the Liverpool SuperPort would support this activity.

4.1.2 Manufacturing accounts for 13% of UK GDP and has increased its productivity by 50% since 1997, outperforming the rest of the economy. The UK generates the sixth largest manufacturing output in the world and attracts more foreign direct investment than any country apart from the USA. Manufacturing accounts for 75% of business research and development in the UK and half of the UK's exports.

4.1.3 Six manufacturing sub-sectors were identified by the former Government's Department for Business, Innovation and Skills as forming the advanced manufacturing sector and which contribute to the supply chain of numerous other sub-sectors, such as the digital economy and life sciences. These are:

- aerospace
- silicon electronics
- plastics / printed electronics
- industrial biotechnology
- composites
- nanotechnology

4.1.4 *Manufacturing: New Challenges, New Opportunities* set out a vision for an internationally competitive sector, which builds on existing areas of comparative advantage and anchors the higher

value elements of the increasingly prevalent and complex global value chain. It aimed to establish a stronger enabling environment to support the manufacturing sector as it comes through the current downturn to emerge as a competitive component in a mixed and balanced economy. The strategy, therefore, recognised and set out measures to address the shifting environment which is reshaping the context for advanced manufacturing. The move to a low carbon economy and rising energy costs present both new challenges and opportunities for manufacturing firms. The former government established a new Office for Renewable Energy Development to address barriers to the development of renewables. The Office of Nuclear Development will help to develop nuclear supply chains and maximise high value-added work.

4.1.5 In recognition of the increasing importance of investing in people and skills, the former Government announced a 10% increase in the number of manufacturing apprenticeships. The UK Design Skills Alliance has been charged to ensure that the design sector has the skills that manufacturers require. Demand for new products and services has also accelerated the pace of technology exploitation. There will be a new Manufacturing Technology Centre in Coventry, complementing the existing centre in Yorkshire and the one being built in Glasgow. The Technology Strategy Board will also invest £24m in research into high value-added manufacturing.

4.1.6 Finally, measures were set out to improve the image of manufacturing. The Design Council and RDAs were to implement the findings of the review of the Designing Demand programme and a new body, Manufacturing Insight, was established to help change the public perception of manufacturing, reflecting its successes. It is as yet unclear how these arrangements will fit with the Coalition Government's policy, although they have made clear their commitment to supporting the development of manufacturing in the UK.

4.1.7 Alongside these enabling measures, the former Government intended to make targeted investments for specific sector initiatives. A £150m package of targeted investment was proposed to secure four new advanced manufacturing facilities – three in aerospace and one in civil nuclear – creating around 800 jobs. Low carbon automotive transport was identified as a key sector with growth potential and a £270m loan guarantee provided to General Motors Europe. In terms of international markets, it was also intended that UK Trade and Investment would allocate additional resources to support 600 British companies of all sizes to identify manufacturing value chain opportunities in India and China. The position of the new government in respect of these intentions is now emerging and the loan guarantee, for example, has been confirmed.

4.2 Strategic Context - Regional and City Region

4.2.1 North West partners have set out a vision to establish NW as the UK's foremost manufacturing region with an attendant commitment to focus activity upon raising the contribution of manufacturing to regional GVA, creating an innovative, enterprising and highly-skilled sector. The *Manufacturing Strategy and Action Plan for England's North West* identified the following key sub-sectors in the region:

- Aerospace
- Automotive
- Chemicals
- Biomedical Technology
- Advanced flexible materials (concentrated in central Lancashire and northern Greater Manchester)
- Energy and Environmental Technologies
- Food and Drink
- Digital and Creative Industries.

4.2.2 The North West's approach to achieving its vision is consonant with that at UK level, recognising the importance of improving the image of manufacturing, enhancing innovation and improving interactions between business and education to address skills needs. There is also a focus upon ensuring that facilities and infrastructure are fit for purpose, increasing new enterprises in manufacturing and ensuring that the sector has adequate intelligence on changing markets. The *MAA* (see Ch. 1) builds on this issue, recognising the potential for the shift to a low carbon economy to create a range of new opportunities.

4.2.3 The **North West Science Council** set out a series of priority areas of science and technology to support sustainable growth, and the following are particularly relevant to advanced manufacturing:

- **Simulation** – the application of modelling and computational approaches to the development of products and processes, including the assessment of in situ performance. N.B. The availability of the High Performance Computing facilities and the Virtual Engineering Centre at Daresbury SIC are particularly relevant in this regard.
- **Autonomy** – the development of a wide range of applications for autonomous/intelligent systems, building on a platform established by the military aerospace industry.
- **Performance Materials** – The use of material science (including material chemistry) to design, manufacture and engineer new materials with precise and tailored properties for high technology applications. N.B. The world-class research in materials at UoL is highly relevant here.
- **Sustainable Product Design** – the creation of products that offer new and exciting features, but also place lower demand on the environment. There is much embryonic work in this area embracing product design, life cycle analysis and environmental chemistry. There is a real opportunity to integrate and energise these strands to allow the UK to take a lead in what is sure to be one of the dominant global market trends.

4.3 Current position and strengths

4.3.1. The UK is the world's sixth largest manufacturer and a leading exporter of high-tech goods. Government policy has identified that it has secured a competitive advantage in terms of research and development, design and innovation. The demand for the high-value goods and services associated with advanced manufacturing, especially those produced to high environmental standards, has been forecast to increase significantly. The previous Government stated that the transition to low carbon could secure 180,000 jobs in the UK manufacturing industry.

4.3.2 The National Composites Centre in Bristol has estimated that the market in the aerospace (e.g. engine and wing design and manufacture) and wind turbine blade industries (e.g. advanced composites) could be worth £22 billion by 2020. Other areas of projected significant growth include plastic electronics, industrial biotechnology (chemical sales are projected to grow to £12bn by 2025) and space manufacturing, services and applications (forecast to be worth at least £400bn by 2030).

4.3.3 The North West has a well established manufacturing base with specialisms in a number of high value-added sectors. The region is the UK's largest centre of aerospace manufacturing in terms of employment and overseas income generation; it provides one third of the UK's entire aerospace turnover with 75% of sales being exported. Key players include Rolls Royce, Airbus and BAE. The region is also the second largest in the UK for the manufacture of both vehicles and vehicle components; 60% of products are exported. The sector, which comprises over 500 automotive companies and a highly skilled workforce of 43,000, generates £9bn p.a. Vehicle manufacturing

activity is concentrated around four key sites: two in LCR in Knowsley (Jaguar/Land Rover) and Wirral (General Motors); one in West Lancashire (Leyland Trucks) and one in Cheshire (Bentley Motors).

4.3.4 The region is the largest centre for chemical manufacturing in the UK. The sub-sector generates almost £10bn in sales and has high productivity, with GVA of £55,000 per employee. North West HEIs have generated a number of spin-outs in the sub-sector, which employs 43,000 highly skilled workers, many of whom are employed in clusters along the M56/M62 corridor. The North West also has the largest cluster of advanced flexible materials manufacturers in Europe. Some 350 companies provide employment for around 25,000 people and generate an annual turnover of £2.5bn. Additional strengths identified in *RS2010* include electronics, rubber and plastics and food and drink.

4.3.5 Although the number of jobs in Advanced Manufacturing has declined in the last decade, it remains a significant sector for knowledge intensive employment. The number of enterprises has increased, reflecting broader fragmentation and niche production within the sector as a whole.

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
Advanced Manufacturing	47101	34589	8.6%	5.9%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
Advanced Manufacturing	2738	3008	7.1%	6.9%

4.3.6 Advanced manufacturing businesses are spread throughout the city region, with a similar percentage of businesses in Liverpool and Wirral.

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	392	13.0%
Knowsley	217	7.2%
Liverpool	785	26.1%
Sefton	520	17.3%
St Helens	394	13.1%
Wirral	700	23.3%
Total LCR	3008	100.0%

4.3.7. In terms of employment, there is a much more even distribution of jobs across Liverpool, Wirral, Halton and Knowsley. The strategic importance of the Jaguar Land Rover plant is demonstrated by the fact that the greatest concentration of jobs at ward level is in Halewood South in Knowsley, followed by clusters of similar size in wards in Halton, Wirral and Liverpool.

Jobs by Geographical Distribution 2008

	No. of jobs	%
Halton	6912	18.5%
Knowsley	7214	19.3%
Liverpool	7821	20.9%
Sefton	3049	8.2%
St Helens	5039	13.5%
Wirral	7322	19.6%
Total LCR	37357	100.0%

Employment hotspots

Ward	District	No of jobs	% of jobs in this sector
00BXFD : Halewood South	Knowsley	!*	!
00BYFQ : Everton	Liverpool	2,207	5.9%
00ETND : Daresbury	Halton	2,002	5.4%
00CBFD : Bromborough	Wirral	1,904	5.1%
00BYGC : St. Mary's	Liverpool	1,599	4.3%

*cannot be disclosed for purposes of confidentiality

4.3.8 There are in the region of 140 commercial manufacturing businesses within the energy and environmental technology sector (including glazing, insulation and building control systems) and 103 advanced engineering companies within Liverpool. Evidence suggests that the strength of these commercial knowledge sectors is linked to research strengths in the city region's HEIs. There are a significant proportion of SMEs and five business parks and industrial estates (the Boulevard Industry Park, the Estuary Commerce Park, G Park, the Aintree Industrial Estate and the Wellington Employment Park) have been established to encourage entrepreneurs to set up operations.

4.3.9 Jaguar Land Rover's Halewood plant in Knowsley is one of the world's most advanced automotive facilities. There are also particular strengths in biomanufacturing in Speke in south Liverpool which offers considerable potential for inward investment. The National Biomanufacturing Centre is also located in Speke. Other key players in the sector include Pilkington, NGF Europe Ltd, Knauf, Halewood International, and Nichols.

4.3.10 The NW Aerospace Alliance have positioned Daresbury as a key location in their sector strategy in view of its potential to site collaborative centres of excellence, such as the Virtual Engineering Centre (see below), and to attract major inward investors. Complementing the strengths and activities of the VEC, the DSIC is developing a cluster of companies in modelling and simulation and the campus will be a key focal point for developments in autonomous systems technology for developments in Unmanned Aerial Vehicles.

4.3.11 The city region's marine engineering activity is largely based at the Cammell Laird shipyard in Birkenhead. The yard is currently undertaking shipbuilding, ship conversion and ship repair contracts

and plans to diversify into a broader spectrum of marine engineering and support services including those related to nuclear and wind energy.

4.4 Issues and challenges

4.4.1 The Government has previously forecast that the next 20 years will see over £150bn invested in low and ultra-low carbon vehicle technologies and it has committed over £450m towards placing the UK at the global forefront of the development, demonstration, manufacture and use of ultra low carbon vehicles. Increased investment in fixed line and mobile broadband networks should drive new opportunities for the supply and manufacture of network and consumer hardware and electronics.

4.4.2 Within the North West, the cost of raw materials and competition from low cost locations in Eastern Europe have been identified as long-term issues. Despite the region's strengths, the draft *RS2010* identified that there may be vulnerability through dependency on specific companies like BAE. Other identified issues included:

- weak HEI links in some sub-sectors
- poor supply chain linkages between large production businesses within the region and their suppliers for both manufactured components and services that support manufacturing production (e.g. design)
- a lack of a 'voice' for the sector
- the need to align the skills supply and demand equation.

4.5 Research Strengths

Utilising the manufacturing sub-sectors defined by BIS and set out in 4.2.1. above, research strengths can be summarised as follows:

Aerospace

4.5.1 The **Virtual Engineering Centre (VEC)** has been established to catalyse virtual engineering activities within regional SMEs and encourage joint research programmes between industry and academia. The VEC is located at the Science and Technology Facilities Council (STFC) Daresbury Science and Innovation Campus, facilitating access to the high performance computational facilities and scientific expertise in specialist software development. VE skills and capabilities are being developed through a number of aerospace case studies, creating virtual prototypes that can be used to exercise design options and validate requirements across the life cycle from manufacturing and assembly to operations and upgrades. The ability to virtually test and model new products and production process reduces both risk and cost.

4.5.1.1 The VEC has been established to assist the North West aerospace sector and wider industry by providing a focal point for world class virtual engineering technology, research, education and best practice with the aim of improving business performance throughout the supply chain. In Lancashire, and Airbus at Broughton, the VEC has key strengths in digital simulation and modelling and managing simulation, an area of increasing demand from industry.

4.5.1.2 The VEC catalyses virtual engineering activities and joint research programmes across the sector and between industry and academia. It provides:

- a physical virtual engineering centre with 'best practice' facilities, which display integrated, interactive simulation and modelling software across the full range of virtual capabilities
- a research partnership that will add value to existing research activities within the region by providing a commercially relevant focus

- a knowledge exchange centre to increase awareness and give potential users an opportunity to ‘try before they buy’ so that they can become more confident of the business advantages that can accrue from using VE tools
- an educational centre to help meet the current skills shortages in VE in the UK.

The VEC comprises seven research staff and a business team of four.

4.5.1.3 The VEC has received £5.3m for its first three years of operation (£2.5m from the Northwest ERDF, £1.18m from the NWDA and £1.64m from the University of Liverpool). The intention is to make the VEC self-sustaining after this period. It is envisaged that the VEC’s future funding mix will comprise contributions from both industry and public funding (e.g. Research Councils and the TSB).

4.5.1.4 Strategic Partners of the VEC include the STFC, North West Aerospace Alliance and BAE Systems. The Computational Science and Engineering Department at Daresbury is also a partner in the VEC and hosts the Knowledge Centre for Materials Chemistry.

4.5.1.5 Since its inception, the VEC has:

- established partnerships with industry, including Airbus. There are ongoing discussions with a number of other primes
- forged connections with the other businesses at Daresbury –
 - a CASE studentship was recently awarded with a Daresbury SME
 - the VEC are bidding into the current nuclear feasibility TSB call with another SME located on the Daresbury campus.
 - links forged with the Nuclear Skills academy to explore VR training opportunities
 - one of the VEC beneficiary companies has already relocated to the Daresbury campus and several others are considering the move in order to be closer to the VEC facilities.
- made use of the supercomputer facilities at Daresbury; it is now incorporated within tours for UK and international delegations visiting the campus.
- connected to research expertise at UoL via six academic leads at the University
- connected with UoL’s Agility Centre

4.5.1.6 Future ambitions and potential:

- Although it has a current focus upon aerospace, the VEC’s overall ambition is to establish a centre of excellence in and hub for Advanced Manufacturing and other sectors; there would be the potential to position the VEC as a national Technology and Innovation Centre for Advanced Manufacturing in the city region – investing in ‘Virtual’ Advanced Manufacturing would be a logical position before investment in large capital facilities.
- The VEC provides a physical base upon which a more significant relationship between the city region’s HE base and activity at Daresbury can be built. There is potential to align HE research with strengths in prototyping (particularly via the Engineering Technology Centre) and Computational Science and Engineering (including via the proposed Hartree Centre) at the DSIC.
- Verification and Validation of VE tools is a core theme for development and future funding and Daresbury Campus and the VEC have the combined capabilities to support this.
- There is potential for further research and collaboration with LJMU as well as other HEIs in the North West, thus providing regional companies with the tools to evaluate and optimise new product development ideas and then the opportunity to seamlessly move from virtual to real engineering.

- An expanded VEC would make a significant contribution to the broader ‘innovation ecosystem’ in the city region.

4.5.2 The **University of Liverpool** (UoL) undertakes aerospace research in the areas of flight simulation, handling qualities and control, aerodynamics, aero-elasticity, structural dynamics, impact engineering and materials. It has expertise in flight science, aero-elasticity, structural materials and mechanics. This is matched with a range of facilities, including a high-end flight simulator, considered the most capable in academia worldwide. Current projects include the alleviation of operational problems at the aircraft/helicopter-ship dynamics interface, utilising piloted simulation and Computational Fluid Dynamics (CFD). The CFD framework runs an in-house code and has been used to investigate the non-linear aerodynamics encountered in both fixed wing and rotary wing operations, including rotor dynamic stall and stall flutter, vortical flow, transonic cavity flow and fin buffet.

4.5.3 UoL has expertise in most aspects of avionics, which are electronic systems associated with flight. Particular strengths include radar and radar processing, aircraft data buses and data links, airborne imaging systems and target tracking. Projects undertaken include airframe simulation studies for QinetiQ-led/MoD-funded projects concerned with guidance and control for future precision guided missiles.

4.5.4 UoL’s expertise in laser technology is of relevance to the aerospace industry as well as the automobile, biomedical and general engineering sectors. Its facilities and expertise, combined with those of its dedicated **Lairdside Laser Engineering Centre**, constitute an internationally significant resource, which includes high power carbon dioxide laser systems for cutting, welding, surface treatment and laser forming.

4.5.5 The aerospace industry makes use of electrical plasma competencies alongside those working in microelectronics, telecommunications, automotive, environmental control, packaging and textiles. UoL is at the forefront of this activity in the UK, specialising in experimental and modelling studies of plasma discharges of relevance to industry. Areas of research currently being developed include plasma treatment and doping of carbon nanostructured materials and atmospheric pressure plasmas (DBD) for the modification of 3D materials.

4.5.6 LjMU’s **General Engineering Research Institute** (GERI) has a broad portfolio of projects with applications in the aerospace industry. GERI’s principal areas of expertise include: optical system design; instrument and sensor design; advanced manufacturing technologies; laser processing; high speed computing; mathematical modelling; image processing; digital signal processing; non-destructive testing and inspection; digital electronic systems and precision metrology.

4.5.7 Within GERI, the **Coherent and Electro-Optics Research Group** (CEORG) has relevant research projects concerned with precision measurement:

- 3D Measurement of Large Objects Using Multi-Panel Methods, involving the development of a scalable system based on fringe projection/analysis for the measurement of large objects, the major innovation being the development of a dynamically re-configurable calibration technique for the sensor.
- 3D Measurement of Reflective Objects Using Reflected Fringe Projection, involving 3D surface measurements on specularly reflective surfaces, tested on car glass, but with potential for application in aircraft manufacturing.
- Absolute Length Interferometry, involving the development of a novel system to measure absolute length over distances of up to 20m, with application to sectors requiring alignment and registration of large components and systems, such as aerospace.

4.5.8 Within the **Advanced Manufacturing Technology Research Laboratory (AMTReL)**, another sub-division of GERI, relevant projects are concerned with grinding technology. Grinding remains one of the most important material removal and/or finishing processes in the production cycle and AMTReL's innovations have potential for exploitation in the aerospace industry. Projects include:

- **Vibration Assisted Grinding:** aimed at reducing the cutting force and hence the power consumption of grinding, whilst achieving a better surface finish than conventional methods.
- **High Efficiency Deep Grinding (HEDG):** developing a new manufacturing process for the grinding industry that is highly efficient in terms of energy, product, process and environmental impact.
- **Near Dry Grinding and Minimum Quantity Lubrication:** involving the efficient usage and delivery of fluids to meet industrial, environmental and legislative considerations in the grinding process. This early stage, pioneering research has attracted interest from world-leading institutes such as the Korean Institute of Industrial Technology.

4.5.9 GERI's **Photonics in Engineering Group (PiE)** is also working with the UK aerospace industry to develop technology that will be incorporated into the next generation of acoustic liners for jet engines.

Silicon electronics

4.5.10 UoL is involved in the development of advanced Thin Film Transistors (TFT) and photovoltaic structures for high performance at low cost, as well as the development of high performance silicon structures and novel circuits for Radio Frequency (RF), micropower and 3G neural network applications. UoL produces novel devices in both polymers and silicon, particularly vertical metal oxide semi-conductor field effect transistors (MOSFETs). It has a history of engaging with industry, particularly in relation to the trouble-shooting of anomalies, but also in joint programmes relating to reliability and other issues. UoL also has a track record of successful research into the test and reliability of gate dielectrics for silicon based electronics. There is considerable activity around high-permittivity dielectrics for end-of-roadmap application and UoL has excellent atomic layer deposition (ALD) facilities. New work is aimed at producing very high precision passive components, particularly capacitors for medical, RF and energy harvesting applications.

4.5.11 The **Research Centre for Electrical and Electronic Engineering** at LJMU has expertise in silicon electronics related to two fundamentally different sub-areas: nano-electronics and power electronics:

- **Nano-electronics:** This work concentrates on "very large-scale integrated circuits" (VLSI) devices, with emphasis on new material and VLSI device structures for future generation of CMOS technologies. Research focuses on reliability, quality assessment and improvement, and device manufacturing process optimisation. Existing test facilities are aimed at nano-MOS devices and flash memories.
- **Power electronics:** This work concentrates on power electronic converters and their control. The emphasis is on silicon device based energy conversion circuits, predominantly aimed at variable speed drives and electric power system applications. The expertise includes development of new pulse width modulation control techniques for inverting circuits aimed at high power applications, with utilisation of multiphase two-level and multi-level supply topologies. It combines theoretical and experimental approaches and the laboratory facilities include a series of multiphase two-level and three-level inverters (with up to nine phases), as well as a range of multiphase and three-phase variable speed drives.

Nanotechnology

4.5.12 UoL's **Ultra Mixing and Processing Facility (UMPF)** gives companies direct access to the latest technology for the development and testing of nanomaterials for a broad range of applications including medical, personal care, food and other production areas. Both distributive (blending) and dispersive mixing can be carried out with significantly higher performance compared to other techniques. UMPF can produce new properties within existing materials as well as creating truly new products.

4.5.13 UoL has a critical mass of research groups which are recognised leaders in various aspects of bionanotechnology. Their expertise spans biology, biomedical science, chemistry, clinical sciences, Earth and ocean sciences and engineering. The **Liverpool Institute for Nanoscale Science Engineering and Technology (LINSET)** helps to foster the vital interdisciplinary collaborations underpinning bionanotechnology. It is also part of 'NanoCentral' – an alliance of organisations whose members can provide access to a broad range of leading edge technologies, equipment and services.

4.5.14 GERI is involved in research that develops bespoke solutions to nano-scale problems across a range of technologies, including:

- the design and construction of a laser tweezers system, used to hold cells whilst under examination in AFM or digital microscopy.
- acoustic micro-imaging, to inspect next generation 3D electronic packages and systems.
- low temperature precision grinding to secure optical surface finishing, with surface roughness to nano-scale.
- laser micromachining of polymeric surfaces, creating nano and micro scaled structures that can interact with cells and influence their behaviour.

Composites

4.5.15 Composite materials are relevant across a range of industries including the aerospace and automotive sectors. The **North West Composites Centre** brings together the Universities of Bolton, Lancaster, Liverpool and Manchester. It offers new, low energy, rapid manufacturing techniques for industry and academia and provides the following benefits:

- A research centre offering new, low energy, rapid manufacturing techniques for industry and academia
- Long term research projects aimed at improving company performance
- Short term evaluation of processes and materials.

Areas of expertise include:

- Technical textile structures
- Auxetic materials
- Rapid low cost processing
- Infrastructure aerospace applications
- Characterisation
- Fire performance.

4.5.16 There are significant related research strengths in materials. The **Knowledge Centre for Material Chemistry**, a business unit of Chemistry Innovation Limited, is a virtual centre of expertise providing a single point of contact for companies of all sizes to access a substantial range of facilities and expertise in applied materials chemistry. This includes the molecular modelling capabilities of the Science and Technology Facilities Council at Daresbury as well as relevant expertise at UoL (e.g.

UMPF, CMD – see below), University of Manchester and the University of Bolton. Core capabilities include:

- Consultancy and project design
- Modelling
- Synthesis and characterisation
- High throughput technologies
- Chemical processing
- Interpretation, timely reporting
- Knowledge transfer.

4.5.17 The **Centre for Materials Discovery** (CMD) at UoL provides research and knowledge transfer services to academia and industry in the area of high throughput materials discovery. The focus of CMD is to use state-of-the-art robotics and automation technologies for the accelerated discovery of new functional materials in applications such as energy, health, home and personal care. Working closely with other universities in the North West, the centre aims to provide access to leading research, training for industry personnel, and world-class facilities such as robotics and advanced ICT. It is accessible to all businesses across the North West and UK and has enabled small, medium, and large industries across a range of sectors to move rapidly into the next generation of materials science.

4.5.18 The **National Centre for Electron Spectroscopy and Surface Analysis**, based at Daresbury, brings together industry and academics to address problems in materials science, surface science and engineering. Also at Daresbury, the **Medium Energy Ion Scattering Facility** (MEIS) investigates the surface structure and properties of crystalline materials.

4.5.19 At LJMU, the **Drug Delivery and Materials Science** research group brings together researchers in chemistry, polymer science, materials science, pharmaceuticals and biological sciences, encouraging a multi-disciplinary approach.

4.5.20 GERI has significant research expertise with Fibre-Optic Sensors using Bragg Gratings, which offer low noise, high sensitivity, compact and low costs interrogation strategies. Applications for Fibre Bragg Grating sensors include temperature, ultrasonic and vibration measurement of composite materials.

4.5.21 GERI's Photonics in Engineering Group (PIE) is active in laser material processing of carbon fibre reinforced plastic (CFRP) and laser micromachining of polymer surfaces to control cell interactions. AMTReL is expanding its research activities into the machining of aerospace material and a new five axis machine has been purchased to investigate the machinability of titanium and composite stacks.

Industrial biotechnology

4.5.22 Relevant research expertise within the School of Pharmacy and Biomolecular Sciences at **LJMU** is concerned with the exploitation of micro-organisms. The School works with industry partners to improve processes for the production of a range of products, from antibiotics that are made by microorganisms found in soil, to enzymes that are used in biological washing powders. Current projects include research surrounding the ability of yeast to produce high levels of alcohol to act as a fuel for vehicles. The School has just been awarded a grant to develop a test method for sexually transmitted diseases, working with a local diagnostic company along with the Health Protection Agency and colleagues at UoL.

4.5.23 The Research Centre for **Built Environment and Sustainable Technologies** (BEST) at LJMU also has an interest in Industrial Biotechnology in its work around sustainable fuels. Current research activities include the mass cultivation of micro-algae for bio-fuel production.

Other relevant research strengths

4.5.24 The expertise within GERI at LJMU cuts across all the targeted Advanced Manufacturing sectors in that its unique offer is unrivalled specialist equipment to support its cutting-edge research in advanced manufacturing processes. Examples include:

- optical measurement (including atomic force and confocal microscopes, state-of-the-art 3D surface measurement systems developed as part of a major EPSRC programme, digital holographic microscopy and light trapping)
- manufacturing technology (HEDG and low temperature grinding & vibro-machining and high-speed machining/cutting)
- electronics (fine-focus X-ray inspection systems, vibro-reliability testing rigs).

4.5.25 This equipment supports techniques that have applications in many advanced manufacturing disciplines e.g. precision measurement in Nanotechnology, vibro machining & super-abrasive grinding in Aerospace, laser assisted processing in Composites, laser manufacture of surgical devices in Industrial Biotechnology etc.

4.5.26 GERI has a notable international reputation in its field, with 20% of its activity rated as world-leading in RAE2008. LJMU is engaged in a number of industrial collaborations linked to innovations in advanced manufacturing processes and products and, as part of this portfolio of activity, GERI has brought forward important innovative techniques in direct industrial application in processes such as precision measurement, grinding and photonics.

4.5.27 Significantly, LJMU has well established links via GERI and also the **Astrophysics Research Institute (ARI)** with **Technium OptIC**, an Innovation and Knowledge Centre in Ultra Precision and Structured Surfaces, as well as other associated companies around the OptIC site at St. Asaph. ARI is part of the Welsh Opto-electronics Forum (WOF) and the Institute plans staff exchanges as part of R&D developments with one of the associated companies. These HE connections are reinforced via the STFC's strategic relationship with the Welsh Assembly Government. There is potential to establish a link between the DSIC and the A55 Knowledge Corridor, including to Technium OptIC. This would focus on sensing, optics and instrumentation technologies, with applications into medical devices and renewable energies.

4.5.28 UoL has extensive experience of Selective Laser Sintering (SLS), which fuses small particles of metal, ceramic, glass or plastic to create a 3D object. SLS offers a means of making complex geometries directly from digital CAD data. It also has expertise in additive layer manufacturing (ALM) processes, including 3D printing. These processes are relatively energy-efficient and parts can be built in days or hours for clients in a range of sectors including aerospace, dental and medical. ALM represents an important potential growth area in manufacturing with links across to the creative and digital sector.

4.5.29 UoL has devised and developed two new rapid manufacturing methods (Selective Laser Melting and Spiral Growth Manufacturing) with strong industrial support from BAE Systems and EADS, and MCP Systems respectively. The **Integrating Digital to Manufacturing and Marketing** (iD2M) Centre has been set up to assist manufacturing companies in integrating leading-edge technology solutions from product design to manufacturing and marketing. Its staff can advise on optimizing the application of CAD systems and help incorporate CAD models into live 3D virtual representations on the internet. This is complemented by research expertise in the development of

3-D modelling software for children in primary and secondary schools at Hope. As stated above, this technology has the potential to converge with other knowledge economy strengths, notably CDI.

4.5.30. The **Agility and Supply Chain Management Centre** at the UoL Management School focuses upon Agility and Lean manufacturing implementation. The Centre has assisted 84 small companies to improve their manufacturing and marketing operations significantly. This involved training and coaching firms in the principles of waste minimisation and operations improvements as well as training to bring new customers to the business.

4.5.31 The **Cockcroft Institute** is an international centre for Accelerator Science and Technology and is jointly delivered by the Universities of Liverpool, Manchester and Lancaster, the Council for the Central Laboratory of the Research Councils (CCLRC at the Daresbury and Rutherford Appleton Laboratories), the Particle Physics and Astronomy Research Council (PPARC), and NWDA. The Institute is located in a purpose-built building on Daresbury SIC as well as in centres in each of the participating universities. The Institute's aim is to provide the intellectual focus, educational infrastructure, and the essential scientific and technological facilities for Accelerator Science and Technology research and development, which will enable UK scientists and engineers to take a major role in accelerator design, construction, and operation for the foreseeable future. The objectives of the Institute are to develop a major international presence in research and development in accelerator science and technology with four broad themes:

- Electron-positron colliders
- Proton and ion accelerators including neutrino beams
- Photon sources
- Neutron sources.

4.5.32 The **Radio and Microwave Frequency Group (RFM)**, part of LJMU's BEST, has been selected by the Defence Science and Technology Laboratory (DSTL) at Porton Down to undertake a prestigious research contract into the real-time monitoring of activated carbons in warfare masks. The RFM group is also concerned with harnessing microwave technology to bring forward commercial innovations, including a system that enables the instantaneous and efficient heating of domestic, fixed-unit water supplies.

4.5.33 UoL is a member of the **Nuclear Technology Education Consortium (NTEC)**, a consortium of UK universities and other institutions providing postgraduate education in Nuclear Science and Technology. The ten participating institutions in NTEC represent more than 90% of the nuclear postgraduate teaching expertise in the UK's universities and research institutes. The consortium, therefore, aims to provide a one-stop shop for a range of postgraduate training in Nuclear Science & Technology.

4.5.34 The National Skills Academy for Nuclear is located in the North West as well as the National Nuclear Laboratory (NNL). UoL recently signed a Memorandum of Understanding with the NNL, primarily focused upon increasing research collaboration. UoL's expertise around nuclear includes:

- New nuclear power solutions
- Nuclear waste
- Safety cases.

Knowledge Transfer initiatives

4.5.35 The School of Engineering at LJMU has strong teaching and research links with major industrial partners such as Jaguar Land Rover, BMW, BAe Systems, Airbus Industries, Pilkington and Delphi. One of the key strategies in this area is the development of Knowledge Transfer

Partnerships, of which the School has a strong and growing portfolio. This approach compliments that at UoL, which has a track record in KTPs in Advanced Manufacturing. Within the city region, UoL successfully delivered 6 KTPs with city region firms in 2009 and 2010. These projects, which engaged companies in Liverpool (3), St. Helens (2) and Wirral (1), included work on optimising manufacturing technologies via improved information technology, introducing 3D magnetic modelling capability and implementing lean and agile manufacturing strategies. UoL currently has a KTP with a St.Helens manufacturer focussing on the design and manufacture of steel pipeline flanges for the offshore oil and gas industry.

4.5.36 Pockets of knowledge transfer activity exist within the manufacturing ‘sub-sectors’ at LJMU and there are strong existing links that could be built upon to improve the value to these industries. For example, LJMU’s Centre for Tourism, Consumer and Food studies is active in the Food and Drink manufacturing sector, leading innovations in food processing and lean manufacturing techniques.

Skills

4.5.37 LJMU is an IET (Institute of Engineering and Technology)-accredited provider of Aerospace Manufacturing Engineering training, supplying professionally qualified graduates to local industrial partners such as Airbus Industries. The School is the UNESCO Centre for Engineering Education in England, recognising its continued excellence in teaching, knowledge transfer and applied research.

4.5.38 Advanced learning options at UoL include an MSc in Advanced Science, which includes specialist pathways (e.g. within chemistry, physical sciences and biological sciences) so that learning can be tailored to individual needs and research interests. Further Masters-level provision includes:

- Aerospace and Mechanical Systems Engineering
- Simulation in Aerospace Engineering
- Advanced Manufacturing Systems and Technology
- Advanced Engineering Materials
- Engineering Applications of Lasers
- Maritime Civil Engineering
- Product Design and Management.

4.5.39 **The Manufacturing Institute** offers a range of training courses including the well-established Accelerated Route to Lean Manufacturing and the Team Leader Development programmes. Each course can be offered as a bespoke course to individual companies as and when required. Working in partnership with Jaguar Land Rover, the Institute offers a lean manufacturing education programme at the company’s Lean Learning Academy, which is open to other manufacturers.

4.5.40 The Institute also offers a series of Master Classes and workshops featuring live examples of excellence. This is complemented by the provision of a range of educational programmes in collaboration with HEIs, including the MSc in Manufacturing Leadership, awarded by Lancaster University Management School and sponsored by the Northern Aerospace Exploitation Centre. The Institute runs the Manufacturing Advisory Service for the NW; it has the support of MIT for the development of Fab Labs in the UK and is the first global partner of the Shingo Prize organisation based at Utah State University. STFC is developing a proposal for a Technical Skills Centre at the DSIC, focussing on apprentice skills and CPD training at technician level. This has the potential to connect to and complement The Institute’s existing skills offer as well as any Fab Lab development.

4.6 Opportunities

4.6.1 Across the city region, issues and opportunities which have emerged from discussion with the sector include the:

- need for business support arrangements to raise awareness of IP issues and provide support for growing ideas
- need to focus on the application of new technologies (e.g. nanotechnology, composites)
- need to develop new products and to work smarter
- need to exploit the potential for future convergence (e.g. across the manufacturing and digital sectors through digital manufacturing, including additive layer manufacturing)
- fact that the changing financial context and the rising cost of transportation are bringing some production facilities back to the UK
- continuing need to raise the profile and image of manufacturing and the role Fab Labs could play in this
- need to strengthen the supply chain within the city region, not just to individual major manufacturers but recognising also that supply chains are becoming horizontal, serving several clients (e.g. aerospace and automotive).

4.6.2 The wide range of research strengths across manufacturing is outlined earlier in this section. There is a need to ensure that knowledge of this expertise is widely disseminated across the sector to maximise the value of the work being done and improve the level of its application to wealth creation.

4.6.3 The public sector could do more, through its procurement processes, to both foster innovation and to support the growth of defined markets (e.g. the micro-generation of wind power, photovoltaics) through common commitment and collaborative procurement.

4.6.4 In Wirral, a structured, business-driven business support arrangement has been developed, involving the local authority, the manufacturing advisory service and Business Link. This type of approach could be widened to embrace research base and the skills supply and rolled out across the city region.

4.6.5 There is a need to establish a 'voice' for manufacturing across the city region, an issue which will become more important as many regional structures are inevitably dismantled.

4.6.6 Relevant partners across the city region, including major firms, the Universities, Daresbury SIC and the Manufacturing Institute, need to explore, with the Technology Strategy Board (TSB), the possibility of establishing a manufacturing technology innovation centre aimed at closing the gap, through the provision of business-focused capability, between research and technology commercialisation (see *The Current and Future Role of Technology and Innovation Centres in the UK*, a report by Dr. Hermann Hauser, 2010). The Virtual Engineering Centre at Daresbury SIC may form the basis for such a development. NB. This is one of several areas of potential involvement of the TSB and, consequently, it will be important to develop a strategic approach to the city region's relationship with that organisation (see Appendix 8).

4.6.7 In order to increase the flow of knowledge into the sector, there is a strong case for increasing the scale of the Knowledge Transfer Partnerships and other similar programmes between the universities and manufacturing companies. In addition, a specific opportunity exists to more fully exploit the research- and technology-based assets within LJMU's GERI. The Institute currently works collaboratively with major international partners including Rolls Royce, DeBeers, Castrol and Bosch, but its considerable expertise remains relatively untapped by local SMEs. The barriers that currently inhibit engagement could be addressed by bringing GERI's excellent equipment and research credentials into one world-class facility, whilst actively promoting collaborative applied research opportunities to local SMEs with currently limited but potentially significant involvement in R&D.

4.6.8 The Fab Lab network led by MIT now operates through 45 labs in 17 countries around the world. The UK became part of that network with the opening of the first Fab Lab in Manchester in 2010. A Fab Lab is a high tech workshop aimed primarily at helping local communities solve local problems but also available to support entrepreneurs and innovators develop ideas which have potential commercial application. The establishment of Fab Labs in the city region would promote innovation and creativity and improve the image of manufacturing as well as supporting the development of emerging business ideas. There is an important crossover here with the creative and digital sector. Depending on the individual circumstances, the cost of setting up equipment ranges from £50K to £100K with running costs ranging from £110K to £180K for up to three years, after which a Lab should be self financing. Knowsley Council have expressed a desire to explore the possible establishment of a Fab Lab in their area, linked to major businesses.

4.6.9 Digital Manufacturing is the 21st century way to make products – producing real physical products from digital information. Work is needed to examine how partners across the city region can best promote the application of this groundbreaking technology in support of the manufacturing sector.

5. Financial and Professional Services

5.1 Strategic context - National

5.1.1 For the purposes of the KEP, Financial and Professional Services (FPS) is understood to comprise the whole of the financial services sector and, therefore, includes banks, building societies, insurance and pension companies, financial intermediaries such as insurance brokers and financial advisers, venture capitalists, fund, asset and wealth managers, stock brokers and investment companies. FPS also includes key parts of the business services sector, broadly comprising the professions, including legal services, accountancy, management consultancy, recruitment consultancy and property services.

5.1.2 Within FPS, clusters of activity help to underpin specific sectors, such as maritime, comprising maritime law, marine insurance, accountancy, ship finance, ship broking, ship and cargo surveying and freight derivatives. FPS could, therefore, be seen as a complementary sector. *Professional and Business Services: a 2020 Vision for Growth* argued that business services are informing, catalysing and enabling the transition to a low carbon economy. The sector also plays a significant role in setting standards, enhancing skills levels and spreading innovation and good practice throughout business and industry more widely.

5.1.3 FPS have been identified by UK Trade and Investment as a key growth sector for the UK. A full UK strategy was to be developed later in 2010 by the former government. A key element of that strategy would be to ensure the full exploitation of the EU Services Directive, which will make it easier to export a range of services throughout the EU.

5.1.4 *A 2020 Vision for Growth* identified that the private sector considered that Government could help to create an environment more conducive to private investment in infrastructure. Priority actions included:

- Improving digital infrastructure
- Strengthening trust in the internet and improving IP frameworks
- Enhancing capability by supporting business and facilitating innovation.

A pipeline of workers with a combination of ‘hard’ and ‘soft’ skills, such as project management, creativity and initiative and ICT was also seen as essential by business and would be key to future success.

5.1.5 This approach draws upon the *Professional Services Global Competitiveness Group Report* from March 2009, which sets out a vision for a successful economy with Professional Services at its heart, based upon:

- Financial stability
- Raising skill levels
- Innovation
- Setting global standards (e.g. in law and accountancy)
- Headquartering of international firms
- Connectivity

5.1.6 The Coalition Government, as part of its drive to create a fairer and more balanced economy, where there is less reliance on a small number of sectors, is now working with the professional and business services sector to establish the priorities for government actions over the next decade in order to support growth, innovation and competitiveness. The approach will take into account feedback on *A 2020 Vision for Growth*.

5.2 Strategic Context - Regional

5.2.1 The *Regional Economic Strategy* identified Business and Professional Services (BPS) as a priority area for growth in the region. The *Financial and Professional Services Strategy and Action Plan for England's Northwest* covers these services under the broader BPS umbrella. Its vision was for an internationally recognised, competitive and vibrant sector comprising market-focused businesses, underpinned by talent and expertise. The ambition was to establish Manchester as a leading European centre, supported by Liverpool and Chester as thriving centres in their own right.

5.2.2 In order to increase the total GVA generated by the sector in the North West, the strategy set out commitments to encourage higher value-added employment and raise levels of innovative activity in the sector. It aimed to increase the number of people working in the sector by attracting new investment, supporting the growth of existing businesses, and encouraging the start-up of new businesses.

5.2.3 The strategy identified a series of cross-cutting themes, which correspond with those in the KEP and include Innovation and Enterprise, Marketing/Image and Skills. In terms of the latter, developing linkages between firms and universities to enhance employability is identified as a priority. The strategy also identifies the following priority sub-sectors:

- Accountancy
- Banking/Finance
- Insurance
- Management consultancy
- Legal services.

5.3 Strategic Context – the City Region

5.3.1 FPS is essential in underpinning job growth in the knowledge and low carbon sectors. New and forthcoming legislation will require significant changes in building design and operation and lead to increased demand for architects, consultants and planners. Similarly, the creation of new infrastructure and products and services will require specialist finance and legal skills. However, despite these imperatives, it was recognised that, whilst the sector in the city region was responding to these opportunities, it was being outpaced by others in the North West.

5.4.6 Employment in the sector increased by 53% from 1998-2008, accounting for 15.5% of all jobs by the end of this period. The review concluded that, in overall terms, the sector was falling behind the UK, with certain elements demonstrating signs of decline. Whilst banking is the most important sub-sector in terms of scale, Asset and Wealth Management is a notable strength with the city region being the most important English location outside London for this specialist activity.

This assessment is largely corroborated by analysis of data created using codes relating to the SIC 2003 coding system and sourced from the 2008 Annual Business Inquiry, ONS Crown Copyright, from Nomis. These statistics suggest that employment increased by some 59% over the same period, although this accounted for a slightly lower percentage of all jobs sourced via this method. It would appear that there are now a greater number of micro-businesses and SMEs, reflected by the fact the total number of businesses has increased by some 85%.

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
Financial and Professional Services	44887	71166	8.2%	12.2%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
Financial and Professional Services	4044	7472	10.4%	17.2%

5.4.7 This analysis reveals a significant concentration of enterprises in Liverpool, particularly the city centre area. However, there are secondary clusters in Sefton and Wirral, notably in Southport and Birkenhead. This picture is largely confirmed by data generated for the current employment profile across the City Region.

Jobs by Geographical Distribution

	No. of jobs	%
Halton	5762	8.1%
Knowsley	5930	8.3%
Liverpool	35137	49.4%
Sefton	10168	14.3%
St Helens	4818	6.8%
Wirral	9351	13.1%
Total LCR	71166	100.0%

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	517	6.9%
Knowsley	389	5.2%
Liverpool	2778	37.2%
Sefton	1547	20.7%
St Helens	689	9.2%
Wirral	1552	20.8%
Total LCR	7472	100.0%

Business hotspots

Ward	District	No of enterprises	% of enterprises in this sector
00BYFQ : Everton	Liverpool	1,174	15.7%
00BYFA : Abercromby	Liverpool	374	5.0%
00CAGG : Dukes	Sefton	285	3.8%
00CBFC : Birkenhead	Wirral	221	3.0%
00CBFJ : Heswall	Wirral	200	2.7%

5.4.8 This analysis includes contact/call centres even though they do not advance the city region up the value chain or impact significantly on GVA. They are, however, important job generators (172,000 in NW England – Babel Report, 2009) and the city region has a number of important centres such as O2, Santander, Vertex and Barclaycard. At a time of rising unemployment, opportunities to secure such centres should be taken wherever possible.

5.4.9 Ernst and Young identified six firms in the City Region, which were both ranked as ‘Tier 1’ in terms of the scale of their operation and rated as of strategic importance. All of these were located in Liverpool:

- SSS Holdings Corporation Ltd
- Royal Liver Assurance Ltd
- DWF LLP
- Brabners Chaffe Street LLP
- Hill Dickinson
- Weightmans Solicitors.
-

The city region’s business base has relevant expertise in some areas relating to others in the Knowledge Economy Plan. For example, Hill Dickinson has a 16-strong local marine team.

5.5 Issues and Challenges

5.5.1 The *Professional Services Global Competitiveness Group* report envisions a national sector in 2020 which is likely to be based on a frontier-free style of business, requiring international standards and effective regulation which crosses borders but which takes account of the impact on national competitiveness.

5.5.2 It is considered likely that there will be an ever-growing focus upon co-operation, with firms taking a collaborative approach to foreign markets and engaging in greater levels of exchange. Flexibility, transportability and innovation are key to success. A number of specific factors could spur further growth:

- The former Government forecasted that the liberalisation of EU markets is potentially worth up to £6 billion per year to the UK economy, and could create up to 80,000 new UK jobs
- The growth of emerging economies will provide significant opportunities for innovative firms
- There will be major opportunities for services related to sustainability and infrastructure
- Carbon reporting will require a range of new advisory, technical, legal and accountancy services
- A market price of carbon would, once high enough, incentivise behaviour change and create new FPS opportunities
- The sophistication of data mining and analytics has the capacity to transform professional services.

5.5.3 A recent sector report by Ernst and Young noted that Liverpool has a comparatively low number of key decision-making organisations headquartered in the City Region. It also suggested that, whilst there were a large number of sector networks, there was less evidence of a sense of a collaborative, mutually supporting business community incorporating bankers, solicitors and legal employees. In parallel with this, there is a lack of a clear evidence base to gain a comprehensive understanding of the sector as a whole.

5.5.4 The growth and success of Manchester has perhaps stifled the sector in Liverpool. However, with a different geographic perspective, it is argued that FPS in Liverpool could grow alongside Manchester, providing a complementary offer in its own areas of strength and expertise and helping to drive growth in the broader economy. Extending the reach of the Asset and Wealth Management sector both in terms of geographic markets and product range would be one such example.

5.5.5 The city region is currently not strongly perceived externally as a financial centre. Improving branding would come at a time when the structural changes across the sector means that there are opportunities for outsourced activities and third party provision of services.

5.6 Research strengths

5.6.1 LJMU's FPS expertise is primarily situated in the **Faculty of Business and Law (BLW)**. The Faculty is one of the largest and most diverse within LJMU, comprising two academic schools - Liverpool Business School and the School of Law - alongside the research unit, the European Centre for Corporate Governance. BLW's teaching provision covers a range of specialist management programmes, as well as accounting, economics, marketing, public relations, languages, international business and law. Research within the Faculty spans the public, private and social sectors, with a strong focus upon banking and finance, corporate governance and social enterprise management.

BLW already enjoys a strong regional presence and professional esteem, with many of its programmes being accredited by relevant professional bodies in accounting, law and management practice. From 2012 the Faculty will be housed alongside the new Professional Centre within the flagship Clarence Street development, providing a catalyst for deeper interaction between the University, business and communities. The new building will create an environment that promotes the cross-fertilisation of knowledge, to build on the synergies that exist between subject areas and to cultivate a multi-disciplinary knowledge transfer hub for business and law in LCR. The Faculty also continues to build strong credentials in overseas collaborations and has recently embarked upon a

five year consultancy contract with Libya's National Economic Development Board to support the creation of an International Business School in Tripoli.

5.6.2 The **University of Liverpool Management School (ULMS)** was launched in 2002; its mission is to strive to make a significant difference in the lives of individuals, enterprise and communities. In RAE2008, some 85% of the Management School's research was recognised as internationally important in terms of originality, significance and rigour. Its Research Groups include:

- Accountability, Regulation and Corporate Governance
- Business History
- Entrepreneurship and SMEs
- Organisational Learning and Change
- Regional and International Economic Development

ULMS delivers a range of services to business including the LEAD Programme for SMEs, Innovation Academy, Agility Centre, IDEAS programme at Daresbury SIC, Enterprise Champions, and the Knowledge Edge Series. ULMS' corporate connections ensure that staff continually develop their expertise in current business practices, which can be transferred to students via practical teaching methods.

5.6.3 **Liverpool Hope University's** QAA excellent-rated Business School has three research centres: the International Business Management Centre; the Economic and Social Development Centre and the Centre for Leadership and Learning in Organisations. The work of these Centres is also represented in a collaborative international research joint venture with the Bangalore Institute of Business in India. The city region needs to build on Hope's strong ties with India with a view to developing trade and inward investment with that country. The Business School is involved in measuring the impact of social enterprise and the Head of School is a research fellow at ESRC's Social Enterprise Research Cluster at Middlesex University.

5.6.4 The **European Centre for Corporate Governance (ECCG)** at LJMU aims to enhance the knowledge and understanding of Corporate Governance amongst directors and other practitioners generally. Its research is both pure and applied in nature and has been active in influencing government policies. This has included work as part of the modern company law review.

5.6.5 There is related expertise at ULMS, where staff conducted background research for the *Higgs Review into the Role and Effectiveness of Non-Executive Directors*, which culminated in revisions to the UK Combined Code of Corporate Governance. Current corporate governance projects relate to companies' ownership structures and their effect on corporate value, the impact of Board characteristics on a company's performance and its risk of default, the effect of ownership structure on the likelihood of filing for bankruptcy and the design and practice of executive incentive and remuneration structures.

5.6.6 A research grouping, '**Accountability, Regulation and Corporate Governance**', has been formed at ULMS and cover individual research interests in:

- Economic impact of accounting information
- Managerial entrenchment, agency costs and corporate performance
- Management-labour relations
- Boards of Director Effectiveness
- The Roles, Work & Effectiveness of Non-Executive Directors and Company Chairmen
- Corporate Governance and Capital Markets
- Institutional Investors and Corporate Engagement.

5.6.7 In the financial sector, UoL's research expertise encompasses liquidity, financial flexibility and asset prices, and mutual fund performance. UoL has particular expertise in the application of international financial reporting standards (IFRS) which have been implemented throughout the EU over the past few years. This is founded on research into a number of UK organisations which have adopted IFRS

5.6.8 LJMU's **Centre for International Banking and Economic Finance (CIBEF)** is concerned with fostering research, consultancy and training in banking, economics and finance. CIBEF draws on expertise from LJMU's Liverpool Business School, as well as engaging industry practitioners through associate memberships. CIBEF offers services in the following areas:

- Training in finance
- Research projects on applied quantitative financial issues
- Design of forecasting models and development of decision support systems based on these models: feasibility study, prototyping, development and staff training
- Building of investment decision tools
- Value-at-Risk analysis
- Quantitative modelling for asset allocation and portfolio management
- Independent evaluation of quantitative financial software.

5.6.9 The **Research Unit for Financial Inclusion (RUF)**, based within LJMU's Faculty for Health and Applied Social Sciences, undertakes academic action and evaluative research in a wide ranges of areas related to poverty, financial exclusion and the development of financial services for lower income households. The Unit has developed particular expertise in credit union activities and was commissioned by the Joseph Rowntree Foundation to undertake research around this theme.

5.6.10 The **Medicine, Law, and Bioethics Unit (MLAB)** at The Liverpool Law School draws on a range of legal and interdisciplinary perspectives to inform substantive areas of law. In developing these perspectives the Unit actively collaborates with legal and non-legal scholars based at UoL and at other HEIs both nationally and internationally. The Unit has a growing focus on the comparative and international dimensions of medical law and health law. MLAB's current work can be grouped together under the following themes:

- Medical Malpractice – Compensation and Liability
- Medical Law and Ethics – Feminist Perspectives
- Law and Biotechnology
- Mental Health Law
- Global Health Law – Social Theory and Medical Law.

5.6.11 The **International & European Law Unit (IELU)** at UoL brings together the scholarship and teaching of well-established programmes in the fields of International Law, Human Rights and European Union Law. Members of the Unit engage with practitioners, international organisations and non-governmental organisations.

5.6.12 Within LJMU there is a strong focus upon company law, associated with the work of the ECCG and banking law, aligned to the interests of CIBEF. Other areas of research include:

- Sports Law
- Media Law
- Feminist Jurisprudence
- IT Law
- Tort Law.

5.6.13 Other areas of expertise at UoL related to FPS include:

- Business continuity and crisis management
- Knowledge, learning and strategic change
- Managing and marketing services
- International Business History.

5.7 Skills provision (See Appendices 9 & 10)

5.7.1 LJMU's new Clarence Street development plans incorporate a dedicated **Professional Centre**, an innovative space that will embrace new methods of delivering learning to business professionals. These facilities will be harnessed to expand existing programmes and develop new provision to meet the professional development needs of the business community. There will be a particular focus upon leadership & management skills and capacity through action learning, underpinned by state-of-the-art technology. The centre will host relevant, focused programmes such as the Business Turnaround Management, the first of its kind in the UK. It will also be a catalyst for further employer-led programmes, similar to the on-going Higher Level Skills Pathfinder for leadership and management in legal practice.

5.7.2 Undergraduate degrees and postgraduate options (including law) at UoL and LJMU are set out in Appendix 9. Both LJMU and UoL have a well-established portfolio of CPD for the FPS sector, with programmes generating a combined total of over £760,000 in 2008/9. Options at UoL included the LEAD programme for SME owner-managers, Small Charity Accounting, the Knowledge Edge Executive Education Series and a programme of Innovation Management masterclasses, which attracted 70 businesses. LJMU will launch an MBA in Legal Practice in January 2011 as a CPD option. The programme, which is being designed to reflect Law Society CPD requirements and the award criteria for the Chartered Management Institute, will use a virtual learning environment and blended learning options. Its content has been developed in partnership with an industry steering group and designed to provide a critical understanding legal practice management.

5.8 Related initiatives

5.8.1 There are two initiatives which directly support the governments Big Society initiative. First, the **Liverpool Law Clinic** is a community-focused, law-in-action programme, run by staff and undergraduate students from UoL's Law School. Filling a clear gap in service provision in Liverpool and complementing the activities of other valuable advocacy services such as Citizens Advice, the Law Clinic has provided local residents with access to justice and embedded a range of practical skills in the next generation of legal practitioners. The Law Clinic offers the public free, first-rate legal advice on a wide range of issues, including:

- Landlord and tenants disputes
- Employment rights
- Consumer rights
- Divorce
- Child contact and maintenance
- Immigration law.
-

Applicants are interviewed by students under the voluntary supervision of practising solicitors drawn from local law firms, including Berrymans Lace Mawer, Hill Dickinson and EAD. Endorsed by local practitioners and professionals as well as a former Attorney General, the Law Clinic has continued to expand and develop in response to the high demand from both clients and students.

5.8.2 Secondly, LJMU's **Social Enterprise Research Group** (SERG) connects research, teaching and consultancy activities which relate to the corporate sector with issues relating to social enterprise,

such as corporate social responsibility, social inclusion and social return on investment. LJMU was one of the first universities in the UK to offer an MA in Social Enterprise Management and staff within SERG have worked closely with central government, providing commentary on the research strategy of the Office of the Third Sector.

5.9 Opportunities.

5.9.1 The profile of FPS in Liverpool is an important issue. The city is not fully recognised as an important centre for these services nor is it branded as an important commercial centre. Action needs to be taken to redress this situation.

5.9.2 It will be important in the future to develop an even more sophisticated approach to attracting inward investment into this sector in the city region. Building on the sector knowledge in Professional Liverpool (see 5.4.3.) and in other involved organisations and individuals, potential business opportunities which arise and the approach to be adopted in order to attract them to Liverpool, all need to be explored in depth in order to best exploit those opportunities on behalf of the city region. This approach needs to be linked to a sustained marketing effort to communicate to the required audiences the strengths which Liverpool can offer (e.g. geography, price (property, local tax etc), a gateway city, skills, academic support, quality of life). The city region needs a structure which sustains the capacity to market the city and develop the intelligence needed to underpin the attraction of investment including foreign direct investment. This applies across all the key sectors of the economy and to international as well as national audiences building on established links such as with China (via the Shanghai Expo) and India (via Liverpool Hope University). The establishment of a Local Enterprise Partnership for the city region could simplify the landscape and create one organisation working on behalf of the city region which is sufficiently well resourced to support the development of the economy across all the priority sectors, including the attraction of major new investment.

5.9.3 If the FPS sector in Liverpool is to grow effectively, a number of other issues need to be grasped:

- In line with the coalition government's priorities, companies need to look for business not just regionally and nationally but internationally. In particular, improved links and relationships with London are pressing
- The FPS sector services the entire economy; it is important, particularly, to ensure that it can provide the full range of general and specialised services required by each of the key sectors of the knowledge economy moving forward
- The sector needs to build on its strengths. Professional Liverpool is bringing together a Wealth and Asset Management Group to discuss how best to build on that area of expertise, which is second in importance only to London, and use it to sell to the international markets in which they operate; consideration should also be given to establishing a group to consider how best to develop bank processing activity
- The Higher Education sector needs to offer the highest quality support for the sector through its Business/Management Schools, both through their research and the quality of their post-graduates
- The Universities need to consider strengthening their support for the sector (e.g. the prospect of establishing a Chair in Wealth and Asset Management and producing graduates with particular skills in 'financial' mathematics). Regular dialogue should take place between Professional Liverpool and its members and the Universities
- The HE and FE sectors need to be able to offer bespoke training opportunities both for existing companies (including CPD) and as part of the service which the city region can offer to potential external investors whether national or international.

5.9.4 Finally, the city region needs to be able to offer the type of Grade A office accommodation which the banking and professional sectors require and which is a pre-requisite for attracting significant new external investment. In addition to the distinctive accommodation (new and refurbished) in the Commercial Business District in which major private sector developers/landlords continue to invest heavily and which gives Liverpool its physical commercial identity, Liverpool and Wirral Waters have the capacity in the longer term to provide significant quantities of modern, fit for purpose accommodation which would meet many of the potential needs of the Financial and Professional Services and other sectors. The city region needs to work closely with all those developers who can deliver the required type and quality of accommodation, to mutual advantage.

6. Public sector

6.1 Strategic context

6.1.1 The independent report '*Transforming where and how Government works*' reviewed the potential for government relocations from London and the South East as part of the drive to create "smarter government" for the 21st century. It aims to build on new service innovations, communications and flexible ways of working connected to the *Digital Britain* agenda.

6.1.2 The report concluded that there was considerable scope for further relocation of civil service functions and that there should be a greater rebalancing of activity between London and the rest of the country. It was, therefore, recommended that 15,000 civil service jobs should be relocated from London in the next five years, with a target to reduce the number of civil servants in London by at least a third in the next ten years. This included headquartering public bodies which provide national services outside London and the South East.

6.1.3 As well as reducing costs and bringing government closer to the people, the proposals would seek to break the 'London Magnet', which has concentrated the majority of senior civil service positions in central London for centuries. Under these measures, there would be a much more streamlined, strategic and closely networked Whitehall core.

6.1.4 The report recognised that relocation would help to stimulate economic vibrancy in UK regions via the creation of centres of excellence and linkages with the private sector. The aim would be to build clusters of international competitiveness, contributing to growth and jobs. The former Government advised that Regional Ministers, working with Regional Development Agencies, Government Offices and Local Authorities, should take the lead in developing propositions for these regional campuses and clusters, which should be scale-efficient, competitive and act as a catalyst for improving the efficiency and effectiveness of the Civil Service as a whole. Although the concept of campuses may still be relevant, clearly the regional dimension will no longer apply. It is assumed, therefore, at this stage, that a city region approach will now apply and that this will need to be developed through the LEP once that is established and operational.

6.1.5 It will still be important for the city region to make a case for relocation, which is not simply based on the impact on employment, but which specifies how a hub/campus can be created which complements and supports the city region's economy going forward. Campuses should, therefore, go beyond delivering transactional and support activities, becoming self-sustaining and contributing fully to the economic vitality of their surroundings to help achieve critical mass.

6.1.6 The Mayfield Campus in Manchester has been highlighted in '*Transforming where and how Government works*' as a potential site for the relocation of 5,000 civil servants from London over the next five years. The new campus, which could include a cross-department facility, would also help

create a further 1,000 jobs in support services in the wider economy. It is important that the LCR now addresses this opportunity in an effective way.

6.1.7 It is clear that the public sector has a significant ongoing role to play, despite public expenditure cuts. High-quality, efficient and responsive public services can, therefore, help to catalyse the knowledge economy as well as providing excellent services to users. This is certainly the case in the LCR where the economy is overly dependent on the public sector and where the transition to a stronger private sector is particularly important.

6.2 Current position and strengths

6.2.1 The Liverpool City Region already houses a number of central and local government functions, including:

6.2.1.1 Government Departments:

- The Headquarters of the Health and Safety Executive, Bootle, Sefton
- UK Border Agency
- HM Revenue and Customs
- Government Office of the North West

6.2.1.2 NHS Trusts:

- Royal Liverpool and Broadgreen University Hospitals NHS Trust
- Southport and Ormskirk NHS Trust
- St. Helens and Knowsley Hospitals NHS Trust
- Mersey Care NHS Trust
- 5 Boroughs Partnership NHS Foundation Trust
- Aintree University Hospitals NHS Foundation Trust
- Alder Hey Children's NHS Foundation Trust
- Clatterbridge Centre for Oncology NHS Foundation Trust
- Liverpool Heart and Chest Hospital NHS Foundation Trust
- Liverpool Women's NHS Foundation Trust
- The Walton Centre NHS Foundation Trust
- Wirral University Teaching Hospital NHS Foundation Trust

6.2.1.3 Local Authorities:

- Halton, Knowsley, Liverpool, St. Helens, Sefton, and Wirral

6.2.1.4 **Merseytravel** is the combined Passenger Transport Authority (PTA) and Executive (PTE) for LCR. Within the city region, it covers Knowsley, Liverpool, St Helens, Sefton and Wirral and co-ordinates public transport in partnership with bus and rail operators. Amongst other assets, it owns and operates the Mersey Tunnels, the Mersey Ferries and Livesmart, a smart card organisation. It has been awarded Centre of Excellence status for integrated public transport, integrated public transport planning and the delivery of public transport schemes.

6.2.1.5 **Merseyside Police** is responsible for policing Knowsley, Liverpool, St Helens, Sefton and Wirral. In March 2009, the force employed 4,494 police officers, 2,221 staff, 442 police community support officers and 420 special constables. The force operates under the Merseyside Police Authority.

6.2.1.6 **Merseyside Fire and Rescue Service** is the statutory service for Knowsley, Liverpool, St Helens, Sefton and Wirral. Headquartered in Bootle, Sefton, it employs approximately 1800 staff at a number of administrative centres and at 26 community fire stations. Halton is part of the area covered by Cheshire Constabulary and is served by Cheshire Fire and Rescue Service

6.2.1.7 The city region is covered by the **North West Ambulance Service**, the second largest urban ambulance service in the country. The Trust currently operates from 114 ambulance stations and employs around 4,500 staff.

6.2.1.8 **Merseyside Waste Disposal Authority** (MWDA) is a statutory authority with responsibility for household waste disposal functions for local authorities across Knowsley, Liverpool, St. Helens, Sefton, and Wirral. This includes managing the municipal waste which has been collected and the provision of fourteen Household Waste Recycling Centres in across the five council areas. MWDA takes a lead in advocating recycling, waste minimisation and the safe and effective disposal of household waste for LCR residents. Halton Borough Council is an observer within the MWDA governance structure.

6.2.2 The city region could also be argued to have the most significant level of third sector activity outside London, an area which is assuming growing importance in terms of government policy and service delivery. The umbrella groups are Halton VA, Knowsley VCS, Liverpool CVS, St.Helens CVS, Sefton CVS and Wirral CVS. This high level of activity, reflected in Liverpool's status as a 'vanguard community', is a significant contributor to the Big Society agenda.

6.2.3 The public sector continues to be the biggest knowledge-intensive employer in the city region and accounts for a similar percentage of jobs as a decade ago.

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
Public Sector	144896	167947	26.3%	28.8%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
Public Sector	4756	5550	12.3%	12.7%

Liverpool accounts for around a third of businesses, with notable concentrations in the city centre. There are secondary clusters in Wirral and Sefton, which are focused around Birkenhead and Sefton.

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	402	7.2%
Knowsley	442	8.0%
Liverpool	1927	34.7%
Sefton	1093	19.7%
St Helens	607	10.9%
Wirral	1079	19.4%
Total LCR	5550	100.0%

The focus of activity in Liverpool is confirmed with analysis of current employment statistics with Wirral and Sefton again forming other notable areas for employment.

Jobs by Geographical Distribution 2008

	No. of jobs	%
Halton	9667	5.8%
Knowsley	12299	7.3%
Liverpool	70382	41.9%
Sefton	34081	20.3%
St Helens	15644	9.3%
Wirral	25874	15.4
Total LCR	167947	100.0%

6.3 Research Strengths

6.3.1 LJM, Hope and UoL have significant policy research strengths, including Education, Health and Health Inequalities, Urban Planning, Criminology, Socio-Economic Development Social Work and Social Justice, Faith, Ethnicity and Diversity and multi-level governance. Many of the Universities' research strengths, notably in social sciences and health, lend themselves naturally to policy-making. The attached diagram details current complementary policy strengths identified by the Universities. The current 'offer' to public agencies and others delivering public services encompasses targeted research, policy evaluation and bespoke training provision/capacity building.

6.3.2 In terms of specific initiatives, the **European Institute for Urban Affairs (EIUA)** in LJM has notable credibility in informing public policy in regeneration through research, strategy development and programme evaluation. EIUA has established an international reputation for its work on cities and urban policy across the UK and Europe, leading the UK Government's *State of the English Cities* report and, more recently, assessing the impacts and implications of the 'credit crunch' on wider public policy. The EIUA's reputation for defining the key regeneration issues and devising/evaluating measures to tackle them will be a notable asset in the current economic climate. Recent assignments have included an analysis of the North's response to the credit crunch in the context of future regeneration prospects, commissioned by the Northern Way.

6.3.3 There are a concentration of assets around Public Health and Health Inequalities although it will be necessary for them to adjust to the announced change in the responsibility for promoting public health from the NHS to local authorities. The recently-launched **Liverpool Health Inequalities Research Institute (LivHIR)** is collaboration between UoL and Liverpool PCT with a focus on reducing health inequalities in LCR. It aims to provide leadership and excellence in public health research and will consolidate evidence on the most effective interventions Liverpool PCT can make to address the disparities in health across the region. The research programme will focus on inequalities in health status, and the provision and quality of care in areas such as obesity, alcohol abuse, tobacco control, sexual health and workplace health. LivHIR's objectives are to:

- increase the evidence base for local strategic planning & service commissioning
- improve the knowledge and health outcomes of local people and reduce health inequalities
- increase the quality, effectiveness, efficiency, equity and outcome of services
- improve the translation of research
- improve understanding of behaviours
- improve research capacity within the NHS partners.

6.3.4 LJMU's **Centre for Public Health** has a distinguished track record in planning and delivering applied research and educational programmes that address health issues at all levels. The Centre has an international reputation for expertise across a range of public health issues, including sexual health, substance use and drug prevention and has been recognised by the World Health Organisation for its work on interpersonal violence and alcohol. The **National Collaborating Centre for Drug Prevention** (NCCDP), based within the Centre, has received significant funding from the National Institute for Health and Clinical Excellence for its work on drug prevention amongst young people.

6.3.5 The Centre for Public Health hosts the **North West Public Health Observatory** (NWPHO), one of a national network of nine regional public health intelligence organisations, researching and disseminating information on emerging public health issues, informing public policy and shaping professional practice. The NWPHO leads the national network's research agenda on alcohol, drugs, violence, health protection & dental health and has advised the Chief Medical Officer on key national public health issues such as alcohol use amongst children and alcohol pricing. This foresighting role will be increasingly important as health policy seeks to take more account of prevention

6.3.6 As part of its work to improve health and reduce health inequalities, LJMU has played a lead role in developing Health Impact Assessment (HIA) methodologies and tools, which are now widely used around the world. The University has set up a dedicated HIA consultancy and training service, **IMPACT+**, which has undertaken consultancy for a wide range of organisations, including the European Food Safety Agency and the WHO.

6.3.7 The work of LJMU's **Research Institute for Sport and Exercise Sciences** (RISES) also connects to the well-being agenda. Its world-leading research has translated into interventions at very local level, including sustainable community-based lifestyle programmes to tackle childhood obesity and a cardiac screening programme in collaboration with CRY (Cardiac Risk in the Young).

6.3.8 LJMU and UoL have worked in collaboration to establish the new **Institute for Cultural Capital** (ICC) which will aim to improve policy-making around cultural innovation in Europe, drawing on the city's experience in the delivery of European Capital of Culture in 2008. The Institute, which will be open to research commissions from organisations across Europe, will bring together researchers, policy makers and cultural practitioners. It will build on the success of the 'Impacts 08' research programme undertaken by the universities to evaluate the success of Liverpool's Capital of Culture status and help establish the new UK City of Culture programme. The ICC has already drawn interest from the Department of Culture, Media and Sport as well as the AHRC (see 3.6.8).

6.3.9 The **Centre for the Study of the Child, the Family and the Law** at UoL is an interdisciplinary research centre that facilitates collaboration between academics, practitioners, representatives from children's rights NGOs and statutory and governmental bodies, as well as children and young people. The Centre aims to undertake and produce authoritative participatory and multi-disciplinary research on legal and social policy and practice, as well as issues of national and international concern affecting children and their families.

6.3.10 At Liverpool Hope, the **Centre for the Child and Family** (CfCF) is a new initiative, created to act as the focal point for a developing international network of academics and practitioners interested in exploring how the various boundaries which make it difficult to improve practices for children and young people can be dissolved. The overall aim of the Centre is to test the hypothesis that the well-being of children can be continuously improved by pooling the energy, values and talents of the numerous professionals who are passionate about making a difference to the quality of children's lives.

6.3.11 The Centre's work is complemented by that of the **Institute for Social Work and Social Justice**, the **Institute for Research into Education and Society**, and the **Bishop Heber Institute for Applied Social Sciences**, which focuses upon social work, social care and health. The most recent Research Assessment Exercise rated Hope's research in Social Work and Social Policy Administration as being 'internationally excellent' and there is considerable collaborative work being undertaken with third sector and social enterprise organisations. These strengths are complemented by the presence of PSS, a social enterprise providing community social and health care, at Liverpool Hope's Education, Innovation and Enterprise Centre.

6.3.12 In terms of citizenship, the **Centre for Transcultural and Global Studies** at Hope aims to contribute to the contemporary debate on citizenship within the United Kingdom and Liverpool in particular. In doing so, it fosters co-operation and mutual understanding at local, national and international levels between communities.

6.4 Skills provision

6.4.1 In terms of skills provision, UoL's **Masters in Public Administration (MPA)** is the longest-established in the UK. Building upon the MPA, a new in-company model of the programme has recently been developed as Continuing Professional Development in collaboration with Merseytravel, Liverpool City Council and other local partners. The programme, which recruits middle managers from across local public agencies, aims to enable organisations and individuals to address the fundamental changes taking place in the public and voluntary services with a view to developing more effective leaders and managers. A tender was recently submitted to be a preferred provider of training for the Pan Government Framework Agreement, enabling UoL to now deliver an MPA to civil servants via an executive or traditional part-time model.

6.4.2 The **Centre for Public Service Management (CPSM)** at Liverpool Business School (LJMU) aims to:

- develop knowledge and expertise of challenges and issues facing the public services
- support and promote research, teaching and consultancy in public service management
- develop a critical mass of knowledge and expertise by working in partnership with academics and practitioners.
-

The Centre has worked in collaboration with Anglesey County Council to develop an award-winning management training programme, leading to an MA in Change Management. Over the ten years in which the partnership has been in operation, the Authority has risen in league tables for planning and service delivery. Other partners working with the Centre include: Age Concern, Cobalt Housing, Merseyside Police, North West Employers Organisation, and Sefton MBC.

6.4.3 LJMU has worked with Merseyside Police to establish a Foundation Degree in Police Studies. The programme offers high-level skills training alongside the basic Police Force training, facilitating the convergence of academic and vocational skills development to meet the changing needs of a modernised police service. LJMU also hosts a portfolio of programmes for ambulance services staff in the dedicated Paramedic Practice Suite. Capacity building support is provided through LJMU's creative facilitation space, 'The Automatic', where a number of public sector clients have chosen to engage in strategic planning, team-building and stimulating culture change with the support of dedicated facilitators from LJMU's business development team. At Liverpool Hope, the Business School works closely with Merseyside Police, the NHS and the Ethnic Minority Business Network in delivering CPD and accredited management courses.

6.4.4 UoL's **Masters in Public Health** (MPH) was established in 1989. It is internationally respected, especially for its multidisciplinary focus and commitment to the World Health Organisation's (WHO) Health for All principles. The programme is designed to build on the existing experience of professionals working in health, public management, environmental and related fields, providing them with the knowledge and skills required for the wide and increasing variety of opportunities for public health practice.

6.5 Related initiatives

6.5.1. This public sector expertise is complemented by a range of other activities, which (in line with the Big Society initiative) seek to engage a broader range of citizens. Notable examples are:

- A variety of public lectures series (Roscoe Lectures at LJMU; Public Lectures at UoL; Policy Provocations; Science and Society lectures; and a range of Department-focused events)
- HE experts working as non-executives on parliamentary services boards and also providing a range of formal and informal advice to government and governing bodies
- Staff representation (both corporate and in terms of specific expertise) on a range of public governance structures, including public agencies, regeneration boards, local schools etc
- Student internships, placements and volunteering with public agencies and voluntary organisations, supporting the delivery of public policy (see Interchange below).

6.5.2 Liverpool Hope is planning for the future with a **Health, Care and Science Centre** seeking to address the need for growth in the third and social enterprise sectors to develop businesses which address the issue of health and care as well as the critical issues relating to a shortage of scientists. The initiative involves an expansion of Hope's work with PSS, a dynamic social enterprise providing community social and health care, to develop a national dementia centre of excellence as well as to create together an incubation centre for new businesses addressing health, care and science challenges.

6.5.3 **Interchange** is a registered charity which links the three Liverpool universities with the local voluntary and community sector. Community groups and voluntary organisations can come to Interchange to discuss issues which require further research. Interchange then works to identify undergraduate and postgraduate students with the right skills to take on the project.

6.5.4 During the period 2007/8 to the present, LJMU and UoL have delivered 8 KTPs with organisations delivering public services. These included working with a major Registered Social Landlord to address a knowledge deficit in regeneration planning and client engagement through a prototype housing management scheme driven by local residents. A current live project with the Health and Safety Executive is aiming to shape and deliver new guidance on managing health and safety for leaders in UK organisations across all sectors whilst further increasing the competence and confidence of HSE officers in assessing health and safety management.

6.6 Opportunities.

6.6.1 The public sector across the city region dominates the economy. Although this sector is destined to contract over the next few years, it will continue to be a major element of the city region's economy. As, on average, over a third of the money spent by the public sector is delivered by the private sector, the procurement policies adopted by the public sector could, if effectively co-ordinated and focused, not just provide important efficiency savings for that sector but also underpin the development of the local economy, including FPS.

6.6.2 In addition, there are two further key issues in the current climate which the city region needs to address. First, there are the rapidly changing levels of public sector expenditure, with the Coalition Government making significant cuts in its first few weeks of office, followed by much more significant reductions in expenditure set out in the Comprehensive Spending Review published in late October. Wide ranging significant cuts have been announced with only the Health Service and International Development being ring fenced. Even in the Health Service, the ageing population and the anticipated increase in demand for services generally are resulting in cost improvement efficiencies being required from all trusts amounting to £20bn over five years.

The scale of reductions announced across the public sector is such that it will be necessary for there to be fundamental reviews, not just of what services the public sector should provide, but also of the method of provision including greater collaboration across services. The reductions sought will require radical and fundamental change and that, in turn, could be facilitated across the city region if the universities, in conjunction with other sources of expertise, and the public sector itself, were to establish a **Public Services Institute** (see 6.6.3) focusing both on innovation in public services and on stimulating policy thinking across the city region.

This concept has so far secured the support of all members of the Knowledge Economy Group (see Appendix 1), the City Council, Merseyside Police and MerseyCare NHS Trust. The Chief Constable in his consultation response stated: "A commitment to enter constructive and imaginative partnership arrangements across a range of public services, where it is appropriate to do so, will ultimately benefit the public and deliver value for money. Provided participants are at an appropriate level to influence their respective organisations, the sharing of knowledge and the collective challenge to services could be constructive and beneficial."

6.6.3 Secondly, there is a need for the city region to address how it can best attract relocating civil servants to the Liverpool city region. This must be done in a way which is seen to complement and support the development of the city region economy as well as offering an environment and a range of related services and quality of life which will meet government, as well as city region, objectives. The Wirral Waters and proposed Liverpool Waters projects being promoted by Peel offer a tangible opportunity for the city region to work in partnership with Peel to secure significant inward investment. The opportunity to work with other developers as opportunities arise should also be taken.

The scale, quality and nature of the proposed development of Wirral Waters will transform the competitive position of Wirral and dramatically enhance the profile of the city region. It will provide a wide range of opportunities for employment and, when fully developed, will accommodate 20,500 FTE jobs contributing almost £1bn to GVA. Planning consent has recently been granted. Total investment is anticipated to be £4.5bn.

Liverpool Waters will transform 60ha of vacant dockland into a vibrant destination to live, work and visit. A natural extension to the city centre, the scheme will comprise a mix of employment, housing, leisure, cultural and community facilities centred around restored docks and high quality public realm. Total investment is anticipated to be £5.5bn with over 20,000 new jobs generated. The scheme will be phased over 5 stages with phase 1 delivering 250,000sqm of mainly commercial and leisure space by 2015. It is expected that a planning application will be submitted by October 2010.

6.6.4 The three Universities of Liverpool, John Moores and Hope, (in conjunction with other centres of expertise including FE and the wide ranging public sector across the city region) need jointly to address the establishment of a **Public Services Institute** which would focus on two distinct areas of action:

6.6.4.1 Public Service Innovation Centre

Objective:

To build an 'innovation culture' around service delivery and position the city region as a UK leader in innovation in public services, making it a distinctive UK destination for academics, policy-makers and practitioners in Europe and beyond.

Model:

An Innovation Centre could:

- create an 'innovation lab' bringing together a range of staff from across agencies and institutions to work on a range of projects around identified critical service delivery issues. This could include:
 - KTPs
 - secondments from public agencies and the voluntary sector
 - HE staff
 - public engagement.
- connect to the CPD portfolio as well as other higher learning options.

Functions:

An Institute could:

- forge new, creative and multi-disciplinary perspectives to address key service challenges
- draw upon real-life practice in Liverpool and connect this with international comparators
- raise the profile of innovative practice across public services in the city region, both within the city region and internationally
- signpost external users to areas of relevant expertise in research and higher-level learning.
- formulate and advise upon the implementation of real policy innovations, responsive to the city region context (e.g. innovation procurement plans).

Products:

Potential products could include:

- evaluation
- networking (e.g. Daresbury-style business breakfasts) and events
- innovation services (cf. Innovation Academy)
- CPD
- policy guidance and policy formulation
- independent analysis and consultancy services.

Existing initiatives:

- Innovation Academy (UoL).

Benefits to HEIs:

- Increasing the impact of translational research
- Winning more major research and consultancy contracts
- Establishing closer engagement in local policy communities
- Brokering more KTPs, work placements and internships
- Developing CPD market.

Benefits to city region partners:

- Access to high quality evaluation etc
- Skills development
- Enhanced networks, including the third sector and the public
- Creative thinking space
- Consultancy services.

6.6.4.2 **Public Policy Institute**

Objective:

- To stimulate and lead policy thinking in the city region
- To improve the quality of policy-making in the city region by bringing together expertise and a broader group of stakeholders, including HE input, public agencies, voluntary sector and the public
- To harness HE strengths in policy research to address critical local issues.

Model:

A 'policy hub' could:

- offer a neutral space for policy-makers to address key policy issues; a Doctoral Training Centre, built upon a base of CASE studentships could provide input alongside academic staff input and supervision
- provide a means of connecting HE policy research areas with a track record of high quality outputs to public and third sector agencies, community groups and the public
- connect to the CPD portfolio as well as other higher learning options.

Functions:

- forge new, creative and multi-disciplinary perspectives to address key challenges
- broker collaborative relationships within HE as well as with public agencies, community organisations and the public. This could add value to the work of individual research projects and enable more strategic projects to be delivered
- make policy research accessible for a practitioner / public audience
- convene a range of players in policy communities around issues of common concern
- signpost users to other relevant expertise and learning options
- raise the profile of policy research in Liverpool.

Products:

- 'foresighting' / think pieces
- provocations / papers on critical city region issues (e.g. a city region journal could be developed)
- interdisciplinary and cross-agency research
- policy advice
- roundtable policy sessions
- networking and events (e.g. Policy Provocation series at UoL)
- CPD.

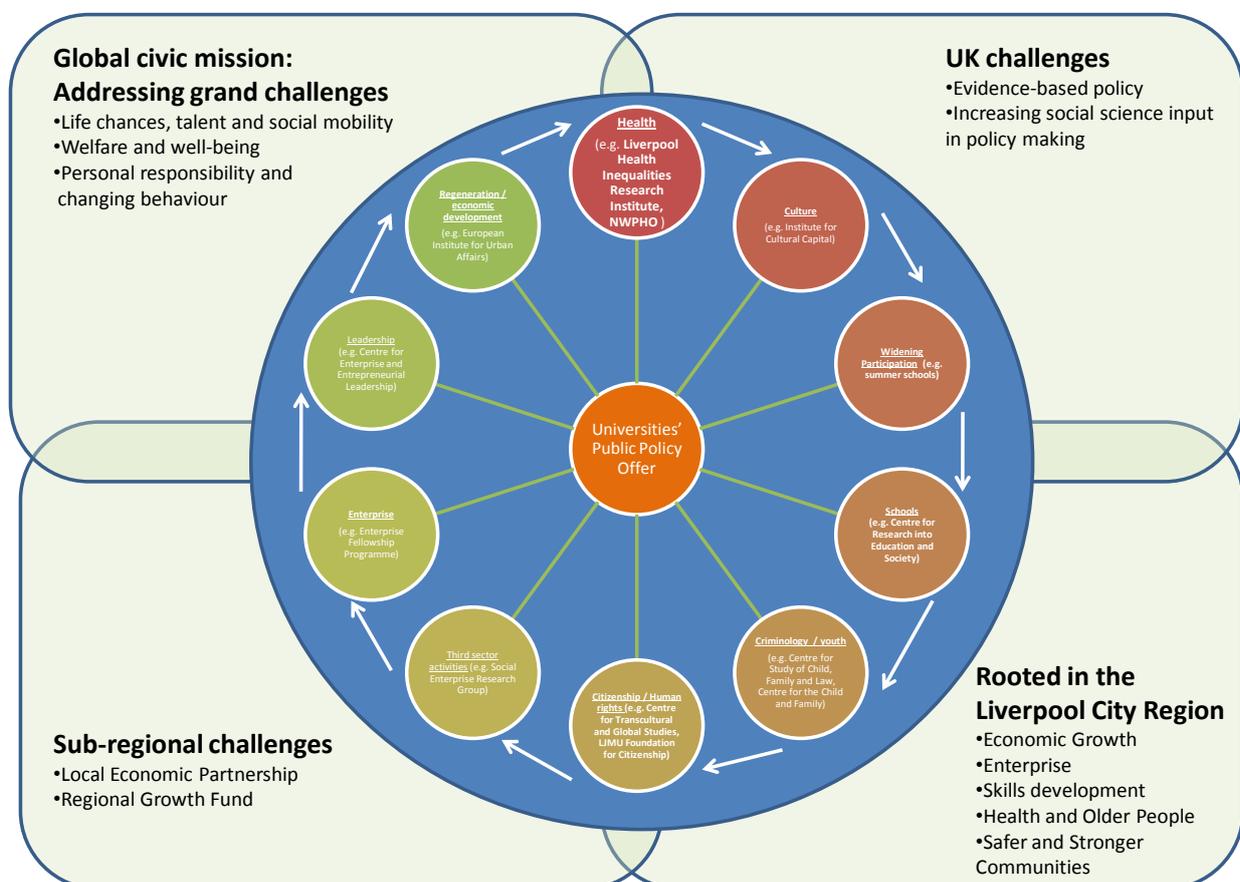
Existing initiatives:

An Institute could build upon and connect to existing:

- collaborative (ICC) and institutional research initiatives (EIUA; LivHIR)
- policy research strengths (see Annex for the Universities’ strengths)
- CPD provision (e.g. in-company Masters in Public Administration) and other learning options.

6.6.5 The city region urgently needs to begin to define the case for attracting the relocation of civil servants from London and do so in partnership with the private sector. Liverpool Vision and TMP should jointly take this opportunity forward pending the establishment of the LEP.

Annex: The Universities’ Public Policy Strengths



Cross Cutting Issues

7. Innovation for Growth

7.1 Introduction

7.1.1 The Coalition Government's ambition to create a rebalanced economy, underpinned by international competitiveness and export-driven growth, places innovation at the heart of the economic growth agenda. Its commitment to make sure that Britain is the best place in the world to run an innovative business or service is underpinned by four inter-related strands: Universities, Enterprise, Access to Finance and Skills. The primary importance of innovation to the future economy is reflected in the European Union's new growth strategy, which includes a blueprint for transforming Europe into an 'Innovation Union' by 2020.

7.1.2 Innovation is a source of comparative advantage for UK business in the global marketplace and the city region is the location for a number of innovation assets of national and international significance, including Daresbury Science and Innovation Campus (see Ch2, item 10) and the Liverpool Knowledge Quarter (see Ch2, item 14). Leveraging these strengths more effectively and integrating them with the City Region's other major gateway facilities, such as Liverpool Science Park, the Heath and the Baltic Triangle, the Liverpool Innovation Park and the industrial parks in Knowsley and Wirral, will deliver private sector growth to both the city region and UK economies.

7.1.3 The Knowledge Economy Plan offers a framework for enhanced local co-ordination and collaboration to realise the value of these assets. A strategic partnership between LCR knowledge economy partners and key UK bodies, including the TSB, is now required to drive this national ambition forward.

7.1.4 The approach to innovation in the KEP reflects the growing consensus that innovation is a primary driver for growth and job creation and that it is not limited solely to the application of new technologies. A more holistic, cross-sector and demand-driven approach to innovation policy is now required building upon the HE strengths outlined in this KEP and incorporating:

- Enterprise, including business support;
- Access to finance; and an
- Enhanced flow of skills between the business base and Further and Higher Education

The delivery of measures set out across the other cross-cutting themes in the KEP, namely Education and Skills, Digital and Physical Infrastructure and Branding, will be integral to enhancing the broader innovation ecosystem.

7.1.5 Innovation for Growth is at the heart of the Knowledge Economy Plan; it will be a key driver of the future growth of the City Region's knowledge economy, enabling businesses, particularly SMEs, to establish comparative advantage in international markets. Innovation unites all the key sectors and is of critical importance to realising new market opportunities arising from convergence between sectors and the application of technologies to new areas.

7.1.6 The city region already has the critical building blocks for an effective innovation infrastructure in place, including physical assets, networks and expertise as well as the inherent advantages offered by an urban environment for innovation: proximity, density and variety. The task is now leverage these assets to create an enabling environment in which high growth can thrive.

7.2 Strategic Context

7.2.1 **Innovation ecosystems** - a series of national policy papers make reference to the importance of establishing an effective innovation 'infrastructure', 'architecture' or 'ecosystem'. Whilst there is no common view on what this looks like in practice, there is, nevertheless, a recognition that innovation is not limited solely to the application of technological advances and that a collaborative, cross-sector approach is highly beneficial:

- NESTA has stated that an innovation 'infrastructure' needs to create new knowledge, but also enhance the capacity for ideas to be accessed, absorbed, spread and applied.
- Lord Sainsbury's review identified the need to shape innovation 'ecosystems', in which business, HEIs, investors and government agencies could interact more effectively.
- Dr Herman Hauser's report on *The Current and Future Role of Technology and Innovation Centres in the UK* identified innovation centres as having an important role alongside Technology Transfer Offices, Science Parks, public policy centres and laboratories in an enhanced 'ecosystem'.

7.2.2 The **Atlantic Gateway** framework proposes that an enhanced, area-wide Innovation system should be established. This would comprise the following key elements:

- Effective knowledge transfer between research and business, with a particular focus on universities and Daresbury
- Greater networking, including connecting networks both within and between research and business
- A more developed spectrum of supporting infrastructure, including start-up space, and specialist and digital connectivity
- Graduate internships as well as graduate enterprise, aiding talent retention and development
- Enhanced access to finance.
-

This approach is equally relevant to the Liverpool City Region.

7.2.3 More locally, one KEP interviewee suggested that an effective innovation system should comprise multiple levels of engagement, including:

- Inspiration
- Provision of advice
- Facilitation of innovation activity in business
- Engagement in innovation/collaboration.

7.2.4 **Approach to innovation policy** - in order to innovate, NESTA has argued that places need to combine a capacity to absorb external knowledge with a corresponding capacity to develop this knowledge into new innovations. 'Absorptive' capacity would include the capacity to:

- link and connect to international networks of knowledge and innovation
- attract people, investments and firms from overseas
- disseminate knowledge effectively

'Development' capacity includes:

- knowledge creation capacity
- knowledge exploitation capacity

7.2.5 It could be argued that previous Government policy and the City Region's current infrastructure have been predominantly focused upon this *development* capacity. Within this, the UK's capacity to commercialise knowledge from its research and science base has been identified as a key priority for ensuring economic competitiveness. Greater investment and a more fully-developed and co-ordinated innovation infrastructure, including translational facilities which close the gap between universities and business, have been seen as critical means by which this should be addressed.

7.2.6 NESTA has also identified the importance of framework conditions such as taxation, competition, regulation, public procurement, intellectual property regimes and public sector performance targets in facilitating or militating against innovation. Networks are viewed as crucial to new business creation as well as for promoting collaboration, stimulating creativity and making better use of shared resources. Networks can be physical (e.g. airports), organisational (e.g. Multi National Corporations) or social (e.g. business clubs).

7.2.7 *Current policy and initiatives* - the translational function provided by **Technology and Innovation Centres** (TICs), which operate across the spectrum of research and business interactions and are part-funded from public sources, is identified as one means to address this issue. The role of TICs is to ensure that new technology is market-ready, thereby delivering a step change in commercialisation. They are viewed as having the potential to anchor knowledge-intensive activities of globally mobile companies and form part of a wider-ranging innovation architecture. TICs can be described in more detail as follows:

- TICs are mission-driven organisations that develop their own in-house knowledge and capability by working closely with leading universities. TICs provide a business-focused capability that bridges research and technology commercialisation. Their workforce is recruited from academia and the private sector and they operate with a high degree of autonomy, but with strong (yet light touch) governance.

In terms of their focus, TICs can be:

- Technology/capability focused, developing a specific technology in response to a business opportunity across a wide platform of applications
- Sector/market focused, bringing together complementary disciplines, cultures and parts of value chains (e.g. MediaCityUK).

Typical activities and outputs include:

- Developing and scaling up manufacturing processes
- Producing technology and application demonstrators
- Providing shared access to research equipment and a focus for collaboration.
- Undertaking basic research
- Carrying out applied research in the innovation chain between university-generated initial discovery and industrial development to realise its commercial potential
- Enabling SMEs to innovate through provision of knowledge, equipment and applied research
- Providing technical and commercialisation services to large and small companies
- Developing a highly skilled workforce.

Where there is a particular focus on SMEs, functions could also include:

- Marketing, commercialisation and IP advice
- Venture capital advice
- Help in securing public grant support funding.

TICs receive some public sector funding to cover start-up costs/R&D projects etc. However, they supplement core funding (from national/regional government) by winning additional income from contract research and commercialisation and subscriptions/subsidised access to facilities. This reliance on demand from end users is crucial to encouraging innovation and boosting efficiency. However, experience of other countries, such as Sweden, suggests that low levels of core funding can lead to a focus on short-term projects.

7.2.8 Under the previous Government, it was recommended that funding for a co-ordinated national network of business-focused TICs exploiting the most promising new technologies should be established and sustained. The elite UK focus of the network would require new TICs to demonstrate their national nature, track record, research excellence and industrial capability and absorptive capacity, whilst clearly meshing with a locally-specific approach, including collaborative relationships with universities and business. New TICs would also need to demonstrate that:

- there was genuine potential for the UK to gain a competitive advantage
- there were significant global markets
- the UK had technical leadership
- there was a defensible technology position
- there was capacity to anchor a significant part of the value chain from research to manufacturing in the UK.

Candidate technology areas included:

- stem cells and regenerative medicine
- future internet technologies
- plastic electronics
- software and technologies addressing renewable energy and climate change
- satellite communications
- fuel cells
- advanced manufacturing
- composite materials.

The TSB was charged with leading the implementation strategy for this programme. Whilst the Hauser Review has received endorsement from the Coalition Government, it is unclear at present how the Coalition Government will wish to implement its recommendations.

7.2.9 In parallel with this programme and in recognition of the fact that commercialisation can be a lengthy, complex and high-risk process, the TSB has set out plans to build a greater continuum of support for emerging, early-stage technologies which have the potential to lead to new products, services and industries. This commitment to bridge the gap between the various types of technology demonstrator and the market acknowledges the barriers which limit the pace and scope of early commercialisation, including:

- the difficulty of finding the best route to market
- a lack of sufficient support for early-stage, pre-investment, proof-of-concept work
- a lack of alignment across existing support mechanisms
- an equity gap for start-ups and spin-outs
- a lack of skills for different stages of commercialisation process.
-

Measures to address this include later-stage support, such as Knowledge Transfer Networks and collaborative research.

7.2.10 Other aspects of previous UK Government policy have been geared towards establishing a more co-ordinated and market-driven approach to innovation investment and infrastructure, enabling a broader spectrum of cross-sector collaboration. This has included an identification of the need to align the work of the key public agencies, such as the Technology Strategy Board (TSB) and UK Research Councils more closely with UK industrial policy, ensuring that emerging technologies are more closely matched to market demand in order help secure private sector investment.

7.2.11 The **Atlantic Gateway** framework proposes the establishment of an Innovation Group to support the objective of establishing a more effective Innovation System. The group would focus on four priority sectors: digital and creative, life sciences and health, transport and logistics, and green technology and renewable energy.

7.2.12 **Enterprise** - the new Government has set out a commitment to take urgent action to boost enterprise and to create a competitive environment in which it can thrive. Enterprise will be supported across all regions and industries and measures will be introduced to make it easier for people to set up new enterprises, including cutting the time it takes to start a new business and introducing a targeted national mentoring scheme for black, Asian and minority ethnic people who want to start a business.

7.2.13 Much as with innovation, the **Technology Strategy Board's Strategy for Emerging Technologies and Industries** identified the need to provide a continuum of support for entrepreneurs. Enterprise was identified by the previous government as one of five means by which to drive productivity growth. Their strategy set out a framework of five 'enablers' to help stimulate enterprise growth. These focused upon:

- stimulating a culture of enterprise by raising awareness of the rewards of enterprise
- improving knowledge and skills by facilitating access; extending enterprise education throughout the schooling system and through to Higher Education; simplifying business support and mentoring and making it more accessible; extending and improving Train to Gain; increasing investment in the Leadership and Management Programme for small businesses
- enhancing access to finance by strengthening the Small Firms Loan Guarantee; launching a third round of Enterprise Capital Funds; and ensuring that early stage, high-growth businesses were better able to secure appropriate sources of investment and finance
- developing a simplified regulatory framework
- increasing business innovation as a driver of enterprise itself by rolling out the demand-led Innovation Vouchers scheme; refocusing the Small Business Research Initiative; and establishing University Enterprise Networks via the National Council for Graduate Entrepreneurship.

7.2.14 This package of measures was designed, amongst other objectives, to increase the:

- number of people with the ambition to start and grow a business
- percentage of SMEs making use of external business advice
- proportion of SME turnover due to new or significantly improved products
- number of innovative firms playing a role in international markets.

7.2.15 The **Enterprise and Business Growth Strategy** for the LCR identifies that enterprise is one principal means by which the rate of economic growth can be increased by:

- growing the business base through increased start-ups and improved survival rates
- supporting local business growth and expansion
- increasing local business productivity levels.

In order to achieve its vision for the city region to be known for its innovative and enterprising workforce, the strategy sets out objectives to:

- develop a more enterprising culture by embedding entrepreneurship in the school and university curriculum
- raise interest in entrepreneurship and new business starts amongst groups who may not have previously considered it
- provide relevant advice for entrepreneurs.

7.2.16 City region policy echoes this approach via its commitment to explore the potential of introducing entrepreneurship into all relevant areas of the curriculum and providing the means to channel young people's creativity into innovation. This was supported by a complementary ambition to deliver a significantly larger graduate enterprise programme, making full use of the universities' business schools. In terms of specific sectors, enterprise supply chain creation and stimulation were identified as priorities for the Knowledge Economy, Low Carbon and Cultural and Visitor Economy platforms.

7.2.17 The future configuration of business support is currently being determined within the context of the pending abolition of the NWDA and the establishment of Local Enterprise Partnerships. The approach to 'Innovation for Growth' set out here is fully consonant with the opportunity identified in the LCR LEP submission to further integrate business support and sub regional innovation in order to deliver high growth.

7.2.18 **Access to Finance** – The Coalition Government has recognised that accessing finance continues to be a challenge for many UK businesses and that medium-sized companies face particular challenges. The assessment recognises that the current system is not adequately delivering finance to small, growing businesses, which are vital to the future of the economy. A new Green Paper, *Financing a Private Sector Recovery*, sets out the range of finance options for different sized businesses and explores where the market is failing to provide and whether there is a role for government intervention. The outcome of a consultation process concluded in September may help to inform the Comprehensive Spending Review.

7.2.19 The city region's LEP submission identified that the use of financial instruments such as JESSICA would be central to delivering sustainable economic growth for the LCR. JESSICA provides the opportunity to develop a "revolving door" investment fund by investing in projects that will provide a future return to the fund to re-invest in long-term economic transformation. The stated intention was that the LEP would play a significant role in the future development of the JESSICA fund and would seek to align potential JESSICA investments with Regional Growth Funding, ERDF and other private sector investment. The re-investment of funds returned to MSIF, through the recently announced £25M Merseyside Loan and Equity Fund by Alliance Fund Managers, also offers an important opportunity to support further economic development. This fund is keen to explore investment opportunities in the Creative and Media sectors.

7.2.20 **Skills flow** – The Coalition Government's stated approach to education and skills seeks to mesh enterprise with training, learning and research. Across the skills spectrum, practical skills will be valued alongside theoretical ones and a broader range of more flexible progression routes both into higher learning and the workplace will be encouraged.

7.2.21 It is envisaged that Local Enterprise Partnerships will work in close cooperation with colleges and training organisations. The Government has advocated the development of effective networks at local level so that LEPs can draw upon a coordinated view of local economic priorities and deliver effective responses. Under such a system, the key economic contribution of colleges and training

providers is viewed as being the teaching of the practical skills required to access local job opportunities.

7.2.22 The Government has stated that a key objective will be to expand the number of apprenticeships at Level 3. This is complemented by the TSB's stated ambition to double the number of KTPs as well as investigating more flexible and shorter-term options.

7.2.23 The City Region's *Employment and Skills Strategy* complements this approach by setting out commitments to:

- work more closely with employers to focus investment upon their skills needs, including supplies of graduates, Knowledge Transfer Partnerships and a more substantial placements and internship programme
- build clear and effective career pathways for 14-24 year olds
- empower employers to drive improvements in skills and productivity within their own workplaces, sectors and networks
- simplify the employment and skills system to help individuals and employers access services more effectively.

7.3 **Current position and strengths**

7.3.1 **UK** – Businesses only rarely innovate in isolation. Equally, they may not invest in innovation (or skills), as benefits do not accrue solely to them. The vast majority of innovations in the UK draw on knowledge and resources from overseas and cities are viewed as offering three qualities essential to innovation: proximity, density and variety. Users are an increasingly important source of innovation as they are often able to identify unmet needs, and businesses, rather than universities, play the central role in commercialising new knowledge.

7.3.2 The UK currently invests less in R&D as a percentage of GDP than other comparator economies. Previous government policy papers have identified that it could significantly improve its record in translating research outputs into innovative, commercial propositions. The previous government provided funding towards a number of high-tech research/innovation facilities in key high growth sectors identified in the KEP:

- *Advanced Manufacturing*
 - National Composites Centre – Bristol
 - Centre for Plastic Electronics – Durham
 - Demonstrator facilities for Industrial Biotechnology – North East
 - Space Innovation Centre – Harwell
 - Manufacturing Technology Centre – Ansty
- *Low Carbon*
 - New and Renewables Energy Centre – North East (wind blade test facility/marine energy testing)
 - Nuclear Advanced Manufacturing Research Centre – South Yorkshire (connects to materials and metals expertise at Sheffield)
 - Wave Hub (test site for marine energy devices) – North Cornwall coast.
- *Life Sciences*
 - Bioscience campus in Stevenage (hub for early-stage companies).

The lack of any investment in LCR and the wider NW is of concern.

7.3.3 The UK is rated as one of the best places in the world to start a business, to access finance for company growth and to expand a company into export or international markets. The UK is identified as having the lowest barriers to entrepreneurship of all OECD countries and it is third in the G8 rankings for early stage entrepreneurship. However, compared to the US, the UK does not perform well in terms of business growth or number of businesses per head. Only 10% of students in FE have access to enterprise education and relatively few UK businesses develop new or novel products. Nevertheless, there has been an increase in the proportion of businesses that are 'innovation active' (from 45% in 1998-2000 to 57% in 2002-4); the largest increase in this rise was reported by SMEs.

7.3.4 **City Region** – The existing concentration and variety of physical assets, networks and expertise across the city region provide it with the essential building blocks upon which it can grow its innovation infrastructure. These now need to be fully aligned to a range of existing programmes of activity around enterprise, business support, access to finance and skills flow.

7.3.5 Physical assets - Chapter 2 sets out in detail the city region's knowledge assets across:

- Commercial Locations
- Science Parks
- Universities
- Significant Public Agencies.

7.3.6 **Daresbury Science and Innovation Campus** occupies a strategic position between the major economies of the Liverpool and Manchester City Regions and North Wales. It is of major significance, not only to the knowledge economy in the city region, but also to the UK's international competitiveness.

7.3.7 The DSIC is a unique UK location, where major corporates, blue-chip companies and start-ups converge with cutting-edge research to deliver new knowledge with real economic value. These players are attracted by the Campus' range of technological capabilities and its open innovation ethos. The DSIC can be at the forefront of the Coalition Government's ambitions for a rebalanced economy delivering international competitiveness and increased inward investment through innovation.

7.3.8 The existing expertise and facilities at Daresbury SIC provide it with the opportunity to be a UK leader in simulation, modelling and prototyping. These facilities, including those at the proposed Hartree Centre and the established Virtual Engineering Centre, enable commercial organisations to innovate more quickly and at a lower cost. They also offer a platform for cross-sector innovation, where technology can be applied to new areas and convergence between sectors explored.

7.3.9 The Science and Technology Facilities Council's (STFC's) Daresbury Laboratory has a broad range of leading edge technological capabilities. Its position within the STFC's national structure means that it is able to harness skills and capabilities across the UK whilst also being a locus of excellence in the city region. The Daresbury Laboratory, therefore, has a powerful role to play as a physical conduit between the city region and UK knowledge economy: whilst bringing UK and international knowledge, skills and ideas into the city region, it also enables excellence to be exported across the UK and beyond through its networks.

7.3.10 These networks have the capacity to connect disparate sections of the supply chain and deliver products through from initial business demand and concept to market solution. Furthermore, the range of users of the Daresbury Laboratory means that it is a primary location for

exploring new market opportunities created via convergence between sectors and the application of technologies across sectors.

7.3.11 The assets at the DSIC are complemented by a broad range of other physical gateways into the City Region (see Chapter 2), notably **Liverpool Science Park** (the Special Purpose Vehicle for the exploitation of commercial knowledge enterprise in Liverpool), **the Heath** and the **Baltic Triangle** as well as the **University of Liverpool** and **Liverpool John Moores University**. However, there is no formal innovation hub in the city region to provide a common focal point for innovation activities.

7.3.12 Networks: Supporting contact within and across these key locations, the following formal networks exist in the city region:

- Sector networks across key sectors (e.g. Mersey Maritime, Professional Liverpool, ACME, BioNow, Envirolink, TMI)
- Business networks for a given area / market segment (e.g. Chambers of Commerce, FSB, CBI)
- Business clubs and events. Daresbury's Business Breakfast events were commended by both university staff and those interviewed in the Advanced Manufacturing sector. One of the keys to success was that Daresbury offered 'neutral turf'; it would appear that Liverpool Science Park could fulfil a similar function in the city centre creating a city centre 'node' to complement that at Daresbury SIC. An Innovation Network was previously facilitated by UoL to stimulate innovation and share practice across sectors and businesses of different sizes.

These networks have the capacity to play an intermediary role, providing a common focal point and a 'translational' facility for interactions with other networks and sectors, such as HE.

7.3.13 Regional structures have meant that certain knowledge-based sectors have been organised on a NW basis (e.g. BioNow, Envirolink). Whilst opening networks beyond the City Region, this has led to a loss of local interactions in some instances, such as life sciences and environmental technologies. A growth of international connections has also been noted in sectors such as creative and digital industries.

7.3.14 Expertise: Daresbury has its own knowledge transfer arm, STFC Innovations Ltd, which operates a dedicated marketing team with a group of highly qualified technical sales managers. The City Region's HEIs have established IP exploitation and commercialisation capabilities, including incubation for supporting business start-ups. In broader terms, LJMU has sought to embed innovation and enterprise within the institution, driving local, organic innovation networks around specific areas of activity and expertise.

7.3.15 As a specific innovation initiative, UoL's **Innovation Academy** helps organisations to deal with a variety of business-contingent issues across technological, product, service, and business model innovation. A number of specific HE centres have also helped to forge networks, bringing together public, private and third sector players in areas of relevance to the broader knowledge economy. Alongside Lancaster and Manchester Universities, the Innovation Academy was a partner in IDEAS (Innovation, Design, Entrepreneurship and Science) at the DSIC. Promoting effective knowledge exchange at the interface of SMEs, large corporations, universities and strategic government-funded science, the project focused upon putting new ideas into practice to enhance business performance. IDEAS also has a base at Harwell Science and Innovation Campus, near Oxford.

7.3.16 At UoL, the **Centre for Enterprise and Enterprise Leadership** (CEEL) combines active engagement with entrepreneurs and small firms with high-quality academic research. It aims to develop insights which are of real value to policy-makers and practitioners as well as the broader academic community. To complement this offer, UoL also:

- runs workshops on entrepreneurial leadership and business growth
- offers bespoke consultancy
- helps small, entrepreneurial firms to address issues by means of projects undertaken by Masters students

7.3.17 The proposed **Liverpool Research Alliance**, to be established by the beginning of the academic year 2010-11, would connect the city region with other global knowledge networks, such as the Georgia Research Alliance, with complementary strengths and capabilities. One of its key outcomes would be greater commercialisation of knowledge assets.

7.3.18 **Enterprise:** All three universities have dedicated access points for enterprise and innovation via their Business Development Centres and Business Gateway teams. A network of LJMU Business Development Managers focuses upon Health, Food & Drink, Advanced Engineering, Environmental Technologies and Sport, whilst counterparts at UoL cover strengths in Health & Wellbeing, Materials, Advanced Manufacturing, Management & Enterprise, Digital Technologies, Safety & Security, Energy & Sustainability, Environment & Climate Change and Cities, Culture & Regeneration. UoL has created ULive Enterprises as a subsidiary company to commercialise IP. Liverpool Hope has expertise in ethics and social justice, recent initiatives including the Hope Business Recovery Programme, the Hope Minority Business Programme and the Economics Crisis Support Programme.

7.3.19 Building on innovative approaches to integrating student and graduate enterprise within the curriculum, LJMU was selected to host the first (pilot) Enterprise Champion post, in collaboration with the National Council for Graduate Entrepreneurship. This provided the impetus to develop a dedicated, structured programme to nurture student and graduate entrepreneurs to help them explore their business ideas and develop sustainable enterprises. This function is matched at UoL with a dedicated Enterprise Champion.

7.3.20 The Business Development Centre is also the focal point for LJMU's student and graduate enterprise network, which uses social media to facilitate connections amongst entrepreneurs. A similar function is housed within the University's Management School as part of the **CEEL**. Both Universities have extensive work placement and internship programmes, having previously collaborated on the Business Bridge programme. They also run business clubs, establishing cross-sector networks.

7.3.21 LJMU's Enterprise Skills Routeway programme works in-curriculum to raise awareness of entrepreneurship and harness enterprising behaviour to stimulate entrepreneurial activity amongst the student and graduate population. Participants can take the opportunity to explore their business idea in a supportive and structured environment through the Enterprise Fellowship Programme, which offers a bursary scheme alongside a package of bespoke business support measures. The programme combines practical business advice with enterprise-related skills training to generate successful business ideas that can be sustained as growing enterprises. In its two years of operation, the scheme has seen over 60 graduates enter self-employment. There are opportunities to enhance the scale and scope of this scheme and to provide support structures beyond initial start-up to ensure sustainability, growth and retention within the city region.

7.3.22 At Liverpool Hope, the Business School developed and delivered a specifically designed business recovery programme for SMEs and BME companies as part of the HEFCE Economic Challenge Fund initiative to support companies through the recession. Liverpool Hope is looking to appoint a Chair of Entrepreneurship in 2011.

7.3.23 Current programmes of business support activity include:

- General business support mechanisms for high value firms (e.g. via Business Link, NWDA, Chambers of Commerce)
- Business support mechanisms for specific sectors (e.g. Manufacturing Advisory Service)
- Dedicated innovation / business development teams at specific locations (e.g. STFC Innovations Ltd, Liverpool Science Park).

7.3.24 **Access to finance:** LEP partners are currently working with a private sector-led consortia to create a new investment model to support strategic projects, which are critical to the city region's economy. Alongside JESSICA and ERDF, a range of other sources of finance are also available for assisting business growth, including:

- Enterprise Finance Guarantee Scheme
- Small Loans for Business
- Northwest Business Angels
- Loan Fund operated by Business Link
- The NorthWest Venture Capital Fund (6 separate funds)
- Merseyside Loan and Equity Fund (utilising funds realised by the Merseyside Special Investment Fund)

7.3.25 **Skills Flow** – see 9.2.2 below. Increasing the flows of skills and ensuring they are targeted at the right businesses will be critical to maximising future growth potential. To ensure this approach forms an integral part of future city region policy, implementation will require close co-ordination with the existing Employment and Skills Board.

7.4 Issues

7.4.1 The current economic climate demands that the city region responds effectively to the twin challenges of increasing private sector employment to offset impending public sector job losses whilst growing its innovation infrastructure for sustainable private sector prosperity. To address these imperatives, a focus on supporting high growth, innovative businesses in the short-term needs to mesh with measures to build innovation capacity across the knowledge economy more broadly in the medium- to long-term.

7.4.2 A significant percentage of future growth is likely to come from the SME base and this is expected to arise, in part, through convergence between sectors, including the application of technologies to new areas. A cross-sector approach to innovation in the city region is now required. This would also allow for greater benchmarking across common underlying trends, enabling organisations to come together over issues in a co-operative rather than competitive manner.

7.4.3 Interviewees for the KEP suggested that there was an opportunity to create an innovation 'community' (rather than a 'network'). As the term suggests, this would entail a long-term direction and a common commitment, whilst also enabling evolution and learning. It was suggested that this would require a bottom-up approach, community 'champions', careful targeting of members and strong regulation of membership to ensure quality and value. This approach would be supported by the establishment of a business-led 'foresighting' function, which, by definition, would need to be cross-sector in its breadth and reach.

7.4.4 It will be critical during the implementation phase of the KEP to determine how this 'community' may be nurtured and grown. This could include building on current expertise and services as well as finding opportunities to experiment with new approaches and access international networks. As an illustration, innovation is a strategic priority for INTERREG and funding is currently available for transnational projects to pilot new approaches to innovation. Further consideration should be given to how such opportunities align to development priorities and existing strengths.

7.4.5 An enhanced innovation infrastructure will increase the development of leading edge expertise within the SME base. The city region needs to respond to this opportunity by providing demand-driven and committed support to maximise the benefits of this new knowledge. Fostering effective business networks, within and outside the city region, will help to ensure that knowledge is fully developed, exploited and taken into the right foreign markets in a timely manner.

7.4.6 Throughout this plan there are various references to different forms of business support which are being funded and/or delivered by NWDA, Business Link and others. There is currently considerable uncertainty over the future arrangements for business support given the pending abolition of the NWDA and uncertainty over the future arrangements for Business Link. Business Support should be provided in a way which is user friendly and responsive to the businesses involved. It is particularly important for SMEs, which make up the vast majority of companies in the area.

7.4.7 In considering its approach, the LEP will need to address a wide range of business support including:

- The work carried out by Business Link for high value firms.
- Services provided by Chambers of Commerce
- Specialist support in the field of IP exploitation and commercialisation
- Incubation and other mechanisms for supporting business start ups
- The Manufacturing Advisory Service
- Technology and Innovation Centres e.g. in Life Sciences, Creative and Digital Industries, Advanced Manufacturing and cross-sector Innovation.
- Access to Finance including the six funds within the North West Fund, the Merseyside Loan and Equity Fund and European Funds including the Framework Programme
- Knowledge Transfer Programmes including mechanisms for making them more accessible to SMEs
- Skills development issues including apprenticeships
- Specific programmes such as Innovation Vouchers.

7.4.8 Effective business support, driven by the needs of the private sector, must be responsive, tailored and user-friendly. Building a positive working relationship between the company and those providing the support is vital and, in most cases, this means the service needs to be delivered locally and on a personal basis. This is particularly true for SMEs, which will be responsible for much of the projected future growth of the knowledge economy. The KEP, therefore, supports the assertion in the city region LEP submission that, whilst a UK overview will be beneficial, policy competencies for business support – as an integral part of a burgeoning innovation infrastructure – need to be devolved to the city region. An integrated and cost effective approach to business support needs to be adopted for the city region and it is important that the LEP takes the lead on this issue.

7.4.9 The city region's HEIs and FE sector have an impressive track record in delivering programmes to enhance the flow of skills into the workplace, including KTPs and apprenticeships (see 9.2.2). They are well-placed to respond to the anticipated growth in these mechanisms. Further alignment is now required with the growth opportunities put forward in the Knowledge Economy Plan.

7.4.10 The public sector will continue to be an important driver of innovation in the future, both as a procurer and deliverer of innovative services and a regulator determining the framework conditions for innovation. A closer dialogue with business is now required at city region level in order to ensure that the environment for a demand-driven innovation system is created. This should feed into similar discussions at UK level.

7.4.11 In terms of access to finance, consideration needs to be given to how current and future funds are managed and how future returns on investment will provide a platform to drive forward growth in key sectors of the knowledge economy. This should include a full assessment of the current potential to make use of funding streams for the purposes of pursuing the priority actions set out in this KEP.

7.5 Opportunities

7.5.1 With its broad-ranging concentration of assets and expertise, the DSIC is perhaps the foremost international innovation gateway to the city region. It is a national asset, which is critical to growing the innovation capacity of both the UK and city region economies. Maximising the Campus' position as a locus of excellence and a site of connectivity for building competitiveness and supply chains is, therefore, a national as well as a city regional imperative.

7.5.2 The Knowledge Economy Plan offers a framework for connecting and leveraging the value of city region innovation assets. A strategic partnership between Liverpool City Region knowledge economy partners and key UK bodies, including the TSB, is now required to realise Liverpool's contribution to national innovation and growth ambitions.

7.5.3 In order to maximise its contribution to the UK and city region knowledge economy, it is also essential that the capabilities and strengths of the DSIC are now fully integrated with the City Region's other major gateway facilities, including Liverpool Science Park, the Heath, the Universities, the Baltic Triangle and the BioInnovation Centre.

7.5.4 Connecting these city region assets via high synchronous speed broadband using existing NorthernNet and FibreNet infrastructure would create a digital platform to facilitate innovation, create commercial opportunities, and establish a virtual city 'business incubator' whilst also delivering innovation services to SMEs and entrepreneurs. Although the winding-up of NWDA presents issues to the development of such a facility, the critical infrastructure is in place in order to deliver the project with only modest investment. An assessment of the effectiveness of previous related initiatives, such as NorthernNet, would help to inform a suitable funding model as well as subsequent roll-out and promotion.

7.5.5 Liverpool City Region partners recently put forward an initial proposition for a 'Growth Hub' to DBIS to support business innovation and high value growth. The hub would respond to the need to grow private sector jobs to offset forthcoming public sector job cuts (estimated at 16,000 jobs over the next 5-6 years by the Office of Budget Responsibility) and contribute to the transition from previous arrangements, led by Regional Development Agencies, to new arrangements, led by Local Enterprise Partnerships. There would be a particular focus on SMEs.

7.5.6 The 'Winning Pitch' Observatory, part of the Coaching for High Growth programme in the city region, has identified 1,700 firms with high growth potential and aspirations ready for intensive assistance, which is no longer available because the programme has ended. The Growth Hub would build upon the existing expertise and assets within the city region's innovation infrastructure, including:

- 'hard' assets, such as Daresbury, Science Parks and incubators as well as local 'blue chip' companies like Unilever, Pilkington, Jaguar Land Rover, Sony, and the universities
- 'soft' assets, such as strong effective clusters and supply chains, existing entrepreneurial management expertise, Venture Capital funds and Angels, and local capacities for coaching, mentoring, leadership and management development, including the accumulated expertise and capabilities derived from recent High Growth programmes in the city region.

This would be in order to:

- identify, target and be a single point of access to support for firms (principally SMEs) with growth potential
- act as a co-ordinating point for all the forms of assistance needed for firms' business strategies, including export
- facilitate business-to-business interaction and mentoring
- provide hands-on diagnostics and a 'joined-up', tailored package of support
- gather, maintain and disseminate business and market intelligence
- showcase the city region to foreign investors
- ensure that national and local support are fully integrated and mutually supporting, informing city region priorities and building an enhanced environment for innovation and business success.

7.5.7 As a business-focused and business-led initiative, the proposal argues that the Growth Hub should operate according to the following principles:

- **Selection:** intensive, face to face, hands-on support should be provided only to businesses demonstrating serious growth aspirations, commitment and potential and those seeking growth through collaborative business partnerships.
- **Sustainability:** the Hub should build the capability within aspiring high growth businesses to sustain themselves in the future and to access any further support at normal commercial rates from the private sector. Furthermore, the services provided by the Hub should pilot ways of generating income, e.g. subscription services, payment by results, equity stakes in firms etc., so that the Hub itself is not over-dependent on state funding in the long term. Developing a collaborative business community will also support self-help and sustainability.
- **Substantial private sector engagement:** the Hub should draw extensively on private sector expertise and resources. Businesses should be encouraged to help each other. Mentoring and self-sufficiency should be central to the Hub concept. Business networks should be encouraged to connect into the Hub and to promote access to its services to member businesses with growth aspirations.
- **Localism:** the Hub should be a partnership between local public and private sectors and Government, led by high growth business needs as articulated by local high growth businesses and larger international corporates who, from the Daresbury experience, are likely to want to engage with the Hub.

7.5.8 In terms of its form, a poly-centric model has been advanced:

- Daresbury and central Liverpool would provide two physical centres, where staff, ICT and knowledge resources could be concentrated
- ‘spokes’ would provide outreach centres in key business areas
- networks would meet business needs in other locations, such as science parks and business incubators.

The Growth Hub would also have strong links with other ‘Hubs’ across the UK as well as the wider national business and innovation infrastructure. This local and national connectivity would be a critical part of strengthening and rebalancing the economy towards one which has a strong, robust and collaborative high-growth SME sector.

7.5.9 There are a wide range of business support arrangements currently being offered which are ‘at risk’ because of the impending demise of the NWDA and the prospective cuts in public expenditure. It is important that the LEP take the lead in seeking to ensure that an integrated range of effective arrangements are put in place to support the development of businesses in general and the key sectors in particular.

7.5.10 Building on the expertise at Daresbury SIC and the importance of consolidating the relationship between the city region’s universities and Daresbury SIC, it is proposed that the development of a city region Innovation Hub at Daresbury be explored, with the objective of enhancing the ability of businesses in the city region to access, absorb, spread and apply ideas in support of business development and growth. Better networking, better information/knowledge transfer and the active promotion of cross-sector discussions/events etc could all flow from such a Hub. This could also involve the Technology Strategy Board (see Appendix 8). The development of a Growth Hub with one of its bases at DSIC, could be undertaken in conjunction with this Innovation Hub and complement its activities.

7.5.11 Scaling up existing people transfer mechanisms such as Knowledge Transfer Partnerships, secondments, mentoring arrangements etc could further improve the links between academe and business. The Enterprise Skills Programme delivered by LJMU and the associated Enterprise Fellowship Programme offer practical supportive mechanisms for students and graduates to explore and develop their business ideas and translate them into business start-ups. Work is needed to explore how these types of activities can be expanded across the city region and how their scope to provide support structures beyond initial start-up can be enhanced to ensure sustainability, growth and retention of graduate businesses.

8. Branding

Issues:

8.1 The Liverpool City Region is widely recognised as a key business tourism destination. Policies are in place to develop the city region’s cultural offer further, with an explicit focus on the visitor economy and improving the city region’s image. LCR’s tourism strategy is based around a small number of key drivers:

- culture, focusing on Liverpool’s strengths in heritage, sport and music
- Liverpool as the lead destination with an international profile
- conference tourism.

These are supported by the two destination brands of the classic resort of Southport and England's Golf Coast. Clearly, aspects of this branding and its links to quality of life can help to attract knowledge workers.

8.2 In preparing this KEP, the issue of the branding of the Liverpool City Region, not just as a visitor destination but also as an internationally well connected Gateway City with an attractive quality of life and:

- With major knowledge assets
- Strong in science and technology
- Renowned for its creativity and innovation
- With a strong and dynamic commercial centre
-

was repeatedly raised by consultees/interviewees across all the key sectors.

8.3 This is a fundamental issue which needs to be tackled energetically and decisively. It is essential that the Liverpool City Region has a Branding Policy which enables its real and relevant strengths to be communicated effectively to specific audiences for specific purposes. The remarkably wide range of knowledge assets documented in this Plan need to be disseminated effectively to all relevant audiences. The city region needs to promote its strengths, its particular unique selling points, nationally and internationally, in a targeted way in order to help promote the assets and expertise which form the basis for growing the knowledge economy. At the same time, it also needs to promote the quality of life it offers to those who chose to work, live in and experience the city region's culture. In this, it must challenge outdated stereotypes – for example, overall crime across the city region fell by almost 40% since 2006 and it is now one of the safest metropolitan areas in the country.

Opportunities

8.4 LCR partners need to review branding policy to take full account of the need to support the development of all key sectors. Work should begin immediately, building on the excellent material assembled for the Shanghai Expo. This is another issue which may fall to the Local Enterprise Partnership to deal with once it is operational. The private sector has a particularly important role to play in developing the city region brand and marketing strategy.

9. Education and Skills

Strategic context

9.1 The Coalition Government's stated approach to education and skills seeks to mesh enterprise with training, learning and research. Across the skills spectrum, practical skills will be valued alongside theoretical ones and a broader range of more flexible progression routes both into higher learning and the workplace will be encouraged. There is a renewed emphasis on increasing workplace learning and apprenticeships in particular, as well as on reducing the number of 18 to 24-year-olds not in employment, education or training and increasing lifelong learning. As with other government departments, it is likely that funding will be significantly constrained in future years; a new strategy for skills will be developed over the coming months.

9.2 In support of this approach, the Department of Business, Innovation and Skills brings together university policy, skills policy, business, regulation and competition policy, science and research policy with an overarching goal of achieving economic growth. A comprehensive audit of

Government activity over the past decade in terms of business support, higher and further education, science and research has been requested.

9.3 UK governance and regulation: there will be less central control and inspection in relation to FE provision with Government's primary role being to create a framework which enables providers to respond flexibly to the demands of employers and learners. As an example, all colleges apart from poor performers will be able to move money between budgets.

9.4 In parallel with this, more information on courses and a growing number of education providers are viewed as a means to improve efficiency and value for money whilst increasing learner choices and the quality of learning options. A Next Step service is to be launched with the aim of giving people access to the relevant information, advice and resources to make more effective choices about skills, careers and work. A course and provider labelling system will be introduced, making every provider publish reliable information about their institution and the opportunities they provide.

9.5 Role of education and skills in local areas: It is envisaged that Local Enterprise Partnerships will work in close cooperation with colleges and training organisations. In the city region, it is anticipated that the LEP will work through the LCR Employment and Skills Board. The Government has advocated the development of effective networks at local level so that LEPs can draw on a coordinated view of local economic priorities and deliver effective responses. Under such a system, the key economic contribution of colleges and training providers is viewed as being the teaching of the practical skills required to access local job opportunities and the importance of providing realistic progression routes particularly for young people from disadvantaged areas. FE is frequently at the forefront of addressing a local qualification base, attacking deprivation, tackling regeneration issues, addressing work force development and in stimulating opportunities for higher level study and employment. Addressing these issues is fundamental to the success of this Plan. Securing the progression of the existing workforce and encouraging young people to enter the key sectors through opportunities such as 'Aim Higher' and enterprise initiatives in schools and colleges are also very important.

9.6 The broader social value of education and the place of institutions in communities have also been stressed alongside their importance to economic growth. Universities have been encouraged to forge closer links with schools in deprived areas and academies to raise aspirations and awareness of learning opportunities. In terms of FE, commitments have been made to ensure that irrespective of future policy direction, the most disadvantaged learners should not be worse off. Liverpool Hope's Creative Campus is an example of education and culture-led regeneration, whilst its sponsorship of two academies and engagement with several school trusts illustrates its commitment to the broader social value of education. Hope was recently chosen as an example of exemplary practice in building social capital in inner cities.

9.7 Employer engagement: The Government has stated that the most effective way to teach the practical skills required by employers is via Apprenticeships. The Train to Gain programme will be dismantled and £200m of funding previously allocated for Train to Gain has been refocused into capital spending for FE (£50m) and creating 50,000 extra apprenticeships (£150m) beyond the 250,000 already in place.

9.8 The Government has stated that one key objective will be to expand the number of Apprenticeships at Level 3. The length, content and quality of Apprenticeships will be reviewed alongside measures to increase employer engagement. An increase in other forms of workplace training is also a stated objective to complement these measures.

9.9 *Priority areas for skills development*: In the constrained economic context, funding will focus upon developing the skills required for the future economy and the sectors in which the UK is likely to enjoy comparative economic advantage. The most recent report by UKFI has highlighted future skills shortages for engineers as the most single important concern of prospective foreign investors. At Daresbury SIC they are developing plans to address the shortage of suitably qualified scientific technicians.

9.10 *Skills pathways*: The Government has restated its commitment to offering an extra 10,000 university places this year and increasing the number of routes by which learners can progress to Higher Education. In terms of graduate employment, the Government has stated that it wants to make it easier for current graduates to find work and all universities have been requested to provide statements on employability for their students.

9.11 At regional level, a Higher Level Skills Pathfinder began in October 2006 and currently has funding until 2011. The Pathfinder brings together the region's Universities, FE Colleges, Government Office, the Association of Colleges, the Sector Skills Councils, the RDA, the LSC, the NW Provider Network, Business Link NW and the Regional Skills and Employment Board. It is demand-driven and seeks to:

- support Business Link NW Skills Brokers in delivering specialist HE advice
- work with Sector Skills Councils and employers to identify gaps in Health and Life Sciences provision and then commission demand-led provision.

9.12 It is recognised that the delivery of the Knowledge Economy platform involves raising skills levels across the board. Alongside the need to grow the number of appropriately skilled people, it is essential to ensure that there is a supply to meet current and future employer demand, increasing productivity. It is important to increase the numbers qualified to NVQ3+ and NVQ4+ to above the North West average. In order to achieve this, a greater degree of integration between employment and skills services is required within the City Region. Investment in high quality vocational pathways is essential to maintain the widest possible recruitment to the knowledge economy. To complement this, universities should increase their provision of Continuing Professional Development, focusing on more active workforce development.

9.13 It is recognised that existing initiatives need to be scaled up and employer engagement incentivised in order to deliver significant changes.

9.14 The City Region's *Employment and Skills Strategy*, led by Knowsley Council, includes commitments to:

- work more closely with employers to focus investment upon their skills needs, including supplies of graduates, Knowledge Transfer Partnerships and a more substantial placements and internship programme
- build clear and effective career pathways for 14-24 year olds
- empower employers to drive improvements in skills and productivity within their own workplaces, sectors and networks
- engage people to make informed choices about their learning, jobs and careers
- simplify the employment and skills system to help individuals and employers access services more effectively.

It will be important for the city region's Employment and Skills Board to play a key role in the implementation of this Plan.

Current position and strengths

9.15 The 2010 *National Strategic Skills Audit* forecasted that future job expansion was most likely to occur in higher-skilled occupations, including managers, professionals and associate professional or technical occupations. Such positions, which account for 43% of jobs today, may grow to cover 47% of all posts by 2017. However, although numbers of high-skilled jobs have grown, there are indications that the UK has recently experienced a relatively slow rate of high-skilled job creation, falling behind the overall growth of skilled people.

9.16 The audit identified the following key generic areas where skills must be improved across sectors:

- Management and leadership skills, which are especially important for High Performance Working
- STEM skills (including more graduates) for a wide range of sectors, including computing, manufacturing and teaching
- Technician and equivalent skills across a range of sectors
- Intermediate vocational skills within sectors such as manufacturing
- Customer service and employability skills, including customer handling, problem solving, team working, oral and written communication.

9.17 In respect of priority sectors for the KEP, the following specific demands were identified:

- *Life Sciences*: Key future demand is likely to focus upon higher level and more interdisciplinary skills focusing upon key STEM areas, including biology, chemistry, chemical engineering, maths, stats and health economics. Skilled trades and machine operatives will continue to be essential for the production of medical technologies. Other key skills will include scientific and health regulation, negotiation and procurement.
- *Low carbon economy*: There is a dependence upon high-level STEM skills and a need for those qualified to levels 4 and 5 in the following engineering disciplines: mechanical, design, civil and structural, electrical, aeronautical, marine and geotechnical. More generically, a need for project management and technology transfer skills was identified.
- *Creative and digital*: Skills gaps relating to digital content concerned the ability to produce multi-platform content, monetisation of content, broadcast engineering skills and visualisation. In terms of creative industries, whilst there is currently an over-supply of potential entrants, there is a skills mismatch, particularly around production skills, intellectual property, commercial acumen, broadcast engineering and visual effect skills. In the future, it is forecasted that multi-skilling and multi-platform skills will be required alongside entrepreneurial and IP skills. The main skill gaps identified within the existing workforce related to working with and exploiting digital technological advances.
- *Advanced manufacturing*: Again, high-level STEM skills were viewed as being critical, with a corresponding need for individuals with an understanding of multiple scientific disciplines. New product development and commercialisation skills were also identified as important.
- *Finance and Professional Services*: It is likely that there will be an increasing demand for accountants and actuaries, alongside a need across the whole sector for a range of management-related skills, including finance and risk management, commercial awareness, and project management as well as an increasing knowledge of green issues.
- *Digital infrastructure*: Skills gaps were seen to affect over 75% of technology professionals. These related to IT programme management, supplier management and service management and delivery at senior levels

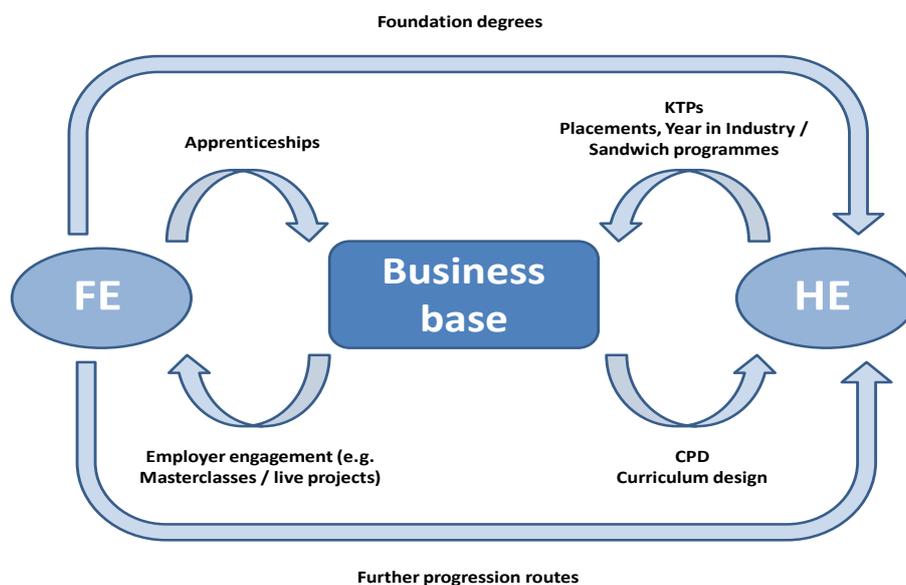
9.18 The Ambition 2020 report, also published by the UK Commission of Employment and Skills, stated that, on recent trends, the UK is likely to slip from 18th to 21st in OECD rankings for intermediate level skills by 2020.

9.19 Liverpool John Moores University’s World of Work (WoW®) is a globally unique brand, which aims to ensure that every student is equipped with the skills they need to engage successfully in the world of work. The programme, which is embedded in every degree at LJMU, places industry and employer engagement at the heart of the student experience, ensuring that all LJMU graduates can demonstrate key transferable ‘world of work’ skills and have completed work-related learning alongside their studies.

9.20 A National Advisory Board draws together professionals representing the IoD, the CBI, Marks and Spencer, Sony, Ford and the NHS amongst others, ensuring the continued validity of the WoW® skills agenda. A local Employers’ Panel has also been established to reflect LCR’s sector specialisms. Industrial placements are integral to the WoW® concept and LJMU students are supported to undertake appropriate work experience as part of their WoW® accreditation.

9.21 In addition, both UoL and LJMU are delivering a HEFCE-funded programme of undergraduate internships, to support access to the professions for students from disadvantaged backgrounds. For graduates, there are a number of on-going initiatives that offer opportunities to acquire work-related skills. LJMU’s Graduate Accelerator Programme delivers a series of workshops aimed at providing unemployed (and underemployed) graduates with a structured programme of activities designed to optimise their employability in the current climate. The associated Graduate Accelerator Entrepreneurship Programme supports graduates who are pursuing self-employment as a route into the labour market.

9.22 **Skills Flow** - There are well-established mechanisms in the city region enabling a flow of talent and knowledge between the HE, FE and business base. These include apprenticeships for FE students, work placements and internships for HE students and extend to KTPs for recent graduates as well as CPD options for those already in the workplace. The increasing significance of HE provision within FE also needs to be fully appreciated and supported.



Apprenticeships

The city region's FE colleges already offer a full range of apprenticeships across the priority sectors identified in the KEP, providing a solid base for major future expansion as envisaged by the Coalition Government.

Sector	Examples
Advanced Manufacturing	Over 30 apprenticeships offered in Motor Vehicle Service and Repair / Motor Vehicle Fitting Over 100 apprenticeships offered p.a. in electrical, mechanical and fabrication and welding engineering at St Helens College alone Advanced apprenticeship in Engineering
Creative and Digital	Creative and Digital Apprenticeships including communication skills and pre-production techniques
Financial and Professional Services	40 apprenticeships in AAT (Association of Accounting Technicians) at Hugh Baird College alone Advanced and Level 2 apprenticeships in Accountancy, Business Administration and Providing Financial Services
Life Sciences	Advanced apprenticeships in process technology
Low Carbon	Construction trade options
Public Sector	Advanced and Level 2 apprenticeships in Health Care

It is important that full account is taken of the experience of successful local initiatives in moving forward. 'The Wirral Apprentice' scheme involving Wirral Council, Connexions, Job Centre Plus and the National Apprenticeship Service, utilised the Working Neighbourhood Fund to offer employers a wage subsidy to employ an apprentice, resulting in an additional 100 apprenticeships being created across the Wirral. Although the funding opportunities are now changing, this programme illustrates very clearly what effective collaboration can achieve.

Sandwich and Year in Industry

As part of the vocational degree offer, LJMU offers a number of sandwich courses that are designed to provide workplace experience. Sandwich placements by KEP priority sectors in 2008/9 were:

Sector	No. of Sandwich Placements
Creative and Digital	551
Financial and Professional Services	924
Life Sciences	24
Public Sector	13
Total	1512

This provision is matched by Year in Industry options at UoL (see Annex 5 for full list of options). Enrolment on these programmes during 2008/9 was:

Sector	No. of enrolments
Advanced Manufacturing	56
Life Sciences	50
Total	106

Internships and placements

In addition to the work of the Liverpool Culture Campus, LJMU and Liverpool Hope recently launched a 4-week internship programme for undergraduates, delivering placements over the summer vacation. This HEFCE-funded pilot scheme is aimed at providing access to the professions for students from disadvantaged backgrounds. Undergraduates are matched with a business in one of the target sectors and supported in their placement through complementary skills development, delivered via Liverpool Hope's Career Service and LJMU's World of Work (WoW®) programme. At Hope, 14 internships were taken up in accountancy. To date the number of internships offered through the LJMU Graduate Development Centre is as follows:

Sector	No. of internships
Creative and Digital	9
Financial and Professional Services	8
Life Sciences	1
Public Sector	9
Total	27

This is complemented by the provision of work placements at UoL. In 2008/9 placements delivered across the KEP priority areas were as follows:

Sector	No. of placements
Advanced Manufacturing	4
Creative and Digital	2
Financial and Professional Services	2
Life Sciences	0
Low Carbon	0
Public Sector	12
SuperPort	2
Total	22

KTP and CPD

Both LJMU and UoL have a national reputation for KTP provision across a range of sectors, including those focused upon by the KEP. In the Greater Merseyside area, extending to incorporate firms in Ormskirk, Ellesmere Port and Warrington, LJMU and UoL have delivered a total of 39 KTPs from 2007/8 to the present:

Sector	KTPs
Advanced Manufacturing	19
Creative and Digital	5
Financial and Professional Services	3
Life Sciences	2
Low Carbon	1
Public Sector	8
SuperPort	1
Total	39

CPD provision at both HEIs similarly extends across the KEP priority sectors. Attendance on credit-bearing programmes during 2008/9 was as follows:

Sector	No. of learners
Advanced Manufacturing	67
Creative and Digital	376
Financial and Professional Services	62 + 70 businesses contracted for masterclasses
Life Sciences	2357
Low Carbon	0
Public Sector	2352
SuperPort	9
Total (excluding masterclasses)	5223

Although there is currently no credit-bearing provision around Low Carbon, LJMU launched a part-time programme in Sustainable Built Environment in September 2010, which is available via CPD amongst other options. The programme content, which has been developed in partnership with an industry steering group, has been designed to provide a critical understanding of the theories of sustainability and develops a practical approach for use in the construction industry. Modules include: Leadership for a Sustainable Environment; Developing a Green Future; Sustainable Design; Sustainable Construction; and Energy and Environmental Management.

Issues for consideration

9.23 The complexity of developing appropriate links between industry/commerce and HE/FE sectors across the skills agenda, in order to ensure that all courses are relevant, focused and up-to-date, is very great indeed. The Knowledge Economy Group, in consultation with the city region's Employment and Skills Board, will need to consider how this complex landscape could be simplified to the benefit of all concerned, with particular emphasis on the key sectors set out in this report, building on the LCR Employment and Skills Strategy, which advocates a more demand driven approach. Particular attention should be paid to the development of managerial and leadership skills.

9.24 It is very important that the city region takes maximum advantage of the intended increase in (a) the number of KTPs which the Technology Strategy Board is to support (see appendix 8), and (b) the number of apprenticeships to be established nationally, building on the existing apprenticeship programme. All concerned in the public and private sectors across the city region will need to consider how best to achieve these objectives. At the same time, consideration needs to be given to incorporating apprenticeships as part of a more flexible system with enhanced options for progression. The power of public sector procurement should be brought to bear particularly in support of enhanced apprenticeship programmes.

10. Physical and Digital Infrastructure

(A) PHYSICAL INFRASTRUCTURE

Strategic context

10.1 NINJ recognised that an effective infrastructure, including energy and transport, is integral to the success and competitiveness of UK businesses. There was a role for Government and other agencies, therefore, to create an environment which facilitated investment in infrastructure.

10.2 The previous Government created Infrastructure UK as a focal point for its infrastructure strategy. The agency will map the UK's future infrastructure needs across a 5-50 year horizon and enable the investment to put this in place. The Government also established the Infrastructure Planning Commission (now being taken in-house) to oversee planning decisions on major projects with a view to reducing the average time for major planning decisions by over 50%.

10.3 The former Government announced that it would set out plans for a major programme of rail electrification. The High Speed Two Company was established by the Government in 2009 to make recommendations on a dedicated high speed North-South rail line.

10.4 A key objective for integrated regional strategies was to co-ordinate and prioritise key infrastructure projects. The draft *RS2010* set out proposals to improve internal connectivity, recognising the need to consider the role of places and the relationship between them, notably the Liverpool and Manchester City Regions. It made a commitment to delivering accessible integrated regional transport, whilst recognising that knowledge workers do not always want to live near their place of work.

10.5 In order to achieve its vision to make the North West a better place to live, learn, work, visit and invest by 2030, *RS2010* sought to build on regional distinctiveness by maximising assets in culture and sport as well as the natural built environment. This built upon the *RES* commitment to invest in the region's environment, culture and infrastructure and its transformational actions to invest in quality public realm, green space and environmental quality.

10.6 *Atlantic Gateway* similarly sets out ambitions to improve the sustainable movement of people and goods across the City Region. Infrastructure investment and connectivity across the Gateway area, and its adjoining areas, is key to the delivery of its city regions' economic objectives and has the potential to deliver mutual benefits. Improving accessibility and intra-regional connectivity, creating attractive recreational environments, providing residential opportunities and cultural destinations are all considered essential to meeting the demands of knowledge workers.

10.7 The strategic infrastructure for *Atlantic Gateway* includes SuperPort and NGA (see Digital Infrastructure below). It puts forward proposals to promote a single, integrated, multi-modal network and to use the Gateway as a means to agree a shared view on priorities for investment, advocacy and policy alignment. It proposes the establishment of a Sustainable Infrastructure Commission to oversee and manage a programme of projects for the Gateway area. A Transport Forum would consider smart ticketing, journey planning and promotion.

10.8 It is suggested that the Gateway framework should be adopted as an overarching framework to guide the development of JESSICA bids and that it could help to deliver a high-quality urban and rural environment, supporting economic growth. Identified projects include revisiting the concept of

a regional park, the creation of a Bio-Region and a Mersey Playground and working with Defra and the Environment Agency to develop new initiatives to add to the quality of place.

10.9 The city region is committed to developing a fully integrated transport network for the City Region, which maximises connectivity via the ports, airport and multi-modal freight and logistics infrastructure and meets the needs of all stakeholders. This includes support for the development of the Mersey Gateway project to remove bottlenecks and improve access to multi-modal interchanges. This scheme will generate over 4,500 jobs across the region and generate an additional £62m a year in GVA as well as increasing journey reliability and improving the city region's links to the rest of the UK. 70% of the cost (estimated at an outturn cost of c. £600m) will be met by toll income. Government's announcement of their support for this important project as part of the Comprehensive Spending Review is to be welcomed. In terms of connections beyond the City Region, it was proposed that capacity improvements on the West Coast Mainline would be pursued as a priority and that the case for a high speed rail link should be supported.

10.10. These measures formed part of a broader approach to create a top quality environment for the development of a world-leading knowledge quarter with clusters of centres of excellence and knowledge-based businesses, connected to Liverpool's city centre and its cultural offer. In support of this objective, a strategic investment framework for the city's Knowledge Crescent will be developed to guide physical master-planning and public and private sector investment over the next decade.

Current position and strengths

10.11 Previous policy set out a number of actions in relation to improving the City Region's infrastructure, including:

- improving road access to Liverpool City Centre
- developing a second Mersey crossing
- growing Liverpool John Lennon Airport
- investing £170m in port access improvement, notably the A5036.

10.12 Other recent and ongoing infrastructure and public realm developments include:

- the Knowledge Quarter Public Realm Programme
- a £150m post-panamax port facility at Seaforth
- a new transport hub at Liverpool South Parkway
- improvements to Lime Street and other Merseyrail stations, including a £6m rebuild of St.Helens Central and £4.25m upgrade of Bootle Oriel Road
- the City Centre Movement Strategy to provide a high quality city centre environment and a £7m award-winning project in Bootle Town Centre.

10.13 Liverpool's Knowledge Quarter, which includes key public institutions as well as businesses located at the Science Park, is a key physical location for knowledge economy activity. A Regeneris report calculated that these major institutions alone generate around 15% of the City's total GVA, employing some 7% of the workforce. At present, the Knowledge Quarter is fragmented and disconnected from the rest of City Centre due to poor quality public realm.

10.14 A programme of public realm development is now being delivered and a number of capital investment programmes have been identified, including:

- the Royal Liverpool and Broadgreen University Hospital NHS Trust is progressing plans to redevelop the current Royal Liverpool University Hospital. As part of the proposals, the Trust plans to build a biomedical campus (see Life Sciences).
- the Board of Liverpool Science Park is currently finalising options for the next phases of development. Preferred options are to develop a c.40k sq ft IC3 facility, increasing current floor space by 50% (see Life Sciences)
- UoL has a Five Year Capital Investment programme, including the Apex Centre for the Faculty of Medicine, providing research and office facilities; the University recently invested £3.5m in public realm
- LJMU launched a radical 10-year campus redevelopment programme in 2002. When the programme is completed in 2013, the University will have invested £180 million in upgrading existing properties and developing new buildings, including £37m on the Clarence Street development, which will house LJMU's new Professional Centre.
- Liverpool Hope have invested over £40M in various capital projects including a Students Services Gateway, an Education, Innovation and Enterprise building, the Cornerstone Art, Design, Drama and Dance Centre, the Capstone Centre for Music, Performance and Innovation and the Angel Field Renaissance Garden in Everton.

Opportunities

10.15 *Atlantic Gateway* notes that the development of High Speed 2 could yield potential growth in freight across the Gateway area. In terms of passenger journeys, the Merseyrail network has significant enhancement and expansion potential.

10.16 One of the constraints to realising the potential of the Knowledge Quarter is the availability of immediate- to medium-term public funding to lever in private investment. In order to address this situation, it is proposed that the strategic planning framework would be used to identify how financial instruments such as JESSICA, TIF, Asset Based Vehicles and Accelerated Development Zones might be used as part of a new approach to funding.

Issues for consideration

10.17 It is essential that the city region, through the emerging Local Enterprise Partnership, plays its full part in determining the infrastructure priorities for action across its area in support of the development of the knowledge economy and that the city region benefits to the maximum extent from national and regional infrastructure investment including High Speed Rail, the second Mersey crossing and the Atlantic Gateway initiative.

(B) DIGITAL INFRASTRUCTURE

Strategic Context

10.18 Policy documents distinguish between digital technology and digital content activities, with the former providing the infrastructure and platforms through which the latter are delivered. The focus in this section is upon digital *technology* activities, within which a separation has been drawn between digital services, which covers a broad range of industries, including IT services, software development and networking and communications, and digital communications, which is underpinned by technologies in photonics and optical communications.

10.19 There is a common consensus that digital technology is a crucial means to increase productivity, facilitate innovation and improve access to new markets. Computer generation and

large-scale file transfer are essential to the functioning of all knowledge-based businesses. Whilst specific demands will differ, all priority sectors within the KEP will require increasing digital connectivity in the future.

10.20 *Digital Britain* identified that the digital communications sector is at a critical point and that long-term national competitive advantage could be secured by strategic investment. A key objective was, therefore, to modernise and upgrade infrastructure. The previous Government made a commitment to deliver Broadband access for all by 2012 and was to invest up to £1 billion to incentivise the delivery of super-fast broadband in the parts of UK where the market alone would not deliver universal coverage, with the aim of 90 per cent of British households being able to access super-fast broadband by 2017.

10.21 In terms of wireless infrastructure, there was an identified need to implement next generation high-speed mobile broadband and move towards universal coverage in 3G and Next Generation Mobile. To facilitate this process, the *Digital Economy Bill* proposed a new duty for Ofcom to review the UK's communications infrastructure every two years alongside a duty to encourage investment in communications infrastructure.

10.22 In common with other policies, the approach of Government was to work alongside markets, making investments where this added value and recognising its impact upon the Digital Economy as a major purchaser of digital systems, as a commissioner and holder of data and content and as a strategic hub for the development of Britain's future digital strength.

10.23 Government objectives included developing skills, particularly at low and intermediate levels, where there were comparative weaknesses, and ensuring that innovation systems enabled new research to be commercialised effectively into new products and services. In support of this, it was stated that the Research Councils would invest over £120m over three years in a co-ordinated Digital Economy Programme. The coalition government's position on these various intentions is still emerging.

10.24. It is recognised that Next Generation Access will be a pre-requisite for building an internationally competitive economy and delivering increased productivity, new ways of working, higher level skills and innovation. Ensuring high-quality digital connectivity to stimulate enterprise, improve service delivery and reduce the need to travel is a key requirement.

10.25 Recent reports for the NWDA on NGA identified that the single most important strategic objective was for the North West to lead the UK in the widespread use of NGA in order to maximise the major economic and transformational benefits it could deliver. Achieving this objective would require ubiquitous availability, a range of competitive suppliers, world-class networks and attractive services and applications.

10.26 Whilst it is acknowledged that NGA availability, particularly in major conurbations, will improve simply due to market forces, a role for public agencies is identified in stimulating demand by promoting the benefits of NGA (particularly given the current economic context), removing barriers to private sector investment and investing in the supply of NGA where appropriate. This is reinforced by the commitment of Atlantic Gateway partners to work together to secure the optimum roll out of NGA. The role NWDA might have played in this will clearly now not proceed and it remains to be seen what public sector resources will be available to support the roll out of NGA.

10.27 Greater connectivity is a key requirement which will underpin the Knowledge Economy and Liverpool's vision to establish itself as an international city region of knowledge and science, renowned for its creativity and innovation.

10.28 The review of grow-on space for knowledge-based industries will be integrated with a review of the digital communications infrastructure. A recent *Broadband Mapping* report recommended that a city-wide NGA strategy should be formulated, which meshed with that of neighbouring areas, notably the Manchester City Region. This was complemented by recommendations to develop plans for demand stimulation and working with existing suppliers to prioritise Liverpool for their NGA rollout.

Current position

10.29 NESTA has suggested that the nationwide rollout of superfast broadband could directly create 600k jobs, adding £18bn to GDP. Developments and research strengths in machine intelligence, autonomous systems and man-machine interface have the potential to transform operations in sectors such as aerospace, pharmaceuticals, finance and energy management. More immediately, providers need to respond to growing connectivity demands, notably those of high-end users, who on average require increases in connection speeds at a rate of approximately 50% per year.

10.30 The opportunity cost of businesses failing to deploy digital infrastructure effectively in the North West is estimated to be 3% of GVA per year. The Northern Way has established NorthernNet, a high-speed fibre optic telecommunications network linking creative and digital media businesses in Liverpool to MediaCityUK, effectively creating a supply chain and allowing MediaCity UK's impact to extend further. Access to the Network is currently provided at three Media Access Bureaus in the city region (Daresbury SIC, the LIP and FACT) as well as through direct connections to the network.

10.31 Liverpool is currently well served for basic broadband services and ranks as average in comparison to other UK cities. However, the city region is less well served by current Symmetric Digital Subscriber Line (SDSL) availability and the forecast is that this position will worsen with the introduction of the next generation of DSL services. Liverpool's provision also falls behind that of Manchester and this has been identified as a significant issue, given the focus of investment there and the opportunities this will create.

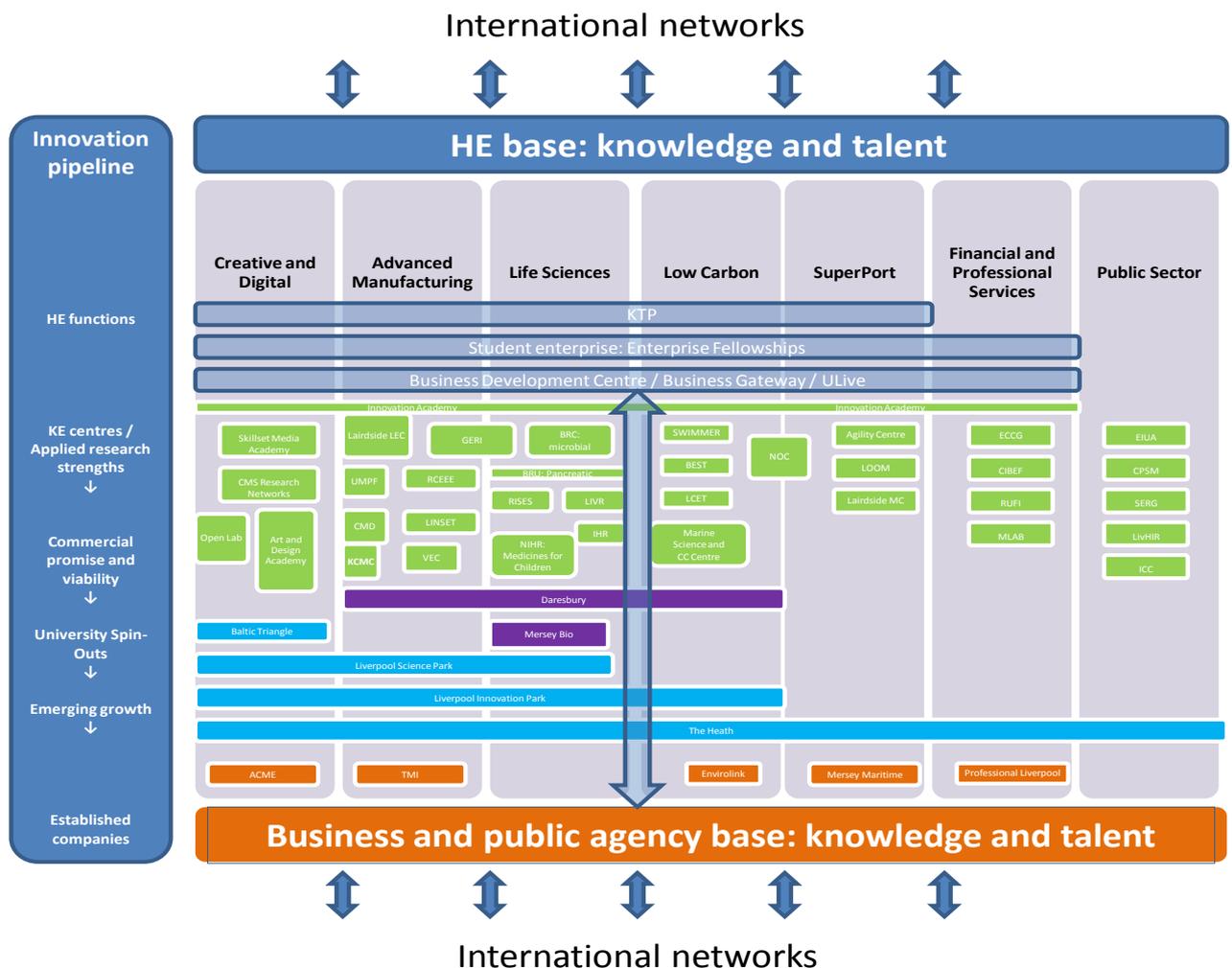
10.32 In order to maintain parity with other UK cities, Liverpool must deliver at least 100Mbps connectivity. Becoming a centre of international quality digital communications would require significant investment and a body to manage and maintain the network. It is suggested that future plans from BT and Virgin will deliver a choice of services offering up to 100Mbps.

10.33 In terms of specific sectors, Liverpool's CDI sector requires high broadband speeds and reliable connectivity for large file sharing and collaborative working. Life Sciences organisations are becoming more data intensive with a corresponding need for better connectivity to service significant data mining requirements and increased use of imaging equipment. The connectivity requirements around SuperPort are similarly expected to increase significantly in coming years as are the requirements of the FPS sector. Finally, although connectivity requirements for Materials and Advanced Engineering businesses are not as high as other priority knowledge economy sectors, they will nevertheless increase in the coming years as technologies such as virtual engineering and robotics become more prevalent and the concept of digital manufacturing develops.

Issues for consideration

10.34 The Liverpool *Broadband Mapping* report identifies the opportunity to use existing spare capacity and ducts in the city to create an open access network, which would deliver a step change in connectivity if paired with an Internet Exchange. This would require capital investment. This mapping exercise needs to be extended across the city region and the outcome inform the assessment of the priorities for action in support of the development of the knowledge economy.

10.35 The provision of superfast broadband across the city region is a key requirement for the effective development of the knowledge economy. Every sector covered in this KEP requires such broadband access and high priority needs to be given to determining the priorities for provision (both by sector and by geography) and to exploring different mechanisms for funding the provision of the required infrastructure. It is vital that the city region management arrangements, and particularly the LEP, have the capacity and resources to pursue this important issue which is (inter alia) directly relevant to the government’s ambition to secure smarter public/private investment.



CHAPTER 4

OPPORTUNITIES FOR ACTION

CHAPTER 4: OPPORTUNITIES FOR ACTION

1. The Liverpool City Region Local Enterprise Partnership.

1.1 Following Government approval, work is currently underway to establish a Local Enterprise Partnership (LEP) for the city region. It will be extremely important for the LEP, on behalf of the city region, to have the expertise, capacity and resources to drive forward this Knowledge Economy Plan and the wider economic plan. The LEP will need to be able to develop and maintain an adequate data base for the city region's economy; to provide time series information to highlight trends and opportunities; to co-ordinate the development and delivery of projects across the city region; to help ensure that the city region secures its appropriate share of all available resources including funding from the Technology Strategy Board, the Regional Growth Fund, the JESSICA Fund, the Regional Venture Capital Funds (and particularly those where a percentage of the fund is specifically earmarked to be invested within the city region), the Merseyside Loan and Equity Fund utilising funds from investments realised by the Merseyside Special Investment Fund etc, all so long as properly developed projects which demonstrate value for money and outputs which support the development of the economy, are brought forward in a timely fashion; to support the work of the Employment and Skills Board; to monitor performance and roll forward the Economic Plan and policies for the city region, including this KEP. The LEP will also be well placed to identify opportunities arising from convergence across the key sectors as well as removing barriers to development, access to finance etc.

1.2 As indicated in Ch 1, item 2.10, it is assumed that responsibility for securing the implementation of this Plan will lie with the LEP once it is operational. It is also assumed that the KEG, with its membership reviewed as necessary and possibly re-defined as an Innovation Board, with strong private sector, academic and public support will oversee the delivery of the Plan, reporting to the LEP as required. The KEG/Innovation Board should also have the job of keeping the city region and its economy at the leading edge of thinking (the 'Foresighting' role), technology development and applications for the use of new technologies. The Board could play an important role in supporting the development of the proposed Innovation Hub at Daresbury SIC. The KEG/ Innovation Board should be free to prompt debate and encourage innovation across the economy, supported by the LEP.

2. Summary of Proposed Actions Drawn from Chapters 2 and 3.

2.1 The Role of Small and Medium sized Enterprises.

2.1.1 SMEs are fundamental to driving the economy forward across the key sectors, generating jobs and raising GVA. Policies aimed at supporting business growth and innovation need to focus on SMEs and, in particular, those with a desire to grow within the context of robust business plans.

2.2 Daresbury Science and Innovation Campus. (Ch 2, item 10)

2.2.1 Daresbury SIC is an exceptionally important economic asset for the city region and beyond. Not only does it offer opportunities for the HEIs in the area, but it also offers potential as:

- An exceptional science park with the capacity to act as a major catalyst for economic growth, attracting new/emerging and established companies to the area
- a major and growing economic hub with the potential for over 1m sqft of further development
- a centre of outstanding scientific excellence of national and international importance

- a potential focal point for the development of a strategic relationship between universities and businesses in the city region with the Technology Strategy Board
- a broker at the interface of business and research, with the capacity to radically improve the ability of the research base to tackle practical problems faced by businesses and the added capacity to forge successful Business-to-Business relationships
- A location for large, technology-intensive blue chip companies who want to access technologies from STFC and partners, and for companies wanting to link into key STFC facilities, such as high performance computing.

2.2.2 The city region must develop a much closer long-term strategic relationship with Daresbury SIC including raising awareness among businesses in the city region of its current strengths and potential areas for engagement. This needs to be given a very high priority. This strategic relationship will provide a platform to build on existing successful collaborations, such as the VEC and the Cockcroft Institute and launch further ambitious multi-partner initiatives bringing together HEIs and a range of commercial partners. The formal establishment of the joint venture company involving the selected private sector developer partner, Langtree, is of key importance to this.

N.B There is also a case for exploring the opportunity to develop greater collaboration between The Heath and the city region's universities.

2.3 Life Sciences.

2.3.1 The city region has many notable assets in life sciences, but it should not be forgotten that regional and international links are of key importance. In international terms, compared to major clusters in Boston, Singapore and the Golden Triangle for example, the city region does not, on its own, have critical mass. Active consideration needs to be given to how collaboration across the NW and the North of England can be galvanised to secure global reach and underpin global aspirations. There is a need for a Life Sciences Globalisation Strategy driven by business and science sector specialists, drawn from across the North of England.

2.3.2 A package of projects is being actively pursued In order to:

- build on the world-leading expertise in the Universities, the Royal Liverpool & Broadgreen University Hospitals NHS Trust and the Liverpool School of Tropical Medicine
- tackle the severe shortage of incubation space and the complete lack of grow-on space for new emerging and developing companies
- provide more effective innovation and commercialisation support processes, and develop the concept of the Royal Liverpool University Hospital BioCampus adjacent to the hospital once it is built.

They are:

2.3.2.1 The Liverpool Institute of Vaccines Research (LIVR) will exploit the region's unique research, clinical and industrial configuration and create a world-class centre for vaccine development. It will build upon the region's existing strengths in infectious disease research, clinical trials resources and industrial vaccine manufacturing, providing the final component for a complete, comprehensive and internationally competitive vaccine R&D capability.

The Institute will engage with collaborators in the research and development of new vaccines in response to the needs of industry and public health. Vaccines developed through the LIVR will save lives and improve health and wealth on a global scale.

It will support the vaccines, biomanufacturing and related industries in the NW, providing access to specialist knowledge and expertise, R&D support, and training and up-skilling of employees. A sustainable LIVR will stimulate the vaccines industry cluster development, attracting new companies to the region and driving sector growth.

The LIVR will establish the city region as a global centre for vaccine development and will become the flagship facility for vaccine development partnership within the UK.

2.3.2.2 The Liverpool Science Park (LSP) is urgently pursuing the conversion of space in their second Innovation Centre into laboratories, which will enable the relocation and expansion of companies from Mersey Bio and release space within Mersey Bio to allow the remaining companies there to expand. LSP is also actively pursuing the development of a third Innovation Centre to further increase the amount of space available for incubating science- and technology-based companies and which will have one floor of labs for general science-based companies to use, but which can also be used (certainly in part) to effect further relocations from Mersey Bio to provide expansion space in that incubator and the ability to begin to attract new/emerging companies. Subject to clarifying the funding arrangements in the current uncertain circumstances, the conversion of IC2 could take place in 2011 and the new IC3 building could be completed in 2012.

2.3.2.3 The Proposed New BioInnovation Centre - this Centre will have two equally important components: namely, incubation and grow-on space and a Development Centre to provide assistance and support to help both resident companies and others become 'investor ready' and assist in the commercialisation of their IP. Plans for this new Centre are currently being developed by a multi-organisational steering group led by the Royal Liverpool University Hospital Trust and involving the LSP, the University of Liverpool and Mersey Bio. A detailed business case is to be completed by October 2010. It is proposed that the new Centre be designed to enable a two phased development with a first phase of 80,000 sq ft (15,000 sq ft of incubation space; 45,000 sq ft of grow-on space and a 20,000 sq ft Development Centre) followed by a second phase of c. 60,000 sq ft of further incubation and grow-on space.

The recently published report by Dr. Hermann Hauser 'The Current and Future Role of Technology and Innovation, 2010' clearly identifies a role for incubators in bridging the gap between R&D and commercialisation and developing a successful active and dynamic interface between industry, R&D and clinical activity. The proposed Development Centre will be critical in establishing a fully integrated business creation environment which supports the development of new ideas, innovation and both new and growing businesses. The Centre will: support existing businesses through access to equipment and expertise on site; support the technical evaluation of commercial research ideas and the validation of other research and innovation (e.g. from the universities, the Royal Liverpool & Broadgreen University Hospital NHS Trust and other Trusts), and support the delivery of high quality analytical services. The Centre will be able to provide services across the LSP and not just for life sciences companies.

In determining the best mechanism for securing the necessary range of specialist expertise needed to manage the Development Centre effectively, the LSP and its partners (and with suitable input from business) will need to work closely with all existing areas of expertise both in the universities (U-Live and the Business Gateway at UoL and the Business Development Centre at LJMU) and in Mersey Bio (2Bio).

The New BioInnovation Centre will be located on Royal Liverpool Trust land adjacent to the new hospital and will effectively also act as a first phase of the proposed Biomedical Campus (see below). The Centre will be procured, owned and managed by Liverpool Science Park. Discussions are currently taking place to explore the Royal Liverpool & Broadgreen University Hospital NHS Trust becoming an equal partner in LSP alongside the UoL, LJMU and Liverpool City Council.

2.3.2.4 The Vision for the Proposed Royal Liverpool Biomedical Campus is defined by the Royal Liverpool University Hospital Trust as:

'A vibrant, internationally recognised campus, with health provision, related high profile research and innovation and associated businesses, attractive to top researchers from across the world.'

This vision will be realised by the rebuilding of the hospital, releasing the balance of the site for this development. Outline planning consent has been secured for c. 1m sq ft of health-related development. The co-location of dedicated clinical trials accommodation within the new hospital, adjacent to new research facilities developed by UoL together with commercial research organisations and associated industry, will be crucial to success. The project is being taken forward by a Steering Group established by the Royal Liverpool University Hospital Trust. An international competition will take place to commission consultants with experience of successful Biomedical Campus Developments across the world to define, in more detail, the role scope and content of the Campus and options for procuring its development and for its management.

2.3.2.5 In addition,

- Further discussion is required in respect of the leading edge research and applications work referred to in Ch3, s.2.5.2 to determine how to exploit that work to best effect. The Royal Liverpool University Hospital Trust and UoL will establish a stakeholder group to pursue this.
- The prospect of securing Technology Strategy Board (TSB) investment into a Technology Innovation Centre in Life Sciences is one of several areas in this Knowledge Economy Plan where TSB involvement may be appropriate. An urgent exercise is to be carried out involving the Universities, Daresbury SIC and other prospective stakeholders to explore the potential synergy between the development of the knowledge economy in the city region and the objectives of the TSB (see Appendix 8).
- The proposed Clatterbridge Innovation Park will bring together the Wirral University Health Trust and Chester University, focussing on healthy living and healthcare, and presents an additional opportunity to develop links between Higher Education and an NHS Trust. The Innovation Park will also offer Wirral a focal point for further enhancing its role as a driver of the knowledge economy including private sector R & D strengths.

2.4 Creative and Digital Industries

2.4.1 The current proposals to establish a Local Enterprise Partnership for the city region present an excellent opportunity for the currently dispersed resources available to champion and support the development of the sector to be brought together to provide a more effective and efficient arrangement.

2.4.2 In developing the city region's support for the development and growth of the sector, an integrated approach to working with the TSB should be explored by the sector support group, the Universities and Daresbury SIC.

2.4.3 The opportunity needs to be taken to access new market opportunities in digital advertising and marketing, gaming and new cinema technologies and the business generated through MediaCityUK and also the opportunity to develop a Creative Business Hub to encourage networking, collaboration and business development and support for the many micro businesses in this sector.

2.4.4 MediaCityUK presents a significant opportunity for the city region's CDI sector. The following opportunities need to be explored as a high priority:

2.4.4.1 Utilising the Creative Business Hub (and those businesses with an interest in MediaCityUK) as a focal point for relating to MediaCityUK-generated opportunities and ensuring that the sector in the city region is effectively supported to take maximum advantage of those opportunities

2.4.4.2 Establishing a city region presence in MediaCityUK, possibly in the Media Enterprise Centre depending on how that develops, to enhance the networking opportunities for city region companies

2.4.4.3 Support collaborative working between the city region's universities, Daresbury SIC and the University of Salford and other HEIs at MediaCityUK to develop the collective capacity to work effectively with the private sector in supporting the development of the Media City concept and to maximise the opportunities which MediaCityUK will present to the city region economy

2.4.4.4 Secure involvement in the NWDA review of the Media Access Bureau business model given the current low take-up, to ensure that maximum advantage can be taken of the technology which Northern Net represents and then ensure that further media access points are provided across the city region where there are concentrations of creative and digital industries.

2.4.5 The opportunity should be taken to explore how the earlier Wirral-led proposal to establish a Digital Enterprise Network for the city region (see Ch3, item 3.6.6) might be taken forward utilising alternative sources of funding and taking full account of competition requirements.

2.4.6 The opportunity to continue the rapid development of the Baltic Triangle for occupation by creative and digital industries through the release of Liverpool City Council-owned vacant land for the purpose (see Ch3, item 3.6.3) and the proposals to develop Ropewalks Square (see Ch3, item 3.6.2) will assist the development of the sector and should be supported. Other initiatives, such as the FibreDrive proposal being pursued by Liverpool City Council to make business use of their fibre network, which was installed to provide connectivity for traffic cameras and information boards, should also be supported, particularly where more effective use can be made of existing infrastructure and in a way which can be applied across the city region quickly, pending the wider roll out of New Generation Access.

2.4.7 The opportunity should be taken by the current sector support group to facilitate a dialogue between key companies and the universities to explore the potential for strengthening the city region's capability in the field of digital post-production (complementary to MediaCityUK) including addressing the skills needs in this area.

2.4.8 More broadly, there are opportunities for the evolution of a wider knowledge exchange hub linked to the recent major developments around the Art and Design Academy and the Clarence Street development at LJMU. Industry-focused, interdisciplinary working between local companies, academic/technical staff and students could deliver opportunities to explore and exploit new and emerging markets. Alongside access to specialist equipment and Skillset-accredited training offered by Liverpool Screen School, this could create a focal point for

interaction across the sector and beyond, stimulating more extensive knowledge transfer, innovation and commercialisation opportunities.

2.4.9 Finally, in addition to supporting the ongoing development of the sector, the opportunity should be taken to explore Next Generation technologies such as smart materials and physical computing and the potential business opportunities which could flow from their exploitation. Opportunities from current research conducted by the universities such as the digitisation of film, heritage and library content and the curation and re-use of digitised content should also be pursued. The importance of developing 'foresighting' capacity to take full advantage of the leading-edge research and applications which the city region's knowledge assets generate needs to be addressed.

2.5 Advanced Manufacturing

The UK economy depends on effective involvement in the manufacturing sector which provides goods to the world's market place. A broader definition of manufacturing has become increasingly appropriate, recognising that the sector means far more than final assembly of products in the production facilities normally associated with the term manufacturing. It involves the full cycle of activities, incorporating services as well as products. This spans activities from research, design, development and production through to logistics, after-sales service, maintenance and repair and end-of-life management. It embraces the development of the sophisticated materials that allow novel features to be included into products and also the advanced technologies that allow sophisticated final products to be designed and produced with fine degrees of tolerance, excellent quality control and optimum efficiency. The Liverpool City Region, which has particular strengths in lean, efficient manufacturing processes, can participate in the manufacturing sector at all points of the supply chain from the design and supply of component materials to companies throughout the world, to the final assembly of finished products within the region.

Across the city region issues and opportunities which have emerged from discussion with the sector include:

- the need for business support arrangements to raise awareness of IP issues and provide support for growing ideas
- the need to focus on the application of the science and technologies defined by the NW Science Council as required to support sustainable growth; namely simulation, autonomy, performance materials and sustainable product design
- the need to develop new products and to work smarter
- the need to exploit the potential for future convergence e.g. across the manufacturing and digital sectors through digital manufacturing including additive layers manufacturing
- the fact that the changing financial context and the rising cost of transportation are bringing some production facilities back to the UK
- the continuing need to raise the profile and image of manufacturing and the role 'Fab Labs' could play in this
- the need to strengthen the supply chain within the city region, not just to individual major manufacturers but recognising also that supply chains are becoming horizontal, serving several clients e.g. aerospace and automotive
- the need to ensure that knowledge of the wide range of research strengths across manufacturing is widely disseminated across the sector
- the opportunity for the public sector, through its procurement processes, to foster innovation and support the growth of defined markets through common commitment and collaborative procurement

- whether the business-driven support arrangements in Wirral involving the authority, the Manufacturing Institute and Business Link could be widened to embrace the research base and the skills supply side and be rolled out across the city region.
- the need to establish a ‘voice’ for manufacturing across the city region.

The following action is proposed:

2.5.1 Relevant partners across the city region, including major firms, the Universities, Daresbury SIC and the Manufacturing Institute, need to explore, with the Technology Strategy Board (TSB), the possibility of establishing a Manufacturing Technology Innovation Centre. The Virtual Engineering Centre at Daresbury SIC may form the basis for such a development. NB. This is one of several areas of potential involvement of the TSB and, consequently, it will be important to develop a strategic approach to the city region’s relationship with that organisation (see Appendix 8).

2.5.2 In order to increase the flow of knowledge into the sector, there is a strong case for increasing the scale of the Knowledge Transfer Partnerships and other similar programmes between the universities and manufacturing companies. In addition, a specific opportunity exists to more fully exploit the research- and technology-based assets within LJMU’s General Engineering Research Institute. The Institute currently works collaboratively with major international partners including Rolls Royce, DeBeers, Castrol and Bosch, but its considerable expertise remains relatively untapped by local SMEs. The barriers that currently inhibit engagement could be addressed by bringing the Institute’s excellent equipment and research credentials into one world-class facility, whilst actively promoting collaborative applied research opportunities to local SMEs with currently limited, but potentially significant, involvement in R&D.

2.5.3 The establishment of Fab Labs in the city region (see Ch3, item 4.6.8.) would promote innovation and creativity and improve the image of manufacturing as well as supporting the development of emerging business ideas. There is an important crossover here with the creative and digital sector.

2.5.4 Digital Manufacturing is the twenty-first century way to make products – producing real physical products from digital information. Work is needed to examine how partners across the city region can best promote the application of this groundbreaking technology in support of the manufacturing sector. If a Manufacturing Technology Innovation Centre were established (see 2.5.1 above) then the promotion of digital manufacturing would form part of its remit.

2.6 Financial and Professional Services

2.6.1 The profile of FPS in Liverpool is an important issue. The city is not fully recognised as an important centre for these services nor is the city branded as an important commercial centre. Action needs to be taken to redress this situation.

2.6.2 It is important to develop an even more sophisticated approach to attracting inward investment into this sector in the city region. Building on the sector knowledge of Professional Liverpool (see Ch3, item 5.4.3) and other involved organisations and individuals, potential business opportunities which arise and the approach to be adopted in order to attract them to Liverpool, all need to be explored in depth in order to best exploit those opportunities on behalf of the city region. This approach needs to be linked to a sustained marketing effort to communicate to the required audiences the strengths which Liverpool can offer including geography, price (property, local tax etc), a gateway city, skills, academic support, quality of life etc. The city region needs a structure which sustains the capacity to market the city and develop

the intelligence needed to underpin the attraction of investment including foreign direct investment. This applies to all the key sectors of the economy and to international as well as national audiences, building on established links such as with China (e.g. via the Shanghai Expo) and India (via Liverpool Hope). The establishment of a Local Enterprise Partnership for the city region could simplify the landscape and create one organisation working on behalf of the city region which is sufficiently well resourced to support the development of the economy across all the priority sectors, including the attraction of major new investment.

2.6.3 If the FPS sector in Liverpool is to grow effectively, a number of other issues need to be grasped:

- Companies need to look for business not just regionally and nationally but internationally. In particular, improved links and relationships with London are pressing
- The FPS sector services the entire economy; it is particularly important to ensure that it can provide the full range of general and specialised services required by each of the key sectors of the economy moving forward
- The sector needs to build on its strengths. Professional Liverpool (see Ch3, s5.4.3) is bringing together a Wealth and Asset Management Group to discuss how best to build on that area of expertise, which is second in importance only to London, and use it to sell to the international markets in which they operate; consideration should also be given to establishing a group to consider how best to develop bank processing activity
- The higher education sector needs to offer the highest quality support for the sector through its Business/Management Schools, both through research and the quality of post-graduates
- The Universities need to consider strengthening their support for the sector e.g. the prospect of establishing a Chair in Wealth and Asset Management, and producing graduates with particular skills in 'financial' mathematics. Regular dialogue should take place between Professional Liverpool and its members and the Universities
- The HE and FE sectors need to be able to offer bespoke training opportunities both for existing companies (including CPD) and as part of the service which the city region can offer to potential external investors whether national or international.

2.6.4 Finally, the city region needs to be able to offer the type of Grade A office accommodation which the banking and professional sectors require to attract significant new external investment. In addition to the distinctive accommodation (new and refurbished) in the Commercial Business District, which gives Liverpool its physical commercial identity, Liverpool and Wirral Waters have the capacity to provide significant quantities of modern, fit for purpose accommodation which would also meet the potential needs of the Financial and Professional Services sector and other sectors in the longer term. The city region needs to work closely with developers who can deliver the required type and quality of accommodation, to mutual advantage.

2.7 Public Sector.

2.7.1 The public sector across the city region dominates the economy. Although this sector is destined to contract over the next few years, it will continue to be a major element of the city region's economy. As, on average, over a third of the money spent by the public sector is delivered by the private sector, the procurement policies adopted by the public sector could, if effectively co-ordinated and focused, not just provide important efficiency savings for that sector but also underpin the development of the local economy including FPS.

2.7.2 It is proposed that UoL and LJMU jointly lead the establishment, in conjunction with Liverpool Hope and other centres of expertise and the wide-ranging public sector across the city

region (and in consultation with national bodies such as the TSB and NESTA), of a Public Services Institute which would focus on two distinct areas of action:

- A Public Services Innovation Centre, to develop an Innovation Culture around service delivery and position the city region as a UK leader in innovation in public services (particularly at a time of major public funding reductions) making it a distinctive UK destination for academics, policy makers and practitioners from Europe and beyond
- A Public Policy Institute, to stimulate and lead policy thinking in the city region and improve the quality of policy making by bringing together expertise and a broader group of stakeholders including Higher Education, public agencies, the voluntary sector and the public, building on the third sector strengths and Liverpool's status as a 'vanguard community'.

This proposal has the support of all members of the KEG (see appendix 1), the City Council, Merseyside Police and MerseyCare NHS Trust. The City Council has suggested that partners explore the idea of establishing a joint liaison post between the HEIs and the public sector across the city region, to be responsible for disseminating relevant research findings to practitioners as well as working with the public sector to identify practical research problems for academics to address. Collaboration of this kind would help research become more relevant and improve the effectiveness of the public sector. The post holder could also communicate best practice and facilitate collaborative working.

2.7.3 The city region urgently needs to define the case for attracting the relocation of civil servants from London, and to do so in partnership with the private sector. Liverpool Vision and TMP should jointly take this opportunity forward pending the establishment of the LEP. The proposed Wirral and Liverpool Waters projects offer a tangible opportunity for the city region to secure significant inward investment.

Cross Cutting Issues

2.8 Innovation for Growth.

2.8.1 There are a wide range of business support arrangements currently being offered which are 'at risk' because of the impending demise of the NWDA and the prospective cuts in public expenditure. It is important that the LEP take the lead in seeking to ensure that an integrated range of effective arrangements are put in place to support the development of businesses in general and the key sectors in particular. This work should support and be complementary to the DBIS proposal to establish Growth Hubs across the UK.

2.8.2 Building on the expertise at Daresbury SIC and the importance of consolidating the relationship between the city region's universities and Daresbury SIC, it is proposed that the development of a city region Innovation Hub at Daresbury be explored, with the objective of enhancing the ability of businesses in the city region to access, absorb, spread and apply ideas in support of business development and growth. Better networking, better information/knowledge transfer and the active promotion of cross-sector discussions/events etc could all flow from such a Hub. This could also involve the Technology Strategy Board (see Appendix 8). The development of a Growth Hub, with one of its bases at DSIC, could be undertaken in conjunction with this Innovation Hub and complement its activities.

2.8.3 Scaling up existing people transfer mechanisms such as Knowledge Transfer Partnerships (in line with the TSB's stated ambition to double the number of KTPs as well as investigating more flexible and short-term options), secondments, mentoring arrangements etc. could further

improve the links between academe and business. The Enterprise Skills Programme delivered by LJMU and the associated Enterprise Fellowship Programme offer practical supportive mechanisms for students and graduates to explore and develop their business ideas and translate them into business start ups. We need to explore how these type of activities can be expanded across the city region and how to enhance their scope to provide support structures beyond initial start-up to ensure sustainability, growth and retention of graduate businesses.

2.9 Branding.

2.9.1 In preparing this draft KEP, the issue of the branding of the Liverpool City Region not just as a visitor destination but also as an international Gateway City with an attractive quality of life:

- with major knowledge assets
- strong in science and technology
- renowned for its creativity and innovation and
- with a strong and dynamic commercial centre,

was repeatedly raised by consultees/interviewees across all the key sectors and needs to be tackled energetically and decisively. It is essential that the Liverpool City Region has a Branding Policy which enables its real and relevant strengths to be communicated effectively to specific audiences for specific purposes. Visitor branding is rightly aimed at potential visitors (business or otherwise); investor branding needs to be aimed at companies and address the issues which are important to those companies. The remarkably wide range of knowledge assets documented in this Plan need to be disseminated effectively to all relevant audiences. The city region needs to promote its strengths, its particular unique selling points, nationally and internationally, in a very targeted way in order to promote the assets and expertise which form the basis for growing the knowledge economy. It also needs to promote the quality of life it offers to those who chose to work, live in and experience the city region's culture. In this it must challenge outdated stereotypes – for example, overall crime across the city region fell by almost 40% since 2006 and it is now one of the safest metropolitan areas in the country.

2.9.2 It is recommended that the partners across the city region review branding policy to take full account of the need to support development of all the key sectors. Work should begin immediately building on the excellent material assembled for the Shanghai Expo. The city region should also capitalise on the fact that many of its knowledge assets (e.g. LSTM) attract people from all over the world, presenting an excellent opportunity to promote Liverpool as a Science and Technology city region. This is another issue which may fall to the Local Enterprise Partnership to deal with once it is operational. The private sector has a particularly important role to play in developing the city region brand and marketing strategy.

2.10 Education and Skills

2.10.1 The complexity of developing appropriate links between industry/commerce and the HE/FE sectors across the skills agenda in order to ensure that all courses are relevant, focused and up to date, is very great indeed. The Knowledge Economy Group, in consultation with the city region Employment and Skills Board, will need to consider how this complex landscape could be simplified to the benefit of all concerned, with particular emphasis on the key sectors set out in this report, building on the city region's Employment and Skills Strategy, which advocates a more demand driven approach. Particular attention should be paid to the development of managerial and leadership skills.

2.10.2 It is very important that the city region takes maximum advantage of the intended increase in (a) the number of KTPs which the Technology Strategy Board is to support (see appendix 8) and (b) the number of apprenticeships to be established nationally, building on the

existing apprenticeships programmes. Consideration needs to be given to incorporating apprenticeships as part of a more flexible system with enhanced options for progression. The power of public sector procurement should be brought to bear particularly in support of enhanced apprenticeship programmes.

2.11 Physical and Digital Infrastructure

2.11.1 Physical Infrastructure - It is essential that city region partners, through the emerging Local Enterprise Partnership, determine the infrastructure priorities for action across LCR in support of the development of the knowledge economy, and that the city region benefits to the maximum extent from national and regional infrastructure investment including High Speed Rail, the second Mersey Crossing and the Atlantic Gateway initiative.

2.11.2 Digital Infrastructure

2.11.2.1 The Liverpool *Broadband Mapping* report identifies the opportunity to use spare capacity and ducts in the city to create an open access network, which would deliver a step change in connectivity if paired with an Internet Exchange. This would require capital investment. This mapping exercise needs to be extended across the city region and the outcome inform the the priorities for action in support of the development of the knowledge economy.

2.11.2.2 The provision of superfast broadband and associated data centres and internet exchange serving the city region is a key requirement for the effective development of the knowledge economy. Every sector covered in this KEP requires such broadband access and resilience and high priority needs to be given to determining the priorities for provision (both by sector and by geography) and to exploring different mechanisms for funding the required infrastructure. It is vital that the city region management arrangements, and particularly the LEP, have the capacity and resources to pursue this important issue.

2.12 Priorities for Action

This chapter has summarised all the possible areas for action across the 5 sectors and the 4 cross cutting issues. Many of these areas for action are about the development of appropriate structures and processes at the city region level and it is hoped that they will all be addressed in determining the role, functions and resourcing of the LEP. Out of the nearly 40 separate proposals, the following 9 (not in any priority order) have the highest priority and that should be reflected in decisions on prioritising the use of resources.

2.12.1 The development of a close and long term relationship with Daresbury SIC, including promoting its particular strengths to industry across the city region.

2.12.2 The development of a strategic relationship with the Technology Strategy Board across the Creative and Digital, Advanced Manufacturing and Life Sciences sectors and including the possible development of an Innovation Hub at Daresbury SIC.

2.12.3 Life Sciences: The development of the package of projects (Vaccine Research; LSP Development; the BioInnovation Centre and the BioCampus) which builds on the world class strengths of LCR in Life Sciences.

2.12.4 Creative & Digital: The development of proposals to tap into new market opportunities in digital advertising and marketing, gaming and new cinema technologies and the business generated through MediaCityUK and also developing a Creative Business Hub to encourage networking, collaboration and business development.

2.12.5 Advanced Manufacturing: The development of Fab Labs in the city region to promote innovation and creativity and improve the image of manufacturing, and the establishment of an Advanced Manufacturing TIC, building on the VEC at Daresbury.

2.12.6 Financial & Professional Services: The joint development of a strategy to attract inward investment into the sector, particularly utilising private sector knowledge and the opportunities which new and refurbished accommodation in the Commercial Business District and the Liverpool and Wirral Waters projects present to provide the range and quality of accommodation needed both now and in the long term.

2.12.7 Public Sector: The establishment of a Public Services Institute providing both a public services Innovation Centre and a Public Policy Institute.

2.12.8 Branding: To fundamentally review the branding of the LCR to more effectively reflect the knowledge assets across the city region, its strength in science and technology, its reputation for creativity and innovation, its dynamic commercial centre and its attractive quality of life, in addition to its importance as a visitor destination.

2.12.9 Digital Infrastructure: The development of a strategy to secure the provision of superfast broadband and associated data centres and internet exchange is a key requirement for the successful development of the knowledge economy and the city region will need to give high priority to taking this forward if the area is not to fall behind other cities in the UK.

N.B. An Implementation Plan for this knowledge economy plan will be prepared early in 2011, and will (inter alia) define who is to lead the actions required.

APPENDICES

APPENDIX 1: COMPOSITION OF THE KNOWLEDGE ECONOMY GROUP, THE KNOWLEDGE ECONOMY STEERING GROUP AND THE ECONOMY PANEL

Knowledge Economy Group membership

Sir Howard Newby	Vice Chancellor, University of Liverpool (Chair)
Prof. Michael Brown	Vice Chancellor, Liverpool John Moores University (Vice Chair)
Prof. Colin Whitehouse	Deputy CEO, Science and Technology Facilities Council and Head of Daresbury Laboratory and Director of Campus Strategy
Dr. Roger Platt	Chairman, NW Science Council
George Baxter	NWDA
Matt Johnson	MD, Mando Group
Mike Parker	Chairman, Liverpool Vision
Mike Parkington	Unilever
Mike Shields	URC Associates and Project Director
Rod Holmes	Chairman, TMP
Tom Dawes	Aerogistics
Tony Bell	CEO, RLBUT

Knowledge Economy Steering Group

Mike Shields	Project Director, Knowledge Economy Plan
John Flamson	University of Liverpool
Denise Stewart	Liverpool John Moores University
Helen Jackson	RHLBUT
Sophy Krajewska	Liverpool Vision
Dave Moorcroft	TMP
Dave Sanderson	NWDA
Matthew Cliff	University of Liverpool

Knowledge Economy Panel membership

Ian Rennie	ABB Ltd
Tom Dawes	Aerogistics
Emy Onuora	Aimhigher Greater Merseyside
Richard Glenn	Alder Hey
Tim Johnson	Amion Consulting
Dr Geoff Davison	Bionow NW
Brian Woodhouse	Bizzare Creations
Deborah Ascott-Jones	Brabners Chaffe Street
Peter Timmins	Bristol Myers Squibb Research Centre
Lynne Wood	Business Link North West
Sue Jarvis	City Employment Strategy
Damian Waters	Confederation of British Industry (CBI)
Prof Colin Whitehouse	Deputy CEO, Science and Technologies Facilities Council and Head of Daresbury Laboratory
Andy Green	DWF
Barry Flynn	Ernst & Young

Jo Lappin	Government Office North West
Dick Tregoe	Halton BC
Tony Wilson	Hill Dickinson
Chris Tane	Ineos Chlor Vinyls
Michael Straughan	Jaguar Land Rover
Mike Shields	Knowledge Economy Plan Director
Nick Kavanagh	Knowsley MBC
Ian Green	Liverpool Community College
Prof. Gerald Pillay	Vice Chancellor, Liverpool Hope University
Neil Pakey	Liverpool John Lennon Airport
Andy Young	Liverpool John Moores University
John Barrett	Liverpool John Moores University
Prof Michael Brown	Vice Chancellor, Liverpool John Moores University
Denise Stewart	Liverpool John Moores University
Prof. Janet Hemmingway	Director, Liverpool School of Tropical Medicine
Chris Musson	Liverpool Science Park
Sophy Krajewska	Liverpool Vision
Andy Green	Liverpool Vision
Matt Johnson	Mando Group
Mike Potter	Merseyside Colleges Association
Andy Churchill	Merseyside Network for Europe
Dr Crawford Brown	National Biomanufacturing Centre
George Baxter	Northwest Regional Development Agency
Steve Jones	Novartis Vaccines & Diagnostics
Dr Roger Platt	NW Science Council
Ann McCracken	O2
Mark Chadwick	Professional Liverpool
Prof Andrew Willmott	Proudman Oceanographic Laboratory
Tony Bell	Royal Liverpool University Hospital
Andy Wallis	Sefton MBC
Mick Hocking	Sony Computer Entertainment
Bob Hepworth	St Helens MBC
Steve Stuart	Steve Stuart Partnership
Peter Cook	The Heath
Mike Parkington	Unilever Research & Development
Sir Howard Newby	Vice Chancellor, University of Liverpool
Dr Gillian Murray	University of Liverpool
John Flamson	University of Liverpool
Dr Simon Longden	University of Liverpool
Jim Wilkie	Wirral MBC

APPENDIX 2: CONSULTEES OVER THE PERIOD MARCH TO JULY 2010 INCLUSIVE.

A. Consultees Attending Discussion Groups on Creative and Digital Industries.

Andy Abram	New Mind
Roy Boulter	Hurricane Films
Jon Corner	River Media
James Doherty	Qire
Duncan Fraser	Finch Ideas
Lee Hardman	Conquer c/o Lime Pictures
Ben Hatton	Ripple Effect
Jon Holmes	Milky Tea
Matt Johnson	Mando Group
Sean Marley	Lime Pictures
Dougal Paver	Paver Smith
Simon Rhodes	Smiling Wolf
Brian Woodhouse	Bizarre Creations
Simon Ryder	Vision and Media
Amanda Stevens	
Roger Webster	LJMU
Martin Downie	LJMU
Paul England	LJMU
Lindsay Sharples	LJMU
Paul Goldberg	UoL
Paul Watry	UoL
Chris Unsworth	UoL
Lynne McCadden	NW Vision & Media
John Leake	Daresbury
Kevin Peacock	TMP
Suzanne Jameson	NWDA
David Parr	Halton Council
Mark Tock	Liverpool Innovation Park

B. Consultees Met by the Project Director:

Chris Musson,	CEO, Liverpool Science Park
Geoff Wainwright	Director, 2Bio
Dr. Geoff Davison	Director BioNoW, NWDA.
Prof. Michael Brown	Vice Chancellor, LJMU
Linda Magee	formerly Head of BioNoW
Tony Bell, CEO	Royal Liverpool University Hospital Trust
Helen Jackson	Royal Liverpool University Hospital Trust
Felicity Goodey	Chair, Central Salford URC re: MediaCityUK
Martin Lloyd	NWDA Property
Jim Gill, CEO	Liverpool Vision
Sophy Krajewska	Liverpool Vision
Prof Colin Whitehouse	Deputy CEO, STFC and Head Daresbury SIC
David Higham	Deputy Director, GONW
Steven Broomhead	CEO, NWDA
George Baxter	Director of Science and Innovation, NWDA
Mike Taylor	Director of Investment and Enterprise, Liverpool Vision

Prof Roger Webster	LJMU
Rod Holmes	Chairman, The Mersey Partnership (TMP)
Lorraine Rogers	CEO, TMP
Mark Butchard	TMP
Mark Basnett	Director of Operations, TMP
Mark Knowles	TMP
Gary Adlen	Head of Corporate Sales, TMP
Laki Singh	Investment Development Manager, TMP
Neil Bradley	Corporate Development Manager, TMP
Michael Parker	Chairman, Liverpool Vision.
John Flamson	Director, Strategic Partnerships and Development, UoL
David Parr	CEO, Halton Council.
Jon Corner	Creative Director, River Media.
Mark Dickinson	Business Development Director, Trinity Mirror plc
Dr. Crawford Brown	CEO, Eden Biodesign (Watson Group).
Mark Tock	Innovation Manager, Liverpool Innovation Park
Sara Kemp	Creative and Digital Industries, NWDA
Iain Bennett	Creative and Digital Industries, NWDA
Suzanne Jameson	Creative and Digital Industries, NWDA
Chris Rowlands	Manufacturing, NWDA
Sir Howard Newby	Vice Chancellor, University of Liverpool
Roger Platt	Chairman, NW Science Council
Denise Stewart	PVC Finance and Planning, LJMU
Alison Thornber	Head of Development Funding, LJMU
Lyndsey Sharples	Open Lab, LJMU
Prof. Janet Hemmingway	Director, Liverpool School of Tropical Medicine
Kevin McManus	Head of Creative and Digital Sector Development, ACME
Steven Smith	Industry Director ICT, Liverpool Vision
Graham Heywood	Daresbury SIC
Prof. John Huthnance	Deputy Director, National Oceanographic Centre
Prof. John Belcham	University of Liverpool
Prof. John Caldwell	PVC, University of Liverpool
Alice Morrison	CEO, NW Vision and Media
Simon Ryder	NW Vision and Media
Lynne McCadden	NW Vision and Media
Prof. Dennis Kehoe	CEO, Aimes Grid Services
Michael Straughan	Operations Director, Jaguar Land Rover
John Kelly	Director of Strategy, Liverpool City Council
John Leake	General Manager, Daresbury Science and Innovation Campus
Michael Gleaves	Business Development Manager, STFC Innovations, Daresbury SIC
Mike Stubbs	CEO, FACT
Steve Power	Regional Manager, Rider Levett Bucknall
Martin Carey	CEO, Resource Management and Planning, Hope University
Graham Donelan	University Secretary, Liverpool Hope University
Steve Stuart	The Steve Stuart Partnership/Brabners Chaffe Street LLP
Jonathan Furnival	The Steve Stuart Partnership/Brabners Chaffe Street LLP
Richard Glen, Project Director	Alder Hey University Hospital Trust
Mark Chadwick	CEO, Professional Liverpool
Maureen Mellor	Principal, Liverpool Community College

Marie Allen	Vice Principal, Liverpool Community College
Peter Nears	Strategic Planning Director, The Peel Group
Richard Mawdsley	Senior Development Surveyor, Peel Land and Property
Sean Marley	MD, Lime Pictures
Mike Taylor	Director of Investment and Enterprise, Liverpool Vision
Richard Farrow	Associate Director of Technology, STFC

C. Persons Consulted by Matthew Cliff, supporting the Project Director:

Alex Addyman	Regional Intelligence Unit, NWDA
Dr. Julie Madigan	CEO, The Manufacturing Institute
Adam Buckley	The Manufacturing Institute
Mark Sutherberry	The Manufacturing Institute
Andy Jones	Knowledge Transfer Partnership, University of Liverpool
Gillian Murray	Virtual Engineering Centre
Gary Murphy	Heptron Ltd
Ian Raymond	TMP
David Sanderson	NWDA
Noordin Shehabuddeen	Director, Innovation Academy, University of Liverpool
Ray Squires	Wirral Borough Council
Mike Stubbs	FACT
Simon Usher	Joloda International.

D. Consultees present at Knowledge Economy Panel meeting on 07 July 2010

Prof Michael Brown	(LJMU)
Rod Holmes	(TMP)
Lorraine Rogers	(TMP)
Emy Onuora	(Aim Higher Gtr Merseyside)
Richard Glenn	(Alder Hey Children's NHS)
Sue Jarvis	(Knowsley MBC)
Chris Musson	(Liverpool Science Park)
Sophy Krajewska	(Liverpool Vision)
Andy Green	(Liverpool Vision)
Dr Roger Platt	(North West Science Council)
Mark Chadwick	(Professional Liverpool)
Dr. Crawford Brown	(National Biomanufacturing)
Prof. John Huthnance	(National Oceanography)
Steve Stuart	(Steve Stuart Partnership)
Dr Gillian Murray	(University of Liverpool)
John Flamson	(University of Liverpool)
Matt Johnson	(Mando Group)
Alison Thornber	(LJMU)
Mike Potter	(Merseyside Colleges Assoc.)
Andy Churchill	(MNE)
Observers	
Dave Moorcroft	(TMP)
Gary Adlen	(TMP)
Laki Singh	(TMP)
Neil Bradley	(TMP)

E. Consultees responding to Draft Knowledge Economy Plan

Liverpool Science Park
Liverpool Innovation Park
MerseyBio/2Bio
St. Helens College
Knowsley Council
Bruntwood
Liverpool Hope University
Alterity/Federation of Small Businesses
Merseyside Police
NWDA – Bio NoW
NWDA – Digital and Creative Industries
NWDA – Business and Professional Services
NWDA – Advanced Engineering and Materials
LJMU
Mersey Maritime
Halton Borough Council
St. Helens Council
Trinity Mirror
University of Liverpool
Liverpool Chamber of Commerce
Wirral Council
Sefton Council
Liverpool Charity and Voluntary Services
Culture Campus Liverpool
Wirral Metropolitan College
Liverpool City Council
The National Oceanography Centre
Daresbury Science and Innovation Campus.
Mersey Dee Alliance

APPENDIX 3: LIVERPOOL SUPERPORT

1. Background

The SuperPort opportunity can be summarised as follows:

- International business is now operating on a completely new scale, leading to concentration whereby fewer, larger companies take an increasing share of global business, particularly in manufacturing, retail and transport. Creating a new burgeoning market and building on considerable existing maritime capabilities, SuperPort is the Liverpool City Region's response to become a leader in this dynamic and truly global market place.
- SuperPort physically comprises the core assets of Mersey ports (£913m GVA contribution per annum alone), Liverpool John Lennon Airport, logistics and transportation infrastructure but, conceptually, it can be much more by integrating these attributes together to provide a cohesive cost efficient entity that creates a credible product for a global marketplace. In addition, the region also has the scale of freight community able to make best use of these physical assets.
- At the cornerstone of the SuperPort is Peel Group's Ocean Gateway strategy for the Mersey and Manchester Ship Canal, coupled with the Stobart Group's plans for extending their logistics footprint in the city region and other key operators' plans for port and logistics infrastructure. These will ensure that the overall SuperPort concept is, and remains, very much a private sector-driven initiative.
- SuperPort will create new logistics supply chains across political boundaries and beyond the City Region.

However, the essence of SuperPort is that it is far more than port and airport infrastructure or indeed about front end interaction with logistics and passenger customers. To realise its potential, it needs to interact and influence the development and growth of a number of prominent high value sectors across the Liverpool City Region, in particular:-

- ICT – The development of innovative customer-facing ICT solutions will move SuperPort towards its goal of operational integration and material cost efficiencies.
- Professional Services – Building on the existing and historic strengths that the City Region has in the maritime profession and business services markets.
- Transportation – Examining innovative solutions to the needs of the expanding Liverpool SuperPort for both freight and passengers in line with the Transport MAA and evolving City Region governance.
- Skills development - Coordinated partnership approach needed for the skills required to support SuperPort. This includes the development of a highly skilled technical workforce provided through an Employment and Skills Strategy, together with an accompanying Commissioning Plan.

If SuperPort is realised, its future role (opportunity) will be: -

- (a) the only west coast deep sea container port able to accommodate post-panamax vessels handling direct calls by deep sea vessels, transshipment traffic to Ireland and traffic fed from other UK and Continental deep sea container ports;
- (b) a major deep sea "gateway" port for the region and the UK, handling the full range of deep sea traffic. From a North West perspective, SuperPort will be the sea gateway for the Manchester City Region through the development of the Manchester Ship Canal;

- (c) a vibrant gateway for the North West for both passengers and freight whilst balancing the needs to provide a sustainable environment;
- (d) the major Irish Sea RoRo port in the North West region, following the development of a riverside terminal, and
- (e) a major sustainable distribution hub (waterborne, rail and road freight transport), serving a national hinterland (at the lowest cost and carbon output) with associated warehousing.

2. Strategic context

- (a) The North West Regional Economic Strategy 2006 defined this transformational action as: *Growing the Port of Liverpool and in support delivering deep water facilities, related development and transport links.*

The draft 2010 Economic Strategy, although now not to be finalised, sought to build on the region's distinctiveness by improving international connectivity through LCR SuperPort. Notwithstanding the demise of regional strategy, these objectives remain valid.

- (b) The Atlantic Gateway Framework:
 - Seeks to build on the strategic infrastructure of two airports, a major sea port, road and rail multi-modal freight facilities and potentially enhanced use of the ship canal, to provide better, more competitive and lower carbon logistics and strengthen international connectivity
 - Points out that, now that the Post-Panamax facility has planning consent, support should be focused on providing access and supporting infrastructure
 - Promotes the joint development of freight and logistics capacity at the two airports.
- (c) As part of the activity being taken forward under SuperPort, the City Region:
 - Aims to significantly improve Liverpool's position as one of UK's primary international gateways by 2030
 - Sees the planned expansion of the Mersey Ports and Liverpool John Lennon Airport as presenting an opportunity for an internationally significant SuperPort. The £100m investment in a new post-panamax container facility has the potential to double the amount of traffic into the Port, supported by necessary access improvements
 - Seeks to establish an effective dialogue with Government to deliver the SuperPort concept
 - Looks to strengthen the support which the city's financial and professional services sector can give the SuperPort industries
 - Asserts that, in order to be considered as a transformational idea for the Liverpool City Region, SuperPort needs to penetrate global markets through a portfolio of outstanding port-related assets and willingness from stakeholders to cooperate under the Liverpool SuperPort brand
 - Identifies the need to encourage innovation in those industries which make up SuperPort.

Current position

Although the number of businesses connected to SuperPort has fallen in the City Region, overall employment has increased around logistics in the past decade and the sector now has a turnover of around £2.8bn. The Port of Liverpool is the seventh largest Port in the UK and handles around 33 million tons of cargo a year.

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
SuperPort	23126	26595	4.2%	4.6%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
SuperPort	1801	1725	4.6%	4.0%

Whilst there is a concentration of businesses in Liverpool (26.1%), there is notable activity in Sefton, St. Helens and Wirral.

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	213	12.3%
Knowsley	177	10.3%
Liverpool	451	26.1%
Sefton	342	19.8%
St Helens	275	15.9%
Wirral	267	15.5%
Total LCR	1725	100.0%

A more nuanced picture emerges following analysis of current employment data, revealing the importance of activity in Haydock and West Sutton in St. Helens.

Jobs by Geographical Distribution 2008

	No. of jobs	%
Halton	4588	17.3%
Knowsley	2235	8.4%
Liverpool	7995	30.1%
Sefton	2882	10.8%
St Helens	6378	24.0%
Wirral	2519	9.5%
Total LCR	26595	100.0%

Employment hotspots

Ward	District	No of jobs	% of jobs in this sector
00BYFQ : Everton	Liverpool	3,560	13.4%
00BZFF : Haydock	St. Helens	2,362	8.9%
00BZFS : West Sutton	St. Helens	!*	!
00ETND : Daresbury	Halton	1,681	6.3%
00BYGC : St. Mary's	Liverpool	1,457	5.5%

*cannot be disclosed for purposes of confidentiality

The Liverpool City Region already has the primary North Atlantic port in the UK, supplying the UK hinterland, one of the fastest growing airports in Europe and a rapidly expanding logistics industry.

Liverpool SuperPort - 3MG Multi-modal Gateway. 3MG is an innovative rail and road logistics hub offering a completely bespoke solution to meet customers logistics needs. It aims to be industry leading and has already attracted visitors from across Europe looking to learn from its operations and design. Although the site will continue to be developed until 2012, it already benefits from five daily rail services, with storage capacity of 6000 containers and high-quality warehouse space available. 3MG is located within a maximum of four hours of every major UK destination.

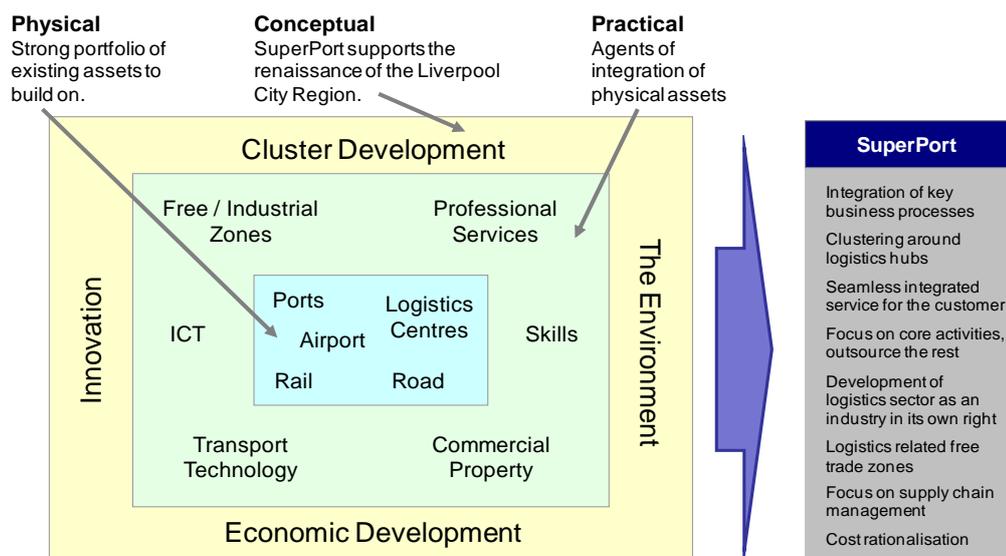
Maersk has moved their UK HQ facility to the city region.

Parkside St. Helens offers a further major opportunity to develop a strategically located road/rail interchange.

3. Opportunities

- Liverpool John Lennon Airport's masterplan suggests growth in passenger numbers from 5m in 2008 to 12.3m in 2030.
- Freight at LJLA is currently at a low level. The Airport Masterplan will boost freight operations from current 4k tonnes to 220k tonnes and provide additional capacity to grow the passenger route network.
- Despite the current economic downturn, long-term growth rates for sea-bound trade are forecast to be about 4% per annum between 2005 and 2030 (Port Traffic forecasts – DfT 2007). New areas of strengths and markets e.g. Far East need to be developed.
- SuperPort can be the most cost efficient and sustainable gateway for freight and passenger transit in the UK and can stimulate the development of port-centric logistics around the Mersey Ports and Manchester Ship Canal.
- SuperPort will exploit its central UK position to open up new market growth opportunities for the shipping of goods into the sub-region through the development of effective partnerships and a strong brand presence.
- SuperPort will stimulate and mould the development of associated sectors such as ICT, legal, insurance, skills development and influence the development of key transport infrastructure schemes.
- SuperPort is a major demand-led capital development programme providing new infrastructure to support intended growth. This will require a concerted search for investment to realise the portfolio of infrastructure projects that underpins SuperPort e.g. post Panamax facility, Mersey Gateway, transport schemes.

- SuperPort can be the catalyst for maximising return on the City of Liverpool Cruise Liner Facility through resolving outstanding issues preventing embarkation and the development of relevant infrastructure.
- SuperPort has the opportunity to address the emerging skills requirements through the development of specialist skill centres and possibly national academies, working with partners such as LJMU, University of Liverpool Management School and Mersey Maritime.
- SuperPort can be positioned as a “port of national significance” providing services across the UK and Ireland.
- Liverpool SuperPort is multi-dimensional in that it contains physical, practical and conceptual components:



Indeed, SuperPort has the potential to become a genuinely unique selling proposition for the Liverpool City Region and the North West by seizing competitive advantages in a global industry with an assured, long-term future. This is despite the projected short-term downturn in containerised trade.

4. Major related knowledge assets:

The **Agility and Supply Chain Management Centre** at the University of Liverpool Management School focuses upon Agility and Lean manufacturing implementation; it brings together experts in operations management and marketing. The Centre has assisted 84 small companies to improve their manufacturing and marketing operations significantly. This involved training and coaching firms in the principles of waste minimisation and operations improvements as well as training to bring new customers to the business. The Centre has established a relationship with Mersey Maritime. Relevant expertise at UoL includes:

- The development of agility within businesses and their operations to meet the challenges of turbulent market places
- The optimisation of operations (e.g. scheduling, resource allocation, layout etc)
- Simulation to help in process and supply chain design and optimisation
- Total Quality Management (TQM), continuous improvement, SPC, benchmarking etc.
- e-Business, enterprise resource planning (ERP) and management information systems
- Sustainability and resilience to resource depletion, most notably ‘peak oil’.

This expertise has been harnessed in the following applications:

- Intermodal port management
- Design of automatic identification and data collection system for logistics supply chains
- Resilient multi-plant networks.

Liverpool Logistics, Offshore and Marine Centre (LOOM) has expertise in developing an efficient logistics and supply chain management system that could deliver and enhance the potential of SuperPort, particularly with reference to intelligent, efficient and sustainable transport and logistics systems. Relevant research interests include:

- Electronic charts
- Formal ship safety assessment
- Human and organisational error studies
- Marine and offshore system design
- Navigation studies
- Offshore safety analysis
- Simulation studies of marine systems
- Offshore structural assessment
- Port safety assessment
- Port studies
- Simulator based research
- Security studies
- Quality modelling
- Appraisal of marine regulation performance.

The **Lairdside Maritime Centre (LMC)** provides training facilities for the maritime industry. It has a ship-handling simulator that is amongst the most advanced in Europe, and currently the only one in the UK with a 360° field-of-view visual system. The facility enables marine pilots, shipmasters and senior navigating officers to develop and practise their skills in a realistic but risk-free environment. Examples of the applications undertaken include:

- **Port Development:** Testing the feasibility of proposed harbour facilities prior to construction and identifying limiting factors for entry to or departure from a port in difficult conditions. Using the River Mersey database, it was possible to model a new RORO ferry terminal and allow shipmasters and river pilots to practise berthing under a variety of conditions. Other recent research has included the impact on navigation of an offshore wind farm.
- **Accident Investigation:** Simulation is effective in reconstructing and analysing incidents. It enables the incident to be reconstructed in a real time and all aspects of the incident can be thoroughly examined. These can include: equipment failures, human error, vessel characteristics, vessel procedures and environmental conditions.
- **Pilotage Training:** Pilots are specialists with expert knowledge of a particular river system and port area. The river system and port area can be accurately created in the 360° ship handling simulator with care being taken to ensure that details are realistically represented. Courses are offered in Local Pilotage, which uses simulation training based on the clients own local port.
- **Ship Handling:** Ship handling training courses can be developed and tailored to an individual company's specific requirements. In general, the training is intended for deck officers who are routinely required to manoeuvre and handle ships but it is also excellent training for deck officers with limited "hands-on" experience or officers converting to vessels with sophisticated or unusual manoeuvring systems.

The Centre has extensive experience of developing and delivering professional training courses for the maritime and ports sector, for example: courses in bridge team management, crew resource management, and ship handling. Other courses include electronic charts and information systems, automatic radar plotting aids, and navigation as well as the full range of STCW95 courses. In addition, courses in port operations, port security, safety and risk management and auditing are offered, plus bespoke training with industrial clients, where required.

The **National Oceanography Centre** has been engaged with Peel and other partners around the evaluation of the potential for tidal power generation in the Mersey Estuary, with a recently completed a major feasibility study.

5. Skills provision (See Appendices 9 and 10)

(a) LJMU provides Graduate and Postgraduate Degree courses in the Maritime and Transport Industries including:

- BEng/MEng Marine and Offshore Engineering
- BSc Maritime Studies
- BSc Maritime Business and Management
- BSc Management Transport and Logistics
- Cert.HE/DipHE/BSc Nautical Science
- Diploma/MSc Port Management
- Diploma/MSc Maritime Operations
- Diploma/MSc Marine and Offshore Engineering
- Diploma/MSc International Transport Trade and Logistics
- MBA Maritime Enterprise
- Continuing Professional Development (CPD) courses in General and Maritime English, Port safety and Security, Fire and Rescue, STCW95 courses.

(b) At UoL, Masters students can study for the following programmes:

- e-Business Strategy and Systems MSc
- Operations and Supply Chain Management MSc.

(c) Mersey Maritime, the sector development organisation for the industry, aims to support the development of a world class cluster of maritime businesses. It has developed the Maritime and Engineering College and Innovative Training Simulators for international trade and port operations. Mersey Maritime has an important role to play in developing the SuperPort.

6. Progressing Liverpool SuperPort

The draft SuperPort action plan directed by the SuperPort committee is initially subdivided into four areas of focus.

- Attracting Regional Distribution Centres
- Enabling the Build of Key Infrastructure
- Promoting Skills Development
- Stimulating Passenger Flow Through.

6.1 Attracting Regional Distribution Centres

This will work to increase the supply of sites and premises suitable for SuperPort distribution operations through the development of a pipeline of sites and premises to meet demand generated

by the market. It will be achieved, in part, through the development and implementation of a SuperPort freight and logistics marketing strategy to ensure that the “product” is clearly defined, target customers identified and marketing activities defined. This will be complemented by SuperPort lead generation activities, exploiting development of a pipeline of SuperPort inward investment and re-investment projects and enquiries.

6.2 Enabling the Build of Key Infrastructure

Investment is required by the private sector and public sector in those capital projects that can deliver step change in the development of SuperPort. This includes new infrastructure and relevant hinterland developments which are variously dependent upon demand, private funding, planning approval and public funding. To facilitate this, there will need to be a co-ordinated lobbying of central government to ensure that SuperPort hinterland access pipeline projects are supported through the planning process and are funded. Development of a Master Plan for the Mersey Ports and a review of the existing Airport Master Plan are required.

6.3 Promoting Skills Development

A skills and training study is required to ensure there is sound evidence upon which a strategy can be developed. This initial study would then need to be followed up with a long-term strategy.

6.4 Stimulating Passenger Flow Through

Although heavy emphasis in SuperPort is on freight it is also important to ensure that facilities and services are in place for optimal flow-through of passengers, particularly supporting the Visitor Economy.

APPENDIX 4: LOW CARBON.

1. Strategic context - National

1.1. A distinction needs to be drawn between low carbon energy and technology and the need to adapt to a radically different future economy. In terms of low carbon energy and technology, one can distinguish between the Energy Sector and Environmental Technologies and Services as two separate, but interconnected, areas. The former covers companies engaged in fuel supply and the production, distribution, supply and usage of energy. The latter covers a wider range of technologies and services associated with managing and protecting the environment as well as those which develop cleaner, more efficient products and services.

1.2. The previous Government's *Low Carbon Transition Plan* set out plans to move the UK to a permanent low carbon position. It set objectives to produce 30% of electricity from renewable sources by 2020 and cut emissions from workplaces by 13% on 2008 levels. The plan launched the Office for Renewable Energy Deployment to reduce carbon emissions, increase energy security and create business opportunities in the UK. The plan built upon commitments made in *New Industry, New Jobs* for a clear programme to adapt Britain's energy grid to link homes and businesses to new forms of power generation and to provide clear incentives to produce and use renewable energy.

1.3. Also published under the former Government, the *Low Carbon Industrial Strategy* identified a number of opportunities for the UK, in particular, offshore wind, marine, nuclear and ultra-low emission vehicles. Drawing upon the rationale for public intervention established in *New Industry, New Jobs*, it set out a more strategic role for Government with measures to encourage business demand for low carbon (e.g. via procurement) and ensure that UK-based companies and people were equipped with the skills to compete for the opportunities created by this new demand, nationally and internationally. The former Government also announced that it intended to create a Green Investment Bank to invest in the low carbon sector, starting by investing up to £1bn from the sale of infrastructure-related assets and seeking to match this with private sector investment.

1.4. In terms of innovation, £405m of additional funding was to be made available as support for early stage low carbon industries including:

- Up to £120m to support development of a British-based offshore wind industry. In recognition of the UK's strength in this area, a national Composite Strategy has been developed
- Up to £60m for a package of measures to help accelerate the development and deployment of wave and tidal energy
- Up to £22m for a Marine Renewables Proving Fund to support testing and demonstration of pre-commercial renewable devices
- Up to £10m for the accelerated development of electric vehicle charging infrastructure in the UK, alongside the establishment of a cross-Whitehall Office for Low Emission Vehicles (OLEV) to co-ordinate policy across government
- A £4m expansion of the Manufacturing Advisory Service.

1.5. The former Government was also developing Low Carbon Economic Areas (LCEAs) to accelerate low carbon economic activity in locations where there are geographic and industrial assets. In December 2009, the North West and Yorkshire were announced as the UK's LCEA for nuclear. The LCEA aims to bring together knowledge, skills and investment and is building on existing nuclear expertise in the North West and manufacturing and supply chain activity for the industry across Yorkshire. The LCEA in the South West focuses upon marine energy and will establish collaborative links with other parts of the UK with relevant strengths, including the North West.

1.6. Whilst underlining the importance of understanding specific low carbon challenges in each locality, the *Low Carbon Industrial Strategy* also set out a series of low carbon activities and priorities for the UK as a whole, namely:

- greater energy efficiency
- smarter low carbon procurement
- construction or retrofit of low carbon buildings.

1.7. The Coalition Government's detailed position in respect of the Low Carbon Industrial Strategy is still emerging.

2. Strategic Context – Regional

2.1. Previous regional strategy makes clear the North West's intention to be at the forefront of progress in moving to a low carbon economy. The region must capitalise on opportunities in new technology and low-carbon energy, including nuclear and renewables and build capacity in science, research, innovation, supply chains, skills and market development of low carbon technologies. The intended abolition of the NWDA and the demise of Regional Strategies throws these objectives into question. The City Regional policy framework will now form the policy context within the emerging national policy framework.

2.2. The ambition referred to above is matched by that in *Atlantic Gateway* for the area to become one of Europe's leading low carbon economic growth areas. It envisages the development of renewable and low carbon energy sources including wind, solar, tidal, biomass and energy from waste as well as the promotion of a green 'heavy' industrial corridor along the Manchester Ship Canal from Liverpool to the Widnes area.

2.3. In support of these objectives, and to help position the Gateway to capture projected high-value growth, plans are set out to establish an Institute for Applied Research into Sustainable and Low Carbon Technology. Functions of the Institute would include:

- Supporting research, especially translational research
- Encouraging emergent supply chain development
- Facilitating the application of technologies where there is specific strength in the Gateway area.

2.4. The future of the Atlantic Gateway Policy also needs to be clarified in the new policy circumstances.

3. Strategic Context – Sub Regional

3.1. The Liverpool City Region set an objective to become energy self-sufficient and a net energy exporter by 2030. It was acknowledged that the delivery of the Low Carbon economic platform would require adaptation and transformation of the existing industrial and commercial base as well as jobs across a range of occupational levels. This would extend to connected knowledge sectors, including Financial and Professional Services and Advanced Manufacturing. In Knowsley for example, the Council is developing a public private partnership to drive forward the opportunity to develop the Knowsley Industrial Park as a 'green energy hub'.

3.2. There are potentially significant opportunities around innovation, connected to existing research strengths in the city region's universities in areas such as marine modelling and management, advanced engineering and construction and civic design. The demand for new skills would require adaptation in skills provision, including within the Further Education sector. In the

commercial sector, it was observed that many companies were SMEs, which required support. One practical measure to help generate new markets and increase the likelihood of investment was the encouragement and development of local supply chains.

3.3. The Mersey Tidal project was put forward as a project of potentially major significance and one which had engaged the City Region’s Higher Education base via the National Oceanography Centre (formerly Proudman Oceanographic Laboratory). A proposal to investigate the potential for a Tidal Energy Centre was put forward as well as a northern centre for BRE focusing on glass-related products, photo-voltaics and micro CHP.

4 Current Position and Strengths

4.1. The UK is already the sixth largest low carbon environmental goods and services (LCEGS) sector in the world. Including supply chain, this was worth £112 billion in turnover in 2008/09, providing nearly 910,000 jobs. The UK renewables sector is well established and had an estimated market value of £33bn in 2008/9, employing some 250,000 people including supply chain.

4.2. The UK is the world’s biggest market for offshore wind and has the world’s largest demonstration programme for ultra-low carbon vehicles. It has identified potential to be a world leader in marine power. Nuclear power had a market value of £3.7bn in 2008/9. All these sectors are forecast to grow significantly in the future, particularly in the light of the 2008 Climate Change Act, which stipulates an 80% reduction in carbon emissions by 2050, with an intermediate target of a 34% reduction by 2020.

4.3. Although the North West is the second highest energy-consuming region in the UK, it is a net exporter of energy. 50% of the UK’s civil nuclear workforce is based in the region and it is the only UK region to contain the whole fuel cycle capability. Envirolink Northwest is the region’s energy and environmental technologies sector development agency and the NW Tidal Energy Group brings together more than 100 members including universities, environmental groups, public sector regulators and technology developers. N.B. It is unclear at this time what the cessation of support from NWDA will mean for these organisations.

4.4. The number of Low Carbon businesses and jobs has remained largely constant in the past decade:

Jobs

	No. of jobs		% of all jobs	
	1998	2008	1998	2008
Low Carbon	6864	6172	1.2%	1.1%

Businesses

	No. of businesses		% of all businesses	
	1998	2008	1998	2008
Low Carbon	434	416	1.1%	1.0%

Around a quarter of businesses and nearly a third of employment is located in Liverpool. Wirral accounts for almost one fifth of enterprises with Sefton and St Helens being the location for 15.9% and 15.4% of business respectively.

Businesses by Geographical Distribution 2008

	No. of businesses	%
Halton	58	13.9%
Knowsley	44	10.6%
Liverpool	106	25.5%
Sefton	66	15.9%
St Helens	64	15.4%
Wirral	78	18.8%
Total LCR	416	100.0%

This picture is largely confirmed with analysis of current employment figures across the City Region. However, it should be noted that there are particularly strong concentrations of jobs in Wirral and Halton.

Jobs by Geographical Distribution 2008

	No. of jobs	%
Halton	954	15.5%
Knowsley	642	10.4%
Liverpool	2012	32.6%
Sefton	615	10.0%
St Helens	688	11.1%
Wirral	1261	20.4%
Total LCR	6172	100.0%

4.5 There are significant strengths in the city region's Environmental Technologies and Services (ETS) sector. The *Economic Impact of EU and UK Climate Change Legislation on Liverpool and the City Region* identified that key sub-sectors included:

- Waste management and recycling, by far the largest of the subsectors, including some of the major waste management firms, and recycling firms in areas such as plastics, glass and composting
- Environmental consultancy with a number of large multi-disciplinary consulting firms and a range of smaller specialists
- Energy management, including specialists in insulation, glazing, lighting, controls and heating, ventilating and air conditioning
- Renewable energy, especially in the marine sector, including suppliers of products, fabrications and specialist services to the offshore wind energy market (e.g. corrosion protection, port facilities and supply boats)
- Water and wastewater treatment including fabrication companies and specialists in filtration and chemical treatment.

4.6 However, despite annual sales of over £1bn and GVA of £344.6m, compared to other locations, the sector is not especially large and has the potential to grow further in:

- Waste Management (currently 4,000 jobs)
- Energy Management (currently 800 jobs)
- Renewable Energy (currently 800 jobs).

4.7 In terms of the renewable energy sector, the City Region's geography makes it well placed to deliver significant growth:

- *Tidal*: The Mersey Estuary has one of the largest tidal ranges in the country, making it a prime site for a tidal power scheme. The Mersey Tidal Power project, which aims to deliver the maximum amount of affordable energy from the tidal resource in the Mersey Estuary, completed the first stage of a major feasibility study in March 2010. Four main technologies (tidal barrage, tidal power gate, a tidal fence and an alternative tidal fence) have been selected for further analysis. The aim is to submit a preferred option for planning permission by the end of 2011 with a view to becoming operational in 2020. The scheme, which has engaged researchers at the National Oceanography Centre and also involves STFC at Daresbury, would lead to skills development, facilities, infrastructure improvements and supply chain growth as well as establishing the city region as a recognised centre for renewable energy development.
- *Wind*: Coastal parts of the city region have good quality wind and, whilst it currently only accounts for 2% of the on-shore wind capacity of the North West, there is potential to promote additional schemes, beyond those already in existence at Royal Seaforth Dock and Port of Liverpool, in particular on industrial and derelict land. Liverpool is the nearest major port to the off-shore wind farms in Liverpool Bay (Burbo Bank accounts for 25% of the North West's off-shore capacity) as well as major current and planned installations in North Wales (Gwyny Mor, Anglesey). The excellent port facilities at Liverpool and Birkenhead mean that there are supply chain and maintenance opportunities. In addition, wind energy companies are already located in the North West, including Vestas in Warrington, whilst there are maintenance and repair specialists in the City Region.
- *Nuclear*: The Nuclear Directorate of the Health and Safety Executive, which employs 250 skilled staff, is headquartered in Bootle. The Nuclear Decommissioning Authority is located in Cumbria and also in Birchwood, Warrington. The North West and Yorkshire are the UK's LCEAs for nuclear.
- *Energy from Waste*: A major new facility (150kW or equivalent to the electricity supply for c. 200,000 homes) is being constructed at Ineos Chlor in Runcorn, which will create heat and power from residual municipal waste from across the North West. Peel Energy is also promoting a significant Energy from Waste plant at Ellesmere Port.
- *Biomass*: There are significant sources of biomass in the City Region, both from the Mersey Forest and from waste wood, unsuitable for recycling. Liverpool's position as a west-facing port means there is also a significant opportunity to import biomass.
- *Solar*: The city region has research and manufacturing strengths in photo-voltaics. This links to commercial strengths in related industries, such as Pilkington.

More generally, STFC and the Cockcroft Institute at Daresbury SIC has significant capabilities in Low Carbon, in particular:

- Wind turbine design & development and wind power forecasting
- Grid protection/optimisation technologies
- Hydrogen storage and next generation battery technology development
- Photovoltaic material development

- High performance nanomaterials
- Modelling of nuclear waste storage and development of new encapsulation materials.

5. Opportunities and challenges

5.1. The former Government instigated a review of global low carbon business opportunities led by BIS, DECC and UKTI. It is estimated that over 1m people will be employed in the LCEGS sector by the middle of the next decade. The sector is one of the few areas of the economy expected to grow by over 4% per annum up to 2014/5. The UK's renewable energy sector is projected to grow at more than 5% per year by the middle of the decade.

5.2. Britain is the largest single market for offshore wind in the world and has the potential to produce 32GW (compared to current production of 1GW) of offshore wind energy by 2020. According to the Carbon Trust, the offshore wind power sector has the potential to employ up to 70,000 workers in the UK by 2020 and bring annual economic benefits and investments to Britain of up to £8 billion. Sixty per cent of the economic value generated from offshore wind will be through the manufacture of turbines. The previous Government committed itself to providing up to £60 million for the development of port sites to meet the needs of offshore wind turbine manufacturers looking to locate new facilities in the UK.

5.3. The North West has the potential to make a significant contribution to the Government's target to secure 15% of energy from renewables in 2020. It could attract 45% of global offshore wind by 2020, delivering £65bn of net economic value and 225,000 jobs by 2050. The Irish Sea zone has the potential to produce up to 5GW.

5.4. The *Economic Impact of EU and UK Climate Change Legislation on Liverpool and the City Region* predicted that between 6,000 and 7,000 new jobs could be generated in the energy and environmental technology and service sector in the next 5-7 years. There would be opportunities for consultancy and monitoring services associated with measuring the impacts of climate change and assessing adaptation options, including Knowledge Exchange potential. The costs of not adjusting and adapting to the demands of low carbon economy could amount to 1% of the city region's GVA, with 15% of all current employment likely to be significantly affected.

5.5. Smart Grid – a **Smart Grid** delivers electricity from suppliers to consumers using two-way digital technology to control appliances at consumers' homes to save energy, reduce cost and increase reliability and transparency; it overlays the electricity distribution grid with an information and net metering system. A Smart Grid includes an intelligent monitoring system that keeps track of all electricity flowing in the system. It also incorporates the use of superconductive transmission lines for less power loss, as well as the capability of integrating renewable electricity such as solar and wind. When power is least expensive the user can allow the Smart Grid to turn on selected home appliances such as washing machines or factory processes that can run at arbitrary hours. At peak times, it could turn off selected appliances/processes to reduce demand. In addition to this, the grid is also capable of transmitting large volumes of data that will complement broadband

5.6. Liverpool City Region has been chosen to host a major trial of Smart Grid technology. The project will see significant investment in the existing network infrastructure in the designated area and positions the Liverpool City Region at the forefront of global Smart Grid development. The city region was awarded the project following a consortium bid to Ofgem, led by The Mersey Partnership and involving Scottish Power Energy Networks, EA Technology Consulting Ltd., the Plus Dane housing group and Liverpool City Council. The trial, which is the most comprehensive in the UK, will take place over the next 5 years. Smart Grid technology will help with the move towards a low

carbon economy and bring benefits to consumers, suppliers and generators ultimately helping to reduce carbon emissions and increase energy efficiency. The Liverpool City Region has the potential to be at the forefront of Smart Grid development in the UK and could be one of the first areas in the country to benefit from the use of this emerging technology. The Mersey Partnership is now seeking to extend Smart Grid opportunities to Atlantic Gateway, Sefton, Astmoor Industrial Estate, Halton, Knowsley Industrial Estate and to two hospitals, the Knowledge Quarter and the Baltic Triangle in Liverpool.

6 Major Related Knowledge Assets

6.1. Both LJMU and UoL have a broad range of expertise around low carbon technologies. It should be noted that there is a degree of crossover here with research strengths in advanced manufacturing and priorities around SuperPort.

6.2. Tidal Power - The **National Oceanography Centre** was formed in April 2010 when Proudman Oceanographic Laboratory (POL) joined with a complementary centre in Southampton. POL's world-class activity included work on the physics of estuarine, coastal and shelf-sea circulation and marine technologies. The new centre will work in close partnership with the wider marine science community to create an integrated research capability to tackle the big environmental issues facing the world. Research priorities will include the oceans' role in climate change, sea level change and the future of the Arctic Ocean. UoL is a partner in the Manchester-based **Joule Centre** for Energy Research and Development. The Centre funded a UoL and POL Tidal Power project focusing on the potential of the Eastern Irish Sea.

6.3. Solar Energy - Although the **Pilkington Technology Centre** in Ormskirk lies outside the city region boundary, a large part of its 50 staff are city region residents and it is tied to low carbon production within the city region. Work there includes developing glass technology for large-scale solar farm applications. UoL staff in the Department of Electrical Engineering and Electronics have previously worked in collaboration with the Centre on the development of a large-area pulsed deposition system. The deposition of functional films onto plate glass has been a major growth area in recent years, including Pilkington's K Glass™.

6.4. UoL is involved in the development of advanced Thin Film Transistors (TFT) and photovoltaic structures for high performance at low cost, as well as the development of high-performance silicon structures and novel circuits for RF, micropower and 3G neural network applications. The University produces novel devices in both polymers and silicon, particularly vertical metal oxide semiconductor field effect transistors (MOSFETs), but also has lengthy experience of device work in bipolar.

6.5. In terms of wind power, UoL has expertise relating to:

- *Forecasting*: the University is investigating the potential for forecasting wind power generation – estimating the expected power production of one or more wind turbines using computational intelligence.
- *Control*: In collaboration with industry, the University has developed a robust optimal control strategy for varying-speed maximal power point tracking of the outputs of small-scale Permanent Magnet Generators (PMGs).
- *Power maximisation*: Dedicated power electronics converters have been designed to maximise power outputs from PMGs and field tests are planned involving three sets of wind generation systems.
- *Grid stability*: As yet there is no cost-effective way of storing energy from renewables, so it has to be used as it is generated. However, renewable energy sources can't be

connected directly to national grids. Engineers have to convert all power inputs to a DC voltage and use inverters to convert this to a standard AC with a constant frequency. UoL has co-developed a mathematical model of a synchronous generator which can be implemented in any inverter control software. The University's approach is unique in that it addresses both internal dynamics and external properties at the same time. It is also distinctive in that it controls the voltage, rather than the current. A laboratory demonstrator, built at the University, provided an initial proof of concept. The technology has been patented and is available for licence; it could also be harnessed for the distribution of solar power to electricity grids. Further proof-of-concept studies are currently underway using a small research turbine.

6.6. Energy efficiency – The **National Instruments e-Automation Laboratory** is a partnership between National Instruments and UoL, supported by National Grid Company plc. It was established to research and develop e-automation systems – a new generation of automation systems for information management, condition monitoring and real-time control of distributed industrial systems achieved by integrating the latest networking and agent technologies. The laboratory is equipped with:

- A real-time simulator
- A range of hardware, microprocessors, embedded systems and data acquisition devices
- Real-time automation platforms
- Comprehensive software development systems
- Three IP networks, including a wireless local area network which is used for work on network-based industrial automation.
-

The Laboratory develops and integrates key internet and computer technologies with innovative management practices.

Energy and power systems management is one aspect of the work in the **Research Centre for Electrical and Electronic Engineering** at LJMU, specifically efficiencies obtained through improved design and control systems. The **Advanced Manufacturing Technology Research Laboratory (AMTReL)**, part of GERI, has expertise in eco-machining and is currently working, via a TSB grant, on the energy efficiency of large machining devices used in manufacturing industries.

The Research Centre in **Built Environment and Sustainable Technologies (BEST)** at LJMU focuses upon three main themes: Sustainable Technologies, Planning and Development and Construction and Facilities. Within BEST, the RF and Microwave Research Centre (RFM) focuses on the novel application of microwave technologies to improve industrial processes and create consumer products that will reduce carbon consumption. Research activities include testing the application of microwaves in industrial lighting and improving the efficiency of diesel engines through microwave catalysts. BEST was ranked third in the NW in RAE2008.

A key research area at BEST is the recycling of building materials, including using scientific and engineering expertise to break down materials into core components, removing polluting substances and creating a fresh aggregate to make new building materials. **The Liverpool Centre for Material Technology (LCMT)** at LJMU was established as a centre of excellence focusing on R&D in heavy building materials. Specific areas of expertise include: construction aggregates from both primary and secondary sources; unbound mixtures; bound mixtures i.e. asphalt and concrete; structural engineering design, analysis and optimisation of steel, concrete, bridges and pavement engineering (roads, highways, airports).

LJMU's research has also explored power distribution and asset management in both domestic and industrial settings e.g. examining the impact of solid wall insulation in housing developments and working to reduce the carbon footprint of major manufacturing by making machining processes more energy efficient.

6.7. Waste Management - LJMU's water and waste treatment research is managed through the **Liverpool Centre for Environmental Technology (LCET)**. The centre focuses on water engineering and water management in light of national and EU regulations surrounding water efficiency. Projects include examining the possibility of using biological waste as a cleaning agent in waste water treatment plants and investigating the efficiency of upflow sand filters for the treatment of waste water. Within LCET, the Sustainable Technologies Group is working with industrial partners to develop new biological techniques to break down sewage using more environmentally friendly processes.

6.8. Interdisciplinary facilities and networks – UoL recently launched the **Liverpool Green Economy Incubation Network (L-GrEco)**. L-GrEco is an interdisciplinary network which aims to combine expertise from across UoL with a research interest in the development of a Green Economy. Its purpose is to foster the incubation of new interdisciplinary research themes, focused on the wider Green Economy agenda. Preliminary discussions have identified the potential to develop research areas such as: Coastal Cities: Rising to the Challenge of Future Energy Demands; Connecting Science and Innovation to Policy and Practices (cf. Public Sector); Economic Sustainability; and Global-Local Trade and Carbon Life-Cycle.

The Institute for Sustained Water, Integrated Management and Ecosystem Research (**SWIMMER**) at UoL was established to encourage joined-up thinking in the water and environmental sciences, promote interdisciplinary collaboration and facilitate first-class research through new partnerships and active engagement with the end user community. The Institute is now complemented by a Maritime Environment and Water Systems Research Group at the Engineering Department (marine technologies specialism, including tidal energy) at UoL.

6.9. Skills – LJMU is currently developing an employer-led programme delivering flexible Postgraduate studies in Sustainability in the Built Environment, focusing on energy and environmental management, sustainable design and developing a green future. The School of the Built Environment also hosts both undergraduate and postgraduate programmes accredited by the Chartered Institution of Water and Environmental Management, The Royal Institution of Chartered Surveyors, The Royal Town Planning Institute, the Association of Building Engineers, the Institution of Civil Engineers and the Institute of Maintenance and Building Management.

7. Progressing the Low Carbon Agenda

The draft Low Carbon Action Plan created by the Low Carbon Economy Committee is initially subdivided into five areas of focus.

- Renewable Energy Generation Systems
- Transport Systems and Fuel
- Networks
- Built Environment
- Cross Cutting Themes

Renewable Energy Generation Systems

The main forms of renewable energy generation that the City Region has are onshore and offshore wind, tidal, photovoltaics, biomass and waste from energy.

These energy sources are at different stages of development, ranging from biomass and waste to energy, which are mature technologies with relatively mature supply chains, through to tidal energy, which is still in its research and development phase. The application of the renewable energy technology will vary. Onshore wind and PV will have many smaller low-unit-cost applications from multiple developers whereas offshore wind and tidal are capital intensive with very few developers and very prescribed applications. Both tidal energy and deep offshore wind are emerging technologies and, as such, create significant opportunities in applied research and development alongside the requirement for highly skilled engineers in a range of disciplines.

The City Region is creating partnerships with renewable developers to understand and manage their requirements to ensure that principle issues are addressed. These issues include the provision of suitable sites and logistics infrastructure alongside a skilled labour force. These projects will be principally managed and financed by the private sector.

Transport Systems and Fuel

The City Region has a highly developed vehicle manufacturing base centred on Jaguar Land Rover at Halewood and Vauxhall at Ellesmere Port. Both companies are highly engaged in the move to low emission vehicles.

Nuclear

LCR partners will build on existing strengths in contaminated product disposal and land remediation to identify complementary markets in the nuclear decommissioning sector, and will assist the universities and research centres to refine and align their expertise to meet with decommissioning and new build requirements.

Tidal and Marine Energy

Alignment of LCR universities, research centres and supply chain companies to opportunities tidal energy provides in research, construction, equipment supply and operations and maintenance is required, in addition to considering crossover possibilities from offshore wind developments

SmartGrid

University research and energy sector research and development should be aligned to SmartGrid opportunities. A complementary combined heat and power sector should be developed.

Low Emission Vehicles

Stakeholders need to create an attractive environment for vehicle manufacturers to site principal research and development centres for low emission vehicles in the LCR.

Photovoltaics

Current R&D capabilities should be established with universities, manufacturing and installers and introduced to opportunities generated through mass rollout.

Biomass

Viable sites and exploitable opportunities for biomass crop production within the LCR should be identified and incentive schemes for land re-zoning developed.

Energy from Waste

Viable and sustainable supply chain and technology route to market for technologies such as Auto Claving and Anaerobic Digestion should be developed.

Alternative vehicle fuels

The scale and value of existing LCR AVF capacity and the opportunities for hydrogen producers to develop routes to market for hydrogen should be assessed. Universities and research centres need to align with the opportunities provided by private sector developers in areas such as refining, additives, synthetic biofuels and waste recovery. LCR resources that could be applied to emerging fuel sources such as algae and biocrops should be considered and the potential for bi-products such as Hydrogen to be used as alternative fuel reviewed.

Low Carbon Building Stock

A low-cost high-value proposal to site a Building Research Establishment (BRE) innovation hub in the City Region should be worked-up. The centre would focus on the retrofitting of existing residential and commercial buildings and the proposal could link into existing research and development centres and the University of Liverpool's Building Materials centre.

Residential and business communities which would benefit from whole area upgrades on their generation, distribution and transport systems are to be identified.

Strategic Utility Masterplanning

An energy master plan is required for the City Region. This plan will initially target areas that are likely to undergo large-scale urban renewal involving multiple partners, such as the Knowledge Quarter. The master plan will look at multi-utility service requirements over an extended period and define requirements and possible technology choices with the aim of reducing the areas carbon load and delivering efficient and sustainable services.

APPENDIX 5: THE UNIVERSITY OF LIVERPOOL SCHOOL OF VETERINARY SCIENCE

In 1904, Liverpool School of Veterinary Science became the first veterinary school to be incorporated into a University. Some forty years later, UoL acquired the first veterinary field station to be established in the UK. Leahurst in Wirral became the prototype rural site for all UK city centre vet schools. Liverpool's School of Veterinary Science was voted No 1 UK vet school in The Times Good University Guide 2006.

Research

45% of the School's research was rated as being either world-leading or internationally excellent in RAE2008. The School's research groups, which collaborate across UoL and beyond, focus upon:

- Epidemiology and Public Health
- Gastroenterology, Nutrition and Obesity
- Infection Biology
- Pathology
- Proteomics and Functional Genomics
- Musculoskeletal and Locomotion
- Mammalian Behaviour & Evolution.

Facilities

Facilities at the School include:

- The Philip Leverhulme Equine Hospital, which is one of the busiest and most successful equine hospitals in the country, with an international reputation as a centre of excellence for teaching, clinical care and clinical research
- The Leahurst Equine Practice, which is a first opinion practice providing specialist equine care for the community across Wirral and the north of Chester
- The Small Animal Teaching Hospital (SATH), which is the location for some of the most advanced facilities for small animal medicine and surgery in Europe
- The Farm Animal Hospital and Practice, which takes cases from throughout the NW and North Wales for detailed investigation and intensive care treatment.

Commercial collaboration

In 2008, UoL and Tesco launched a new national Dairy Centre to offer expertise in cattle health and welfare – the first major collaboration between a retailer and a University veterinary school. Wood Park farm at Leahurst, which houses 200 cows, is now a national resource centre for farmers as part of the Tesco Sustainable Dairy Group, which offers expertise in cattle lameness, fertility and calf health to help improve efficiencies.

The Centre allows retailers and producers to work together to help improve understanding and deliver good animal welfare, which meets customer expectations. By testing new ideas and systems of operation, it enables farmers to enhance the commercial benefits of their work, as well as offering advice on animal health and welfare. The collaboration has also helped further veterinary teaching at UoL by providing the latest information on dairy technologies and farm management.

CPD

The School of Veterinary Science is a national, and increasingly international, provider of CPD. Its dedicated CPD Unit is housed in bespoke facilities and its activities are funded through a business plan based on external income. Much of the provision builds on the School's international clinical reputation, but it is increasingly broadening its provision and audience to match its additional research strengths.

In addition to traditional short courses for veterinary specialities (e.g. equine lameness, canine orthopaedics), the School runs CPD programmes for medical, veterinary and environmental health professionals on zoonoses (diseases people contract from animals), for Defra officials on epidemiology and disease control, for veterinary para-professionals on vaccination against foot and mouth disease, and for statisticians working in the health services on microbiology.

Contracts with the Royal College of Veterinary Surgeons have been signed to examine a range of subjects leading to RCVS certificates and diplomas and the School is currently developing the programmes that will help practitioners to pass these examinations, in particular via new e- learning routes.

Through its agreement with Tesco, the School's dairy farm is now a national CPD centre for dairy farmers and it is increasingly the venue for national and international conferences. Recent examples include the first international conference on animal MRSA and the annual conference of the British Equine Veterinary Association, one of the largest equine events in the world.

The strategy is to continue to develop a market-responsive programme of events. Further joint programmes will be developed, for example with and for government bodies, with regional specialist organisations such as Chester Zoo, and with commercial CPD/training providers through EU funding. CPD is also increasingly being used as a mechanism for supporting alumni in collaboration with veterinary professional bodies and CPD facilities are used as part of the University's widening participation drive, for example through developing school visits to the School's farm facilities, backed by commercial sponsorship.

APPENDIX 6: PHARMACOGENETICS

Pharmacogenetics aims to identify the specific differences which cause individuals to respond to drugs differently. A recent study by the University of Liverpool showed that a quarter of a million people are admitted to hospital in the UK each year following adverse reactions to a variety of commonly prescribed drugs, which costs the NHS an average of £466m annually.

In 2007, the University of Liverpool was selected by the Department of Health to receive a £3m NHS Chair in Pharmacogenetics: the first and only such position in the country. The Chair is complemented by the £10m Wolfson Centre for Personalised Medicine, which opened at the University in 2009, and functions as a base for the pharmacogenetics team.

Appointed to the Chair in 2007, Professor Munir Pirmohamed leads a team of 11 scientists, researchers and nurses in identifying genes and pathways which dictate a patient's positive or negative response to a drug. The research is carried out in collaboration with the Royal Liverpool and Broadgreen University Hospitals NHS Trust (RLBUHT), Royal Liverpool Children's Hospital and other hospitals in the North West. Its research focus includes:

- Anticonvulsant therapy in epilepsy
- Inhaled steroids in children with asthma
- Acute coronary syndrome and variability in response to treatments
- Non steroidal anti-inflammatory drug (NSAID)- induced peptic ulceration.

To support this work, the University has funded cutting-edge equipment, such as a state-of-the-art DNA archiving system, which holds up to 300,000 DNA samples of patients, sorting and selecting these via an automated robotic system, enabling high-throughput.

Pharmacogenetics also forms an important part of the research being undertaken as part of the NIHR Biomedical Research Centre in Microbial Diseases, awarded to the RLBUHT in collaboration with the University and the Liverpool School of Tropical Medicine. Three of its projects, connected to the safety theme, involve the use of pharmacogenetic techniques:

- Penicillin allergy
- HIV-lipodystrophy
- Clostridium difficile associated toxin disease

The pharmacogenetics facility is also complemented by a wide range of technologies and methods in UoL's Faculty of Health and Life Sciences, including the proteomics unit, immunopharmacology, confocal microscopy, electron microscopy, the Liverpool Microarray Facility and high-throughput sequencing.

Medical robotics

Mechatronics and Robotic Systems BEng (Hons) / MEng (Hons)(including Year in Industry option)
Medical Electronics and Instrumentation BEng (Hons) / MEng (Hons).

APPENDIX 7: VIDEO GAMES - INDUSTRY BRIEFING

Government policy

1. Proposals to introduce tax relief for game developers were overturned in the recent Emergency Budget. Despite the size of the industry, which contributes £1bn to the UK's GDP annually – more than its film industry – there is currently no UK videogames council or lottery funding.

Current position

2. The UK games industry supports about 27,000 workers, including more than 9,000 developers. Rather than being concentrated in London, it is spread across the country with clusters of developers in the West Country, North East England and Scotland as well as the Liverpool City Region. For around 30 years, the UK was the world's third most successful industry, behind the US and Japan. However, talent has been lured abroad and the UK's position has weakened.
3. Competitors including Canada, France and South Korea have worked to introduce more attractive fiscal regimes. In France, video games now have the status of a 'cultural industry' alongside music and cinema, making them eligible for tax breaks and government support. This policy followed the relocation of several leading firms abroad. In Canada, the government offers tax breaks as well as prompt resolution for immigration procedures for games workers and subsidised salaries to attract top talent in some instances. The Korean government has also announced measures to invest significantly in its videogames industry, which was worth around \$2 billion in 2007, over the next 4 years.
4. In 2008, senior executives at French publisher Ubisoft said they would not consider opening new development studios in the UK because there were better incentives in other countries. Alongside tax breaks, Ubisoft received \$263 million (CAD) in subsidies from the Ontario government over a 10-year period in exchange for creating a major games studio in Toronto. In Quebec, game companies benefiting from tax breaks to hire game developers include Ubisoft, Electronic Arts, Eidos, Funcom, Activision Blizzard and THQ.

Future opportunities and challenges

5. Commentators have observed that the games industry is currently shifting from being a product industry to a service industry. Traditional mainstream games, sold as a boxed product, can command huge budgets and retail for over £50. However, 'social gaming' is becoming increasingly popular with a much broader consumer base than that for traditional products. These games are typically given away free over the internet with the bulk of revenue being generated through millions of micro-transactions for add-on purchases to enhance players' gaming experience. Unlike mainstream games, which require full investment up front, only a fraction of the total development costs of social games have to be invested at the pre-launch phase, with further additions being made in subsequent stages.
6. EA recently made a deal to pay up to \$400m for Playfish, one of the world's leading 'social gaming' companies and venture capital money is now flowing towards the sector. However, despite the growth of free online games, it appears that the mainstream product market has not suffered. Whilst other the music industry and newspapers have lost sales, there been no decline in the sales of games. In the future, it has been suggested that these different sectors (and other emergent ones) are more likely to reinforce one another rather than compete, leading to further transformations in the future.

Liverpool City Region

7. Wavertree Technology Park is the headquarters of the video game development house, Sony Computer Entertainment (SCE) Studio Liverpool. Originally founded in 1984 as Psygnosis, the company became a wholly owned subsidiary of SCE Worldwide Studios in 1993. Studio Liverpool was closely linked with the success of PlayStation and it has developed launch titles for every PlayStation format that has been released. Previous developments include Wipeout and Formula 1 franchises, which have generated global revenues in excess of \$2.5bn.
8. Studio Liverpool has 58 development staff¹⁰ as part of its broader operations, which incorporate Quality Assurance and External Development, amongst other areas. Mick Hocking is Group Studio Director, a position he also holds within two other SCE-owned developers, Evolution Studios, which is located in Runcorn, and Bigbig Studios in Leamington Spa.
9. SCE's network of studios (UK, Holland, Japan and US) develops new products for its traditional market of core gamers alongside an expanding audience of casual and social gamers. A production build tool, developed at Studio Liverpool, is currently being used across 13 of the 16 SCE Worldwide Studios. Studio Liverpool also has three HD editing suites on-site and the building is also home to the First Party QA division, which handles European quality assurance for SCE's titles. The team is currently focussing on new IP creation and new ways of developing games, working closely with the local development community.

¹⁰ Confirmed by SCE as accurate in September 2010

APPENDIX 8: TECHNOLOGY STRATEGY BOARD: FURTHER INFORMATION

Role and remit

The remit of the Technology Strategy Board is to ensure that the UK is at the forefront of innovation, enabled by technology. Covering the whole of the UK economy, it occupies a position between business, government and the research community. Its objectives include:

- Promoting a culture of confidence in and enthusiasm for innovation
- Investing to help innovative businesses become and remain successful in the global marketplace
- Understanding and communicating the drivers of innovation
- Collaborating with business and partners to stimulate innovation.
-

In meeting these objectives, the TSB aims to maintain the UK's global position in sectors where it has competitive advantage, including biosciences, aerospace, financial services and creative industries.

Investment framework

The TSB has a total budget of £711m for the period 2008-11. There is also aligned funding from RDAs (£180m) and Research Councils (£120m). The TSB also aims to secure match funding from business, leading to a total projected budget of almost £2bn.

It currently invests according to three main strategic themes to generate sustainable growth and improve quality of life:

- Challenge-led innovation (50% of funding)
- Technology-led innovation (25%)
- Innovation climate (25%)

Its investment criteria are:

- Does the UK have the capability?
- Is there a large market opportunity?
- Is the idea ready?
- Can the TSB make a difference?

Challenge-led innovation: This area of investment focuses upon opportunities arising from major societal and economic challenges. Current identified challenges include:

- Healthcare
- Energy generation and supply
- Transport
- Environmental sustainability
- Built environment
- Creative industries
- High-value services.

A number of cross-cutting innovation platforms have been developed to respond to these challenges by bringing together businesses and adopting multi-disciplinary approaches to drive changes. The current platforms are:

- Intelligent Transport Systems and Services
- Network Security
- Low Carbon Vehicles

- Assisted Living
- Low Impact Buildings
- Detection and Identification of Infectious Agents
- Sustainable Agriculture and Food.

Technology-led innovation: The TSB has identified that it will invest in the following specific key technology areas:

- Advanced materials
- Biosciences
- Electronics, photonics and electrical systems
- Nanotechnology
- High value manufacturing
- Information and communication technology.

Innovation climate: The TSB is working with other organisations, including NESTA and the Design Council to help inspire people about technology and innovation. Commitments in this area include:

- Doubling the number of KTPs and introducing more flexible and short-term partnerships
- Investing in networking activities both in the UK and internationally, primarily via Knowledge Transfer Networks
- Developing a programme of public engagement activities celebrating innovation.

Governance

The current governing board of the TSB is:

- Dr. Graham Spittle (Chair). Previously: Vice President, Software UKI (UK & Ireland); Vice President, Integration Development and Director of the IBM Hursley Laboratory
- Dr Graeme Armstrong: Chief Innovation Officer, Akzo Nobel.
- Eur Ing Nick Buckland: former Deputy Chairman of the South West of England Regional Development Agency; Chairman of the Board of Governors of the University of Plymouth
- Dr John Brown, PhD MBA FRSE: Chairman of BTG plc and CXR Biosciences Ltd; non-executive Director of Vectura Group plc, and Axis_Shield plc
- Dr Joseph Feczko: previously Senior Vice President and Chief Medical Officer of Pfizer Inc
- Anne Glover: Chief Executive and Co-founder of Amadeus Capital Partners
- Dr David Grant: Vice-Chancellor of Cardiff University; Vice-President of the Royal Academy of Engineering.
- Jonathan Kestenbaum: Chief Executive of NESTA
- Andrew Milligan: Head of Global Strategy at Standard Life Investments based in Scotland
- Dr Jeremy Watson: Director of Global Research at Ove Arup & Partners
- Sara Murray: entrepreneur
- Professor Christopher Snowden: Vice-Chancellor and Chief Executive of the University of Surrey; Vice-President of the Royal Academy of Engineering; Board member of Universities UK
- Stewart Davies: Strategy Director at Serco Integrated Services
- Iain Gray: Chief Executive of the Technology Strategy Board

APPENDIX 9: HIGHER EDUCATION COURSES

Life Sciences

Liverpool Hope University

Undergraduate
Biology BSc (Hons) /BSc Combined (Hons)
Human Biology BSc Combined (Hons)
Health BSc (Hons) / BSc Combined (Hons)
Health, Nutrition & Fitness BSc (Hons)

Postgraduate
Health Exercise & Nutrition MSc

Liverpool John Moores University

Undergraduate
BSc (Hons) Medical Biochemistry
BSc (Hons) Applied Biochemistry
BSc (Hons) Biomedical Sciences
BSc (Hons) Applied Chemical & Pharmaceutical Sciences
BSc (Hons) Biochemistry & Forensic Science
BSc (Hons) Molecular Biology with Genetics
BSc (Hons) Food & Nutrition
BSc (Hons) Industrial Pharmaceutical Science
BSc (Hons) Pharmaceutical Science & Biological Chemistry
BSc (Hons) Pharmaceutical Analysis
BSc (Hons) Pharmaceutical Science & Clinical Research
BSc (Hons) Medicinal & Analytical Chemistry
BSc (Hons) Biology
BSc (Hons) Applied Psychology
BSc (Hons) Psychology & Biology
BSc (Hons) Chemistry & Biology
BSc (Hons) Human Psychology
BSc (Hons) Zoology
BSc (Hons) Animal Behaviour
BSc (Hons) Physical Activity, Exercise & Health
BSc (Hons) Sports Science
BSc (Hons) Applied Sport Psychology
FDS Bioscience (Forensic, Biochemistry and Microbiology)
FDS Medicines Management

Postgraduate
MPharm Pharmacy
MSc Clinical Pharmacy
MSc Industrial Biotechnology
MSc Biomedical Science
MSc Biotechnology
MSc National & International Masters Scheme in Virology

MSc Biomechanics of Gait & Posture
MRes Sport & Exercise Sciences
MSc Clinical Exercise Physiology
MSc Sports Biomechanics
MSc Sports Physiology
MSc Sports Psychology
MSc Health Psychology
MRes Health Sciences
Health - Professional Doctorate
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Undergraduate
Anatomy and Human Biology BSc (Hons)
Biochemistry BSc (Hons)
Biochemistry with a year in Industry/Research BSc (Hons)
Biological and Medical Sciences BSc (Hons)
Biological Sciences (with a Foundation Year) leading to BSc (Hons)
Biological Sciences BSc (Hons)
Biology with a Year in Industry/Research BSc (Hons)
Bioveterinary Science BSc (Hons)
Foundation to Health Studies BDS (Year 0)
Foundation to Health Studies BN/BSc (Year 0)
Foundation to Health Studies MBChB (Year 0)
Genetics BSc (Hons)
Genetics with a Year in Industry/Research BSc (Hons)
Life Sciences applicable to Medicine BSc (Hons)
Medicinal Chemistry BSc (Hons)
Medicinal Chemistry with Pharmacology MChem
Microbial Biotechnology BSc (Hons)
Microbiology BSc (Hons)
Molecular Biology BSc (Hons)
Molecular Biology with a Year in Industry/Research BSc (Hons)
Pharmacology BSc (Hons)
Veterinary Science BVSc
Veterinary Science with Intercolated Honours Year
Zoology BSc (Hons)

Postgraduate
Advanced Biological Sciences MRes
Advanced Biological Sciences MRes: Animal Science Pathway
Advanced Biological Sciences MRes: Bioinformatics Pathway
Advanced Biological Sciences MRes: Cell Signalling Pathway
Advanced Biological Sciences MRes: Chemical Biology Pathway
Advanced Biological Sciences MRes: Evolution and Behavioural Biology Pathway
Advanced Biological Sciences MRes: Evolutionary Psychology Pathway
Advanced Biological Sciences MRes: Functional and Comparative Genomics Pathway
Advanced Biological Sciences MRes: Host: Parasite Biology Pathway
Advanced Biological Sciences MRes: Microbiology Pathway

Advanced Biological Sciences MRes: Molecular Oncology Pathway
Advanced Biological Sciences MRes: Plant Sciences Pathway
Advanced Biological Sciences MRes: Structural Biology Pathway
Advanced Biological Sciences MSc
Advanced Biological Sciences MSc: Animal Science Pathway
Advanced Biological Sciences MSc: Bioinformatics Pathway
Advanced Biological Sciences MSc: Cell Signalling Pathway
Advanced Biological Sciences MSc: Chemical Biology Pathway
Advanced Biological Sciences MSc: Evolution and Behavioural Biology Pathway
Advanced Biological Sciences MSc: Functional and Comparative Genomics Pathway
Advanced Biological Sciences MSc: Microbiology Pathway
Advanced Science MRes
Advanced Science MSc/PGDip/PGCert
Biological Sciences MPhil/PhD
Biomedical Sciences MRes
Clinical Chemistry MPhil/PhD/MD
Clinical Science MRes
Human Anatomy and Cell Biology MPhil/PhD/MD
Immunology MPhil/PhD/MD
Magnetic Resonance and Image Analysis Research MPhil/PhD/MD
Medical Imaging MPhil/PhD/MD
Medical Microbiology MPhil/PhD/MD
Microbiology (pathway), see: Advanced Biological Sciences MRes
Molecular Biology of Parasites and Disease Vectors MSc/PGDip
Neuroscience MPhil/PhD/MD
Pharmacology and Therapeutics MPhil/PhD/MD
Physical Analysis of Biological Interactions at Surfaces MRes
Veterinary Infection and Disease Control MSc
Veterinary Science MPhil/PhD
Veterinary Science MSc
Online
Master of Science in Clinical Research Administration (MSc CRA)

Digital and Creative Industries

Liverpool Hope University

Undergraduate
Creative Computing BSc (Hons)
Creative & Performing Arts BA (Hons)
Dance BA Combined (Hons)
Design BDes
Drama BA (Hons)
Drama & Theatre Studies BA Combined (Hons)
Film Studies BA (Hons) / BA Combined (Hons)
Film & Television Production BA (Hons)
Fine Art BA (Hons) / BA Combined (Hons)
Fine Art & Design (Level 0)
Media BA (Hons) / BA Combined (Hons)
Music BA (Hons) / BA Combined (Hons)

Postgraduate
Art History & Curating MA
The Beatles, Popular Music & Society MA
Contemporary Popular Theatres MA
Creative Practice MA
Music since 1900 MA
Music in Cultural History MA
Music Therapy MA
Performance as Cultural Intervention MA
Popular Literatures MA
Radio Journalism PgDip

Liverpool John Moores University

Undergraduate
BSc (Hons) Computer Games Technology
BSc (Hons) Computer Animation & Visualisation
BSc (Hons) Information Technology & Multimedia Computing
BSc (Hons) Digital Broadcast & Media Systems
BSc (Hons) Broadcast & Media Production
BSc (Hons) Software Engineering
BSc (Hons) Computer Studies
BSc (Hons) Computer Forensics
BSc (Hons) Product Innovation & Development
BSc (Hons) Automotive Product Development
BSc (Hons) E-Business Technology & Management
BSc (Hons) Sports Technology
BSc (Hons) Computer Aided Design
BSc (Hons) Computer Technology
BEng (Hons) Broadcast Engineering
BA (Hons) Film Studies
BA (Hons) Film Studies & Drama

BA (Hons) Film Studies & Creative Writing
BA (Hons) Interactive Media Design
BA (Hons) Journalism
BA (Hons) International Journalism
BA (Hons) Media & Professional Studies with Television
BA (Hons) Architecture
BA (Hons) Fashion & Textile Design
BA(Hons) Fine Art
BA(Hons) Graphic Arts (Graphic Design, Illustration, Animation & Interactive)
BA(Hons) History of Art & Museum Studies
BA(Hons) Interior Design
BA (Hons) Popular Music Studies
BDes (Hons) Product Design & Digital Modelling
BA (Hons) Drama, Media & Cultural Studies
BA (Hons) Drama & Screen Studies
BA (Hons) English, Media & Cultural Studies
BA (Hons) Creative Writing & Film Studies
BA (Hons) English Literature & Electronic Creative Technology
BA (Hons) Imaginative Writing & Screen Studies
BA (Hons) Media, Cultural Studies & Screen Studies
BA (Hons) Broadcast & Media Production
BA (Hons) Film Studies
BA (Hons) Media, Culture & Communication
BA (Hons) Media Professional Studies with Television

Postgraduate
MSc Computer Games Technology
MSc Web Computing
MSc Computer Network Security
MSc Wireless & Mobile Computing
MSc Advanced Computer Studies
MSc Computer Animation & Visualisation
MSc Computer Forensics
MSc Computing & Information Systems
MA International Journalism
MRes Screen & Interactive Media
MA Screen Writing
MA Writing
MA Cultural Leadership
MRes Art & Design
MA Architecture (by conversion)
MA Architecture & Urban Design (by conversion)
MA Fine Art
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Undergraduate
Architecture BA (Hons)

Architecture MArch
Communication Studies and Italian BA (Joint Hons)
Communication, Media and Popular Music BA (Joint Hons)
English and Communication Studies BA (Joint Hons)
Film Studies (European) and a Modern Language BA (Joint Hons)
Internet Computing BSc (Hons)
Music/Popular Music BA (Hons)

Postgraduate
Architecture MA
Architecture MArch
Architecture MPhil/PhD
Art, Aesthetics and Cultural Institutions MA
Cities, Culture and Regeneration MA
Music Industry Studies MA
Music MMUS
Music MPhil/PhD
Popular Music Studies MA

Advanced Manufacturing

Liverpool Hope University

Undergraduate
Computing BSc (Hons) / BSc Combined (Hons)
Information Technology BSc (Hons) / BSc Combined (Hons)

Postgraduate
Communication Systems & Informatics MSc
Computer Science MSc

Liverpool John Moores University

Undergraduate
BEng (Hons) Automotive Engineering
BEng (Hons) Mechanical Engineering
BEng (Hons) Mechanical & Marine Engineering
BEng (Hons) Electrical & Electronic Engineering
BEng (Hons) Computer Engineering
BEng (Hons) Telecommunications Engineering
BEng (Hons) Industrial Electronics & Control Engineering
FDE /BEng (Hons) Manufacturing Systems Engineering
BEng (Hons) Mechatronics
BEng (Hons) Aerospace Manufacturing

Postgraduate
MEng Automotive Engineering
MEng Mechanical Engineering
MEng Mechanical & Marine Engineering
MEng Electrical & Electronic Engineering
MEng Computer Engineering
MEng Telecommunications Engineering
MSc Microelectronic System Design
MSc Engineering Design
MSc Manufacturing Engineering
MSc Power & Control Engineering
MSc Industrial Biotechnology
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Undergraduate
Aerospace Engineering BEng (Hons)
Aerospace Engineering BEng (Hons) (Year Three in Industry)
Aerospace Engineering MEng (Hons)
Aerospace Engineering with Pilot Studies BEng (Hons)
Aerospace Engineering with Pilot Studies MEng (Hons)
Artificial Intelligence BSc (Hons)
Astrophysics MPhys

Avionic Systems BEng (Hons)
Avionic Systems MEng (Hons)
Avionic Systems with a Year in Industry MEng (Hons)
Avionic Systems with Pilot Studies BEng (Hons)
Avionic Systems with Pilot Studies MEng (Hons)
Avionic Systems with Pilot Studies with Year in Industry BEng (Hons)
Avionic Systems with Pilot Studies with Year in Industry MEng (Hons)
Avionic Systems with Year in Industry BEng (Hons)
Chemical Sciences BSc (Hons) (4 year route including a Foundation Year at Carmel College)
Chemistry BSc (Hons)
Chemistry MChem
Chemistry with a Year in Industry BSc (Hons)
Chemistry with Nanotechnology MChem
Chemistry with Research in Industry MChem
Civil and Structural Engineering MEng (Hons)
Civil Engineering BEng (Hons)
Civil Engineering BEng (Hons) (with Foundation element)
Civil Engineering MEng (Hons)
Computer Information Systems BSc (Hons)
Computer Information Systems BSc (Hons) (Foundation) (4 year route with Carmel College)
Computer Science and Electronic Engineering BEng (Hons)
Computer Science and Electronic Engineering MEng (Hons)
Computer Science and Electronic Engineering with a Year in Industry MEng (Hons)
Computer Science and Electronic Engineering with Year in Industry BEng (Hons)
Computer Science BSc (Hons)
Computer Science MEng (Hons)
Computing with a Year in Industry BSc (Hons)
Electrical and Electronic Engineering BEng (Hons) (with Foundation Element)
Electrical Engineering and Electronics BEng (Hons)
Electrical Engineering and Electronics MEng (Hons)
Electrical Engineering and Electronics with a Year in Industry BEng (Hons)
Electrical Engineering and Electronics with Year in Industry MEng (Hons)
Electrical Engineering BEng (Hons)
Electrical Engineering with Year in Industry BEng (Hons)
Electronic and Communication Engineering BEng (Hons)
Electronic and Communication Engineering MEng (Hons)
Electronic and Communication Engineering with Year in Industry BEng (Hons)
Electronic and Communication Engineering with Year in Industry MEng (Hons)
Electronic Commerce Computing BSc (Hons)
Electronics BEng (Hons)
Electronics MEng (Hons)
Electronics with Year in Industry BEng (Hons)
Electronics with Year in Industry MEng (Hons)
Engineering BEng (Hons)
Engineering BEng (Hons) (with Foundation element)
Engineering Foundation BEng (Hons) (4 year route including a Foundation Year at Carmel College)
Engineering MEng (Hons)
Engineering with Product Design BEng (Hons)
Engineering with Product Design BEng (Hons) (with Foundation element)
Engineering with Product Design MEng (Hons)

Foundation Certificate in Science and Engineering
Mechanical and Materials Engineering BEng (Hons)
Mechanical and Materials Engineering MEng (Hons)
Mechanical Engineering BEng (Hons)
Mechanical Engineering BEng (Hons) (with Foundation element)
Mechanical Engineering MEng (Hons)
Mechanical Engineering with Business BEng (Hons)
Mechanical Engineering with Business MEng (Hons)
Mechanical Systems and Design Engineering BEng (Hons)
Mechanical Systems and Design Engineering MEng (Hons)
Mechatronics and Robotic Systems BEng (Hons)
Mechatronics and Robotic Systems MEng (Hons)
Mechatronics and Robotic Systems with Year in Industry BEng (Hons)
Mechatronics and Robotic Systems with Year in Industry MEng (Hons)
Medical Electronics and Instrumentation BEng (Hons)
Medical Electronics and Instrumentation MEng (Hons)
Physical Sciences entry route leading to BSc (Hons) (4 year route including a Foundation Year at Carmel College)
Physics and Mathematics BSc (Joint Hons)
Physics BSc (Hons)
Physics for New Technology BSc (Hons)
Physics MPhys
Physics with Medical Applications BSc (Hons)
Physics with Nuclear Science BSc (Hons)

Postgraduate
Advanced Computer Science MSc/PGDip/PGCert
Advanced Engineering Materials MSc(Eng)
Advanced Manufacturing Systems and Technology MSc(Eng)
Aerospace and Mechanical Systems Engineering MSc(Eng)
Chemistry MPhil/PhD
Clinical Engineering MPhil/PhD/MD
Clinical Sciences MRes
Computer Science MPhil/PhD
Computer Science MSc/PGDip/PGCert
Electrical Engineering and Electronics MPhil/PhD
Engineering MPhil/PhD
Graduate Diploma in Science and Engineering
Information and Intelligence Engineering MSc(Eng)
Microelectronic Systems and Telecommunications MSc(Eng)
Microelectronic Systems MSc (Eng)
Nuclear Science and Technology MSc
Physics MPhil/PhD
Product Design and Management MSc(Eng)
Radioactive Waste Monitoring and Decommissioning PGCert (FT/PT)
Simulation in Aerospace Engineering MRes
Simulation in Aerospace Engineering MSc(Eng)

Online
Master of Science in Information Systems and Technology

Master of Science in Information Systems Management (ISM)
Master of Science in Information Technology (MSc in IT)
Master of Science in Software Engineering

Financial and Professional Services

Liverpool Hope University

Undergraduate
Accounting BA (Hons)
Business BA Combined (Hons)
Business Studies BA (Hons)
Football Studies BA Combined (Hons)
International Studies BA Combined (Hons)
Law BA Combined (Hons)
Marketing BA Combined (Hons)

Postgraduate
MBA (Information Technology)
Business & Management MSc
Human Resource Management & Development MSc
International MBA
Marketing Management MSc

Liverpool John Moores University

Undergraduate
BA (Hons) Accounting & Finance
BA (Hons) Business & Economics
BA (Hons) Business & Public Relations
BSc (Hons) Business Information Systems
BA (Hons) Business Management
BA (Hons) Business Management & Information
BA (Hons) Business Studies
BA (Hons) Human Resource Management
BA (Hons) International Business Studies & Chinese/French/Japanese/Spanish
BA (Hons) International Management
BA (Hons) Marketing
BA (Hons) Public Relations & Chinese/French/Japanese/Spanish
BA (Hons) Retail Management
LLB (Hons) Full & Part Time
LLB (Hons) Law & Criminal Justice
BA (Hons) Criminal Justice
BSc (Hons) Forensic Psychology & Criminal Justice
BSc (Hons) Forensic Science & Criminal Justice

Postgraduate
Master in Business Administration (MBA) in Executive Leadership
Master in Business Administration (MBA) in Business Management
MA/MSc Information & Library Management
MSc International Accounting & Finance
MSc International Banking & Finance
MSc International Business & Management
Msc Management Consultancy

MSc Corporate Governance
MSc Corporate Social Responsibility
MSc Corporate Risk & Crisis Management
PGCert Business Turnaround Management
MA Change Management
MRes Business & Law
MA Marketing
MA Personnel & Development
MA Social Enterprise Management
MA Financial Management
MA Strategic Human Resource Management
LLM International Business & Commercial Law
Legal Practice Course (LPC)
LLM in Legal Practice
MA Criminal Justice
DBA Doctorate in Business Administration
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Undergraduate
Accounting BA (Hons)
Business Economics BA (Hons)
Business Studies and French BA (Joint Hons)
Business Studies and German BA (Joint Hons)
Business Studies and Hispanic Studies BA (Joint Hons)
Business Studies and Italian BA (Joint Hons)
Business Studies BA (Hons)
Business Studies with a Year in Industry BA (Hons)
Communication and Business Studies BA (Joint Hons)
Economics and Mathematics BA (Joint Hons)
Economics BSc (Hons)
e-Finance BSc (Hons)
Foundation Certificate in Business, Law and Social Sciences
International Business BA (Hons)
Law and Business BA (Hons)
Law LLB (Hons)
Mathematics and Business Studies BSc (Joint Hons)
Mathematics with Finance BSc (Hons)
Mathematics with Management BSc (Hons)
Politics and International Business BA (Joint Hons)

Postgraduate
Business Finance and Management MBA
e-Business Strategy and Systems MSc/PGDip/PGCert
Entrepreneurship MBA
European Law LLM
Finance MSc/PGDip/PGCert
Financial Mathematics MSc
Graduate Diploma in Business, Law and Social Sciences

Human Resource Management MSc
International Business Law LLM
International Law LLM
Law MPhil/PhD
LLM
Management MPhil/PhD
Management MSc
MBA (The Liverpool MBA) MBA
Research Methodology (Law) MA

Online
Doctor of Business Administration (DBA)
International Business Law LLM
International Finance and Banking Law LLM
Master of Business Administration (MBA)
Master of Business Administration Specialisations (MBA)
Master of Science Corporate Finance
Master of Science in International Accounting and Finance
Master of Science in International Management
Master of Science in International Management (Health Systems)
Master of Science in International Management (Oil and Gas)
Master of Science in Project Management
Master of Science in Project Management Specialisations
Master of Science in Global Human Resource Management
Technology and Intellectual Property Law LLM

Low Carbon

Liverpool Hope University

Undergraduate
Environmental Management BSc Combined (Hons)
Geography BSc (Hons) / BSc Combined (Hons)
Postgraduate
Environmental Management MSc

Liverpool John Moores University

Undergraduate
BSc (Hons) Sustainable Design
BSc (Hons) Energy Management & Sustainability
BEng (Hons) Building Services Engineering
BEng (Hons) Building Services Engineering Project Management
BSc (Hons) Architectural Technology
BSc (Hons) Building Surveying
BEng (Hons) Civil Engineering
BSc (Hons) Construction Management
BSc (Hons) Quantity Surveying
BSc (Hons) Real Estate Management
BSc (Hons) Real Estate Management & Business
BSc (Hons) Environmental Sciences

Postgraduate
MSc Environmental Planning
MSc Water, Energy & The Environment
MEng Building Services Engineering
MSc Commercial Building Surveying
MSc Commercial Property Development
MSc Commercial Property Management
MSc Construction Project Management
MSc Quantity Surveying & Commercial Management
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Undergraduate
Chemistry with Oceanography BSc (Hons)
Earth Sciences entry route leading to BSc (Hons) (4 year route including a Foundation Year at Carmel College)
Ecology and Environment BSc (Hons)
Environment and Planning BA (Hons)
Geophysics (Geology) BSc (Hons)
Geophysics (North America) MEd (Hons)
Geophysics (Physics) BSc (Hons)
Marine Biology BSc (Hons)

Mathematics with Ocean and Climate Studies BSc (Hons)
Ocean Sciences BSc (Hons)
Oceans and Climate BSc (Hons)
Oceans, Climate and Physical Geography BSc (Hons)
Physics with Ocean and Climate Studies BSc (Hons)

Postgraduate
Advanced Biological Sciences MRes: Conservation Biology Pathway
Advanced Biological Sciences MSc: Conservation Biology Pathway
Earth and Ocean Sciences MPhil/PhD
Energy Generation MSc
Environment and Climate Change MSc
Environmental Management and Planning MA
Marine Planning and Management MSc

SuperPort

Liverpool John Moores University

Undergraduate
BSc (Hons) Management, Transport & Logistics
BSc (Hons) Maritime Business & Management
BSc (Hons) Maritime Studies
FDS /BSc (Hons) Nautical Science

Postgraduate
MSc Marine & Offshore Engineering
MSc International Transport Trade & Logistics
MSc Maritime Operations
MSc Port Management
MBA Maritime Enterprise
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Postgraduate
Maritime Civil Engineering MSc(Eng)
Operations and Supply Chain Management MSc/PGDip/PGCert

Online
Master of Science in Operations & Supply Chain Management
Master of Science in Operations & Supply Chain Management (Oil and Gas)

Public Sector

Liverpool Hope University

Undergraduate
Applied Social Science BA (Hons) / BA Combined (Hons)
Childhood & Youth Studies BA (Hons) / BA Combined (Hons)
Criminology BA (Hons) / BA Combined (Hons)
Disability Studies BA (Hons) / BA Combined (Hons)
Certificate in Early Years Professional Status
Early Childhood Studies BA (Hons) / BA Combined (Hons)
Education Studies BA Combined (Hons)
Education Studies with Mathematical Studies BA (Hons)
Health BSc (Hons) / BSc Combined (Hons)
Health, Nutrition & Fitness BSc (Hons)
Leisure BA Combined (Hons)
Nutrition BA Combined (Hons)
Nutrition with Health Promotion BA (Hons)
Personalised Care (Adults) Foundation Degree
Police Leadership & Management Foundation Degree
Social Care (Children) Foundation Degree
Social Pedagogy & Care BA (Hons)
Social Policy BA Combined (Hons)
Social Work BA (Hons)
Sport Studies BSc (Hons) / BSc Combined (Hons)
Teacher Training BA QTS
Tourism BA Combined (Hons)
Youth Work, Community & Social Pedagogy BA (Hons)

Postgraduate
Children & Young People in Society MA
Children & Young People's Rights & Services PgCert
Criminal Justice MA
Education MA
Educational Research MSc
Professional Doctorate in Education EdD
Postgraduate Certificate in Education PGCE
International Perspectives on Education MA / PgDip
Learning & Teaching in Higher Education MA / PgCert
Masters in Teaching & Learning MTL
Exercise Testing & Prescription PgCert
Health Exercise & Nutrition MSc
Police Leadership MSc
Public Health PgCert
Public Health (Nutrition) MSc
Social Work MA / MSW
Therapeutic Childcare (Play Therapy) MA
Therapeutic Childcare (Life Story) MA

Online

Management of Childcare Provision Foundation Degree
Early Years Management BA (top-up)
Certificate in European Early Years Management

Liverpool John Moores University

Undergraduate
<i>Education</i>
BA (Hons) Primary Education
BA (Hons) Primary Education with Early Years
BA (Hons) Primary Education with French
BA (Hons) Primary & Secondary Education: Design & Technology Education
BA (Hons) Primary & Secondary Education: Science Education
BA (Hons) Primary & Secondary Education: Modern Languages Education
BA (Hons) Primary & Secondary Education: Physical Education
BA(Hons) Education Studies & Early Years
BA(Hons) Education Studies & Physical Education
BA(Hons) Education Studies & Special & Inclusive Needs
BA (Hons) Learning, Development & Support
BA (Hons) Early Years Primary Education
BA (Hons) PE, Sport & Dance (Secondary Education)
BA (Hons) Sports Development with Physical Education
BA (Hons) Learning, Development & Support
BSc (Hons) Outdoor Education with Physical Education
BSc (Hons) Outdoor Education with Environmental Education
FDA Teaching in the Lifelong Learning Sector
FDA Educational Support
<i>Public Health</i>
BA (Hons) Midwifery
BA (Hons) Nursing with Registered Nurse Status (Adult)
BA (Hons) Nursing with Registered Nurse Status (Child)
BA (Hons) Nursing with Registered Nurse Status (Mental Health)
BSc (Hons) Environmental Health
BA (Hons) Social Work
BA (Hons) Social Work Practice with Children & Young People, their Families & Carers
BA (Hons) Working with Children & Young People
BSc (Hons) Specialist Community Practitioner - Health Visiting or School Nursing
BSc (Hons) Specialist Community Public Health Nurse - Direct Nursing or General Practice Nursing
FDS Assisting Professional Practice (Radiography)
FDS Assisting Professional Practice (Acute Care)
FDS Paramedic Studies
FDs Health and Social Care (Assistant Practitioner)
<i>Other</i>
FD Police Studies

Postgraduate
<i>Education</i>
MA Artist Teacher
MA School Sport Management
MA Advanced Educational Practice

Early Years PGCE
MRes Education & Society
PG Cert in Advanced Educational Practice
PG Cert in Advanced Educational Practice (Dyslexia)
PG Cert in Advanced Educational Practice (Leadership & Management)
PG Cert in Advanced Educational Practice (Mentoring & Coaching)
PG Cert in Advanced Educational Practice (SEN)
PG Cert in Advanced Educational Practice (SENCO)
PGCE Applied ICT
PCGE Secondary ICT
PGCE Secondary Maths
PGCE Applied Science
PGCE Art & Design
PCGE Biology
PGCE Chemistry
PGCE Design & Technology
PGCE Engineering
PCGE Modern Languages
PGCE Physical Education
PCGE Tourism & Leisure
Doctor of Education
MPhil/ MRes/PhD postgraduate research
<i>Public Health</i>
MSc Health & Social Care Management
Health Psychology
MSc Advanced Healthcare Practice
MSc Advanced Paediatric Nurse Practitioner in Paediatric Ambulatory Care
MSc Advanced Paediatric Nurse Practitioner in Critical Care
MSc Advanced Neonatal Practitioner in Neonatal Critical Care
PGCert Clinical Case Management (Community Matron)
PGCert Primary Mental Health Care
MSc Consciousness & Transpersonal Psychology
MSc Drug Use & Addiction
MSc Health Psychology
MSc Occupational Psychology
MA Counselling & Psychotherapy
MA Social Work
PGCert Working with Traumatic Death & Loss
PGCert Working with Groups
PGDip Community Specialist Practitioner
PGCert Evaluation for Change
MSc Public Health (Analysis)
MSc Public Health (Applied)
MSc Public Health (International Health Development)
MPhil/ MRes/PhD postgraduate research

University of Liverpool

Undergraduate
International Politics and Policy BA (Hons)

Medicine and Surgery MBChB
Medicine and Surgery MBChB (based at Lancaster University)
Medicine and Surgery MBChB (Graduate Entry)
Nursing BN (Hons)
Occupational Therapy BSc (Hons)
Physiotherapy BSc (Hons)
Radiotherapy BSc (Hons)
Sociology and Social Policy BA (Hons)
Town and Regional Planning MPlan
Urban Regeneration and Planning BA (Hons)

Postgraduate
Advanced Practice in Healthcare MSc/PGDip/PGCert
Child Health MPhil/PhD/MD
Civic Design MPhil/PhD
Ethics in Health Care MSc/PGDip/PGCert
Health Sciences MRes
International Public Health MSc/PGDip/PGCert
Master of Public Health MPH
Nursing MPhil/PhD
Occupational Therapy MPhil/PhD/MD
Physiotherapy MPhil/PhD/MD
Planning, Town and Regional MA
Primary Care MPhil/PhD/MD
Public Administration MPA
Public Health MPH
Public Health MPhil/PhD/MD
Radiotherapy MPhil/PhD/MD
Radiotherapy PGDip
Research Methodology (Sociology and Social Policy) MA
Research Methodology (Town and Regional Planning) MA
Sociology and Social Policy MPhil/PhD
Sociology and Social Policy MRes
Town and Regional Planning MA
Town and Regional Planning MCD
Urban Regeneration and Management MSc

Online
Master of Public Health (MPH)
Master of Public Health (MPH) Specialisations

APPENDIX 10: CURRENT FE PROVISION IN THE LIVERPOOL CITY REGION ACROSS KEP PRIORITY SECTORS

This appendix provides an overview of current FE provision in the City Region across the KEP priority sectors, including areas of expertise and relevant employer engagement.

1. Life Sciences

Birkenhead Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Science GCSE	2	32
BTEC Science	2	16
BTEC Medical Science certificate	3	52
BTEC Medical Science subsidiary diploma	3	55
BTEC Forensic Science subsidiary diploma	3	30
AS/A2 Biology	3	131
AS/A2 Chemistry	3	96

Key specialism

- Academic/General vocational Science qualifications including medical science

Carmel College

Relevant course	Level achieved	Current no.s enrolled
A/AS Biology	3	
A/AS Chemistry	3	
A/AS Physics	3	
L3 BTEC Single Science	3	

Hugh Baird College

Relevant course	Level achieved	Current no.s enrolled
Applied Science	2	16
Applied Science	3	27
AS/A2 Biology	3	9
AS/A2 Chemistry	3	12

Key specialism

- Academic/General vocational Science qualifications

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
BTEC National Award in Applied Science	3	20
AS/A Level Human Biology	3	35

AS/A Level Biology	3	30
AS/A Level Chemistry	3	30
GCSE Science	2	35

Key specialism

- Human Biology

Liverpool Community College

Relevant course	Level achieved	Planned no.s enrolled
Pharmacy Services	3	

Riverside College

Relevant course	Level achieved	Current no.s enrolled
A/AS Biology	3	
A/AS Chemistry	3	
A/AS Physics	3	
Access to HE Diploma in Science	3	

Key specialisms

- Forensic Science
- Animal Management

Southport College

Relevant course	Level achieved	Planned no.s enrolled
Extended Diploma in Applied Science	3	36
National Diploma in Applied Science (Forensics)	3	27
Access to Health	3	45
Access to Science	3	

Key specialisms

- Biology
- Chemistry
- Physics
- Level 3 Maths
- Health Sciences

St Helens College

Relevant course	Level achieved	Planned no.s enrolled
BTEC Subsidiary Diploma in Applied Science	3	10
BTEC Diploma in Applied Science	3	13

BTEC Extended diploma in Applied Science	3	5
BTEC Subsidiary Diploma in Applied Science (Forensic Science)	3	15
BTEC Extended Diploma in Applied Science (Forensic Science)	3	15
HNC in Applied Chemistry	4	8
Foundation Degree in Applied Microbiology	5	25

Key specialisms

- | |
|--|
| <ul style="list-style-type: none"> • Microbiological Techniques |
|--|

Apprenticeships offered

Advanced apprenticeships in process technology
--

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
FDS Sc Forensic Science	HE	5
FDS Sc Complementary Studies	HE	17
HNC & HND Applied Chemistry	HE	7
HNC Applied Biology	HE	1

Key specialisms

- | |
|---|
| <ul style="list-style-type: none"> • Higher Level Applied Chemistry • Laboratory and Technical Activities |
|---|

Apprenticeships offered

Process Technology

Laboratory Operations

Other relevant engagement with employers

Bio Medical Science

2. Creative and Digital Industries

Birkenhead Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Computing AS/A2	3	79
Design Technology AS/A2	3	54
BTEC Art subsidiary diploma	3	15
Dance AS/A2	3	21
Drama & Theatre Studies AS/A2	3	55
Film Studies AS/A2	3	96
Fine Art AS/A2	3	102
Graphics AS/A2	3	97
ICT Applied AS/A2 Single & Double Awards	3	186
BTEC ICT Diploma & Extended Certificate	2	25
BTEC ICT subsidiary diploma	3	43
I-Skills BTEC L2 Award	2	351
BTEC Media Diploma	2	27
Media Studies AS/A2	3	216
Music AS/A2	3	21
BTEC Musical Theatre subsidiary diploma	3	14
Textiles As/A2	3	37

Key specialisms
<ul style="list-style-type: none"> • Film & Media Studies • Art and Design, including Textiles • Performance Arts, including music, dance and theatre studies

Other relevant engagement with employers
The college has been instrumental in establishing a media social enterprise (Wirral TV), which provides work placement opportunities for students, particularly those interested in film and journalism careers.

Carmel College

Relevant course	Level achieved	Current no.s enrolled
A/AS Art (Fine)	3	
A/AS Art (3D)	3	
A/AS Art (Graphic Comm.)	3	
A/AS Art (Photo)	3	
A/AS Art (Textiles)	3	
A/AS Film Studies	3	
A/AS Media Studies	3	
A/AS IT	3	
L2 BTEC IT	2	
L2 BTEC Media	2	
L3 BTEC Diploma IT	3	
Salford University Year 1: Graphic		

Communications		
Art Foundation		

Hugh Baird College

Relevant course	Level achieved	Current no.s enrolled
Art and Design	1	Currently 0
Art and Design / Graphics	2	30
Art and Design (including 3D Design)	3	71
Graphics including promotional design	2	31
Visual Merchandising (Foundation Degree)	3	34
Visual Merchandising	4	30
Visual Merchandising	5	60
Media and Interactive Media	3	84
Music Technology	3	50
Performing Arts	2	16
Performing Arts	3	25

Key specialisms
<ul style="list-style-type: none"> • Visual Merchandising
<ul style="list-style-type: none"> • Art and Design, including Graphics
<ul style="list-style-type: none"> • Media and Interactive Media

Other relevant engagement with employers
<p>Hugh Baird has a national reputation for the quality of its Visual Merchandising courses. For the last two years it has won the National Visual Merchandising Competition and this year 2 of the 5 national shortlisted entries were from Hugh Baird students. This course links with numerous local retail employers through work placements for students.</p>

King George V Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Film Studies	3	80
Media Studies	2 and 3	190
Art	3	200

Key specialisms
<ul style="list-style-type: none"> • Film Studies
<ul style="list-style-type: none"> • Media Studies
<ul style="list-style-type: none"> • Art

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
BTEC National Diploma Media Production	3	40
Advanced Diploma Creative and Media	3	40
BTEC First Diploma Media	2	16

A/AS Media Studies	3	35
A/AS Level Film Studies	3	30
GCSE Media Studies	2	15
BTEC Foundation Studies in Art & Design	4	35
Advanced Art & Design	3	50
BTEC National Diploma in Music Technology	3	40
BTEC First Diploma in Music Technology	2	25
BTEC Introduction Diploma Performing Arts (Music)	1	18
BTEC National Diploma/Certificate in Performing Arts (Musical Theatre)	3	30
BTEC First Diploma Performing Arts	2	20
Performing Arts Entry Level	Entry	12
BTEC Introduction Diploma Performing Arts	1	15
Foundation Degree Computing	4	28

Key specialisms
• Graphic Communication
• Radio Production
• Microsoft Technology Certificate
• Photography

Liverpool Community College

Relevant course	Level achieved	Planned enrolled	no.s
Diploma Art & Design (Multimedia)	2		
Diploma Art & Design (Photography)	2		
Art & Design	2		
Extended Diploma Art & Design Pathways	2		
Foundation Diploma Art & Design	3		
Dance	HNC	12	
BTEC Diploma Dance	2,3	45	
Foundation Degree: FdA Digital Media Design			
Drama	HBC	14	
BTEC Diploma Events Management	3	16	
Fashion and Clothing	Foundation Degree	48	
Diploma Fashion and Textiles	2,3	13	
Film Studies	A/AS	16	
Extended Diploma Graphics	3		
Extended Diploma Interactive Media	3		
Extended Diploma Media	3		
Extended Diploma Media (Games Development)	3		
Media	2		
Media Studies	A/AS	16	
Music and Audio Production	Foundation Degree	24	
BTEC Diploma Music Practice	2,3	70	
BTEC Diploma Music Technology	2,3	60	
BTEC Diploma Musical Theatre	2,3	45	
Extended Diploma Photography	3		
Popular Music	Foundation Degree	24	

Apprenticeships offered
Apprenticeships in the Creative Arts: Music Business, Community Arts, Cultural Venue Operations, Live Events and Promotions and Technical Theatre
Creative and Digital Apprenticeships including communication skills and pre-production techniques

Riverside College

Relevant course	Level achieved	Current no.s enrolled
A/AS Art	3	
A/AS Film Studies	3	
A/AS Media Studies	3	
A/AS IT	3	
A/AS Photography	3	
A/AS Textiles	3	
A/AS Graphics Comm.	3	
BTEC Diploma IT	1	
BTEC Diploma IT	2	
BTEC Diploma Art and Design	1,2,3	
BTEC Diploma Graphics	2,3	
BTEC Diploma in Performing Arts	1,2,3	
BTEC Diploma in Music	2,3	
BTEC Cert In IT	1	

Southport College

Relevant course	Level achieved	Estimated no.s enrolled 1 st & 2nd years
Level 1 in IT	1	12
Level 1 in Art and Design	1	10
Level 2 Diploma Music Technology	2	10
Level 2 Art and Design	2	28
Level 2 Diploma Performing Arts	2	14
Level 2 Diploma in IT	2	30
Level 3 Diploma in IT	3	36
Extended Diploma in IT	3	48
Extended Diploma in Art and Design	3	42
Extended Diploma in Photography	3	42
Extended Diploma in Graphics	3	38
Extended Diploma in Media Games and Animation	3	48
Extended Diploma in Performing Arts (Musical Theatre)	3	46
Advanced Creative & Media Diploma	3	32
BA Fine Art (Year 1)	4	16
Foundation Degree in New media	4	16

Key specialisms
• IT/Games Animation/ Film, TV, Editing
• Fashion & Textiles Design
• Musical Theatre
• Photography
• Graphic Design

Other relevant engagement with employers
Extensive links with employers which include:
Master classes
Live Projects
Visits/Trips
Curriculum Development

St Helens College

Relevant course	Level achieved	Planned no.s enrolled
L1 BTEC CERT IN ART & DESIGN	1	5
L1 BTEC DIPLOMA IN ART & DESIGN	1	5
L2 BTEC DIPLOMA IN ART & DESIGN	2	15
L3 SUBSIDIARY DIPLOMA IN ART & DESIGN	3	25
NATIONAL DIPLOMA IN ART & DESIGN	3	12
EDEXCEL DIPLOMA FOUNDATION STUDIES (ART & DESIGN)	3	12
NATIONAL DIPLOMA IN FASHION AND CLOTHING	3	10
NATIONAL CERTIFICATE IN FASHION	3	3
L3 SUBSIDIARY DIPLOMA IN FASHION & CLOTHING	3	18
L3 SUBSIDIARY DIPLOMA IN GRAPHIC DESIGN	3	8
L3 SUBSIDIARY DIPLOMA IN INTERACTIVE MEDIA	3	10
NATIONAL DIPLOMA IN INTERACTIVE MEDIA	3	5
NATIONAL CERTIFICATE IN GRAPHIC DESIGN	3	1
NATIONAL DIPLOMA IN GRAPHIC DESIGN	3	10
L2 BTEC DIPLOMA IN CREATIVE MEDIA PRODUCTION	2	12
NATIONAL CERTIFICATE MEDIA L3	3	10
NATIONAL DIPLOMA MEDIA L3	3	10
L3 SUBSIDIARY DIPLOMA IN MEDIA	3	28
L2 BTEC DIPLOMA IN MUSIC	2	13
NATIONAL CERTIFICATE MUSIC TECHNOLOGY	3	15
L3 SUBSIDIARY DIPLOMA IN MUSIC TECHNOLOGY	3	25
L2 BTEC DIPLOMA IN PERFORMING ARTS	2	12
NAT CERT PERFORMING ARTS (ACTING)	3	12
L3 SUBSIDIARY DIPLOMA IN PERFORMING ARTS	3	26
NATIONAL CERTIFICATE PHOTOGRAPHY	3	5
NATIONAL DIPLOMA IN PHOTOGRAPHY	3	7
L3 SUBSIDIARY DIPLOMA PHOTOGRAPHY	3	4

Key specialisms
• Design
• Moving Image and Sound

<ul style="list-style-type: none"> • Computer generated imaging
<ul style="list-style-type: none"> • Writing for the Screen
<ul style="list-style-type: none"> • Computer Generated Imaging and Audio

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
National Diploma in Media Studies	3	50
BA Media Studies	HE	5
BA Fine Art	HE	7
BA Cultural Studies	HE	21

Key specialism(s) (max. 5)
<ul style="list-style-type: none"> • Animation
<ul style="list-style-type: none"> • Performing Arts
<ul style="list-style-type: none"> • Video and sound recording. Radio.

3. Advanced Manufacturing

Birkenhead Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Mathematics AS/A2	3	120
Physics AS/A2	3	49
Further Mathematics AS	3	10
Use of Maths AS	3	14
Computing AS/A2	3	79
Design Technology AS/A2	3	54

Key specialisms

- Maths and Physics
- Computing
- Design Technology

Carmel College

Relevant course	Level achieved	Current no.s enrolled
A/AS Computing	3	
A/AS Design (Product)	3	
University of Liverpool Year 0: Science and Engineering		

Hugh Baird College

Relevant course	Level achieved	Current no.s enrolled
BTEC Extended Diploma in Engineering	3	12
AS/A2 Physics	3	8
Certificate in Electrical Installations	3	42
Certificate in Electrical installations	2	72
Motor Vehicle Maintenance and Repair	1	66
Motor Vehicle Maintenance and Repair	2	30
Motor Vehicle Maintenance and Repair	3	25
Computer Aided Design	2	10

Key specialisms

- Electrical installations
- Motor Vehicle Maintenance and repair
- Business Administration and Office Skills

Apprenticeships offered

- 11 Apprenticeships in Motor Vehicle Service and Repair
- 4 Apprenticeships in Electrical installations
- 11 Young apprentices Motor vehicle fitting

Other relevant engagement with employers

Hugh Baird College has worked with employers in the development of the New Diploma in Engineering

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
Diploma in Engineering	3	15
Certificate in Electrotechnical Technology	3	30
Performing Engineering Operations	2	30
NVQ Electrotechnical Services	3	40
Certificate in Electrical Installation Requirements	3	50
Certificate in Vehicle Maintenance and Repair	3	20
Certificate in Vehicle Maintenance and Repair	2	20
Award in Vehicle Maintenance and Repair	1	25
Motor Vehicle Entry Certificate	Entry	12

Key specialism

- Electrotechnical services

Apprenticeships offered

Four routes for apprenticeships at advanced Level 2:
Electrical, Electrotechnical, Fabrication and Welding, and Mechanical Maintenance.

Other relevant engagement with employers

Many courses are work-based within Engineering Section, therefore there is wide involvement with employers, including a range of manufacturing companies.

Liverpool Community College

Relevant course	Level achieved	Planned no.s enrolled
Extended Diploma in Engineering	3	
Extended Diploma in Electrical/Electronic Engineering	3	
City and Guilds Fabrication and Welding	1,2,3	
City and Guilds Computer Aided Drafting / Design	2,3	
Food manufacture	3	

Riverside College

Relevant course	Level achieved	Current no.s enrolled
Performing Engineering Operations	1,2	
Motor Vehicle Diploma	1,2	
Extended Diploma in Engineering	3	
National Diploma in Engineering		

Key specialism

- Car Maintenance

Southport College

Relevant course	Level achieved	Planned no.s enrolled
Diploma in Vehicle Systems and Body and Paint Maintenance	3	12
Diploma in Vehicle Maintenance	1	12
Motor Vehicle Maintenance & Repair	2	30
NVQ3 Motor Vehicle Maintenance & Repair Apprentice	3	10
NVQ 2 Performing Engineering Operations	2	45
Foundation Diploma in Engineering (Pre-16)	1	12
Higher Diploma in Engineering	2	12
Advanced Diploma in Engineering (Post 16) 1A	3	30
National Diploma Engineering Year 2	3	23
Certificate in Electrotechnical Technology	2	112
NVQ in Electrotechnology includes Certificate in Electrotechnology	3	32
NAPIT FS1 full scope testing & installation		20
NAPIT PAT testing		20

Key specialisms
<ul style="list-style-type: none"> • Motor vehicle repair and maintenance
<ul style="list-style-type: none"> • Welding and fabrication
<ul style="list-style-type: none"> • CAD

Apprenticeships offered
10 apprenticeships in motor vehicle with local employers
10 apprenticeships in Electrotechnology with local employers

Other relevant engagement with employers
Work placement learning opportunities
Work based learning
14-19 collaborative employer forum

St Helens College

Relevant course	Level achieved	Planned no.s enrolled
Performing Engineering Operations	1	25
Performing Engineering Operations	2	10
Advanced Diploma in Engineering	3	55
Diploma in Electrical/Electronic Engineering	3	15
Certificate in Electrical/Electronic Engineering	3	14

Key specialisms
<ul style="list-style-type: none"> • Engineering Design
<ul style="list-style-type: none"> • Microprocessor Systems and Applications

Apprenticeships offered
108 apprenticeships p.a. in electrical, mechanical and fabrication and welding engineering

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
Higher National Certificate Operations Engineering	HE	40
National Diploma Operations and Maintenance Engineering	3	40
Certificate Engineering Level 1 (City and Guilds 2800)	1	5
Performing Engineering Operations	2	10
Fabrication and Welding Competences	2	15
Fabrication and Welding Competences	3	40
FDEng Process and Plant Engineering	HE	10

Key specialisms
<ul style="list-style-type: none"> • Vehicle maintenance and repair • Nuclear Engineering • Fabrication and Manufacture

Apprenticeships offered
Advanced Apprenticeship in Engineering – Vehicle Maintenance and Repair, Body Repair
Apprenticeship in Engineering - Vehicle Maintenance and Repair, Body Repair

4. Financial and Professional Services (FPS)

Birkenhead Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Law AS/A2	3	98
Business Applied AS/A2	3	107
BTEC Business L2 Diploma	2	35
BTEC Business L3 Certificate	3	74
BTEC Business L3 subsidiary diploma	3	24
BTEC Business National Certificate	3	1

Key specialisms

- Business
- Law

Carmel College

Relevant course	Level achieved	Current no.s enrolled
A/AS Business	3	
A/AS Law	3	
L2 BTEC Business	2	
L3 Dual Applied Business	3	

Hugh Baird College

Relevant course	Level achieved	Current no.s enrolled
AAT	2	70
AAT	3	60
Business	3	53
Business Administration	3	22
Business Administration	2	30
Business Administration	1	13
Business	3	53
Business Foundation Degree	4	54
Certificate for Legal Secretaries	3	19
Certificate for Legal Secretaries	2	35
Certificate in Law and Practice	3	14

Key specialisms

- AAT
- Business
- Business Administration
- Legal Secretaries
- Law and Practice

Apprenticeships offered

40 in AAT
8 in Business Administration

King George V Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Certificate in Financial Studies	3	100

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
Accounting Technician Certificate AAT	4	52
Accounting AAT	3	75
Accounting Foundation Certificate	2	82
Foundation Degree Accountancy	4	15
NVQ in Business Administration	3	15
NVQ in Business Administration	2	18
Legal Secretaries Diploma	3	15
AS/A Level Accounting	3	34
AS/A Level Law	3	46
AS/A Level Business Studies	3	33
Foundation Degree Business and Management	4	28

Key specialisms

- Accountancy and Finance
- Customer Service
- Law

Apprenticeships offered

Accountancy- Advanced and Level 2 apprenticeships.
 Business and Administration-Advanced and Level 2 apprenticeships
 Providing Financial Services-Advanced and Level 2 apprenticeships

Other relevant engagement with employers

Most AAT Students are employed status, ensuring close and up to date contact with a wide variety of financial services employers.

Liverpool Community College

Relevant course	Level achieved	Planned no.s enrolled
Certificate in Personnel Practice Management	3	
Basic Accounting 1	2	
Basic Accounting 2	2	
Accounts Preparation 1	3	
Accounts Preparation 2	3	
Cash Management	3	

Cost and Revenues	3	
Indirect Tax (VAT)	3	
Financial Statements	4	
Budgeting	4	
Credit Management and Control	4	

Key specialisms
<ul style="list-style-type: none"> AAT

Riverside College

Relevant course	Level achieved	Current no.s enrolled
A/AS Business	3	
A/AS Law	3	
A/AS Accounting	3	
BTEC Diploma in Business	2,3	
Administration	1	
BTEC Cert in Business Administration	1	

Southport College

Relevant course	Level achieved	Current no.s enrolled
Book keeping	1	35
Sage Accounts	2	68
Accounting NVQ 2	2	46
Accounting NVQ 3	3	52
Accounting NVQ 4	4	30
Entry 3 Diploma in Business and Training	Entry 3	12
Level 1 Business & Administration	1	12
Level 2 Business Management	2	12
Extended Dip in Business Management	3	24
Access to Business and ICT	3	12
BTEC Level 3 Diploma in Business Management	3	25
Higher E Dip in Progression Dip in Business and ICT	4	15

Key specialisms
<ul style="list-style-type: none"> Account Management Leadership & Management Personal Finance

St Helens College

Relevant course	Level achieved	Planned no.s enrolled
NVQs in Management Chartered Management Institute [CMI]	2,3,4 & 5, 7	
NVQs in Retail Financial Services	2,3,4	

NVQs in Administration	2,3,4	
NVQs in Information Technology	2,3	
NVQs in Accountancy	1,2,3,4	
NVQs in Call Centre Operations	2,3	
Personnel	3, 7	
Learning & Development	3,4	
Procurement	3,4,5,6	
Marketing	4,6	

Key specialisms

- | |
|---|
| <ul style="list-style-type: none"> • AAT • Management |
|---|

Other relevant engagement with employers

Short courses, H&S, CIPD etc

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
Business Improvement Techniques	2	10
Business Improvement Techniques	3	40
AAT Accountancy	3	40
AAT Accountancy Diploma	4	60
HNC & HND Business Studies	HE	25

Key specialism(s) (max. 5)

- | |
|---|
| <ul style="list-style-type: none"> • Accountancy • Administration • Business Studies |
|---|

Apprenticeships offered

Administration

5. Low Carbon

Hugh Baird College

Engagement with employers
The College recently received £4000 NEF funding to work with a local Green technology employer in the development of Green Technology courses and curriculum design. It has seconded three science and engineering staff to develop skills in micro-energy generation (including solar panels, wind turbines etc) in order to deliver courses in these areas in the future

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
Diploma for Domestic Energy assessors	3	40
NVQ in Cleaning and Support Services	2	65

Key specialism
<ul style="list-style-type: none"> Energy assessment

Apprenticeships offered
Apprenticeships across all construction trades offered.

Riverside College

Relevant course	Level achieved	Current no.s enrolled
City and Guilds 6129 Plumbing Technical certificate	2	
NVQ 2 MES (Plumbing)	2	
IEE Wiring Regulations 17 th edition		
BTEC Extended Diploma in Engineering		
NVQ 1 Performing Engineering Operations	1	
NVQ 2 Fabrication and Welding Competences	2	
NVQ 2 Performing Engineering Operations	2	

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
NEBOSH National Diploma in Environmental Management	HE	7
NEBOSH Certificate in Environmental Management	3	20
NEBOSH Diploma in Health and Safety	<u>HE</u>	20

Key specialisms
<ul style="list-style-type: none"> Environmental Management
<ul style="list-style-type: none"> Health and Safety Management

6. SuperPort

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
NVQ Distribution, Warehousing & Storage	2	25
NVQ Driving Goods Vehicles	2	20
NVQ Road Passenger Transport	2	85

Key specialism

- Road transport

St Helens

Relevant course	Level achieved	Current no.s enrolled
NVQ Storage & Warehousing	2	40
NVQ Logistics Operations management	3	15
Courses in Supply Chain Management	2,3,4	20
Operators Certificate of Professional Competence – National Road Haulage		
SQA Carriage of Dangerous Goods		
National Award in Aviation in conjunction with Liverpool and Manchester Airports and Serviceair		30
Aviation Environment Diploma in conjunction with Liverpool and Manchester Airport and Serviceair		30
National Award in Travel & Tourism		30
Diploma in Travel and Tourism		30
NVQ Customer Service	2,3	100

Key specialisms

- Warehousing
- Aviation
- Baggage Handling

Apprenticeships offered

Warehousing and Storage apprenticeship delivered by the airports

Other relevant engagement with employers

Progression from College courses to Apprenticeships delivered by the airports. Curriculum developed with Serviceair, Liverpool John Lennon Airport and Manchester Airport.

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
National Diploma Airline Operations	3	17
Certificate in Airline Operations	2	13

Key specialisms

- | |
|---|
| <ul style="list-style-type: none">• Airline Operations• Ground Crew Services |
|---|

7. Public Sector

Birkenhead Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Health and Social Care Applied AS/A2	3	83
BTEC Health and Social Care L2 Diploma	2	29
BTEC Health and Social Care L3 subsidiary diploma	3	37
CACHE L3 Certificate in Child Care & Education	3	34
Preparing To Teach in the Lifelong Learning Sector (PTLLS)	3/4	45
Government & Politics AS/A2	3	32
Liverpool University Year 0 Foundation in Health Studies	4	14

Key specialisms

- Health and Social Care
- Child care & Education
- Preparation for Teaching

Carmel College

Relevant course	Level achieved	Current no.s enrolled
L3 Dual Applied Health and Social	3	
University of Liverpool Year 0: Health		

Hugh Baird College

Relevant course	Level achieved	Current no.s enrolled
Health and Social Care	1	0
Health and Social Care	2	36
Health and Social Care	3	110
Teaching Assistants	3	37
Certificate in Education	5	103

Key specialisms

- Health and Social Care

King George V Sixth Form College

Relevant course	Level achieved	Current no.s enrolled
Public Services	2 and 3	

Knowsley Community College

Relevant course	Level achieved	Planned no.s enrolled
ILM Award in First Line Management	3	16
ILM Certificate in Team Leading	2	35
BTEC National diploma in Uniformed Public Services	3	31
Foundation Degree Assisting Professional Practice	4	15
National Certificate in Health & Social Care	3	16
Certificate in Health & Social Care	2	22
NVQ Health & Social Care	4	14
NVQ Health & Social Care	3	40
NVQ Health & Social Care	2	52

Key specialism

- ILM qualifications
- Pre- nursing and pre-NHS employment

Apprenticeships offered

Advanced and Level 2 apprenticeships in Health Care

Other relevant engagement with employers

All Foundation Degrees students are placed with employers and must complete an employer-based project.

Close links with NHS Knowsley (PCT) and with local hospitals and care providers

Riverside College

Relevant course	Level achieved	Current no.s enrolled
Health and Social Care	1,2,3	
Teaching Assistants	3	
Public Services	2,3	
PTLLS		
Teaching Certificate		

St Helens College

Relevant course	Level achieved	Planned no.s enrolled
ICT	2,3	100
Short Health Sector courses		200
Full range of NVQs for Councils	2,3	300

Key specialism

- Work with Union Learn

Wirral Metropolitan College

Relevant course	Level achieved	Current no.s enrolled
HNC & HND Public Services	HE	6

NVQ4 in Leadership and management of the Care Services	HE	7
FdA Working with Children and Young People	HE	14
Cert in the Management of Quality Standards in Children's Services	HE	24
Level 4 Diploma Therapeutic Counselling	HE	14
Level 5 Certificate in Cognitive Behavioural Therapeutic Skills and Theory	HE	6

Key specialism(s) (max. 5)

- | |
|---|
| <ul style="list-style-type: none"> • Early Years Care |
| <ul style="list-style-type: none"> • Therapeutic Counselling |
| <ul style="list-style-type: none"> • Uniform and Public Services |

Apprenticeships offered

Childcare

APPENDIX 11: SIC CODES

Codes used in creation of this analysis

Note: all codes relate to the SIC 2003 coding system

All data sourced from 2008 Annual Business Inquiry, ONS Crown Copyright, from Nomis

Advanced Manufacturing

1430 : Mining of chemicals and fertiliser minerals
1440 : Production of salt
1711 : Preparation and spinning of cotton-type fibres
1712 : Preparation and spinning of woollen-type fibres
1713 : Preparation and spinning of worsted-type fibres
1714 : Preparation and spinning of flax-type fibres
1715 : Throwing and preparation of silk including from noils and throwing and texturing of synthetic or artificial filament yarns
1716 : Manufacture of sewing threads
1717 : Preparation and spinning of other textile fibres
1721 : Cotton-type weaving
1722 : Woollen-type weaving
1723 : Worsted-type weaving
1724 : Silk-type weaving
1725 : Other textile weaving
1730 : Finishing of textiles
1740 : Manufacture of made-up textile articles, except apparel
1751 : Manufacture of carpets and rugs
1752 : Manufacture of cordage, rope, twine and netting
1753 : Manufacture of non-wovens and articles made from non-wovens, except apparel
1754 : Manufacture of other textiles not elsewhere classified
1760 : Manufacture of knitted and crocheted fabrics
1771 : Manufacture of knitted and crocheted hosiery
1772 : Manufacture of knitted and crocheted pullovers, cardigans and similar articles
1810 : Manufacture of leather clothes
1821 : Manufacture of workwear
1822 : Manufacture of other outerwear
1823 : Manufacture of underwear
2310 : Manufacture of coke oven products
2320 : Manufacture of refined petroleum products
2411 : Manufacture of industrial gases
2412 : Manufacture of dyes and pigments
2413 : Manufacture of other inorganic basic chemicals
2414 : Manufacture of other organic chemicals
2415 : Manufacture of fertilisers and nitrogen compounds
2416 : Manufacture of plastics in primary forms
2417 : Manufacture of synthetic rubber in primary forms
2420 : Manufacture of pesticides and other agro-chemical products
2430 : Manufacture of paints, varnishes and similar coatings, printing ink and mastics
2451 : Manufacture of soap and detergents, cleaning and polishing preparations
2452 : Manufacture of perfumes and toilet preparations
2461 : Manufacture of explosives
2462 : Manufacture of glues and gelatine

2463 : Manufacture of essential oils
2464 : Manufacture photographic chemical material
2465 : Manufacture of prepared unrecorded media
2466 : Manufacture of other chemical products not elsewhere classified
2470 : Manufacture of man-made fibres
2511 : Manufacture of rubber tyres and tubes
2512 : Retreading and rebuilding of rubber tyres
2513 : Manufacture of other rubber products
2521 : Manufacture of plastic plates, sheets, tubes and profiles
2522 : Manufacture of plastic packing goods
2523 : Manufacture of builders ware of plastic
2524 : Manufacture of other plastic products
2611 : Manufacture of flat glass
2612 : Shaping and processing of flat glass
2613 : Manufacture of hollow glass
2614 : Manufacture of glass fibres
2615 : Manufacture and processing of other glass including technical glassware
2811 : Manufacture of metal structures and parts of structures
2852 : General mechanical engineering
2911 : Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
2941 : Manufacture of portable hand held power tools
2942 : Manufacture of metalworking machine tools
2943 : Manufacture of other machine tools not elsewhere classified
2954 : Manufacture of machinery for textile, apparel and leather production
2956 : Manufacture of other special purpose machinery not elsewhere classified
2960 : Manufacture of weapons and ammunition
3001 : Manufacture of office machinery
3002 : Manufacture of computers and other information processing equipment
3110 : Manufacture of electric motors, generators and transformers
3161 : Manufacture of electrical equipment for engines and vehicles not elsewhere classified
3162 : Manufacture of other electrical equipment not elsewhere classified
3210 : Manufacture of electronic valves and tubes and other electronic components
3320 : Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
3330 : Manufacture of industrial process control equipment
3340 : Manufacture of optical instruments and photographic equipment
3410 : Manufacture of motor vehicles
3420 : Manufacture of bodies (coachwork) for motor vehicles: manufacture of trailers and semi-trailers
3430 : Manufacture of parts and accessories for motor vehicles and their engines
3511 : Building and repairing of ships
3520 : Manufacture of railway and tramway locomotives and rolling stock
3530 : Manufacture of aircraft and spacecraft
3541 : Manufacture of motorcycles
3542 : Manufacture of bicycles
3543 : Manufacture of invalid carriages
3550 : Manufacture of other transport equipment not elsewhere classified
5020 : Maintenance and repair of motor vehicles
5040 : Sale, maintenance and repair of motorcycles and related parts and accessories
5116 : Agents involved in the sale of textiles, clothing, footwear and leather goods

5141 : Wholesale of textiles
5142 : Wholesale of clothing and footwear
5155 : Wholesale of chemical products
5183 : Wholesale of machinery for the textile industry, and of sewing and knitting machines
6210 : Scheduled air transport
6220 : Non-scheduled air transport
6230 : Space transport
6323 : Other supporting air transport activities
7420 : Architectural and engineering activities and related technical consultancy

Low Carbon

1010 : Mining and agglomeration of hard coal
1020 : Mining and agglomeration of lignite
1110 : Extraction of crude petroleum and natural gas
1120 : Service activities incidental to oil and gas extraction excluding surveying
2330 : Processing of nuclear fuel
2952 : Manufacture of machinery for mining, quarrying and construction
3120 : Manufacture of electricity distribution and control apparatus
3710 : Recycling of metal waste and scrap
3720 : Recycling of non-metal waste and scrap
4011 : Production of electricity
4012 : Transmission of electricity
4013 : Distribution and trade in electricity
4021 : Manufacture of gas
4022 : Distribution of gaseous fuels through mains
4030 : Steam and hot water supply
4100 : Collection, purification and distribution of water
4524 : Construction of water projects
5050 : Retail sale of automotive fuel
5112 : Agents involved in the sale of fuels, ores, metals and industrial chemicals
5151 : Wholesale of solid, liquid and gaseous fuels and related products
5157 : Wholesale of waste and scrap
9001 : Collection and treatment of sewage
9002 : Collection and treatment of other waste
9003 : Sanitation, remediation and similar activities

SuperPort

6010 : Transport via railways
6021 : Other scheduled passenger land transport
6022 : Taxi operation
6023 : Other passenger land transport
6024 : Freight transport by road
6030 : Transport via pipelines
6110 : Sea and coastal water transport
6120 : Inland water transport
6311 : Cargo handling

6312 : Storage and warehousing
6321 : Other supporting land transport activities
6322 : Other supporting water transport activities
6330 : Activities of travel agencies and tour operators; tourist assistance activities not elsewhere classified
6340 : Activities of other transport agencies
6412 : Courier activities other than national post activities
7110 : Renting of automobiles
7121 : Renting of other land transport equipment
7122 : Renting of water transport equipment
7123 : Renting of air transport equipment

Financial and Professional Services

6511 : Central banking
6512 : Other monetary intermediation
6521 : Financial leasing
6522 : Other credit granting
6523 : Other financial intermediation not elsewhere classified
6601 : Life insurance
6602 : Pension funding
6603 : Non-life insurance
6711 : Administration of financial markets
6712 : Security broking and fund management
6713 : Activities auxiliary to financial intermediation not elsewhere classified
6720 : Activities auxiliary to insurance and pension funding
7011 : Development and selling of real estate
7031 : Real estate agencies
7032 : Management of real estate on a fee or contract basis
7320 : Research and experimental development on social sciences and humanities
7411 : Legal activities
7412 : Accounting, book-keeping and auditing activities; tax consultancy
7413 : Market research and public opinion polling
7414 : Business and management consultancy activities
7415 : Management activities of holding companies
7450 : Labour recruitment and provision of personnel
7485 : Secretarial and translation services
7486 : Call centre activities
7487 : Other business activities not elsewhere classified
9111 : Activities of business and employers organisations
9112 : Activities of professional organisations

Creative and Digital Industries

1824 : Manufacture of other wearing apparel and accessories not elsewhere classified
1830 : Dressing and dyeing of fur; manufacture of articles of fur
1910 : Tanning and dressing of leather

1920 : Manufacture of luggage, handbags and the like, saddlery and harness
1930 : Manufacture of footwear
7210 : Hardware consultancy
7221 : Publishing of software
7222 : Other software consultancy and supply
7230 : Data processing
7240 : Data base activities
7250 : Maintenance and repair of office, accounting and computing machinery
7260 : Other computer related activities
7440 : Advertising
7481 : Photographic activities
2211 : Publishing of books
2212 : Publishing of newspapers
2213 : Publishing of journals and periodicals
2214 : Publishing of sound recordings
2215 : Other publishing
2221 : Printing of newspapers
2222 : Printing not elsewhere classified
2223 : Bookbinding
2224 : Pre-press activities
2225 : Ancillary operations related to printing
2231 : Reproduction of sound recording
2232 : Reproduction of video recording
2233 : Reproduction of computer media
9211 : Motion picture and video production
9212 : Motion picture and video distribution
9213 : Motion picture projection
9220 : Radio and television activities
9231 : Artistic and literary creation and interpretation
9232 : Operation of arts facilities
9233 : Fair and amusement park activities
9234 : Other entertainment activities not elsewhere classified
9240 : News agency activities
9271 : Gambling and betting activities
3622 : Manufacture of jewellery and related articles not elsewhere classified
3630 : Manufacture of musical instruments
3650 : Manufacture of games and toys
3661 : Manufacture of imitation jewellery
6420 : Telecommunications

Life Sciences

1588 : Manufacture of homogenised food preparations and dietetic food
1589 : Manufacture of other food products not elsewhere classified
2441 : Manufacture of basic pharmaceuticals
2442 : Manufacture of pharmaceutical preparations

2922 : Manufacture of lifting and handling equipment
3310 : Manufacture of medical and surgical equipment and orthopaedic appliances
5146 : Wholesale of pharmaceutical goods
7310 : Research and experimental development on natural sciences and engineering
7430 : Technical testing and analysis
8511 : Hospital activities
8520 : Veterinary activities
246 : Manufacture of other chemical products
281 : Manufacture of structural metal products

Public Sector

6411 : National post activities
7511 : General (overall) public service activities
7512 : Regulation of the activities of agencies that provide health care, education, cultural services and other social services excluding social security
7513 : Regulation of and contribution to more efficient operation of business
7514 : Supporting service activities for the government as a whole
7521 : Foreign affairs
7522 : Defence activities
7523 : Justice and judicial activities
7524 : Public security, law and order activities
7525 : Fire service activities
7530 : Compulsory social security activities
8010 : Primary education
8021 : General secondary education
8022 : Technical and vocational secondary education
8030 : Higher education
8041 : Driving school activities
8042 : Adult and other education not elsewhere classified
8512 : Medical practice activities
8513 : Dental practice activities
8514 : Other human health activities
8531 : Social work activities with accommodation
8532 : Social work activities without accommodation
9251 : Library and archive activities
9252 : Museum activities and preservation of historical sites and buildings
9253 : Botanical and zoological gardens and nature reserve activities
9261 : Operation of sports arenas and stadiums
9262 : Other sporting activities
9900 : Extra-territorial organisations and bodies

This document has been prepared for and approved by the Knowledge Economy Group by Mike Shields, CBE, URC Associates, supported by all the members of the Knowledge Economy Steering Group and, in particular, by Matthew Cliff from the University of Liverpool.
(See Appendix 1 for membership details).

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On behalf of Knowledge Economy Group Partners:

