Oxfordshire Local Enterprise Partnership

BUSINESS PLAN FOR GROWTH 2013

REALISING THE POTENTIAL OF THE OXFORDSHIRE ECONOMY

Contents

Introduction

At the geographical heart of the UK sits an international economic powerhouse, driving new technology, new markets and ground-breaking developments which aid every aspect of UK industry and commerce.

With discovery, science and research, Oxfordshire has one of the most substantial, distinctive and important clusters of research based, high value business activities in Europe, at the core of which are world class universities, research institutions and hospitals in Oxford and to the south of the county at Harwell and Culham.

Oxfordshire has national leadership in globally significant sectors which the Government identifies as having the potential to drive national economic growth over the coming years[1]: life sciences, nuclear fusion, cryogenics, space innovation, and advanced motorsport engineering. Publishing, IT and environmental technologies contribute further to the cross-sector diversity which is such a distinctive strength of the local economy.

Our universities and science institutes are pre-eminent in UK technology transfer. Together with Oxford's global profile this provides an outstanding environment for inward investment and businesses to spin out and grow in high quality business locations across the region: Oxford's science parks, Bicester, Science Vale, the Enterprise Zone, and beyond.

Bringing together businesses, universities, research institutions, the Local Authorities and the Further Education sector, the Enterprise Partnership sets a new benchmark in our collaboration and will accelerate growth at a transformational scale in enterprise and applied research based on six main objectives.

If our goal is to be successful, then we already are here. But we could be so much more. Progress in setting out and acting on Oxfordshire's long term growth ambitions; aligning the agendas of the many different stakeholders and developing a culture that focuses on the benefits of pooling resources to achieve a shared future of prosperity for all. Together these provide the context in which more specific issues – set out in the business plan below – need to be addressed in order to unlock the county's full economic potential.

[1] See for example BIS (2012) "*BIS Industrial Strategy UK Sector Analysis*", BIS Economics Paper No. 18

Executive Summary

Those involved in the Oxfordshire Local Enterprise Partnership share a common ***Vision***: to make Oxfordshire a globally competitive, knowledge based, economy open for business and at the heart of UK-wide economic growth, innovation and private sector job creation.

The Enterprise Partnership's ***Mission*** is to provide a level of strategic leadership to:

- Shape and articulate a vision for the future of Oxfordshire's economic growth;
- Promote the rebalancing of the economy from the public to private sector;
- Support existing organisations to realise their full potential through better support and co-ordination;
- Promote investment in skills development that supports growth in our key sectors.
- Remove barriers to, and creating the infrastructure for, business start-up and growth, actively facilitating innovation and entrepreneurship;
- Support the development of markets in the key sectors of the future.

The Oxfordshire Local Enterprise Partnership will work to achieve alignment not only in ***what*** they are seeking to achieve but also in ***how*** they work together: enabling and supporting what already exists; simplifying where possible and identifying and addressing barriers and gaps where necessary. The Enterprise Partnership will work with other Local Enterprise Partnerships on specific initiatives.

The Enterprise Partnership will focus on those ***sectors*** that have the greatest potential for growth and global competitiveness:

- Life sciences and medical instruments
- High Performance Technologies including advanced materials, cryogenics, nano-technology and engineering
- Space and satellite applications
- Energy and environmental technologies
- Digital, publishing and media

The Oxfordshire Local Enterprise Partnership will prioritise ***key issues*** rather than trying to do everything.

1. Improving access to finance
2. Improve access to business support services
3. Securing investment for infrastructure priorities
4. Improving the infrastructure and exploitation of improved broadband
5. Addressing skills deficiencies
6. Increasing inward investment from international businesses
7. Supporting innovation and growth,

The Enterprise Partnership will focus on ***priority localities*** ranging from Science Vale in the south, through Oxford to Bicester in the north of the county.

The Business Plan 2013 brings together the existing work of the Enterprise Partnership at a time when the economic development landscape locally and nationally is in considerable flux. In this context all the stakeholders involved in the Enterprise Partnership are involved in multiple discussions about the county's long term economic growth strategy. These discussions are being informed by the Enterprise Partnership's regular 'Barriers to Business' surveys and will in turn inform further work by the Enterprise Partnership to develop that long term strategy for business and employment growth during the first half of 2013.

Artist's impression of The Magnet a proposed new science-based visitor attraction, planetarium and innovation centre in the heart of Oxford.

Understanding our potential

Founded in Academic Excellence

Oxford University is rated as the best university in Europe and the second best in the World. Its medical school is rated the best in the world. Oxford Brookes is rated as the best new university in the country. It also has an excellent record of supporting businesses through Knowledge Transfer Partnerships. The Defence Academy of the United Kingdom at Shrivenham is the UK's primary postgraduate training facility. As well as being the MoD's primary link with UK universities, it has links with similar institutions internationally.

While academic excellence is how most people envision Oxford, the county's offer is far wider. Not only has this academic excellence translated into commercial science and innovation on the Oxford Science and Begbroke Science Parks but also Oxford itself was recently highlighted as one of eight 'buoyant cities' regarded as 'prime candidates for major expansion to support further economic and employment growth'.

Science and Innovation to the Fore

As part of Science Vale UK, the Harwell Science and Innovation Campus is being developed as a world-class centre for science, innovation and enterprise. Home to the Science and Technology Facilities Council, the Rutherford Appleton Laboratory, the Medical Research Council and the European Space Agency Space Centre, Harwell has more than 4,500 people working in over 140 organisations comprising large-scale research councils, high technology companies and a range of rapidly growing start-ups.

Elsewhere within Science Vale UK, Culham is home to the UK's fusion research programme – the Culham Centre for Fusion Energy (CCFE) – as well as the world's largest fusion experimental facility – the Joint European Torus (JET). While Milton Park, one of Europe's largest multi-use business parks, is home to more than 160 companies that form one of the UK's foremost science communities. The 6,500 people on the site work for companies of all sizes and ambitions, ranging from start-ups to worldclass plcs with particular strengths in the biotech and ICT sectors.

Technology Transfer: Creating the Future

With global headquarters and/or principal research and development facilities for world leading high technology companies such as Oxford Instruments, Siemens MR Magnet Technology, Sophos, RM plc, Infineum and Sharp, Oxfordshire is home to facilities that are shaping the future. While, in the Oxford University Hospitals NHS Trust, we have one of the leading medical research hospitals in the UK, offering patient care, teaching and world-class research, allied with a strong healthcare technologies sector. The Oxford Academic Health Science Network – that covers the whole Thames Valley area – will further strengthen the capacity to create commercial value out of the medical sector.

The technology transfer company of Oxford University (Isis Innovation) is one of the UK's most prolific and best regarded technology transfer companies, as is STFC Innovations.

Oxfordshire is at the heart of the multibillion pound 'Motorsport Valley' technology cluster that has links to successful firms across the UK that supply a global industry. These companies dominate the design and manufacture of components used in the majority of the world's racing categories. They also develop the leading-edge technology use in F1, technology that ultimately is absorbed into mainstream car technologies.

Each of Oxfordshire's high tech specialisms has different geographies. For example, whilst publishing is concentrated in Oxford, high performance engineering extends across the county and has strong links into neighbouring Northamptonshire, Coventry and Warwick. The bioscience cluster has particular concentrations in Oxford and in southern Oxfordshire, whilst space science and cryogenics are focussed mainly around Harwell and Culham.

Understanding the challenges

Oxfordshire is not performing as well as it could or should. Its Gross Value Added per head is only average when compared with our competitors in the UK[2] or internationally. The growth in its knowledge-intensive economy is slower than its competitors.

There are skills shortages in the area of skilled technicians particularly for engineering and manufacturing and particular concerns about an underperforming schools system.

The economy is characterised by a large public sector, comprising local government, academic institutions, the health sector, the police and the military. Most of these public sector organisations are large scale and will be subject to reductions in the funding they receive from Government.

In contrast the private sector includes many small enterprises, with a slightly lower proportion of medium sized and large businesses than comparable areas. Despite the county's success in producing high tech start-ups, Oxfordshire has produced far fewer businesses that have scaled up to become 'large' businesses when benchmarked either in the UK with Cambridge or internationally with Boston.

As growth in GVA is particularly associated with businesses scaling up from medium to large size this gap in Oxfordshire's business profile is of particular significance. Specific objectives around improving our support to businesses and improving their access to finance are set out below to address this area of concern.

Poor infrastructure adds costs for Oxfordshire businesses seeking to work efficiently. Congestion on the roads, slow broadband and poor mobile phone access all impact different types of businesses in different parts of the county. Knowledge based businesses – of which Oxfordshire has a lot and has potential for more - are increasingly unable to operate or grow in (mainly rural) areas with inadequate digital infrastructure and in Oxford where a recent survey of Oxford businesses revealed the **lack of suitable business premises as the biggest barrier to location/relocation**.

The richness and diversity of the Oxfordshire economy creates a problem of complexity that makes it difficult for those with technical, funding or business problems to find those with the solutions they are seeking.

[2] Note: Gross Value Added, GVA, per head is calculated by the dividing the value of wealth created in an area by the number of *residents living* in that area. Therefore an area like London or Berkshire that attracts in a lot of its workforce from outside their area (and therefore has a larger workforce creating value than it has residents), will have a higher GVA/ (resident) capita than somewhere like Oxfordshire that has a balance between workforce and residents.

The market of those trying to sell their solution to those seeking solutions to their problems is not working. Understanding Oxfordshire's complex networks and making it easy for people and businesses to find the partners they need is essential if the county's full potential is to be realised.

The very strength of the Oxfordshire economy and the quality of its environment creates both a complacency that future prosperity can be taken for granted. Even in the middle of the current recession the level of unemployment is just half that of the UK as a whole.

The threat to Oxfordshire's economy lies in the future as the costs of an aging population and out of date infrastructure combines with a structural shift in the global economy and decline of our major trading partners. Just because Oxfordshire has been prosperous in the past does not guarantee its future. This strategy is about responding to that challenge to ensure both Oxfordshire's contribution to the UK economy and its own future prosperity.

Sadler Building Oxford Science Park

Realising Our Potential

A Shared Vision

Those involved in the Oxfordshire Local Enterprise Partnership share a common vision: to make Oxfordshire a globally competitive, knowledge based, economy open for business and at the heart of UK-wide economic growth, innovation and private sector job creation.

Alongside the cutting edge knowledge being generated by Oxfordshire's universities and research centres, many businesses in Oxfordshire are already successful in global markets. But competition is increasing and to build on these strengths Oxfordshire has to use innovation to increase productivity and address barriers to growth.

A clear mission

The Enterprise Partnership's *Mission* is to provide a level of strategic leadership to:

- Shape and articulate a vision for the long term future of Oxfordshire's economy;
- Promote the rebalancing of the economy from the public to private sector;
- Support existing organisations to realise their full potential through better support and co-ordination;
- Promote investment in skills development that supports growth in our key sectors.
- Remove barriers to, and creating the infrastructure for, business start-up and growth, actively facilitating innovation and entrepreneurship;
- Support the development of markets in the key sectors of the future.

As a partnership the starting point of this mission is working with all the partners that make up the Oxfordshire Local Enterprise Partnership to achieve alignment not only in *what* they are seeking to achieve but also in *how* they work together. The role of the Oxfordshire Local Enterprise Partnership therefore is one of enabling and supporting what already exists; simplifying where possible and identifying and addressing barriers and gaps where necessary.

Oxfordshire has the capacity to pioneer the development of new markets by bringing together the range and intensity of its science and technology offer, its success in spinning out innovative and high growth businesses and its ability to connect these to supply chains linked to world and market leaders. Making new markets and obtaining first-mover advantages in them will be vital to remaining competitive.

Priority sectors

The Enterprise Partnership will focus on developing markets and creating private sector jobs in those sectors that have the greatest potential for growth and global competitiveness. Details of the businesses to be found in first four of those sectors are set out in Annex 2. Newer sectors contain a wide range of emerging technologies that may be a relatively small part of the economy at present but have to be supported in view of their considerable potential for the future.

- Life sciences and medical instruments
- High Performance Technologies including advanced materials, cryogenics, nano-technology and engineering
- Space and satellite applications
- Energy and environmental technologies
- Digital, publishing and media

Other sectors, including retail, creative and cultural industries, tourism and the visitor economy, the military and the voluntary, community & faith sectors will continue to be important. It is this variety, coupled with the heritage offer (including Blenheim Palace – a world heritage site - and the concentration of historic buildings in Oxford) and the quality of the environment that makes Oxfordshire such an attractive place to live and work.

Priority strategies

The Oxfordshire Local Enterprise Partnership will prioritise key issues rather than trying to do everything. Prioritisation starts with the Economic Assessment a summary of which is provided in Annex 1 below. The initial priorities coming out of this are:

1. Improving access to finance
2. Improve access to business support services
3. Securing investment for infrastructure priorities
4. Improving the infrastructure and exploitation of improved broadband
5. Addressing skills deficiencies
6. Increasing inward investment from international businesses
7. Supporting innovation and growth,

Priority Programmes have been established to address these key issues

Priority locations

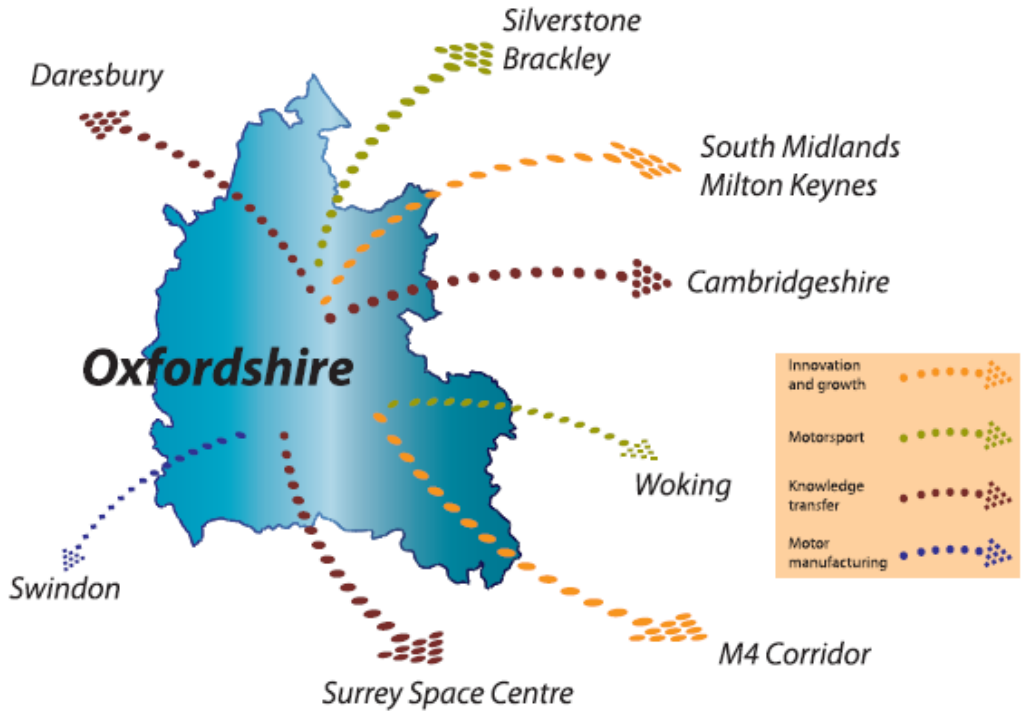
We will focus this work on our key spatial priorities.

- Science Vale UK - where we will build on its extensive research infrastructure and the designation of Harwell as the home of the national Satellite Applications ‘Catapult’;

- Bicester - where improved infrastructure and increased land availability is unlocking the potential for significant increases in employment growth;
- Oxford - where we will continue to invest in developing the critical infrastructure necessary to realise the full potential of its world-class education, research and innovation.

How we work

- Cooperate with neighbouring Local Enterprise Partnerships on specific sector initiatives
- Actively facilitate businesses' needs for cross boundary working where this is necessary
- Work for all the partnership's stakeholders in business, local authorities, academia and other sectors;
- Ensure business representation reflects different sectors and sizes of business
- Add value by building on what exists and bringing disparate initiatives together while also facilitating and enabling the work of others rather than trying to do everything as the Enterprise Partnership.



Priority Programmes - Specific Objectives

The Enterprise Partnership has identified the following themes as priorities for delivery:

1. Access to Finance
2. Business Support
3. Infrastructure
4. Broadband
5. Skills
6. Inward Investment
7. Innovation

A brief strategy for each of these areas is set out below.

1. Access to Finance

Why is help required?

- Access to finance remains a barrier to business development. In particular, small and medium sized businesses face challenges accessing bank and equity finance.
- New and small businesses have inadequate knowledge of funding other than through a bank due to lack of financial expertise and a confusing market offer
- Lack of access to funding for even successful businesses is constraining their rate of growth and causing some to re-trench staff
- The quality of propositions presented to potential investors is not consistently high
- New sources of internet funding are poorly understood
- Capacity to access funding from City of London, London based VCs, EU, Regional Growth Fund, tier one financing and other sources is low

What will success look like?

- Percentage of businesses reporting inability to access funding is reduced
- Internet and phone based brokerage is helping those seeking and offering investment
- Funding is accessed from new internet and institutional sources

Where are we?

- Access to Finance group is bringing together banking, corporate finance, Angel and VC investors to understand what we have and identify gaps
- Business support group is developing internet portal for sharing information

What needs to happen?

- Understanding of Angel, VC, crowd sourcing and institutional funding needs to be improved to identify gaps that need to be addressed
- Financial advice and brokerage service on web and over phone needs to be put in place by spring 2013
- SME Investment Fund is established to provide funding that saves and/or creates private sector employment

2. Business Support for Starting-up and Scaling-up

Why is helped needed?

Business support remains a key requirement for supporting business survival, start up and growth.

Businesses (particularly smaller and earlier stage operations) can struggle to access the range of support they need even though there is a wide range of support currently available within Oxfordshire. Support needs to be demand focussed rather than supply focussed as it has been to date. It is vital to assist those businesses that have capability to grow and create new private sector jobs for Oxfordshire, especially in the current economic climate.

What will success look like?

- Increased employment through increased business survival, start up and growth.
- The majority of businesses in Oxfordshire know where and how to access relevant support by the provision of a comprehensive matrix showing the variety and sources of both private sector and public sector support that is available in Oxfordshire. This matrix to be available from as many sources as possible rather than being accessed through just one organisation.
- Identification of the 6% of Businesses (NESTA report) within our region that have the ability to grow significantly (100% growth) within three years.
- Business start-up and survival rates increased to at least national levels
- Networking events that will facilitate businesses in Oxfordshire to supply other businesses/organisations within Oxfordshire. (Meet the Buyer / Meet the Expert)

Where are we?

- Many existing business advice and mentoring services are in place: gaps in the service and access to them need to be identified and addressed
- Web site support exists on both the LEP and Business link website, this needs to be simplified / combined.
- Regional Growth Fund bid is being developed to provide support to Armed Forces service leavers.

What needs to happen?

- Delivery of 'business hub' detailing sources of support and in use on stakeholder websites – March 2013
- Identification of any gaps in business support based on survey of what business needs in order to achieve growth - Spring 2013
- Appropriate use of social media to facilitate networking. – Spring 2013
- Establish links with Banks and Landlords in Oxfordshire to identify Companies that might benefit from support. – Spring 2013

3. Infrastructure

Why is help needed?

To realise our full potential and remain globally competitive, there is a need for continued investment in both physical and virtual networks. Priorities include ensuring our transport and communication networks are fit for purpose, accessing and aligning infrastructure investment with that made in housing and other infrastructure and ensuring the planning system is an enabler of sustainable economic development, not a barrier to it.

Congestion on main Oxfordshire routes has almost doubled from 5.4% to 9% between 2007 and 2011 and peak time junction delays are forecast to increase. This degradation is limiting potential new housing and employment sites because of concerns they will add further congestion Infrastructure spend has declined in the past 5 years as many public infrastructure schemes have been delayed or abandoned. Funds available are significantly constrained making it a challenge to address the congestion issue

The lack of affordable social and market housing constrains business growth (i.e. lowest quartile housing prices are 9 times the level of lowest quartile earnings) as does the lack of space for incubating and growing innovative businesses.

What will success look like?

- Halve congestion and peak junction delays by 2020
- Delivery of new housing is in line with commitments made in Local Plans to deliver 24,800 new homes in Bicester, Oxford and Science Vale by 2031
- Innovation hubs in Science Vale and Oxford incubate and grow science based businesses

Where are we?

- The Spatial Planning and Infrastructure Partnership's Local Investment Plan is available
- The Oxfordshire Growing Places Fund is now launched

- The Enterprise Partnership gained funding from the Pinch Point Programme to address the congestion at J9 on the M40
- Discussions continuing to create Local Transport Board

What Needs To Happen

- Clarify the nature and scale of the congestion issue and infrastructure issue (e.g. how congestion compares to other similar cities such as Cambridge and other parts of the Thames Valley)
- Set out the 10 year view on infrastructure needs in Oxfordshire
- Develop and evaluate investment alternatives (including investment in East-West railway, Heathrow access rail link; third runway at Heathrow)

4. Next Generation Access Broadband: infrastructure and use

What help is needed?

- Delivering Next Generation Broadband access, particularly in rural areas, will remove a significant barrier to job creation through business growth and increased levels of self-employment.
- Poor quality broadband services are restricting business growth of potential and existing businesses.
- 63% of businesses in rural areas are dissatisfied with their broadband speeds, compared with 48% in urban areas. Furthermore 37% of businesses feel their success has been held back by slow broadband (FSB).
- In Oxfordshire 40% of people working from home feel the speed and quality of their broadband connection is an issue where they live, this rises to 59% in rural areas (Ox Voice survey 2012).
- By the end of 2013 approximately 25,000 businesses will be in areas where superfast is available. The issue for them will be whether they are exploiting the full potential of the improved infrastructure
- A further 15,000[3] businesses will be in "White" areas – where the market is not providing superfast broadband. These businesses will rely on intervention measures through Oxonline to deliver upgraded broadband infrastructure. Once the improved infrastructure is installed realising its benefits will again depend on businesses learning how to exploit its full potential.

What will success look like?

Broadband services across the county that allow existing businesses to grow, in their current location and encourage more start-up businesses.

Services need to provide a range of reasonably priced business focused ISP services, which

enable businesses to utilise such things as the expanding cloud based services, marketing, retailing and B2B networking.
The OxOnline project will be delivered countywide along with focused local projects, this will mean that satisfaction levels will increase – Target 90% businesses satisfied with their broadband service by 2015.

Where are we?

- 70% of the county's premises will be upgraded to Superfast Broadband by operators (BT and Virgin) on a commercial basis, by end of 2014.
- £3.86million of Broadband Development UK (BDUK) money will be combined with £14million gap funding from Oxfordshire County Council for delivery of OxOnline which will upgrade broadband in the non-commercial parts of the county with at least 90% of premises getting Superfast Broadband by 2015.
- In Deddington, BT have announced its first rural fibre only exchange and are delivering a 100% Fibre to the home (FTTH) solution. Gigaclear have announced a new FTTH village network for Appleton and Eaton.
- The Enterprise Zone at Harwell and Milton Park and Oxford City have focused projects that will be delivered by 2014.
- Local operators such as Gigaclear, Sugarnet wireless and Cotswold broadband continue to explore expansion of networks in rural Oxfordshire

What needs to happen

- Business engagement - support OxOnline demand registration providing evidence that businesses want upgraded broadband and stimulation processes, once areas are covered, to encourage businesses to utilise benefits of broadband – Ongoing
- Examine potential of Innovation hubs in rural areas, to provide access to ultrafast services.
- Look at all linkages and funding opportunities for business support to utilise broadband for example ERDF, Getting British Business Online, Spring 2013
- Maintain pressure on government for further investment in fixed and mobile broadband.
- Support local projects e.g. Cotswold Broadband, Noke/Islip to help deliver upgrades in the hardest to reach areas, Spring 2013.

5. Skills for Business - Addressing Skills Deficiencies

Why is help needed?

The recently conducted Skills Needs Analysis has confirmed that some businesses require specific help and advice in order to address their skills gaps:

- Engineering & Manufacturing: serious shortage due to the combination of a relatively large and growing sector, an aging workforce and low take up of training
- Retail: although there is a large gap in this area course up take is a challenge.
- Care: although there is significant take up of training relevant to this sector, a skills gap is anticipated due to the predicted growth of this sector.
- "Employability skills": cutting across all sectors is the need for softer 'employability' skills.

Where are we?

The Oxfordshire Skills Board has set up a Skills Science Vale UK Steering Group to develop a skills strategy, action and investment plan for Science Vale Enterprise Zone overseeing the work funded by the Skills Funding Agency to the amount of £100,000.

Will success look like?

- Rise in the uptake of courses where gaps have been identified
- Agreed local definition of employability skills and solutions emerging to develop these at every level of learning: schools, colleges, unemployed, workforce, undergraduates
- Increase in the number of businesses actively training staff

What needs to happen

- Refresh Skills Needs Statement for the enterprise zone with an additional section – Spring 2013
- Find creative ways to influence learners to make choices about learning that will help them to get a job (on going: Careers Fest, Worlds SkillsUK, Teen Tech, support for schools)
- Encourage and support more businesses to invest in training (starting with high tech manufacturing sector through the Skills for SVUK project)

6. Inward investment

Why is helped needed?

Many of our businesses form part of global supply chains. Actively seeking out the relocation of businesses within existing supply chains to Oxfordshire will increase the resilience of our economy.

UK and international private sector investment (and associated job creation) are lower in Oxfordshire than in comparable areas of UK such as Thames Valley, Berkshire, and Cambridge, potentially due to weaknesses in the Oxfordshire offer – (arising from issues such as problems with infrastructure, housing and access to talent for example) and inadequate communication and marketing of the Oxfordshire offer

National and international competition for investment has already increased and is expected to significantly increase over the coming 5 to 10 years – competition from within the UK and from across Europe and the Middle East.

There are potentially increased inward investment opportunities in the future

What would success look like? What would its impact be?

- Double the level of investment and jobs in Oxfordshire by 2020
- Improvements in the investment offer – skills, infrastructure, business support, access to finance
- Clarity on Oxfordshire's USP and improved marketing of it to investors
- Increased level of positive mentions of Oxfordshire as an investment location in the media

Where are we?

'Invest in Oxfordshire' is set up and is delivering:

- Marketing materials (generic, sector/locality specific, hard copy and electronic)
- Proactive marketing
- Enquiry handling (through Invest in Oxfordshire)
- Aftercare and Account Management targeting key Oxfordshire businesses

What needs to happen?

- Collate empirical data to guide Invest in Oxfordshire activities - competitive analysis; media presence; barriers to investment, and perceptions of Oxfordshire both nationally and internationally.
- Clarify the strengths and weaknesses of the Oxfordshire 'offer' : what are the barriers to investment?

- Clarify Oxfordshire's USP – An umbrella brand/description to bring together Oxfordshire's high tech clusters
- Develop new PR / marketing strategy accordingly
- Develop a strategy to lobby for improvements in the Oxfordshire offer by articulating the improvements that investors need in areas such as skills, infrastructure, business support and access to finance
- Develop and evaluate alternatives for increasing investment
- Develop a strategy to proactively target trade events and specific companies in sectors for which Oxfordshire has strong, growing clusters
- Establish Invest in Oxfordshire as a stand-alone entity, similar to 'Visit Oxfordshire'

7. Innovation

Vision:

"Oxfordshire will be recognised as a globally leading environment for High Technology and Innovative businesses and jobs"

Mission:

To align available knowledge, resources, and skills and to bring in the additional elements needed to create a coherent and self-sustaining innovation environment

Why are we needed?

- The route to growth in Oxfordshire is through high value, knowledge-focused businesses that depend on innovation. This will originate from existing centres of strength but will extend throughout the County to all urban centres and beyond, to small rural businesses.
- Oxfordshire has a world class science and technology base; a strategy is needed to ensure that the regions resources are marshalled to deliver the vision
- Oxfordshire has growing strength in software and creative industries; there is a need for deeper co-ordination of design expertise to support regional innovation

What will success look like?

- Clear implementation plans are in place to deliver the structures, mechanisms and cultures required for a globally leading innovation ecosystem
- Support for Starting, Scaling, and Attracting innovative businesses in and to Oxfordshire is in place
- Success looks like more new technology businesses, more rapid growth in existing business, and increased investment by high knowledge businesses moving to Oxford
- Success looks different for different sectors; we will understand the different shapes of our (e.g.) space and medtech clusters, and will grow them appropriately

Where are we?

- Projects are in place to better understand the scope of resources and current activity (e.g. Oxford Phenomenon project led by the University)
- Oxfordshire has great strength in the 8 priority areas currently identified by government
- Regional organisations are focusing on innovation as the key to unlocking growth (e.g. City Council Economic Growth Strategy)
- The working group has a timeline for delivering the Innovation Strategy by March 2013

What needs to happen?

- The LEP will develop and enhance connections to government, TSB and other key strategic bodies to increase the flow of resources to Oxfordshire Innovation
- The LEP will develop mechanisms to help local companies get through the valley of death, linking companies to government funding.
- The LEP will work to attract development funds that will enhance the innovation environment in the Oxford, the Enterprise Zone and in other foci for innovation
- Continue to support and champion initiatives like the BioEscalator and the Oxford Design and Innovation Lab

Did we do well? - Measuring our Performance

Oxfordshire Local Enterprise Partnership is clear in its focus on "Creating new private sector jobs for Oxfordshire". We have set out above seven specific objectives each involving a programme of work that we will deliver in order to contribute to achieving that goal. Each programme has its own indicators to measure whether it is being delivered.

Measuring the impact of the Enterprise Partnership as a whole will come down to 4 measures, three of which will come from national data sets and the fourth from the Enterprise Partnership's own 6-monthly 'Barriers to Business' survey:

- Jobs growth
- Business formation and survival rates
- Productivity as measured by Gross Value Added per hour worked
- Skills shortages as measured by business survey

Communications

What will success look like?

The Partnership will be a high profile organisation, well-known to the Oxfordshire business community and our public and education sector partners for its work enabling economic development, supporting business and most importantly creating new jobs. Regular news, features and interviews in the local and national media will make the Local Enterprise Partnership, LEP, clearly visible to key partners in Oxfordshire and beyond as the voice of business, celebrating business success, playing a key role in driving forward projects that promote growth and the long term prosperity of Oxfordshire.

The Enterprise Partnership will be actively engaged in conversation with business and our other partners face to face and online - attending key national and local events, networking, connecting companies and individuals. Online, we will be active on business networking sites, engaging in discussions, highlighting opportunities, building our network, recruiting Ambassadors, feeding back survey results and promoting our services to those that need them.

Our approach to communications, engagement and marketing will be professional, proactive, forward-thinking and well-coordinated, anticipating and exploiting key media opportunities, clearly stating our key messages in all our output, positioning ourselves as both a news source and authority on the private sector in Oxfordshire.

Where are we now?

The Enterprise Partnership is now establishing itself with the local media and starting to raise its profile among the business community. It had a successful media launch in November resulting in positive press coverage

We are now starting to actively engage with our business audience, taking a more integrated approach to communications. Our business survey for example had a multi-channel launch and was emailed to over 1000 businesses through partner business organisations. As part of its overall communications, the Enterprise Partnership is now taking a more proactive approach to PR, issuing press releases, comments and responses to relevant business announcements and developments.

What needs to happen?

The Enterprise Partnership communications and marketing activities need to be broadened and stepped up through a detailed communications strategy. The Partnership needs to keep its audience(s) better informed about the work it is doing with its partners and to celebrate its successes.

We need to increase our engagement with audiences and to feedback to them regularly. We need to agree an internal protocol for our PR activities allowing us to plan for news and to react fast with board members available and on-call for interview opportunities. Our communications messages also need board agreement and should be incorporated into all appropriate communications and marketing materials.

Key projects and initiatives such as the Growing Places Fund need to be promoted through mini campaigns that are effectively targeted to ensure they reach key audiences. A regular 'newstorm' at LEP secretariat team meetings and board meetings will identify stories and developments that can be written up or pitched to editors and as articles.

The Enterprise Partnership needs to recruit business leaders as Ambassadors as many other LEPs have done already to great effect. Ambassadors will sponsor our work and build our credibility among the business community.

Ariel view of Oxford

Developing the Growth Strategy 2013 – 2030

The Enterprise Partnership is actively engaged in a number of processes that relate to the development of a long term Growth Strategy for Oxfordshire. This is part of its commitment to work for all of the Enterprise Partnership's stakeholders, to build on what exists and to bring disparate initiatives together. These processes will continue during January 2013 as the Oxfordshire City Deal expression of interest is finalised and submitted and as the Local Investment Plan is developed by the Spatial Planning and Infrastructure Partnership. The Spatial Planning and Infrastructure Partnership has cross representation with the Enterprise Partnership and provides the basis for aligning and delivering business, infrastructure and housing requirements. This work will be informed by the results of the first of the Enterprise Partnership's six-monthly 'Barriers to Business' survey that is currently being concluded.

In addition Oxford University has initiated an in depth review of Oxfordshire's high tech economy which is being produced by SQW under the working title of 'The Oxford Phenomenon. This work is conducting very extensive desk and primary research with high tech business leaders and with a wide range of stakeholders including the Enterprise Partnership. Its preliminary results will be produced during the spring of 2013.

The results of all these processes will inform the Enterprise Partnership's own away-day on 22nd January and, with the findings of the Oxford Phenomenon report, will inform the further development of a long term Oxfordshire Growth Strategy 2013 – 2030. This will be consulted on and refined in the first half of 2013.

STFC Space Test Chamber

The Executive Board members

The Board of the Oxfordshire Local Enterprise Partnership is made up of representatives from business, the public sector and academia.

Adrian Shooter CBE
Chairman, representative of CBI

Ian Wenman
Vice Chairman, business consultant, representative of IOD

Phillip Shadbolt
Business Owner – Zeta Controls Ltd
Bicester Vision

Margaret Coles
Chair of Oxfordshire Federation of Small Businesses

Councillor Ian Hudspeth
Leader of Oxfordshire County Council

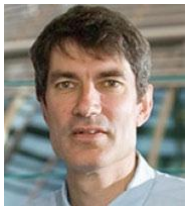
Sally Dicketts
Principle of Oxford & Cherwell Valley College

Councillor Anne Ducker MBE
Leader of South Oxfordshire Council
Oxfordshire Spatial Planning and Infrastructure Partnership

Adrian Lockwood
Business Owner – Integration Technology Ltd
Oxfordshire Skills Board

Paul Inman
Pro-Vice-Chancellor Oxford Brookes

Nigel Wild
Business Owner – Wild Associates, representative of Chamber of Commerce



Professor Steve Cowley
Chief Executive Officer, UKAEA
Science Vale UK

Councillor Bob Price
Leader of Oxford City Council
Representing Oxfordshire District Councils

Nicolas Grant
Managing Director
British Gas Corporate Markets
Oxford Strategic Partnership

Professor Ian Walmsley
Pro-Vice Chancellor for Research Academic Services
Oxford University

Annex 1: Summary of Evidence

Realising the potential of Oxford and Oxfordshire's knowledge economy to drive UK economic growth[4].

Executive Summary

Oxfordshire has one of the most substantial, distinctive and important collections of research-based, high-value business activities in Europe. It is at the heart of the science and knowledge-based economy that the Coalition Government identifies as the centrepiece of national economic recovery. The leading clusters in the Oxfordshire knowledge-based economy (KBE) - biosciences and medical research, space and satellite technologies, cryogenics, advanced automotive engineering - are poised to grow substantially in coming years. There are additional strengths in digital information management, cyber-security, publishing, green construction, professional and business services, and culture/creative industries.

To date, however, Oxfordshire as a whole has benefitted less in comparison with other high-tech areas. Between 1980 and 2006, Oxfordshire's GVA per capita grew in line with the national average, while Cambridgeshire's figure grew at 2½ times the national rate. The reasons for this are complex: While high-tech spin-out activity in Oxfordshire compares very well against other leading areas, the subsequent consolidation of medium-sized and particularly larger-scale enterprises is less apparent. Foreign Direct Investment into Oxfordshire has also been comparatively low, with only 3% of South East region FDI jobs locating in Oxfordshire between 1999-2010. This compares with 13% in Berkshire, 16% in Surrey, 13% in Hampshire and 15% in Bucks. In terms of leading global standards, the Oxfordshire high-tech cluster remains relatively small scale.

Additionally, despite the emergence of the Oxfordshire KBE there are structural constraints and much of the growth potential is still to be realised. For historical reasons (e.g. location on former military bases and UK Atomic Energy Authority sites) key elements of the Oxfordshire KBE are scattered across the county in a largely semi-rural context, resulting in demonstrable infrastructural shortfall and a lack of integrated planning. The growth prospects of the Oxfordshire KBE therefore face immediate challenges in terms of infrastructure development, housing availability and affordability, the variety and location of property for employment use, and skills shortages.

Most importantly, there is a need for improved *connectivity* across the sub-region. This is particularly the case given the diverse geographies which characterise the different clusters (publishing predominantly in Oxford; motorsport/advanced engineering across north and west Oxfordshire and into Northamptonshire; biosciences in and around Oxford and in southern Oxfordshire; space science and cryogenics focussed mainly around Harwell and

[4] This summary developed by Dave Valler of Oxford Brookes University as a contribution to the development of the Oxfordshire City Deal

Culham) and the importance of proximity and networking in innovation and commercialisation processes. Increasingly, analysts are recognising the potential for cross-cluster working as the basis for ongoing dynamism and innovation. Transportation and digital infrastructure improvements are therefore absolutely critical, particularly in the light of existing capacity issues and areas of network stress which impact on the transportation system, including: the A34 especially between Didcot and the M40; the A40 between Witney and Headington; the Oxford Ring Road; the rail corridor through Oxford; and routes in and around main towns. However, agreed priorities for major roads projects are currently hamstrung by lack of funding, and broadband improvements - particularly in rural areas - are too slow.

The challenges of connectivity are compounded by land and property availability. A recent survey of Oxford businesses revealed the lack of suitable business premises as the biggest barrier to location/relocation to Oxford. There is a shortage of nursery industrial units in and around the city, with particular implications for spin-out companies. The pattern of current floorspace supply in the County is heavily skewed by development at Upper Heyford in the north of the County. Employment land allocations to 2026 are substantial across the County as a whole, but more restricted in and around Oxford.

Beyond the current situation, growth figures for Oxford city over the next 20 years or so do not fully reflect its central position in the Oxfordshire KBE and its national and global importance as an engine of knowledge-based economic development. Between 2011 and 2031, Oxford city is projected to increase employment by 11,000, from 105,800 to 116,800. This is a percentage increase of approximately 10%. Starting from a much lower base, employment growth planned at Bicester over the same period is 13,300 (or 102%), and Science Vale 14,000 (56%).

Housing availability and affordability is a further structural challenge. Oxford city is the least affordable housing location nationally outside of London based on the ratio of average incomes to house prices, a factor almost universally highlighted by employers and stakeholders during the development of Oxford City's current Economic Growth Strategy. The rate of house-building in the County has fallen year-on-year since 2006 so that in 2010/11 a total of 1,600 houses were built in Oxfordshire, the lowest annual level of house building since 1971 (from when records are available). Based on the delivery of key sites, household growth at Oxford city (2011-31) is estimated at 9% (5200 households), with Bicester at 52% (6600) and Science Vale/Didcot at 63% (13,000). Currently proposed housing figures will not make any material change to the problems of availability and affordability in the city, and housing supply must be seen as a potentially very significant barrier to the operation of the labour market, with concomitant implications for travel-to-work patterns.

An emerging concern is over skills shortages. Oxfordshire employers report shortages in high level skills, most challenging to businesses in the science, technology and engineering and manufacturing sectors. According to the Oxfordshire Employer Skills Study, in 2010 - in recessionary conditions - 7% of employers were reporting that their vacancies were hard to fill. The dominant reason for recruitment difficulties was a lack of applicants with the

required skills, an issue more common in Oxfordshire than nationally and in neighbouring areas with broadly similar economies such as Berkshire and Surrey. These issues are exacerbated by housing challenges.

There is significant potential to improve the performance of the County in terms of attracting inward investment. It should be noted, however, that across England, UKTI had active involvement in 207 inward investment successes during 2011-2012, equivalent to around only 5 new foreign direct investors for each LEP area. This reconfirms the importance of account managing key local companies since reinvestments by existing companies account for the majority of investment successes. Oxfordshire has a strong track record in new firm formation, but less so at growing medium sized and larger firms.

In sum, Oxfordshire is a critical node of the national and global knowledge economies with substantial future growth potential. However, it has been outpaced by comparator areas and faces significant historical constraints. Responding to these structural challenges of connectivity and housing will require innovative funding arrangements and strengthened sub-regional governance: First, a sustained and demonstrably shared agenda supporting the growth of the Oxfordshire KBE as a whole will be a minimum requirement to attract Central Government funding for significant infrastructure improvements. This also implies more flexible and accommodating Planning policy framework to respond appropriately to employment and housing needs. Second, there are shortcomings in terms of branding and marketing, with little apparent agreement over how to package the diverse elements of the sub-region and how to project a clear message. Third, overall leadership. There is a need for the vision and cohesion associated with a single leading organisation which speaks for Oxford-Oxfordshire and can effectively drive the growth of the KBE.

Dave Valler
Oxford Brookes University
December 2012

Annex 2: Oxfordshire's key clusters

Precision Engineering – Automotive & Motorsport

Heart of Motorsport Valley

Oxfordshire is at the heart of Motorsport Valley with three Formula 1 teams based in the County – Williams F1, Lotus F1 and new arrivals Caterham F1.

This pinnacle of motorsport activity is supported by 4,000 high performance engineering companies in the local area, providing a range of specialist offerings, often to tight deadlines, that enables those engaged in motorsport to compete effectively on the world stage.

International brands

Car manufacturing in Oxford is well established and growing. The City is home to the Mini and over five million cars have been sold worldwide since the Mini car was first conceived.

In 2011, parent company BMW announced a further £500 million investment in the car plant in Oxford taking the total invested in the past ten years to £1.5 billion.

Key suppliers in the area include Faurecia in Banbury and Nedschroef Fasteners in Oxford.

Another well-known, international brand in Oxfordshire is Prodrive. This automotive engineering consultancy firm design, build and run motorsport and vehicle technology programmes for vehicle manufacturers. Their specialist manufacturing operation also works with the motor, aerospace, defence, marine and other high tech sectors to produce machined, fabricated and composite parts.

Skills Base

A key requirement of motorsport and on-road vehicles is a flow of talented people. Oxford Brookes University offers a comprehensive range of undergraduate and higher degrees in automotive and motorsport technologies in a £9 million purpose-built Engineering Centre. This includes extensive facilities such as a four post rig, a damper dyno and engine test cells with emission monitoring equipment.

Approximately 750 students are on degree and postgraduate courses in-house at any one time, including:

- BSc Motorsport Technology
- BEng & MEng in Motorsport Engineering
- BEng & MEng in Automotive Engineering
- MSc in Race Engine Design
- MSc in Motorsport Engineering

The courses have significant industry input with involvement from high profile teams such as Lotus F1. Subject areas covered include aerodynamics, suspension, powertrain, stress analysis, chassis engineering, engine design, tyre dynamics and dynamic analysis, in order to give students a strong understanding of the entire design process.

All students on these courses are eligible to join the Oxford Brookes' Formula Student team - a project that enables them to design, build, test and race a single-seater racing car.

Many Oxford Brookes graduates go on to take up employment in F1 companies such as Red Bull, Lotus, McLaren and Williams as race engineers, designers, aerodynamicists and chassis and powertrain engineers.

In OEMs they join the likes of Audi, Aston Martin, Bentley, BMW, Honda, Jaguar Land Rover, Mini, Nissan and Toyota. Placement students also work in these industries for a one year period between their second and final years of study, which can be an excellent opportunity for the student and the company.

University Consultancy

Oxford Brookes also undertakes significant consultancy activity for motorsport and road going OEMs. Areas of work include composite analysis for companies such as Bentley and electric vehicle development for BMW. Materials recovery and 'End-of-Life' are also growing consultancy areas, as are engine optimisation, performance testing, noise and vibration analysis and emissions assessment.

The University of Oxford's Internal Combustion Engineering Group also has good links with industry, with research projects conducted for clients such as Jaguar.

Life Sciences

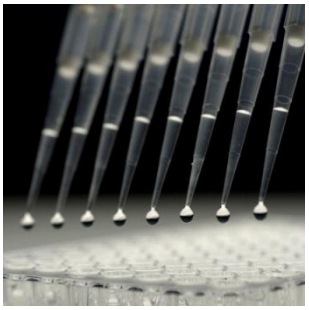
Oxfordshire is well placed to service the needs of companies in Life Sciences, especially with the industry's renewed focus on early stage trials, external innovation and collaboration.

Over £1.2 billion has been invested in biomedical academic research in Oxford over the last 5 years, with companies taking advantage of specialist facilities and world-leading expertise. This allows companies to work across the full spectrum of activities, including drug discovery, development and clinical trials.

University of Oxford & Oxford Brookes University

The Times Higher Education's World Rankings for 2011/12 places the University of Oxford number one in pre-clinical and clinical work, taking into account such factors as volume of research, income from research, research influence, quality of teaching and international outlook.

The University of Oxford is one of the largest biomedical research centres in Europe with 2,500 staff and 800 postgraduate students involved in medical research. The Medical Sciences Division of the University brings in 66% of the University's external research income.



In recent years the University of Oxford has developed innovative ways of working in partnership with industry to help improve the process of drug discovery and development. This includes the formation of the Structural Genomics Consortium and the new Target Discovery Institute. Its work in stratified medicine, using high throughput sequencing technologies to differentiate patient groups based on genetics, is led by the Wellcome Trust Centre for Human Genetics.

Such work brings together world-leading vaccine development capabilities with an industry standard clinical bio-manufacturing facility.

There are six Clinical Research Centre accredited Clinical Trials Units employing over 200 staff which offer trial capabilities from phase 1 to 4 in a broad range of diseases. This includes TB, HIV, malaria and also diabetes and the Units also offer links to international patient networks in Asia, Africa and the Middle East.

In addition, the Institute of Biomedical Engineering houses the Centre of Excellence in Personalised Healthcare, allowing engineers and medical researchers to develop specific products for unmet clinical need, including the development of devices for tele-health and the monitoring of those with Long Term Conditions (LTCs).

Oxford also hosts the Medical Research Council's Immunology Unit, the new Translational Gastroenterology Unit and the new Kennedy Institute of Rheumatology, making it a world leading centre for immunology and inflammation research. Other key areas include cancer, with the new Institute of Cancer Medicine.

Oxford Brookes University runs short courses in planning and managing clinical trials and also works extensively with industry. The University spin-out Oxford Expression Technologies, dealing with baculovirus technologies, has just opened a facility in San Diego US, whilst the collaboration between Oxford Brookes and Beckman Coulter regarding the development and use of the inhibin antibody has gone global.

Oxford offers a comprehensive package of clinical understanding of disease, research to uncover antigens, expertise in constructing vaccines, an industry-standard clinical bio-manufacturing facility and extensive experience of designing and implementing clinical trials.

Patient Engagement

By working in Oxford, companies can utilise nearby hospitals, allowing them to deliver solutions from 'bench to bedside'.

Oxford University Hospitals NHS Trust operates four primary hospital sites in Oxfordshire with comprehensive teaching and research capabilities and strong partnerships with industry. The Trust has well-characterised patient groups, soon to be supported by Electronic Patient Records that will help companies deliver clinical studies. This access to patient groups is vital for further medical advances and is a potential route to market.

Investment Locations

Milton Park, Harwell Oxford and the Oxford Science Park are home to numerous spin-outs from the Universities and international companies covering US, Europe and Asia. Examples include Adapt Immune (US), Amgen (US), Vertex Pharmaceuticals (US), Evotec (Germany), Proteros (Germany) and WuXi PharmTech (China).

A major inward investment opportunity is the redevelopment of land adjacent to hospitals and University facilities in Oxford. This allows world leading science and healthcare to be delivered in partnership.

Courtesy Diamond Light Source

The Enterprise Zone in Oxfordshire, covering Milton Park and Harwell Oxford, provides companies with world-class research facilities.

Harwell Oxford, with over 4,500 staff, hosts the Medical Research Council, with key areas for research including mental health and the development of age-related disease models, covering the likes of diabetes, dementia, parkinsons, huntingdons disease and recently 'glue ear'.

Harwell Oxford also hosts the UK's national synchrotron science facility called The Diamond Light Source. It is a particle accelerator that accelerates electrons to near light speed and generates brilliant beams of light from infra-red to X-ray and is used by companies such as Pfizer and GSK in their drug discovery and development work. An on-site Membrane Protein Laboratory enables chemists and biologists to work together to develop new drugs.

Networks

OBN is a not-for-profit life sciences trade association with over 200 members. Established in 1999 it supports the sector (biotech, medtech and diagnostics) through running partnering events (such as BioTrinity, the third largest bio-partnering meeting in Europe), a group purchasing scheme for the benefit of members and an Investment Network to help members secure funding. Regular networking events are also held to stimulate new collaborations.

ISIS Innovation, a company owned by the University of Oxford, helps commercialise research findings including patenting, licensing, managing funding and technology transfer. Examples of healthcare projects include support to a spin-out company called t+Medical that use mobile phone technology to deliver 'mhealth' and enable self-management of long-term conditions. This is just one example of the many spin-out companies from the University trading internationally but remaining in the area to take advantage of the facilities and expertise available.

Funding

Oxfordshire is at the centre of funding into the Life Sciences sector, including strong networks for private capital and also Government-backed research grants. This includes £90 million from the NHS to translate biomedical research into clinical research to help in the adaption of new technologies, techniques and treatments.

Cryogenics – Extreme Low Temperature Engineering

Cryogenics and Oxfordshire

Oxfordshire's significant research facilities have spawned one of the highest concentrations of cryogenic activity in Europe, with companies such as AS Scientific, ICE Oxford, Oxford Instruments, Scientific Magnetics and Thames Cryogenics. Oxfordshire also hosts Siemens Magnet Technology, who manufacture more superconducting magnets for MRI scanners than anywhere else in the world.

The roots of this world-class cluster lie in the pioneering work carried out at the Clarendon Laboratory in the Department of Physics at the University of Oxford which also resulted in the very first University of Oxford spin-out, Oxford Instruments.

In addition to the University of Oxford, the Rutherford Appleton Laboratory at Harwell Oxford has a specialist Cryogenics Group that works alongside an Advanced Materials Group. They offer companies prototype-scale manufacturing capability and access to significant research facilities including a thermal analysis suite and measurement systems operating at liquid helium and nitrogen temperatures. Comprehensive materials testing can be carried out at very low temperatures.

The cluster is supported by a finely tuned supporting infrastructure including cryogenic piping contractors, logistics experts familiar with shipping superconducting magnets all over the world and suppliers of liquid helium and other cryogenic media.

British Cryogenics Council

Oxfordshire companies form the backbone of the British Cryogenics Council. There are a growing number of international members from across Europe, North America and the Middle East, including Siemens and Sumitomo. The British Cryogenics Council provides a perfect introductory point for international investors in the sector.

Oxfordshire's exceptional cluster of cryogenic expertise and activity embraces research, academia and industry, supporting a wide range of sectors.

Cryogenics – An Enabling Technology

Given the enabling role of cryogenic technology, it is no surprise to find Oxfordshire cryogenic activity in sectors such as manufacturing, life sciences, space, ICT and energy.

Automotive & Motorsport

In automotive manufacturing for example, shrink fitting of engine components by cooling, is a common practice. Motorsport companies also use cryogenics to improve the reliability of components that need to withstand extreme environments.

Life Sciences

Biological material accumulated by the University of Oxford for healthcare research, such as stem cells, requires specialist cold storage equipment. This has provided a model for other large-scale 'Biobanking' facilities in the UK and other countries.

Space

In space, long-life refrigerators have been developed to enable numerous experiments to be conducted. The 'Oxford Cooler' is by far the most successful cryogenic cooler flown in space and has been present on more missions than any other.

ICT

Information Technology infrastructure relies on Highly Accelerated Stress Screening (HASS) for vital component testing. This uses environmental chambers operated at cryogenic temperatures.

Energy

New superconducting materials could find their way into a range of electric power applications, from transmission cable to wind turbine generators. Hydrogen in its very cold liquid state can be expected to take a share of the future 'Hydrogen Economy'.

Courtesy of Oxford Instruments

Training

Oxfordshire's cryogenic community can be relied on to play a key role in the application of new technologies which depend on low temperatures. We are investing in skills development locally to support this activity.

A new local training company called Oxeta runs courses in the fundamentals of cryogenics. They are designed for technicians and engineers and include working examples in design and materials selection, focussing on heat transfer.

Space-Related Technologies

Harwell Oxford science and innovation campus is the UK home of international space collaborations. It is the location of the UK Space Agency, the European Space Agency's (ESA) UK Research Centre and the International Space Innovation Centre (ISIC). This brings together the best of the British space sector, industry and academia in collaboration with international partners to facilitate the commercialisation of space research.

The Technology Strategy Board of the UK is funding a 'Satellite Applications Catapult', a technology and innovation centre with expertise and facilities to help business develop new satellite-based products and services.

Harwell Oxford is home to more than 4,500 researchers, engineers and innovators from over 150 high-tech organisations including the Science and Technology Facilities Council's (STFC) Rutherford Appleton Laboratory and many start-up companies and multinational organisations across a wide range of scientific and technological sectors.

Harwell Oxford Campus

It is also home to the UK's national synchrotron science facility, the Diamond Light Source, which can be utilised for a range of applications such as materials analysis.

At Harwell Oxford there are two broad areas of space related activity – those involved in the upstream work of research and development in space itself and then the significant downstream activities focusing on the use of space technology and data to develop non-space products for use on earth.

Work in Space

STFC's space research and development department, RAL Space, possesses a unique combination of science and engineering expertise, laboratories and testing facilities and has been working in this field for 50 years, including with the ESA and NASA. It focuses on applications in space and undertakes world-leading space research and technology development, provides space test and ground-based facilities, designs and builds instruments, analyses and processes data and operates S-band and X-band ground-station facilities, as well as leading conceptual studies for future missions.

RAL Space's Environmental Test Facility undertakes extreme environment testing to ensure products and instruments withstand the rigours of a space mission. This includes a vibration test facility, the UK's largest thermal vacuum chamber, vacuum bakeout facilities and large clean rooms for assembly and integration of sensitive flight hardware.

The wider Rutherford Appleton Laboratory also houses the world's most powerful pulsed neutron source ISIS and the Central Laser Facility.

Applications on Earth

STFC Innovations Limited, STFC's wholly-owned commercialisation company, manages ESA's technology transfer network in the UK, assessing market needs in the non-space sectors and

matching them with existing or novel space technologies or services. STFC Innovations Limited also supports the transfer process itself.

Through its network of technology transfer brokers across Europe, ESA's Technology Transfer Programme Office has successfully transferred over 200 space technologies to non-space sectors for applications as diverse as cooling suits for a Formula 1 racing team, ground penetrating radar to detect cracks in mine tunnels and several healthcare innovations.

The International Space Innovation Centre (ISIC) looks at upstream and downstream activities, focussing on 3 areas:

- create new everyday applications utilising space and terrestrial technologies and data.
- understanding and countering climate change utilising data from space. ISIC houses the Earth Observation Hub which acquires and analyses environmental data from space, including a new facility for climate and environmental monitoring.
- developing new technologies for the next era of planetary exploration, including robotics and innovative power sources that could be used on the Moon and Mars.

ISIC provide a comprehensive range of facilities to support SMEs and larger companies explore the benefits of space research and development. These include:

An Operations Centre – providing end-to-end support for cost-effective satellite flight operations, payload data processing and training.

Security & Resilience Unit - offering academia and companies the capacity to trial classified ideas and for Government and industry to host systems which provide security capabilities. It also allows UK organisations the opportunity to access imagery anonymously and to trial research concepts securely.

Applications Innovation Centre – facilitating collaborative working through workshops to promote debate and increase the understanding of the benefits of data from space. This in turn can lead to new working partnerships.

Visualisation Centre - providing a variety of visualisation systems to assist innovation including feasibility studies and prototyping. This includes a video wall and 3D stereoscopic visualisation.

Space Incubation Centre and Funding

The ESA Business Incubation Centre (BIC) Harwell supports innovative entrepreneurs and high-tech SMEs as they utilise space research to develop new businesses around non-space applications. The Centre is one of a number of BICs established across Europe in partnership with organisations such as STFC.

The ESA BIC Harwell has specialist capabilities in innovation, exploration and instrumentation, as well as expertise in earth observation, astronomy, operations, data management, advanced electronics, detectors, optics and robotics.

The Centre provides up to 10 start-up companies per year with an intensive package of technical expertise and business support including £41,500 grant to develop their product, fully-equipped office space, easy access to STFC and ESA's technical expertise, intellectual property and facilities, business support advice and help accessing sources of venture capital funding.

The ESA Business Incubation Centre Harwell Oxford has hit its target of signing up ten tenants within a year of launch. Examples of tenants include:

Bennamann Ltd use space technology to create a methane storage system. Methane generated by the anaerobic digestion of grass cuttings during the summer months can be stored to provide heating and electricity for agriculture and homes during the winter.

Travel AI Ltd use ESA satellite navigation technology in a system that automatically collects data about people's travel habits from their smart phones which it then aggregates for use by operators and planners of transport networks.

E-Canal Ltd is developing a smart phone app for boat users on the UK's inland waterways. The app uses ESA satellite navigation technology to provide real-time information on the location of nearby places of interest, amenities, queues at locks and hazards like sunken boats.

Contact Details

Should you wish to establish a facility in Oxfordshire and utilise the area's world class research expertise please contact Invest in Oxfordshire on +44 (0) 1865 894402 or email invest@investinoxfordshire.com.