



OXFORD
SPACE
SYSTEMS

The Oxfordshire Industrial Strategy

A trailblazer for the UK

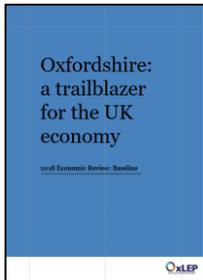
WORKING DRAFT FOR DISCUSSION WITH GOVERNMENT
DECEMBER 2018

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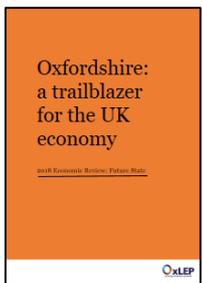
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A GUIDE TO THE SUITE OF OXFORDSHIRE INDUSTRIAL STRATEGY DOCUMENTS

We have produced four reports which, taken together, set an understanding of the current Oxfordshire economy, its future growth potential and how we can work together to deliver the opportunities we have identified. Further information about what you can expect from each report is set out below.



The **Baseline Economic Review** is an objective assessment of Oxfordshire's economic performance to date. It explores how Oxfordshire has performed relative to the UK as a whole, as well as the relative performance of each district authority and different types of businesses and sectors within the county. This report provides detailed economic and spatial analysis that has helped us to shape and prioritise future plans for inclusive growth, productivity improvements and place-based developments, which are set out in the Oxfordshire Industrial Strategy.



The **Future State Assessment** sets out what Oxfordshire has the potential to achieve. It introduces the context for why we are aspiring to be a top three global innovation ecosystem and what this means for Oxfordshire, as well as detail on the key industries in which Oxfordshire can be globally competitive. It details an ambitious economic growth agenda for Oxfordshire, along with the counterfactual 'do nothing' scenario that discusses the risks we face if we do not initiate a step change in growth. Finally this report sets out a spatial vision for Oxfordshire, to ensure that growth in Oxfordshire is achievable and sustainable.



The Oxfordshire Industrial Strategy is the overall plan to deliver inclusive growth across Oxfordshire, drive productivity and innovation, and generate additional growth for the UK. Our vision is to be a top three global innovation ecosystem by 2040: the Oxfordshire Industrial Strategy includes a number of priority interventions to achieve this. It builds on the Strategic Economic Plan whilst setting priorities for the longer term. Its audience will be HM Government, who has commissioned Oxfordshire Local Enterprise Partnership to develop the Oxfordshire Industrial Strategy. It is also designed to help investors, businesses and local communities understand more about our ambitions and how we seek to drive transformative growth in Oxfordshire from now to 2040.



The Investment Prospectus will underpin the Oxfordshire Industrial Strategy. It will take forward the policy interventions central to the Oxfordshire Industrial Strategy, setting out in more detail how we will work with partners across Oxfordshire, the UK and internationally to deliver them. It will also act as an investment prospectus for Oxfordshire, for both public and private investors to understand how they can invest in Oxfordshire to enable us to achieve our growth potential.

Executive Summary

As part of the launch of the UK Industrial Strategy and the agreement under the Oxfordshire Housing and Growth Deal in 2017, Government invited Oxfordshire to be one of the first regions to develop a Local Industrial Strategy.

Today Oxfordshire has one of the strongest economies in the UK. The Oxfordshire Industrial Strategy sets out an ambitious twenty-year plan to build on our strong foundations and world-leading assets to deliver transformative growth and prosperity locally, and to generate additional benefits in other UK regions. This will be innovation-led and will be driven by higher productivity, both in new and emerging sectors that harness transformative technologies and in the existing sectors that have historically driven growth. It will be inclusive, place-sensitive and sustainable, and will enhance our communities, the natural environment and the quality of life for everyone in Oxfordshire.

This new wave of enterprise will unlock the potential of our fast-growing science and technology-focused businesses that have the ability to accelerate the UK's position to the forefront of global innovation industries that are shaping the twenty first century. Importantly it will also enable growth in local businesses that form the backbone of the Oxfordshire economy, that provide jobs and essential services and supply chains across the innovation ecosystem. Growth in Oxfordshire will increase tax revenues for central Government from job creation and higher wages, ensuring Oxfordshire remains a net contributor to the exchequer.

We will work closely with our partners across the Oxford - Cambridge Arc as we seek to deliver on our vision. Working together, we will unlock new opportunities to secure growth and raise productivity, job and output potential.

Our vision for the Oxfordshire Industrial Strategy is to position Oxfordshire as a top three global innovation ecosystem by 2040, building on the region's world leading science and technology clusters to be a pioneer for the UK for emerging transformative technologies and sectors.

As part of this, we will:

- Double the Oxfordshire economy by 2040 to be worth £46bn GVA.* This is £9bn additional growth beyond baseline projections.
- Deliver a minimum of 2% per annum growth in productivity.
- Create a minimum 108,000 net new private sector jobs in Oxfordshire.
- Deliver £4 of benefit to the UK, for every £1 invested in Oxfordshire.

We will do this by setting out a strategy with four pillars:

- A globally connected and competitive innovation economy.
- A powerhouse for commercialising transformative technologies.
- A Living Laboratory solving the UK's Grand Challenges.
- A skills system creating opportunities at every stage of life.

*GVA figures are in real terms 2016 prices.

OUR VISION: DELIVERING UK LEADERSHIP ON THE GLOBAL STAGE

Our vision is to position Oxfordshire as a top three global innovation ecosystem by 2040. Our world-leading and unique combination of assets and science and technology clusters that pioneer transformative technologies and sectors for the benefit of the future UK economy provides the strong foundation for this transformation.

If we succeed in achieving our vision, we will double the size of the Oxfordshire economy to be worth £46bn GVA by 2040. This would be £9bn additional growth above our baseline forecasts. It would be innovation-led, driven by an increase in productivity of a minimum of 2% per annum, as well as the creation of 108,000 net new private sector jobs. We will manage this growth with a light footprint on the environment, harnessing natural resources and demonstrating the benefits of a resilient, ultra low carbon society.

Oxfordshire's innovation ecosystem provides the UK with the strongest platform upon which to lead global technological change, as part of the fourth industrial revolution.

- **Oxfordshire has one of the highest concentrations of innovation assets in the world.** Our universities and science, technology and business parks are at the forefront of global innovation in transformative technologies and sectors such as fusion technology, autonomous vehicles, quantum computing, cryogenics, space, life sciences and digital health. The UK Government has recognised this, investing in Oxfordshire as the home for national assets such as the Faraday Institution, the Diamond Light Source, the National Fusion Technology Platform at Culham Science Centre, the National Satellite Testing Facility at Harwell, and the UK's first quantum computer demonstrator by 2020.¹
- **The markets for these technologies and industries are global and are set for rapid growth between now and 2040.** We have already created a number of high-tech

companies that have been valued at over US\$1bn, which is testament to the ability of the innovation ecosystem to nurture and spin out companies.² Our businesses are successfully competing in these markets, and with more intensive support, have the capability to scale up and become world-leading, contributing to the success of the UK economy.

- **Oxfordshire is a net contributor to the UK.** As Oxfordshire innovates we will deliver an uplift in wider UK manufacturing and supply chain opportunities. We have calculated that for every £1 invested in Oxfordshire, we will deliver £4 of benefit to the UK economy.

DELIVERING THE VISION

To achieve our vision we need to initiate a step-change in the way we support our businesses – a transformation in the way we foster innovation, enable our businesses to grow and nurture our talent. We have to ensure that as well as access to truly world class science and innovation, businesses have room to grow, the necessary physical and digital infrastructure to connect across the ecosystem, the opportunity to collaborate and the human and financial capital to expand.

The challenge now is to set out new and ambitious interventions that will bring investment to the region and enable the innovation ecosystem to grow. We need to set out how we will initiate a step change in growth, deliver new economic infrastructure and ensure that innovation in Oxfordshire generates benefits for everyone, building inclusive and sustainable communities.

The Oxfordshire Industrial Strategy sets out four priority areas or pillars in which we need critical investment from across the public and private sectors. These pillars are designed to bolster our proposition as a global innovation ecosystem, strengthen the foundations of productivity set out in the UK Industrial Strategy, tackle the UK's Grand Challenges, address the structural challenges that are hindering growth and create the conditions for inclusive growth.

PILLAR 1: A GLOBALLY CONNECTED AND COMPETITIVE INNOVATION ECONOMY

- To become a globally competitive innovation ecosystem we need to be better connected internationally, creating new global opportunities for our businesses. As part of this we need investment to relieve the pressure on our infrastructure that is causing traffic congestion and our energy grid to be at capacity. Limited physical and digital connectivity is making the region less attractive to talent, business and investment.
- This pillar therefore focuses on developing the critical physical, economic and innovation infrastructure that underpins the ecosystem. This will increase connectivity, mobility and competitiveness both within Oxfordshire and out to the rest of the UK and to gateways to the world. To do this, we will implement the *Oxfordshire Infrastructure Strategy*, the *Oxfordshire Energy Strategy*, and develop an ambitious *Digital Investment Plan*. This will provide high quality connectivity across the ecosystem, and meet the additional capacity requirements of economic growth.
- To better connect and compete globally, we will develop an *Internationalisation Delivery Plan*, focus on *Brand Development and Promotion*, and establish a *Connecting Globally* platform to facilitate collaboration with other global innovation ecosystems. This will promote Oxfordshire globally and maximise investment and trade opportunities to enable our businesses to grow.

PILLAR 2: A POWERHOUSE FOR COMMERCIALISING TRANSFORMATIVE TECHNOLOGIES

- Oxfordshire has a wealth of innovation potential in technologies and industries with growing global markets. However, many of our businesses struggle to grow to scale and commercialise and export these technologies. To unlock our growth potential in this area we need to improve access to finance, business support and appropriate business space.
 - To improve access to finance to better support businesses and fund new infrastructure across the ecosystem, we will diversify our investment strategy. This will include building an *Oxfordshire Innovation Sovereign Wealth Fund Proposition* to attract investment, establish the *Oxfordshire Finance Hub* and develop an *Oxfordshire Business Investment Fund*.
 - We will establish a *World Class Scale-Up Programme* to develop leadership and management skills and help businesses to commercialise innovation and technology. We will also expand the remit of the Growth Hub to deliver more targeted support to different types of businesses, supporting all of Oxfordshire's business to incorporate new technologies and improve productivity.
 - We will also transform the science and technology parks across the ecosystem and develop new world-leading innovation hubs and clusters around existing and new locations. This will provide critical new business space and improve connectivity across the innovation ecosystem.
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PILLAR 3: A LIVING LABORATORY SOLVING THE UK'S GRAND CHALLENGES

- This pillar focuses on developing Oxfordshire as a globally-recognised living laboratory. This encompasses creating sustainable, liveable places that utilise new technologies and services developed within the ecosystem and encourage collaboration between businesses and communities, to tackle the UK's four Grand Challenges set out in the UK Industrial Strategy: ageing society, mobility, clean growth, and data and artificial intelligence.
- Oxfordshire is a highly attractive place to live but must now deliver on its ambitions for planned housing growth set out in Local Plans and the Housing and Growth Deal. This is an opportunity for Oxfordshire to innovate in place-making, building healthy and sustainable communities that are technology-enabled, improve quality of life, and utilise innovative solutions to challenges of modern living.
- Oxfordshire also needs to lead for future generations. We will establish three types of Living Lab across the county – *Clean Growth*, *Data and Mobility*, and *Health and Wellbeing*. In these Living Labs partners will work together to develop, evaluate and bring to market innovative solutions with local communities and sector related bodies. Through this we will push the UK to the forefront of innovation in these challenges, support businesses to commercialise technologies, and build communities that enhance the lives of the people within them.

PILLAR 4: A SKILLS SYSTEM CREATING OPPORTUNITIES AT EVERY STAGE OF LIFE

- Oxfordshire has one the most highly skilled populations in the UK. However, we have a shortage of school leavers with the skill sets the innovation ecosystem needs and an insufficient apprenticeship offer. We have an ageing population, wide income disparities and need to do more to ensure growth is inclusive, creating opportunities for people to reskill, upskill, and continue to contribute to the economy.
- This pillar focuses on increasing business leadership and engagement with education professionals to transform the Oxfordshire skills system. Through a new *Skills Advisory Panel*, we will co-create a new *Oxfordshire Curriculum* to ensure educational settings provide young people with the skills they need to succeed. We will work with businesses to create new pathways for young people into work, for example by establishing a *retained levy fund* for new apprenticeships in technology businesses. We will develop *OxLife*, a programme to support those further from the labour market to reskill and upskill.
- We will also establish a *Capital Investment Programme* to support the development of new world-leading education hubs and specialist centres across Oxfordshire that provide pathways into industries of the future. We will establish the *High-Flyers Programme* to support researchers to develop business skills, and the *Oxfordshire Entrepreneurship Hub* to support young people from across the county to develop new business ideas and access mentoring and support from world-leading companies through the innovation ecosystem.

NEXT STEPS

The Oxfordshire Industrial Strategy will be followed by an investment prospectus that will clearly set out how to participate in this compelling opportunity for both public and private investors. This will also set out how we will work together with local, national and international partners, including along the Oxford - Cambridge Arc, to deliver our vision with urgency, enthusiasm and conviction.

Introduction to the Oxfordshire Industrial Strategy

This introduction sets out what the Oxfordshire Industrial Strategy aims to do and how it sits in the context of other strategies that have been developed for the region.

The Oxfordshire Industrial Strategy sets out an ambitious twenty-year plan to deliver transformative economic growth for the region, and in turn generate additional growth for the UK. This growth will be innovation-led and will be a step-change for Oxfordshire. It will be inclusive, place-sensitive and sustainable, enhancing our communities, natural and cultural environments and quality of life. It will underpin delivery of Oxfordshire's county-wide economic agenda between now and 2040, and is one of the most forward-thinking and ambitious strategies that local businesses, political leaders and central Government partners have worked together to develop.

This document is first and foremost for Government, who have commissioned us to develop the Oxfordshire Industrial Strategy, responding to the UK Industrial Strategy published in November 2017. It is also designed to help investors, businesses and local communities understand more about our ambitions to drive economic growth in Oxfordshire over the next twenty years. It is deliberately shaped as a long-term framework against which private and public sector investment decisions can be made.

This document sets out our strategy for creating this growth. It focuses on what we need to do to improve productivity and deliver benefits for communities, businesses across Oxfordshire and for the rest of the UK. It looks at how we can unlock the potential of our technology-focused breakthrough businesses, as well as enable technological uptake, innovation and growth in the businesses that form the backbone of the Oxfordshire economy, which stimulate the wider local economy through job creation and wage growth. Finally, the Oxfordshire Industrial Strategy sets out how we can leverage and accelerate the growth of our world-leading assets, businesses and universities to achieve our ambition to become a top three global innovation ecosystem by 2040.

The Oxfordshire Industrial Strategy sets out:

- A summary of Oxfordshire in 2018, including our strengths and challenges in a number of areas:
 - Business
 - Innovation
 - Sectors and global competitors
 - Skills, employment and inclusive growth
 - Place
 - Infrastructure
- Oxfordshire's vision and ambition for 2040
- A plan for delivering on our vision, grouped by three pillars and a foundation skills pillar:
 - A globally connected and competitive innovation economy
 - A powerhouse for commercialising transformative technologies
 - A living laboratory for solving the UK's Grand Challenges
 - A skills system creating opportunities at every stage of life
- What our vision will look like in practice and how we will work with the wider Oxford – Cambridge Arc.
- How this approach will deliver inclusive growth for communities, businesses and for the rest of the UK

While the Oxfordshire Industrial Strategy has been developed in response to the UK National Industrial Strategy and the Oxfordshire Housing and Growth Deal, it is not a standalone strategy. It builds upon significant work already undertaken in Oxfordshire, and aligns to existing and emerging strategies and commitments.

UK Industrial Strategy

The UK Industrial Strategy is a region-led approach to growth. It seeks to boost Britain's productivity and raise living standards by:

- Strengthening the **foundations of productivity**;
- Building long term strategic partnerships between industry and government through **sector deals**;
- Inviting business, academia and civil society to tackle the **Grand Challenges**, to ensure the UK takes advantage of global trends and industries of the future.

This Oxfordshire Industrial Strategy is one of the first Local Industrial Strategies to be developed, and sets out how we can take forward these ambitions.

Oxfordshire Housing and Growth Deal

The recent Housing and Growth Deal has secured an initial £215m of investment over the next five years to build the infrastructure and homes we need to thrive.

As part of the deal we have committed to:

- deliver 100,000 homes by 2031
- develop a Joint Statutory Spatial Plan
- unlock enabling infrastructure
- produce the Oxfordshire Industrial Strategy as a headline commitment under the productivity strand of the Deal.

Oxfordshire Industrial Strategy

Foundations of productivity:

1. **Ideas:** to be the world's most innovative economy
2. **People:** to promote a diverse and inclusive economy with good jobs and greater earning power for all
3. **Infrastructure:** a major upgrade to the UK's infrastructure
4. **Business environment:** to be the best place to start and grow a business
5. **Places:** to have prosperous communities across the UK

Grand Challenges:



Growing the artificial intelligence and data driven economy



Shifting towards clean growth



Shaping the future of mobility



Meeting the needs of an ageing society

Existing and emerging strategies

The Oxfordshire Industrial Strategy will align to and build on a number of existing and emerging strategies. These include:

- 2016 Strategic Economic Plan and sister strategies e.g. Skills, Innovation and Creative, Culture, Heritage and Tourism.
- Emerging Joint Statutory Spatial Plan
- Oxfordshire Infrastructure Strategy (and NIC First Mile/Last Mile 2050 plan)
- 2017 Science and Innovation Audit
- Oxfordshire's Local Transport Plan 5
- Oxfordshire Rail Connectivity Study
- The Local Plans for housing and development for each District
- Oxfordshire Energy Strategy
- Oxford – Cambridge Arc Economic Vision



Diamond Light Source, Harwell Science and Innovation Campus

Oxfordshire in 2018

In this chapter we analyse the strengths of the Oxfordshire economy that, in turn, can be used to drive wealth creation for our businesses and residents, as well as the rest of the UK. We also look at the corresponding weaknesses that will need to be addressed to enable future economic growth.

Oxfordshire has one of the strongest economies in the UK. We are a net contributor to the UK exchequer, contributing £23 billion Gross Value Added (GVA) in real terms in 2017.¹ We are also rapidly growing, with an average growth of 3.9% growth year-on-year in nominal terms since 2006.² Oxfordshire is home to around 678,000 people and 31,000 businesses, including a high concentration of technology-based businesses that are at the forefront of global innovation.³ We are home to the University of Oxford, the top performing university in the world, as well as Oxford Brookes, the top performing young university in the UK for teaching and researching.⁴ We are a highly productive economy – on a per-head basis the output of our workers is in the top 20% of English regions.⁵ We are also leading the way in the UK for ‘good growth’ – Oxford is the highest ranking city in the UK in PwC’s 2018 Good Growth for Cities report, which measures the performance of cities against key economic and wellbeing indicators, such as employment, health, income and skills.⁶

This is an impressive track record of growth that we have delivered through close partnership between local authorities, business leaders and universities. We are continuing to grow, and have secured over £600m worth of central Government and European funds through Growth Deals, City Deal, European Structural Investment Funds and Infrastructure Funds, as part of an overall investment programme in Oxfordshire worth £2.2 billion.⁷

While our economy is strong, our future growth is being put at risk by a number of critical challenges that we need urgent investment to address. We have a productivity challenge – although our economic output is high, productivity per hour worked is below the average for the South East of England.

Our physical and digital connectivity lags behind that of our global competitors, and housing affordability and the rising cost of living is detracting from Oxfordshire’s quality of life. Our economy is dependent on a highly skilled workforce that is at risk unless we improve our ability to nurture, attract and retain talent and align skills to business need, especially as our population changes. Despite Oxfordshire’s strong economy we have pockets of both urban and rural deprivation and inequality, and need to do more to ensure that growth is inclusive and offers opportunities to all our residents.

Although we are globally renowned, many people do not look beyond the university system to the breadth of world-class assets and knowledge-based strengths that we are home to. For example, Culham Science Centre, Harwell Innovation Campus and other world-leading assets and locations in the region. We need to better set out our wider unique proposition to attract investment, business and talent to the region.

This chapter contains a summary of our evidence base which is set out in more detail in the *Baseline Economic Review*. This chapter outlines:

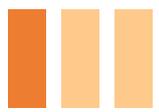
- Oxfordshire’s business base;
 - our capacity for innovation;
 - the breakthrough industrial sectors that are central to our future growth;
 - delivering skills, employment and inclusive growth;
 - the need to develop our international brand while retaining high quality of life and strong sense of place;
 - the need for further infrastructure development.
-

OVERVIEW OF THE OXFORDSHIRE ECONOMY



£23bn
GVA generated in real terms each year⁸


3.9%
GVA growth in nominal terms year-on-year since 2006⁹


1 of 3
net contributors to the UK exchequer¹⁰


51%
of working age population educated to degree level or above¹¹


2.6%
unemployment rate in the working age population¹²

ECONOMY

POPULATION

STRENGTHS


1st
Oxford University rank in Times Higher Education global rankings 2018¹³


£600m
largest fund for university spin outs in Europe: Oxford Sciences Innovation¹⁴


\$1bn
track record of growing businesses with market values of over US\$1bn¹⁵


43,000
New private sector jobs created since 2011¹⁶


30m
visitors to Oxfordshire each year, many of them international¹⁷

CHALLENGES


50%
higher median house prices than the English average¹⁸


3%
annual growth in apprenticeships, well below the UK average of 12.5%¹⁹


7%
full fibre rollout, well behind many international competitors²⁰


55%
increase in population aged over 85 by 2031²¹

UNDERSTANDING OUR BUSINESS BASE

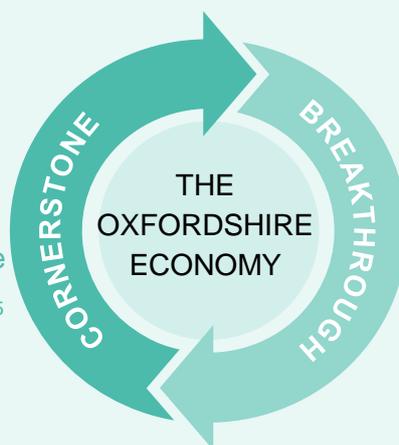
To illustrate the dynamic nature of companies in Oxfordshire, bringing together mature sectors that employ large numbers of staff, and high-growth technology companies that are rapidly expanding, we group firms into two main categories: **cornerstone** and **breakthrough**. While this is a high level distinction, and some firms might identify with both categories, it serves to highlight the different needs of this diverse community.

Cornerstone businesses are the backbone of the economy and provide the platform for economic growth. Their performance is closely linked to the performance of the economy as a whole, as they tend to be in mature sectors, including education, health, professional services, transport, logistics, retail, leisure and tourism. Nearly all of Oxfordshire's businesses are more productive than their UK counterparts. Cornerstone business sectors are also steadily growing, with 2.4% year-on-year growth in the number of businesses.²² Oxfordshire's strong base of cornerstone businesses is essential to future growth. They are the sectors which have contributed to historical growth in Oxfordshire – for example contributing to the 43,000 new private sectors jobs created since 2011 – and they underpin and support Oxfordshire's strong economy.²³

Breakthrough businesses tend to rely on innovation and transformative technologies. These technologies, and the innovation spurred by the convergence of technologies across industries, have the potential to drive economic growth at scale and will increasingly drive productivity across all sectors. These businesses tend to be riskier but have the potential for accelerated growth, becoming 'gazelles' (businesses that grow by 20% for a period of four years consecutively) or 'unicorns' (businesses with a market value of over \$1bn). Oxfordshire is unique in the UK for its high concentration of breakthrough businesses and proven potential to create unicorns. Oxfordshire's breakthrough businesses are growing rapidly, with 9% year-on-year growth in the number of businesses, and are pushing Oxfordshire to the forefront of global innovation in technologies and industries of the future.²⁴

Cornerstone businesses support breakthrough businesses, providing them with essential services and supply chains.

2.4%
growth year-on-year in the number of businesses.²⁵



9%
growth year-on-year in the number of businesses.²⁶

Breakthrough businesses stimulate growth throughout the economy, and can transform cornerstone business models through sharing innovation and technology that can improve productivity.

Both types of business are critical to the future success of the economy, but they equally face challenges to grow. Each market is restricted by a **lack of appropriate business space** across the county. This is particularly acute for small and medium sized enterprises and breakthrough businesses who have the potential to grow and scale-up more quickly but are constrained by the lack of flexible space to meet future needs, and so therefore need to move outside of the county to grow to scale.

Connectivity challenges are also restricting business growth. Physical, digital and energy infrastructure across Oxfordshire is already under pressure from high and rising demand, with some areas challenging to serve through public transport.

The ability of businesses to attract and retain the **talent** they need to succeed is also a challenge to growth. As detailed in the following sections, the skills within the Oxfordshire workforce need to better align to business need across a range of technical, managerial and commercial skill sets.

OUR CAPACITY FOR INNOVATION

Oxfordshire has a high concentration of knowledge-intensive **innovation assets**, including two globally renowned universities: the University of Oxford and Oxford Brookes. Our county is home to a number of world-leading science, innovation, technology and business parks that form a spine of knowledge intensive economic activity, including Begbroke Science Park in Cherwell, Milton Park, Oxford Science Park, and National Labs in Culham Science Centre in South Oxfordshire and Harwell Innovation Campus in Vale of the White Horse.

Public and private **investment** into Oxfordshire in recent years is bolstering our innovation capability. The City Deal Programme and Local Growth Fund resulted in four new innovation centres, each of which are now at capacity: the BioEscalator at the Old Road Campus, the Begbroke Accelerator, Remote Applications in Challenging Environments at Culham Science Centre and the Harwell Innovation Centre. We have also received investment into two Enterprise Zones, which sit across Milton Park, Didcot and Harwell.

Government has also recognised the strategic importance of world-class assets within Oxfordshire, having invested in key sectors to drive the UK's leadership in new and emerging technologies through the UK Industrial Strategy:

- £100m for the Rosalind Franklin research institute at Harwell Innovation Campus to improve health through physical science innovation;
- £65 million for the Faraday Institution at Harwell Innovation Campus, charged with tackling the global energy and battery storage challenge;
- £99 million for a National Satellite Testing Facility at RAL Space at Harwell Innovation Campus;

- £86 million for a National Fusion Technology Platform at Culham Science Centre; and
- £68.3 million for Satellite Applications Catapult at Harwell Innovation Campus.

Oxfordshire has the highest intensity of university **spin out companies** in the country. Oxford University continues to generate more spin-outs than any other University in the country – there are currently 149 active start ups and spin outs from the University, with the ambition to accelerate this in coming years.²⁷ Between 2014 and 2015 a total of 136 spin-out companies generated approximately £147m of GVA, supporting 2,421 jobs in the Oxfordshire economy.²⁸ We also have a unique capacity to grow businesses to values of over US\$1bn, for example Oxford Nanopore Technologies.

Oxfordshire local authorities are collaborating with universities and local businesses to use local innovation to improve service delivery. This collaboration is a strong foundation upon which to take forward more in-depth and wider-reaching projects to help solve problems linked to the UK's Grand Challenges.

However, many of the science and business parks are at capacity and **lack sufficient business space**, in particular new laboratory facilities, clean rooms and flexible science working spaces. They are struggling to respond to demand for new premises which is also resulting in record rental costs. Despite plans to expand, it is uncertain whether the development of new facilities will meet the scale of our need.²⁹ Our innovative industries and businesses are world-leading but face significant **competition** from established global hubs and other challenger regions – we set this out in more detail on the following pages.



OXFORDSHIRE'S BREAKTHROUGH SECTORS

Oxfordshire has a strong economy that is underpinned by productive cornerstone businesses and innovative breakthrough businesses with high growth potential. This potential stems from our most unique strength – our national and international leadership in transformative technologies and industries that are global, which are shaping the twenty first century, and that expect rapid growth in the coming decades. We have strengths in many of the technologies that underpin these industries, and the increasing convergence of these technologies means we are able to unlock new industries and global markets in which we can be world-leading. Our industries are supported both by new, fast growing start ups and by globally successful companies that started in Oxfordshire, which have been pushing us to the forefront of innovation for a number of years.

Oxfordshire is critical to the UK's Industrial Strategy's ambition to lead the industries and technologies of the future – our businesses and industries connect to the rest of the UK, delivering benefits through collaboration and through spill-over effects, such as uplifts in manufacturing and supply chain opportunities to UK-wide cornerstone businesses.

We set this out in more detail in the *Future State Economic Review*.



Life Sciences

We have one of the strongest life sciences clusters in Europe, and are a global hub for life sciences entrepreneurship and business. We have a broad range of strengths including med-tech, pharma, diagnostics, digital health and biomedical engineering, and are shaping the future of the industry using technologies such as AI and machine learning. Oxfordshire is home to numerous national assets including the Rosalind Franklin Institute and the Satellite Applications Catapult at Harwell and the Structural Genomics Consortium. We have strengths in commercialising life sciences innovation, with three companies that have previously been valued at over \$1bn: Oxford Nanopore Technologies; Immunocore; and Adaptimmune, and manufacturing opportunities demonstrated by the new Vaccines Manufacturing Innovation Centre announced in the UK life sciences sector deal.³⁰ Our world leading businesses are supported by strong academic leadership and connections across the UK to Birmingham, Cambridge and Dundee as well as the Medicines Discovery Catapult in Alderly Park. Oxfordshire can help the UK compete against areas such as Boston Metropolitan Area and the Research Triangle in North Carolina that uses its research capabilities to power biological and digital health breakthroughs.



Quantum Computing

Oxfordshire is leading the way for the world in quantum readiness. We are gaining significant international recognition, with Oxford University leading a consortium of nine UK universities to build the first Q20:20 Quantum Computer Demonstrator by 2020. Through this, we are stimulating quantum industries and underpinning technologies such as cryogenics, and attracting top talent from across the world to Oxfordshire. Our research will provide an opportunity for rapidly increasing links with the Birmingham-based Quantum Hub in Sensors and Metrology and Quantum Enhanced Imaging (QuantIC) Hub at Glasgow. The UK has a strong but fragile global position in the race to develop quantum technologies, competing against the likes of Quantum Valley in Canada, Hefei in China, key tech firms such as Google and IBM and start-ups such as Rigetti. The UK needs Oxfordshire to continue to innovate in quantum technologies in partnership with other areas in the UK, if we are to continue to compete internationally in quantum technologies and linked industries.



Space-Led Data Applications

Harwell Science and Innovation Campus is the heart of the UK's space industry and the largest space cluster in Europe. We have almost 90 organisations including the European Space Agency (ESA) Centre for Satellite Applications and Telecoms; the ESA Business Incubation Centre; the Science and Technology Facilities Council's RAL Space Centre; and the Satellite Applications Catapult. By 2021 Oxfordshire will also be home to the UK National Satellite Test Facility. Oxfordshire organisations are involved in a wide range of space activities, from designing and building components and satellites to go into space, to developing end-user applications that utilise space data for a wide variety of sectors. Space organisations in Oxfordshire are working closely with new space opportunities across Cornwall, Glasgow and the East Midlands and is integral to upstream satellite innovation from Airbus, Surrey Satellite Technologies Ltd, NPL and the Universities of Surrey and Southampton, with complementary satellite data analytical capability from the University of Portsmouth. These assets are essential if the UK is to remain at the forefront of global competition and compete with the likes of Silicon Valley, which is home to the NASA-Ames Research Centre, and clusters in France, Germany and Beijing. Development of Oxfordshire's space sector is critical if the UK is to achieve its target market share of 10% of the global space market by 2030.³¹



Robotics and Autonomous Systems (RAS)

Oxfordshire is at the heart of RAS activity in the UK, with RACE at Culham Science Centre a key UK centre of excellence. Connected and Autonomous Vehicles (CAV) are a vanguard application of RAS, and will show us how robots can move people and goods more efficiently with far-reaching implications across industries. Oxfordshire is at the forefront of CAV development: The Oxford Robotics Institute kick-started the UK's CAV programme in 2010; their spin-out Oxbotica is leading a UK consortium to launch a fleet of driverless vehicles to drive from Oxford to London; and RACE is one of the four national CAV testbeds. Other companies in the CAV ecosystem include Zeta, Amev, Nomiment, Latent Logic, Williams, Arrival, StreetDrone and FiveAI. Oxfordshire is at the centre of a 70 mile radius CAV testing area, with London and Birmingham at each end. The area includes public testing environments including the 5G innovation centre, and autonomous vehicles trials of Nissan (Cranfield), Oxbotica (Culham), Jaguar Land Rover (Coventry) and Volvo (Drive Me London). RAS is predicted to impact 15% of UK GVA worth £266bn to the UK economy by 2035.³² Developing Oxfordshire's RAS industry is essential to growth and to remaining globally significant, competing with areas such as Silicon Valley, where Uber, Google and Tesla are developing CAVs.



Cryogenics

Oxfordshire is the global leader in cryogenics – the production and behavior of materials at very low temperatures. The blend of academic, research and industrial expertise makes Oxfordshire home to the most powerful concentration of cryogenic expertise in the world. Cryogenics is a critical enabling technology with sub-sectors such as cryocoolers, instrumentation and superconducting magnets. Cryogenic technologies underpins around 17% of the UK economy, including many of our high-growth sectors, particularly space, life sciences, energy and quantum computing.³³ Oxfordshire is responsible for the majority of the UK cryogenic sector. Our cryogenics cluster includes: the world-leading Rutherford Appleton Laboratory at Harwell Innovation Campus, which pioneered the development of a multifilament superconducting cable known as the 'Rutherford Cable'; companies such as Innovative Cryogenic Engineering in Witney and Thames Cryogenics in Didcot, a world-leader in the manufacture and supply of cryogenic piping; and the University Technical College in Didcot, the first school globally to install a cryogenics lab. Cryogenic technologies developed in Oxfordshire are manufactured across the UK in areas such as the North East of England, creating high value jobs. We are world-leading, but face competition, including the USA, Japan and France where governments are investing heavily in cryogenic sub-sectors, recognising the strategic importance of this technology.



Energy

Oxfordshire is at the forefront of innovation in energy technologies and systems of the future. We are unique in the UK in our specialism in working to develop future energy systems that can work at scale and that have significant overlaps with other sectors, such as transport and electricity. This includes strengths in areas such as novel batteries; battery management systems; and data analytics through its wealth of energy businesses, including the Culham Centre for Fusion Energy (CCFE) and the Faraday Institution at Harwell, which is home to 30 industry, academic and public organisations. UKAEA is a lead participant in the co-ordinated EU fusion programme managed by EUROfusion and operates the largest fusion device in the world, JET. By hosting JET, UKAEA has developed globally unique fusion capability, which is creating high value jobs and exports across the country. For example, the robotics capability at Culham has enabled major contracts worth >£200M to be won around the UK in the last few years, including supporting hundreds of jobs in the North West and North East. Oxfordshire is also home to Tokamak Energy and First Light Fusion, two of the leading fusion start-up companies in the world. Despite increasing competition from Japan and Canada, Oxfordshire's unique assets and strengths have the capability to push the UK to the forefront of innovation.



Digital & Creative

Over 3,000 digital and creative businesses are based in Oxfordshire generating £1.4bn to the UK economy each year.³⁴ We have strengths in a range of digital technologies, such as cyber security and data analytics – these transferable strengths enable us to be world-leading across other industries from space to bio-tech and quantum. Our creative strengths range from animation and digital gaming to digital publishing and media, with a strong cluster in Film City in Upper Heyford. We have produced a number of spin-outs, notably Natural Motion which was recently acquired for \$500 million, and Rebellion has recently announced a £78 million new film complex in Didcot. Oxfordshire collaborates within the UK across the Golden Triangle and with other areas such as Bristol where there are strong creative and digital entrepreneurial communities. Oxford Innovation has recently opened an innovation centre in West Belfast, Innovation Factory, to boost start-up development in the region. The UK has a number of global competitors in this sector, particularly in the USA where tech and social media giants have disrupted the sector, as Alibaba has done in China. Helsinki is another key competitor, with strengths in digital and gaming, along with a strong start-up culture.



Motorsport

Oxfordshire is a critical part of the UK's iconic 'Motorsport Valley', a £6bn automotive global cluster of high-performance technology, motorsport and advanced engineering companies. Oxfordshire is home to a number of world-renowned motorsport names including Williams F1 in Grove, Renault Sport F1 in Chipping Norton and Prodrive in Banbury, as well as global supply chain companies such as SS Tube Technology and Lentus, and the BMW MINI manufacturing plant.³⁵ Oxford's universities are also world-leading centres for education in motorsport engineering, and, for example, Oxford Brookes provides race engineers for all the major Formula 1 teams. Oxfordshire has a number of research strengths, including in advanced engines and battery technology, where companies like Williams and Prodrive have been pushing Oxfordshire to the forefront of global competition for over a decade. Williams is also responsible for the IP and research and development for HyperBat Joint Venture battery manufacturing which is based in Coventry, showing how our energy cluster generates additional growth across the UK. Oxfordshire competes and collaborates globally in this industry, as an integral part of the UK's strongest motorsport cluster.

CASE STUDY: EVOX THERAPEUTICS

Evox Therapeutics is a privately held, Oxford-based biotechnology company. It focuses on harnessing and engineering the natural delivery capabilities of exosomes to develop an entirely new class of therapeutics for the treatment of various severe diseases. Evox was founded in 2016 based on work coming out in part from Oxford University, and received £10m in seed funding from Oxford Sciences Innovation (OSI). This funding allowed Evox to lease laboratory space in Oxford Science Park, advance R&D, and grow the team from one person to thirty over eighteen months. In autumn 2018 Evox raised an additional £35m funding from internationally-known venture capital investors, and re-investment from Oxford University and OSI. Evox anticipates future significant capital raises and further expansion of the team to over 100 employees as it continues to compete internationally.

Factors in the Oxfordshire ecosystem that have enabled growth:

- **Access to world-class funding:** OSI's significant initial funding was critical to Evox's ability to rapidly grow, attract global top talent and investors, and compete on an international stage. Access to more UK-based sources of significant funding, especially for later stages, would better enable companies to continue to grow.

Factors in the Oxfordshire ecosystem that have constrained growth:

- **Laboratory space:** Access to readily available lab space is a key constraint to growth. While Evox has been able to lease a space in Oxford Science Park, options to expand are limited. Lab space might not meet demand in Oxfordshire over the next five years as more companies are spun out of the universities.
- **Connectivity:** The science parks in Oxfordshire are challenging to serve with public transport. Science parks need to be better connected to multi-modal public transport options and with direct and easy access to the central rail station. This will help accommodate the expected growth and enable people to live in outlying communities with more affordable housing and easily commute to work.

CASE STUDY: OXFORD PV

Oxford PV was established in 2010 to commercialise a solid state variant of dye sensitized solar cells from Oxford University. Today, Oxford PV is the technology leader in the field of perovskite-on-silicon tandem solar cells, and the largest team globally exclusively focused on developing and commercialising this technology. The high efficiency and low cost of perovskite technology is driving down costs of generating electricity and enhancing the global solar market. Over the past few years Oxford PV has focused on transferring its technology to industrial processes in preparation for commercial development. In 2016 Oxford PV acquired an industrial pilot line in Germany, where Oxford PV is now producing commercial sized perovskite-on-silicon tandem solar cells and expecting products in the field in 2019. To date, Oxford PV has raised over £40 million in funding from a range of investors, as well as £13m in European Investment Bank financing. In 2018 its team of scientists and engineers moved from Begbroke Science Park to a larger research and development facility at the Oxford Industrial Park.

Factors in the Oxfordshire ecosystem that have enabled growth:

- **Access to business space, talent and investment through Oxford University:** Oxford PV's Oxford University beginnings have significantly benefited the company. It provided them with space at the University's Begbroke Science Park, access to the university's high-calibre talent pool; and it helped them access Innovate UK R&D grants that supported the initial development of the technology and created opportunities for private investor seed funding.
- **Investment:** The network of angel and high-net-worth investors in the Oxford ecosystem provided critical support at the time of the company founding and initial few years.
- **Local and global talent:** The Oxfordshire ecosystem has provided an excellent set of non-executive directors familiar with the local investing climate and skilled in supporting a new company board. The location, while more expensive than some other areas of the UK, has helped Oxford PV attract some of the best scientists and engineers from around the world, important in a niche field. It also provides excellent global connectivity for Oxford PV's customers, partners and global teams

DELIVERING SKILLS, EMPLOYMENT AND INCLUSIVE GROWTH



UTC Oxfordshire, Didcot



Apprentices at Culham Science Centre



Oxford Brookes University, Oxford



Zeta Specialist Lighting, Bicester

The Oxfordshire economy has seen **high levels of employment** in recent years relative to the rest of the country. Oxfordshire has a 2.6% unemployment rate in the working age population, which is almost 50% lower than the UK average for the last two decades.³⁶ At nearly full employment, this has increased pressure on businesses to be able to find, attract and retain suitably skilled workers as they grow and expand.

The workforce is also one of the most **highly skilled** in the country, with 51% of the working age population educated to degree level or above.³⁷ The City of Oxford has one of the lowest levels of workers with no qualifications, at 3.2%, compared with a UK average of 8%.³⁸

Although Oxfordshire's workforce is highly skilled, there is still a shortage of school leavers with **STEM skillsets**. Between 2010-15, Oxfordshire's annual growth in **apprenticeships** was 3%, far below the UK average of 12.5%.³⁹ Increasing and improving apprenticeships is critical for providing pathways for young people to access new opportunities. It is also important to increase engagement with businesses in the skills and education system to ensure skills are aligned with business need. This will help address the mismatch between jobs created and the current skill sets within the local labour market.

Although median wages for the lowest earners in Oxfordshire are above the UK average, there are **wide income disparities** and pockets of deprivation. Fifteen of our neighbourhoods are in the 20% most deprived in England, with these residents increasingly marginalised from the economy. This lack of inclusive growth in Oxfordshire is a key challenge that we need to address going forward.

Oxfordshire has an **ageing population** – our working age population is forecast to decline, while the over 65 population is forecast to increase. By 2031 the number of people aged 85 and over is expected to have increased by 55% in Oxfordshire.⁴⁰ We will need to innovate to reduce pressure on public services and housing, and to create opportunities for people who wish to, and are healthy enough to, continue to contribute to the economy. To sustain growth we will need to increase productivity and attract new workers to the region, accelerating housing delivery to make living more affordable and ensuring the mix of housing supply changes to accommodate this.

OXFORDSHIRE AS A PLACE

Oxfordshire is globally renowned with a strong **international brand** centered on our world-leading university system. However, there is less visibility and awareness of our other core assets, including our innovation, science and technology parks, and leading businesses – Oxfordshire’s brand needs to encompass the full breadth of the region’s offer.

Oxfordshire is a **global destination** with international reach. It is increasingly attractive to visitors across new markets, attracted to Oxfordshire by our considerable tourist offer including the City of Oxford, Bicester Village, the Cotswolds and Blenheim Palace. In 2017 we welcomed nearly 30 million visitors, with many of these from international locations. The tourism and hospitality industry supports 10% of all employment in Oxfordshire, contributing £2.17 billion to the economy.⁴¹ Increased investment in areas such as high grade hotel stock and international conferencing facilities could boost this offer, complement Oxfordshire’s global brand, and create more accessible, permanent jobs for the wider community.

Oxfordshire provides a **high quality of life and healthy communities**. Towns and villages across Oxfordshire are vibrant and distinctive, and Oxford is the highest ranking city in PwC’s 2018 Good Growth for Cities Index, which measures cities in the UK against a range of indicators for economic success and wellbeing. Oxfordshire’s natural capital and cultural and heritage assets are uniquely rich and diverse, including three Areas of Outstanding Natural Beauty, seven Special Areas of Conservation, rivers and the canal, parks and other green spaces, as well as a range of world-class museums and libraries. These are important parts of what makes Oxfordshire a place where people want to live and businesses want to locate.

However, as Oxfordshire becomes an increasingly attractive place to live, work and visit, it has developed a number of challenges that are now restricting economic growth. Oxfordshire has a number of **land constraints** that limit housing development. The urban area of Oxford is contained within a tightly drawn Green Belt that prevents significant expansion around the city and limits housing supply. Flooding and other environmental

issues limit the options for growth beyond existing boundaries. Local towns are able to ease housing pressure for the city but there are challenges in connecting these hubs to core economic activity located elsewhere in the country. A strategic approach to long term planning is needed across Oxfordshire to coordinate housing growth and infrastructure investment.

This constrained housing supply is making Oxfordshire increasingly **unaffordable**, increasing the price of housing to buy and rent. The 2017 median house price in Oxfordshire is now 50% higher than the English average.⁴² Oxfordshire also has a housing to income ratio of 12:1.⁴³ Median wage growth, although impressive, has not grown as quickly creating a significant **cost of living challenge** for many residents. This is exacerbating the inequality within Oxfordshire, making the region less attractive to global top talent, and less able to retain recent graduates from our universities and provide affordable housing for key lower and middle-income workers upon which the economy depends. Lack of ability to attract and retain talent can also hinder business growth and restrict investment into the region.



Cowley Road Carnival, Oxford



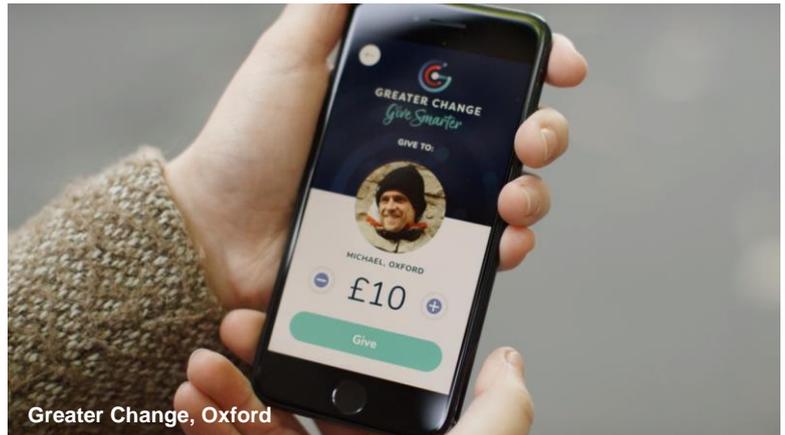
The Cotswolds

CASE STUDY: GREATER CHANGE

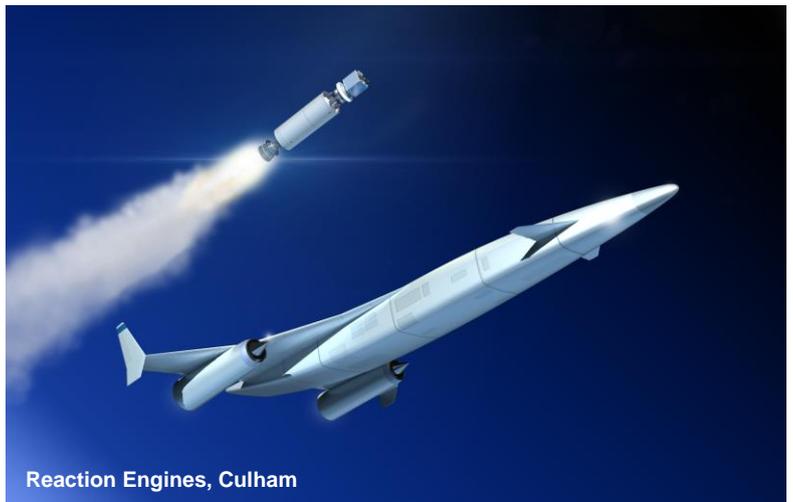
Greater Change is an Oxford-based startup. It is a social enterprise aimed at providing financial support to those who are homeless, providing a way for them to fund long-term savings goals. People who are homeless work with a support worker to agree a target purchase and budget for this. Members of the public then fund the goals of individual people directly through the Greater Change app and website, and money is sent directly to a charity that commits to buying the target purchase.

It enables giving in a cashless society, increases the pool of potential givers, and provides those who are 'street homeless' with a safe way of saving. So far, Greater Change has raised over £10,000 and supported twenty people to achieve their long-term savings goal.

Greater Change has now received confirmation of scale up funding, and will use this to expand its services to more areas across the UK.



Greater Change, Oxford



Reaction Engines, Culham

CASE STUDY: REACTION ENGINES LIMITED

Reaction Engines Limited is a privately held company based at the Culham Science Centre in Oxfordshire, employing around 180 staff. Reaction Engines was founded in 1989 to develop the technologies needed for the Synergetic Air-Breathing Rocket Engine (SABRE™). SABRE™ is a new class of engine which is the leading contender for the next generation of hypersonic flight and space access vehicles. It is an innovative and highly scalable engine type with multiple applications across a range of new and existing markets. The company has raised over £100m in recent years, from the UK Government and private investors. This funding has supported the company's transition from a successful research phase into development and testing of the SABRE engine.

Factors in the Oxfordshire ecosystem that have enabled growth:

- **Growth of the science community:** Culham has been a fantastic place for the growth of Reaction Engines, and the development and growth of other science centres, such as at Harwell has created a strong community that benefits all.
- **Access to public funding:** Funding from central government via the UK Space Agency has been critical in enabling Reaction Engines to move from technology development to the testing phase. At a local level it is often difficult to gather information on the various funding opportunities available without conducting a lot of research, so a more joined up and streamlined approach is needed.

Factors in the Oxfordshire ecosystem that have constrained growth:

- **Transport:** Public transport links across the county and to the science parks need to be better connected with multi-modal and integrated transport options. Train travel to London is also not consistently reliable.
- **Access to funding:** the lack of affordable housing to rent or buy constrains people from remaining in the area, as well as moving there in the first place.

INFRASTRUCTURE

Oxfordshire enjoys a central location that is **well connected across the UK and internationally**, with fast rail links to London, Birmingham and Bristol that provide connections to the West, the Midlands and the North. Oxfordshire is close to Heathrow and Birmingham airports as well as southern ports, within an hour of international transport hubs and connections to global markets. With the development of East-West Rail and the East-West Expressway, there will be new and improved connections across the Oxford – Cambridge Arc and the Golden Triangle with Cambridge and London.

As a region we are working together across the public and private sector to **innovate in transport and mobility**, with multi-modal transport solutions and pro-public transport policies. We are home to companies such as the MobOx Foundation, which brings together Oxfordshire County Council, academia and industry to lead on innovation in mobility-related issues in Oxfordshire.

However, given Oxfordshire's largely rural nature, there is still heavy reliance on car travel between housing and employment locations. This contributes to severe **traffic congestion** on key routes, such as the A34 and the A40. The A34 is a key route to the southern ports and often becomes congested with north-south freight traffic for the UK. Increasingly, congestion affects workplace productivity, quality of life and the environment, and may deter prospective investment in the region. Lack of connectivity in some rural areas also negatively impacts access to public services, increasing inequalities in the county.

Oxfordshire's **energy network** is already heavily constrained with the grid at capacity. Future growth will be restricted unless energy infrastructure responds to our changing requirements and next-generation needs of energy-intensive science and technology assets. To meet the scale of demand we need multiple energy sources and new service models. We also need to innovate in low carbon solutions and ways to reduce demand – currently only 10% of Oxfordshire's energy is from renewable sources in comparison to 25% for the UK average.⁴⁴ The Garden Town developments at Didcot and Bicester, and the emerging West Oxfordshire Garden Village, provide the opportunity to develop new and innovative energy solutions to begin addressing these challenges.

Digital connectivity in Oxfordshire has significantly improved in recent years. The *Better Broadband for Oxfordshire* programme has enabled over 96% of premises across the county to have access to superfast broadband. 7% of premises in Oxfordshire have full fibre connectivity – whilst this is double the national average, it is still well behind many of our global competitors.⁴⁵

Oxfordshire also lacks the "A" grade office space, which can attract foreign direct investment and secure international business headquarters in the region. To enable future growth we will need to urgently address this challenge, and look to leverage planned developments, which can offer the potential for creating a business district and expanding A grade office space.

Without significant investment our competitive advantage in world-leading technologies and markets will be severely constrained and will restrict further growth.





CASE STUDY: “PICKMEUP” demand responsive bus service

PickMeUp is the UK’s largest intelligent demand responsive bus service and was launched in June 2018 by Oxford Bus Company. It uses seven fully accessible minibuses which operate across a 12.2sq mile zone in East Oxford, taking in the rail station, Park & Rides, and many of the key employment sites in the area. Customers request rides on the service via a Smartphone app and can travel on-demand between any of the 1,906 “virtual bus stops” in the zone. The service uses intelligent software which dynamically routes the vehicles to respond to traffic conditions and demand. The system works in real time to calculate the best route for vehicles to take in order to maximize efficiency and to enable similar requests to be aggregated together, delivering “ride sharing.” PickMeUp has shown strong growth, and by the end of its 24th week of operation had carried over 50,000 passengers, with more than 16,000 people having downloaded the app and registered an account. The hours of operation have been extended to match demand seen and it is hoped that the service will reach commerciality within 3 years of launch.

Factors in the Oxfordshire ecosystem that have enabled growth

- **Strong public transport:** The local authority has a track record of supporting public transport and effectively managing private car use in the city, back to the establishment of the UK’s first Park & Ride site in 1973. As a result the city has a high quality bus network and a large portion of the public are open to using bus services. This has made it easier to achieve the behavioural change necessary for people to embrace this new service.
- **Investment:** Oxford Bus Company provided an investment of over £800k to start the service and employed 20 dedicated staff to support the operation.
- **Strong business networks:** the design of the service was informed by extensive consultation with major employers and stakeholders in the area, facilitated by OxLEP, the Chamber of Commerce and local authorities.

CASE STUDY: MultiCAV at Milton Park

The MultiCAV project supported by Innovate UK started in November 2018 and is 30 months in duration. Led by FirstGroup, the project consortium comprises Oxfordshire County Council, South and Vale Councils, MEPC, Arrival, Zipabout and the University of the West of England. The project will deliver autonomous shuttle vehicles (“pods”) initially on a demand responsive service within Milton Park science and technology park near Didcot, the vehicles moving onto a shuttle service between Milton Park and Didcot Parkway station once necessary consents and permissions for operation on public roads are confirmed. The pods will be joined by an autonomous bus towards the end of the project, also linking the park with the rail station.

The autonomous vehicles are a part of a mobility package which MultiCAV will deliver for Milton Park, providing better travel planning information for workers and visitors to make informed decisions and with the intention of cutting internal car trips within the park by 50%. Operational and commercial feasibility of autonomous vehicles in mixed traffic will be explored during the project, together with public reactions in terms of acceptability, personal security and shared mobility.

VISION STATEMENT

A satellite with large solar panels is shown in space, orbiting Earth. The background is a vast expanse of white clouds over a blue planet, viewed from a high altitude. The satellite is the central focus, with its solar panels extending outwards. The overall scene is a representation of technology and innovation in space.

Our vision for the Oxfordshire Industrial Strategy is to position Oxfordshire as a top three global innovation ecosystem by 2040, building on the region's world leading science and technology clusters to be a pioneer for the UK for emerging transformative technologies and sectors.

Oxfordshire's vision: a top three global innovation ecosystem by 2040

Our vision for the Oxfordshire Industrial Strategy is to position Oxfordshire as a top three global innovation ecosystem by 2040, building on the region's world leading science and technology clusters to be a pioneer for the UK for emerging transformative technologies and sectors.

In this chapter we set out our rationale behind this vision and why it is important for both Oxfordshire and the UK.

An innovation ecosystem is the term used to describe the large and diverse nature of participants and resources that are necessary for innovation. The UK needs a dedicated innovation ecosystem if it is to continue to compete globally, embrace technological change and deliver increases in productivity and prosperity across the country. All major countries have at least one innovation ecosystem, for example Silicon Valley in the USA, Tel Aviv in Israel, Quantum Valley in Canada and Helsinki in Finland.

We believe Oxfordshire provides the strongest platform for the UK to drive innovation-led growth across the country. The concentration of assets, technologies and knowledge creates a rich and dynamic ecosystem that can provide national leadership and succeed on a global stage. This underpins our ambition to become a top three global innovation ecosystem by 2040.

Building on the analysis set out in the *Baseline* and *Future State Economic Reviews*, our potential as an innovation ecosystem is apparent.

Our universities, science, technology and business parks are at the forefront of global innovation in transformative technologies and sectors that are shaping the twenty first century. The markets for these technologies and industries are global and are set for rapid growth between now and 2040. Our businesses are already succeeding in these markets and have the capability to compete with locations across the globe. We have already successfully created companies that have been valued at over US\$1bn, which is testament to this potential. This follows years of 'patient' capital investment, through the university system and by some of the most innovative companies in the world.

As the UK's central innovation ecosystem, growth in Oxfordshire also delivers growth for the rest of the UK. As we innovate, we deliver uplift in wider UK manufacturing, supply chain and productivity growth opportunities.

On the following pages we set out in more detail our strategy for achieving our vision to become a top three global innovation ecosystem. This approach will maximise Oxfordshire's growth potential as well as the UK's future global competitiveness.

A GLOBAL INNOVATION ECOSYSTEM

To become a top three global innovation ecosystem we have explored a number of our competitors from Silicon Valley in the USA, Helsinki in Finland and Tel Aviv in Israel to Pangyo Techno Valley in South Korea and the Zhongguancun Science Park in Beijing, China. Through this we can understand the drivers of success for an innovation ecosystem and where we need to improve to compete internationally (see *Future State Economic Review*). It is clear that innovation ecosystems have different trajectories of growth and have succeeded with different combinations of qualities and strengths. We have identified a number of characteristics that successful ecosystems share. This understanding of an innovation ecosystem encompasses both the breakthrough businesses as well as the cornerstone businesses which form the backbone of the ecosystem, providing jobs and critical services to high-technology businesses. In order to genuinely compete internationally, we must bolster our proposition in these areas, embedding these characteristics into our strategy for growth.



Iconic brand

It is essential for a globally-leading innovation ecosystem to have a distinctive proposition and a strong vision that differentiates itself from other ecosystems, around which citizens, businesses, leaders and investors can unite.



Liveable place

To attract people, business and investment, an innovation ecosystem needs to have thriving communities. These must be healthy, sustainable, provide a high quality of life, and support both urban and rural living. They must be affordable, well connected, and have a vibrant community and cultural offer.



Strong financing

Availability of finance is essential to creating and commercialising innovation, scaling spin-outs and investing in the talent and infrastructure necessary for innovation to flourish. Investment can come from a number of sources.



Commercial culture

A strong commercial culture is a culture in which entrepreneurship, investment and innovation thrives. It covers broad factors such as regulation and competition, as well as cultures of collaboration and knowledge exchange that encourage innovation and commercialisation.



Keystone assets

An innovation ecosystem must be anchored by national or international keystone assets – these can range from education institutes, national research facilities, world-class industry clusters and knowledge-intensive assets.



Talent proposition

Talent is integral to the innovation ecosystem. A strong innovation ecosystem must have the ability to attract and retain world-class talent, as well as nurture the talent and skills of its own citizens, developing skills aligned to business need and across a number of sectors.

We perform well in a number of these areas – we have renowned keystone assets, the largest university spin out fund in Europe, high quality of life, a highly skilled population and a thriving culture of innovation across our science and technology parks. However, we have significant challenges that we need to address in order to bolster our proposition in all six of these areas. Over the following pages we set out our strategy to do this.

THE PILLARS OF OUR VISION

Our vision to become a top three global innovation ecosystem is underpinned by three pillars and a foundation pillar for skills. Together, they aim to support business growth, provide a test-bed for innovation and commercialisation, and better connect and internationalise the ecosystem. Creating healthy communities, enhancing the urban and rural environments and ensuring growth is inclusive is also fundamental to our strategy.

We have developed these pillars to bolster our proposition in each of the essential characteristics of a global innovation ecosystem, to strengthen our world-leading capability, address structural challenges that are hindering competitiveness, and create the conditions for inclusive growth. They also feed into and strengthen the five foundations of productivity set out in the National Industrial Strategy: ideas, people, place, business and infrastructure.

Our vision for the Oxfordshire Industrial Strategy is to position Oxfordshire as a top three global innovation ecosystem by 2040, building on the region’s world leading science and technology clusters to be a pioneer for the UK for emerging transformative technologies and sectors.



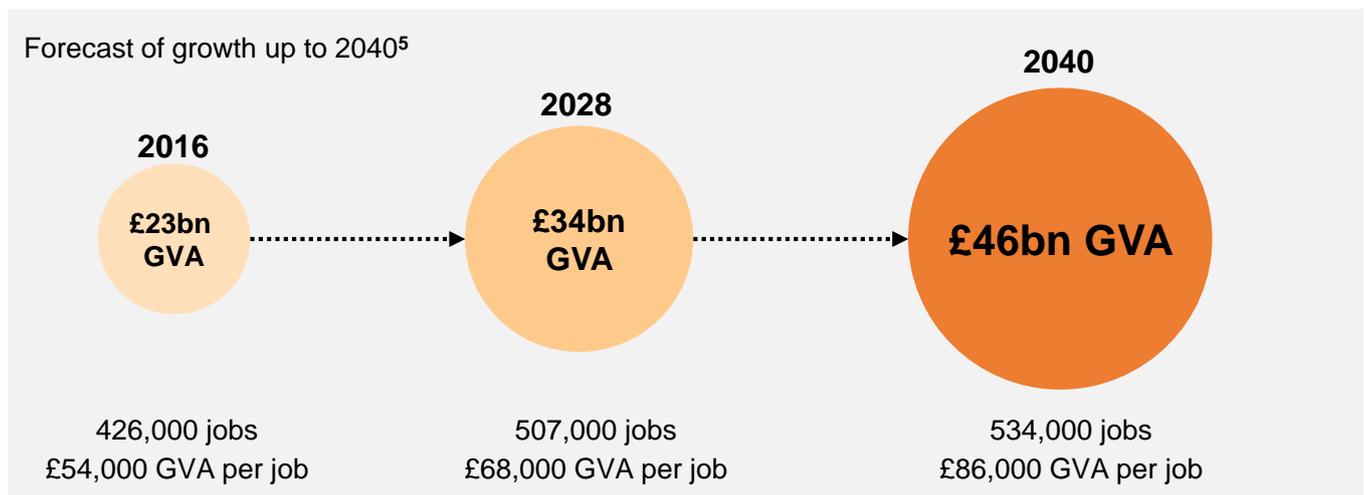
OUR GROWTH POTENTIAL

As part of developing the Oxfordshire Industrial Strategy we have forecast what initiating this step change in growth will mean for Oxfordshire's economy in 2040 (see Future State Assessment for further detail). As a result of this, we have set the following ambitions for Oxfordshire for 2040:

GVA	PRODUCTIVITY	JOBS	R&D
Double the Oxfordshire economy to be worth £46bn GVA. ^{1*}	Deliver a minimum of 2% per annum growth in productivity. ²	Create a minimum of 108,000 net new private sector jobs in Oxfordshire. ³	Contribution towards the Government's 2.4% R&D target. ⁴

If we initiate a step-change in growth and pursue our vision to become a top three global innovation ecosystem, we could double Oxfordshire's contribution to the UK economy by 2040. This increase in GVA will be driven by the creation of a minimum of 108,000 new private sector jobs and an average productivity growth of 2% per annum until 2040. By doubling the Oxfordshire economy to be worth £46bn GVA, we will be creating £9bn additional growth beyond our baseline forecasts. The figure below sets out our forecasts for growth from now up to 2040.

This is an achievable and sustainable growth trajectory that will build on our existing strengths and unique potential. This trajectory will require a step-change in how we pursue economic growth across the ecosystem – for example how we develop our business culture, support innovation across both breakthrough and cornerstone businesses, connect internationally, and improve our skills system. This step-change must ensure that growth is innovation-led, inclusive and place sensitive, enhancing our communities, natural environment and quality of life.



We have also calculated that for every £1 invested in Oxfordshire we will deliver £4 of benefit to the UK economy.⁶

*Note that GVA figures are in real terms 2016 prices.

Williams Formula 1



Delivering our vision

To deliver our vision we have identified a series of key actions which sit behind each pillar. The delivery arrangements will be set out in more detail in the supporting delivery plan and investment prospectus.

I A globally connected and competitive innovation economy

Oxfordshire's ecosystem is internationally renowned due to the strength and concentration of world class assets and innovation. This pillar focuses on developing the critical components and infrastructure of the innovation ecosystem to increase international connectivity and competitiveness. It focuses on internationalising Oxfordshire, connecting our innovation to world wide opportunities and ecosystems. This pillar strengthens a number of the foundations of productivity, focusing on infrastructure, ideas and business environment.

Brand development and promotion

- **We will bring together regional, national and international partners to develop and promote a distinctive brand for Oxfordshire that clearly articulates Oxfordshire's unique proposition as a global innovation ecosystem and business and tourism destination.**
- As part of this we will develop a range of digital and conventional marketing collateral promoting Oxfordshire's unique proposition and investment opportunities and to attract new visitors to the region. We will work with the Department for International Trade (DIT) to promote Oxfordshire in key sectors and locations and identify a global calendar of events to promote Oxfordshire and the Oxford - Cambridge Arc.
- Setting out a distinctive brand will raise Oxfordshire's and the Oxford - Cambridge Arc's international profile, enabling us to seize new opportunities for international connectivity, trade and investment.

Internationalisation Delivery Plan

- **We will work closely with the Department for International Trade (DIT) to develop an Oxfordshire Internationalisation Delivery Plan, developing sector propositions that will maximise investment and trade opportunities.**
- We will develop sector propositions around our specialisms in transformative technologies, targeting key global markets for trade, investment and export.
- We will also work with posts, embassies and consulates to promote and host trade missions and sponsor visits to Oxfordshire and the Oxford – Cambridge Arc, linked to key sectors and global locations.
- This will maximise investment and trade opportunities for Oxfordshire, and will distinguish Oxfordshire as a UK centre for multi-sectoral expertise in trade, investment and exports.

<p>‘Connecting Globally’ Platform</p>	<ul style="list-style-type: none"> • We will establish a ‘Connecting Globally’ Platform to facilitate collaboration with other global innovation ecosystems to share ideas, talent and innovation to support growth and business investment opportunities. • We will work with DIT and businesses to facilitate collaboration with other global innovation ecosystems. We will work with posts, embassies and consulates to host trade missions and sponsor visits to innovation ecosystems, and to send delegations and representatives in return. • This will better connect Oxfordshire internationally to new global opportunities and markets. Collaboration with other global innovation ecosystems will enable us to share ideas, talent and innovation and support business development.
<p>Implementation of Oxfordshire Infrastructure Strategy</p>	<ul style="list-style-type: none"> • We will work with local and national partners to implement the Oxfordshire Infrastructure Strategy (OxIS). • The OxIS identifies, maps and prioritises Oxfordshire’s strategic infrastructure requirements up to 2040, bringing together all the strategic infrastructure that supports local plans. These requirements include road and rail improvements for sustainable, multi-modal transport, along with new stations, support for the growth of the Didcot and Bicester Garden Towns, West Oxfordshire Garden Village and expansion of science parks. • This will address the critical connectivity issues that are hindering growth of the ecosystem and release the pressure on existing infrastructure that is causing congestion, pollution and extensive commuting times. It will better connect the ecosystem, supporting business growth, innovation and commercialisation.
<p>Digital Investment Plan</p>	<ul style="list-style-type: none"> • We will work with the Department for Digital, Culture, Media and Sport and national and regional partners to develop and implement an ambitious Digital Investment Plan to accelerate the roll out of full gigabyte fibre to premises, 5G and next generation telecommunications across the innovation ecosystem to provide world-leading digital coverage. • The Digital Investment Plan will combine with street furniture investment to support the roll out Internet of Things and 5G networks, and provide high quality connectivity across the county. It will provide the digital foundation to support the Living Lab approach and deliver an uplift in services to communities. • Improving Oxfordshire’s digital infrastructure is critical to enable connectivity between sites whilst preserving the natural environment. Through this plan, residents in Oxfordshire will benefit from greater connectivity and digital technological advancements. It will also ensure Oxfordshire remains competitive with respect to other world-wide innovation ecosystems.
<p>Implementation of Oxfordshire Energy Strategy</p>	<ul style="list-style-type: none"> • We will work with local and national partners to implement the Oxfordshire Energy Strategy, which will put in place a low carbon energy grid to support business growth and lead the development of new models for energy management. This will deliver a new market place that connects the grid, suppliers and consumers. • The Energy Strategy will commit to a 50% reduction of CO₂ Emissions by 2030 compared to 2008, as well as the world’s first ‘Zero Emission Zone’ in Oxford City Centre in 2019. This will provide a strategy that will secure investment to meet the additional capacity requirements of economic growth, innovate in low carbon energy products and services and seek ways to reduce energy demand, both in new and existing communities where novel solutions can be applied.

II

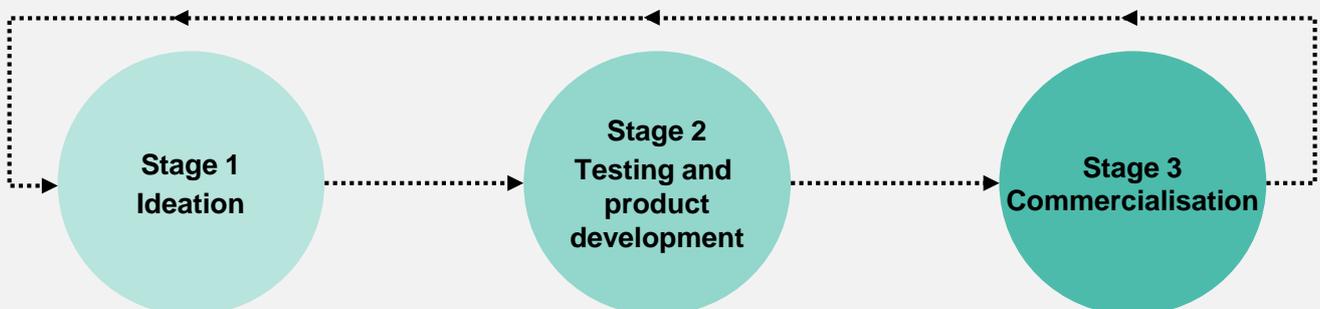
A powerhouse for commercialising transformative technologies

Oxfordshire is a commercial hub, known globally for being a place which brings researchers, businesses and innovators together. This pillar focuses on maximising technology innovation, R&D and commercialisation by putting in place mechanisms throughout the business lifecycle to support and accelerate Oxfordshire’s global leadership in critical emerging sectors and technologies. This pillar seeks to strengthen the business environment and ideas foundations of productivity in the UK Industrial Strategy, to be the best place to start and grow a business and to enable innovation to thrive.

The business lifecycle is critical to understanding how to enable businesses to grow and become more productive – the focus of this pillar. The lifecycle is the progression of a business and its phases over time. Below we set out the Oxfordshire-specific business lifecycle and its phases, that Oxfordshire’s firms need to be enabled to move through to grow and generate new jobs.

Oxfordshire’s business lifecycle

Analysing the lifecycle of Oxfordshire’s businesses, we have identified three key stages of maturity specific to Oxfordshire that we need to better enable businesses to move through. This pillar focuses on putting in place the measures necessary to support businesses to do this, moving more quickly from ideation and innovation to product development and commercialisation. This will enable businesses to capture new growth and export opportunities that result from commercialisation, increasing productivity. It will support businesses to grow to scale more quickly, and enable the creation of more unicorn businesses in Oxfordshire.



This is the idea generation stage. Oxfordshire already has unique strengths in this stage, with our world-class innovation assets and R&D capabilities. We will continue to invest in these capabilities to ensure we maintain our competitive advantage in innovation.

This phase includes the testing and prototyping of new business ideas, in preparation for bringing them to market. This pillar seeks to strengthen this capability to enable businesses to grow to scale faster, by giving businesses better access to investment, business support, and business space.

This is the stage where we have the greatest potential to capture growth and create spill-over effects across the UK. To enable commercialisation we will unlock land and resources to support business growth and ensure the right talent, finance and infrastructure is in place. We will also make a strategic decision on where this growth takes place, whether in Oxfordshire or other areas of the UK.

To attract the investment we need to deliver the infrastructure identified in the Oxfordshire Infrastructure Strategy and other enablers required for economic growth (including key technologies and innovation), we will diversify our investment strategy. This will provide the investment and funding necessary for infrastructure improvements and expanded business support for start-ups and scaling businesses.

Investment & Funds

Oxfordshire Innovation Sovereign Wealth Fund Proposition

- **We will develop a proposition to establish an investment case to attract Sovereign Wealth Fund investment, complementing other UK funds, dedicated to improving infrastructure across the Oxfordshire innovation ecosystem.**
- Oxfordshire will put together a proposition for Sovereign Wealth investments with low risk, fast return and potential for global recognition. We will work with partners to focus on developing a compelling and commercially sound proposition to secure an investment commitment. We will seek to prove that we can effectively utilise funding to develop infrastructure solutions to increase additional future investment.

Oxfordshire Finance Hub

- **We will establish an Oxfordshire Finance Hub to support access to finance by providing advice and support in commerciality, business planning, IP adoption and investment.**
- The Oxfordshire Finance Hub will work closely with the Oxfordshire Growth Hub to provide finance advice and support to both breakthrough and cornerstone businesses.
- This will enable businesses to receive the support they need to accelerate IP adoption and investment in research and development.

Oxfordshire Business Investment Scale Up Fund

- **We will establish the Oxfordshire Business Investment Fund to support investment in high growth companies with potential for accelerated scale up.**
- We will work with partners to combine private and public money to make equity investments in these businesses.
- This will increase the supply of equity to next generation high-growth Oxfordshire companies, addressing the finance gap faced by potential breakthrough businesses and enabling these businesses to grow more quickly to scale.

Oxfordshire Growth Hub enhanced offer

- **We will enhance the offer of the Growth Hub, to enable it to deliver more support for breakthrough and cornerstone businesses.**
- The Growth Hub remit will expand to deliver more targeted support and advice to different types of businesses. This will include targeted support and sector advice to increase market participation and accelerate scale-up; business model innovation support; access to skills development; support accessing finance; and a programme linking world-class researchers to companies.
- Expanding the offer of the Growth Hub will make business support more easily accessible to people wanting to start or grow a business, providing businesses with the support and advice they need to move more rapidly through our business lifecycle.

World-class scale up programme

- **We will establish a world-class scale up programme to support innovative breakthrough businesses to move more quickly through the business lifecycle to grow to scale and commercialise innovation and technology.**
- We will draw on successful global models to set up a dedicated world-class scale-up programme that supports innovators to transition from the ideation phase to access funding and begin to prototype and commercialise technology and innovation. This will also provide critical leadership and management training, linking in with the skills agenda.
- Providing this support will enable businesses to move more rapidly through the business lifecycle, reaching the prototyping and commercialising stage more quickly to capture value from innovation and ideation.

Transformation of science and technology parks and creation of new hubs

- **We will transform the science and technology parks across the ecosystem including doubling floor space at Harwell, Culham and Begbroke science parks, and develop new, well-connected world-leading innovation hubs and clusters around key locations including Oxford Station and West End, Oxford Technology Centre at Kidlington, Bicester, Upper Heyford, West Oxfordshire and Grove.**
- This will provide the business space that the innovation ecosystem needs to support the diverse range of businesses in Oxfordshire, including the fast-growing new businesses, established companies such as Williams F1, Sophos and Oxford Instruments, and the next generation of start ups and spin outs.
- Science and technology park developments will be planned in conjunction with transport planning in the OxIS, ensuring they use multi-modal transport options to be well-connected and sustainable.
- We will work with partners to develop propositions for new science and technology parks and clusters. The table below sets out the initial clusters proposed, but is not an exclusive list and will be developed further.

Proposed network of global hubs and international clusters:

Global Health & Life Sciences Quarter – Oxford	International Space Cluster Harwell
Global Business District Oxford Station West End	Global Quantum Computing Hub Harwell
Global Innovation Hub Begbroke	Robotics & CAV UK Cluster Culham
Global Energy Tech Cluster Harwell	Fusion Technology Global Cluster – Culham
Oxford Science Park Quarter Cowley, Oxford	Bioscience and Technology Quarter – Milton Park
Global HealthTec Cluster Harwell	Williams Technology Campus Grove
Carterton & RAF Brize Norton Industrial Hub	West Oxfordshire Science Park Eynsham
Bicester Eco Zone & Corporate HQ Hub – Bicester	Banbury Industrial Zone Banbury
Film City Upper Heyford	

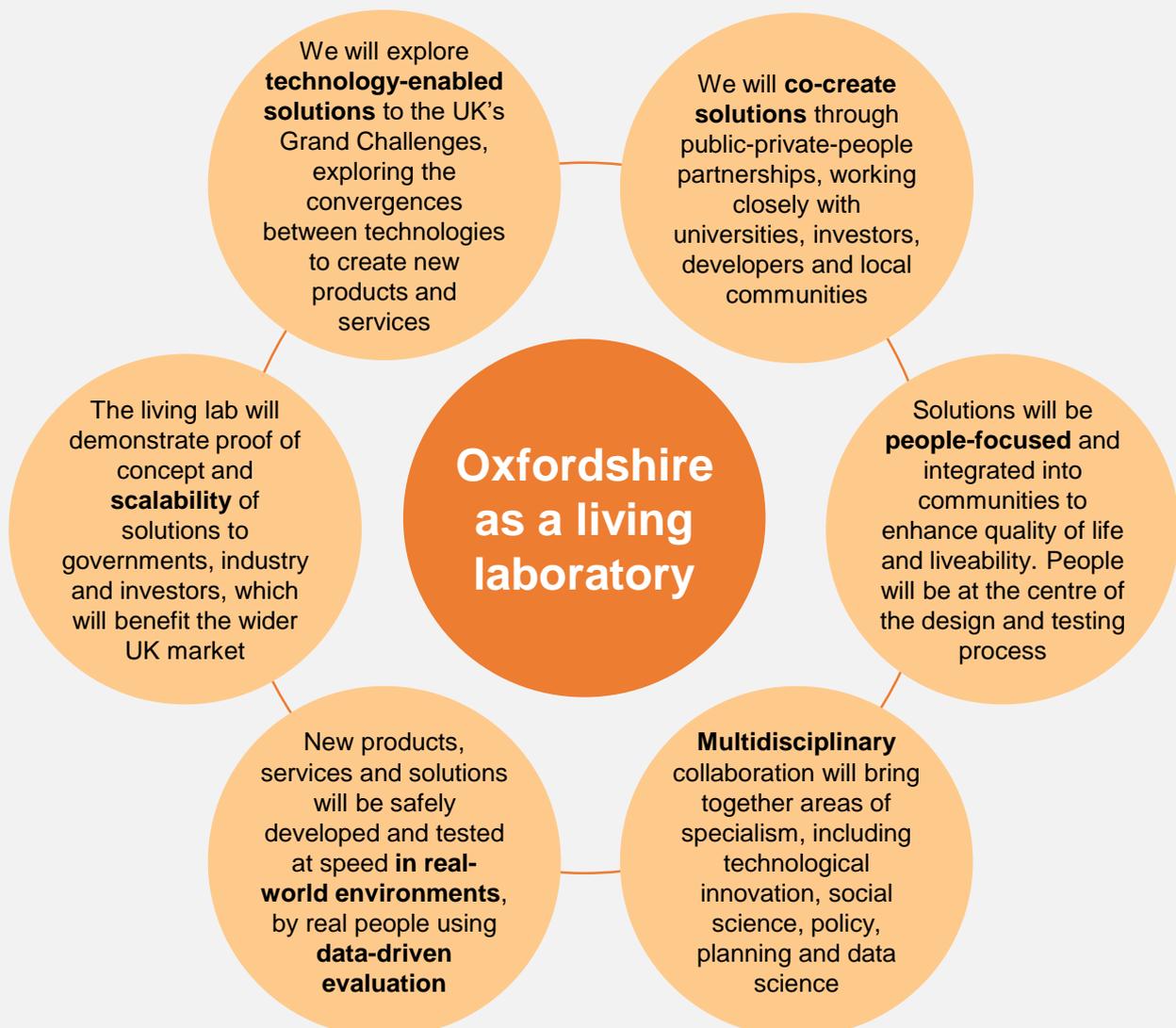
III

A living laboratory solving the UK's Grand Challenges

Oxfordshire's environment and demographics, together with its ambitions for planned housing growth, set out in adopted Local Plans, creates the platform for developing new innovation in place making, at scale. This pillar focuses on developing Oxfordshire as a globally recognised sustainable, high quality, liveable place utilising new technologies and services developed within the ecosystem, working with businesses and communities to tackle the four Grand Challenges set out in the Industrial Strategy. It also strengthens the foundation of productivity in the UK Industrial Strategy that seeks to create prosperous places and communities.

Oxfordshire as a living laboratory

Living laboratories are user-centric innovation environments, built on realistic activities and research. They are an increasingly widespread concept, and already taking root in Oxfordshire. Here we set out what a living laboratory will mean in the context of Oxfordshire – see the *Future State Review* for more detail. We will develop Oxfordshire as a living laboratory, centred on using our world-leading science and technology clusters to innovate in the transformative technologies that are shaping the twenty first century and develop solutions to the UK's Grand Challenges: ageing society, mobility, data and artificial intelligence, and clean growth. This approach builds on our existing test bed areas, particularly the Garden Towns and in Oxford where we are already testing solutions for mobility.



Clean Growth Living Lab

- **We will establish Clean Growth living labs across the county, including at Harwell, Bicester Garden Town and Culham Smart Village to pioneer new forms of locally-generated low carbon energy technologies and solutions.**
- In these zones we will work with partners to develop, evaluate and pilot innovative low-carbon energy technologies and solutions for new housing settlements and business locations including the development of off-grid and new fuel services.
- These labs will speed the implementation of successful clean growth interventions, and support the commitment to a 50% reduction in CO₂ emissions by 2030 compared to 2008. This will tackle the Clean Growth Grand Challenge set out by Government.

Data and Mobility Living Lab

- **We will establish Data and Mobility living lab across the county, including (but not limited to) at Culham Smart Village, West Oxfordshire and Didcot Garden Town to bring forward new solutions to mobility.**
- These living labs will explore new solutions and technologies, such as autonomous vehicles and smart infrastructure to support improved connectivity and mobility across the ecosystem. As part of this they will explore the use of integrated, multi-modal transport services that reduce reliance on private vehicles.
- This will also support linked challenges such as accessibility, independent living, congestion and commuting and journey times across Oxfordshire. This will support the prototyping of new products and services that will support inclusive development in Oxfordshire, enhance quality of life, and develop solutions to the ageing society, mobility and data Grand Challenges.

Health and Wellbeing Living Lab

- **We will establish a Health and Wellbeing Living Lab linked to the Global Health and Life Sciences Quarter that will provide pioneering resources and innovation, and support other life sciences hubs across the ecosystem, including Milton Park and Harwell.**
- This will be integrated into health services within existing communities and the new Garden Towns, Garden Village and other settlements with a focus on delivering improved outcomes arising from an ageing society.
- Oxfordshire's ageing society will increase demands on public services, especially health and social care. This living lab will push Oxfordshire to the forefront of public service innovation in the UK, and pioneer solutions for tackling the Grand Challenges of an ageing society as well as artificial intelligence and data. It will innovate in products and services, ranging from new technologies to novel solutions such as social prescribing, that will help build healthy communities and deliver benefits for people across Oxfordshire.

IV

A skills system creating opportunities at every stage of life

Oxfordshire's economic success is tied to the dynamic and skilled workforce it is able to access, develop, nurture and retain. As a cross cutting priority, the focus of this foundation pillar will be to build a Skills and Education System that is agile and responsive to the needs of Oxfordshire's businesses and innovation ecosystem, and which creates the pathways that can provide young people and local communities with the skills needed to access new employment opportunities and succeed. This cross-cutting priority responds to the 'people' foundation of productivity, promoting a diverse and inclusive economy with good jobs and greater earning power for all.

Providing leadership through a Skills Advisory Panel and new Oxfordshire Curriculum

- **We will establish a Skills Advisory Panel with powers to co-commission skills and education provision with Government departments and agencies. This will inform an Oxfordshire Curriculum which we will develop with local teachers, education professionals, the County Council and businesses.**
- The new, innovative Oxfordshire Curriculum will be developed to inform, enhance, coach and mentor students about the innovation ecosystem and provide advice and guidance about the job opportunities that are being created, to ensure educational settings provide the skills needed for our young people to succeed in the future. It will be developed with and through local teachers, school and college leaders, education professionals and local businesses to ensure better alignment with the changing needs of business and the skills that will be required at all levels across the workforce. This will include introducing and championing a new wave of T-Levels that map to our technology sectors.

Creating pathways and social mobility for young people

- **We will increase business leadership and engagement to create pathways and support social mobility for young people by working with technology companies across Oxfordshire to establish a fund that retains any unspent apprenticeship levy to develop new apprenticeships in emerging technology based opportunities.**
- We will work with the Careers and Enterprise Company, local colleges and Oxfordshire County Council to create a new pilot project for vulnerable learners, including those with SEND and/or 'Pupil Premium', to promote opportunities to access coaching and mentoring with world-leading businesses across the ecosystem. Through this we will improve social mobility for young people who will have greater access to career pathways within Oxfordshire; it will also enable skills development to align to business need and promote more tailored skills that will release pressure on the tight labour market.

Ensuring inclusive growth through OxLife

- **We will ensure inclusive growth through the development of OxLife – a programme designed to support those furthest from the labour market including local residents over 65, armed forces personnel returning to the Oxfordshire workforce, and those on Employment Support Allowance to reskill and upskill in order that they can have an active engagement in the economy, building on existing community learning initiatives.**
- This is important as technologies disrupt the labour market, changing job needs and increasing the importance of re-skilling and development of new capabilities. Retraining and upskilling opportunities for Oxfordshire's residents will support inclusive growth, enabling more people to continue to contribute to the local economy – this will help us achieve our target annual productivity growth of 2%.

<p>Building world-leading educational facilities</p>	<ul style="list-style-type: none"> • We will establish a Capital Investment Programme to support the development of new world-leading education, training hubs and specialist centres across Oxfordshire that will provide the pathways for young people into the advanced technologies of the future. • Our new cryogenics lab set up at Didcot UTC is an example of how we need to develop capital facilities. We will seek to build a Capital Investment Programme that can deliver further facilities in further education and universities for skills development and training in Oxfordshire, such as a Quantum Centre of Excellence that will enable the region to be a global leader in quantum technology training and skills development. • In line with housing growth under the Housing and Growth Deal, Oxfordshire County Council will build forty new schools to accommodate an increased population. These will provide high quality education which will meet the current and future needs of the new communities and businesses, and will have a resource base for 'SEND' to ensure inclusive education and promote successful outcomes for all children and young people.
<p>High-Flyers Programme</p>	<ul style="list-style-type: none"> • We will put in place a High Flyers Programme aimed at supporting early stage researchers and post graduates to develop commercial and business skills which can be transformed into new spin-out and start-up companies. • The High-Flyers Programme will support early-stage researchers and post graduates to develop the commercial, management and business skills needed to begin to commercialise innovation. We will support them to connect with businesses and funding opportunities from across the innovation ecosystem. • This will nurture the talent necessary to commercialise innovation in the ecosystem. Providing new opportunities such as this will also encourage graduates and those early in their careers to remain in Oxfordshire.
<p>Oxfordshire Entrepreneurship Hub</p>	<ul style="list-style-type: none"> • We will establish an Oxfordshire Entrepreneurship Hub to support students and young people across Oxfordshire to develop business propositions and develop connections across the innovation ecosystem. • The Oxfordshire Entrepreneurship Hub will be open to all students and young people in Oxfordshire. It will provide open sessions and targeted advice to support young people to develop ideas, business propositions and entrepreneurship. It will be a place where people across the innovation ecosystem can connect to share ideas, and where they can be directed and supported to take advantage of opportunities across the ecosystem. • This will bolster Oxfordshire's entrepreneurial and commercial culture, ensuring it is inclusive and that everyone is supported to be a part of the ecosystem.



Scaling up our innovation ecosystem

Our vision is to become a top three global innovation ecosystem, doubling our GVA to £43bn and creating 108,000 jobs. It is critical that we ensure this growth is sustainable and can grow to scale. This is why in this chapter we set out a spatial vision for how growth in Oxfordshire can be sustainable, enhancing the natural environment and quality of life for all of Oxfordshire's residents.

We have developed this vision by assessing growth needs and existing land and connectivity constraints and opportunities across the county. The vision originates from a business-orientated perspective of growth that focuses on graduating knowledge assets into successful enterprises by providing fit-for-purpose growth locations. It is formulated to minimise impact on the natural environment and retain the sense of place that makes Oxfordshire unique. We have spatially mapped economic clusters to match the business lifecycle in our strategy. This will ensure that different types of business are enabled to move more quickly through Oxfordshire's business lifecycle, to grow to scale and move into commercialisation.

This recognises the areas that are most suited for each stage of the business lifecycle, and creates a dynamic and integrated innovation environment. This will encourage the flow of ideas and the opportunities for businesses to locate across Oxfordshire with the highest potential to grow.

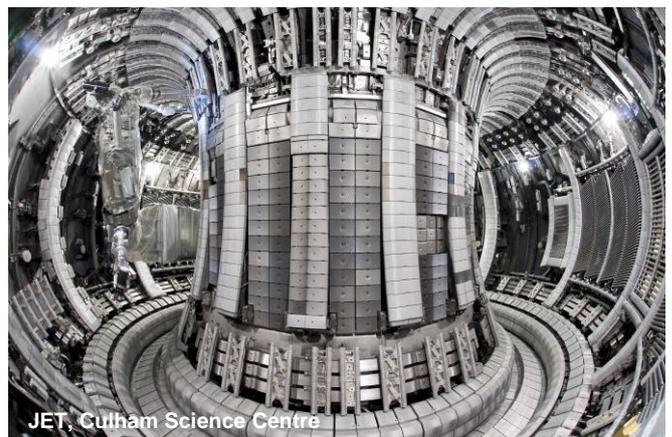
Stage 1: Ideation. R&D will be driven in and around core hubs across the ecosystem, taking advantage of the universities and other research and professional assets.

Stage 2: Innovation corridor. This will take place in growing clusters for testing and developing new businesses. These are primarily located within the existing innovation corridor which extends from Begbroke in the North to Harwell in the South.

Stage 3: Commercialisation region. A wide reaching commercialisation area that extends to the whole of Oxfordshire acknowledging that business of different scales will contribute to growth from across the region, the Oxford - Cambridge Arc and the UK economy. This recognises the reality that not all of this growth needs to be captured within the boundaries of the county.

Our spatial vision's unique propositions include:

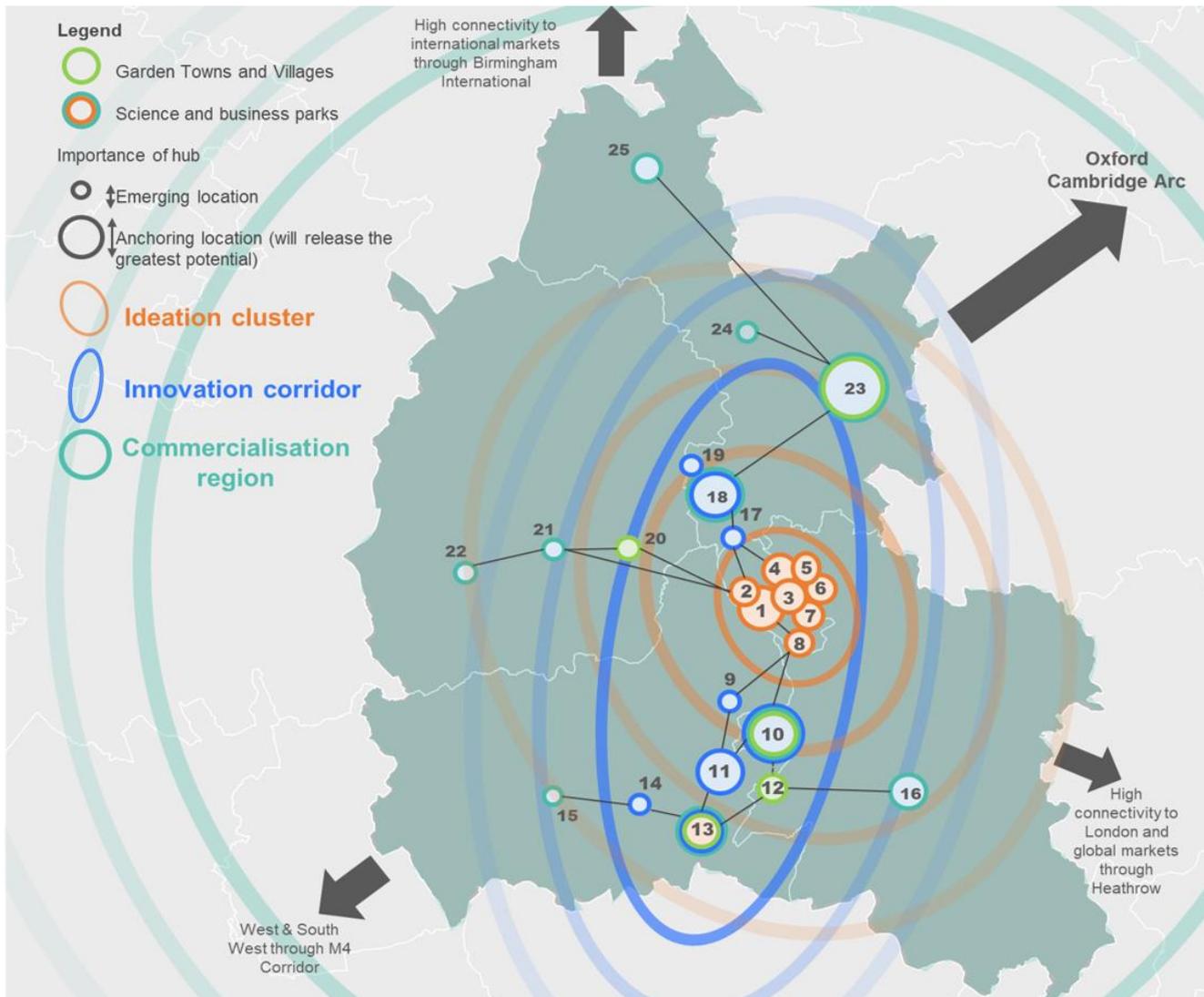
- **A polycentric network of innovation clusters** that offer a distinctive and dynamic future work-life environment for discovery and enterprise.
- **Multi-level physical and digital connectivity** that uses sustainable, multi-modal transport, first within Oxfordshire and between growth locations and assets; secondly across the Oxford - Cambridge Arc by rail and road; and third to the rest of the UK and beyond.
- **Pioneering places that are living labs** that future-proof communities by preparing them for technological and environmental change including the advent of connected and autonomous travel, all electric energy, smart homes and sustainable living.



JET, Culham Science Centre

Figure 2 sets out this spatial vision in more detail, comprising the three stages of Oxfordshire’s business lifecycle. It acknowledges that although different areas are capable of undertaking all stages of the business lifecycle, some will be more suited than others. It shows a concentration of innovation from Begbroke to Harwell and Culham, distributing out from this central area to the rest of the ecosystem. It also shows an expansion of commercial activity across the region that can create employment and business growth where land is less constrained, rippling out across the Oxford - Cambridge Arc and the rest of the UK. This solution seeks to retain the natural landscape and living experience as a major Oxfordshire asset. Ultimately, businesses will seek to locate near each other and where they feel they can best capture supply chain and agglomeration benefits. **Figure 1 is not a spatial strategy but an illustration of these spatial concepts in Oxfordshire’s development journey.**

Figure 1: Key locations



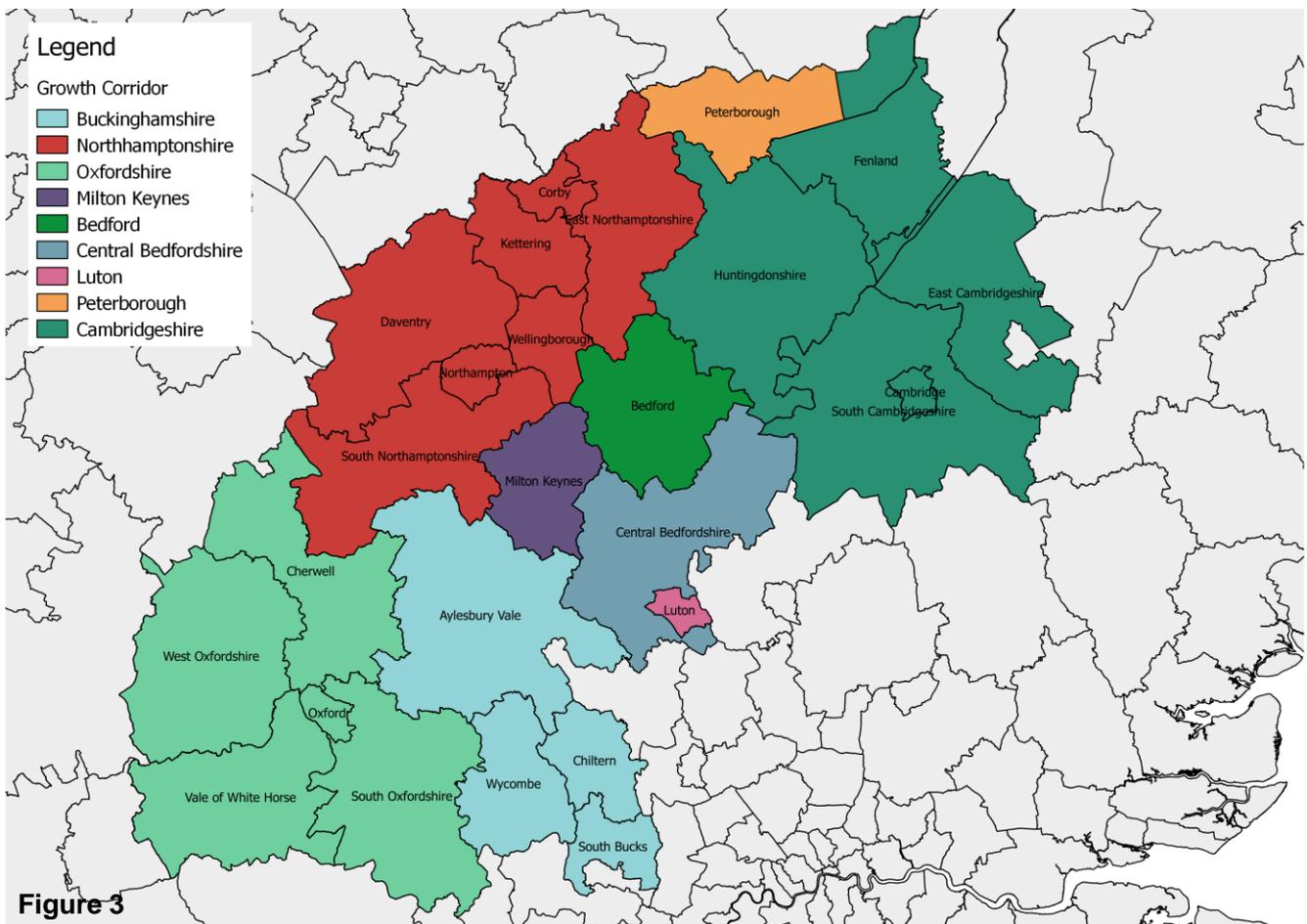
Key locations within the innovation ecosystem:

- | | | |
|---------------------------------------|---|---|
| 1. Oxpens, West End & Station Quarter | 10. Culham Science Centre | 18. Begbroke Science Park and Innovation Centre |
| 2. Osney Meads Innovation Quarter | 11. Milton Park | 19. Oxford Technology Park |
| 3. Oxford University | 12. Didcot Garden Town | 20. West Oxfordshire Garden Village |
| 4. Oxford Centre for Innovation | 13. Harwell Science and Innovation Campus | 21. Witney Business & Innovation Centre |
| 5. Oxford Brookes University | 14. Grove Technology Park | 22. Carterton & RAF Brize Norton |
| 6. Headington Hospital Quarter | 15. Defence Academy, Shrivenham | 23. Bicester Garden Town |
| 7. Oxford Business Park | 16. Howbery Business Park | 24. Heyford Park |
| 8. Oxford Science Park | 17. Oxford North | 25. Banbury |
| 9. Quadrant, Abingdon Science Park | | |

SHARED SUCCESS: THE Oxford - Cambridge Arc

We will work closely with our partners across the Oxford - Cambridge Arc as we seek to deliver on our vision. Working together, we will unlock new opportunities to secure growth and raise productivity, job and output potential. As set out in our spatial vision the Arc can deliver multiple benefits:

- The Oxford - Cambridge Arc **can capture the value-multiplying industries** that will create high value jobs and growth. Oxfordshire will act as a catalyst for further commercialisation and economic development into the Oxford - Cambridge Arc.
- The Oxford - Cambridge Arc **provides an essential response to restricted business space**. The Oxford - Cambridge Arc provides important space and access to new pools of labour to achieve Oxfordshire’s full potential for economic growth, where land is constrained within the region.
- **Improved infrastructure connections including the Expressway and East – West Rail** has the potential to improve local community connections. The emerging route of the Expressway will impact on locations for growth in Oxfordshire and will need to be aligned with the JSSP. This will further promote the sharing of innovation and knowledge across the Arc, as well as improving the flow of workforce between regions.
- The Oxford - Cambridge Arc provides an opportunity to **extend the concept of Living Labs across the Arc** – testing some of Oxfordshire’s innovative responses to the grand challenges with a wider pool of communities and with other clusters across the Arc, delivering greater impact and enhancing Arc-wide collaboration.
- With an emphasis from conception on **sustainability and quality of life and place**, the Oxford - Cambridge Arc can make this a key factor that leverages new inward investment and enhances the natural environment.



DRIVEN, located at RACE, Culham Science Centre: an ambitious and exciting £8.9 million project that will see a fleet of Level 4 autonomous vehicles being deployed in urban areas and on motorways, culminating in multiple end-to-end journeys between London and Oxford in 2019.



Delivering for communities, businesses and the UK

Our strategy will deliver inclusive growth in Oxfordshire that brings benefits to all Oxfordshire's communities and businesses, improving sustainability, productivity, prosperity and quality of life. Our strategy will also deliver transformative growth for the rest of the country, as growth in Oxfordshire delivers additional benefits across the UK.

FOR OXFORDSHIRE'S COMMUNITIES

The Oxfordshire Industrial Strategy seeks to improve living standards and raise quality of life for people across the county. All of Oxfordshire's communities will benefit from better access to education, transport, jobs, opportunities and more liveable places.



Increased prosperity for people and communities

Improved productivity will lead to better jobs, higher wages and increased prosperity for Oxfordshire's residents. As workers become more productive their wages will rise, improving living standards for individuals and for communities. We will also look to ensure growth is inclusive, so that it brings benefits to all residents across Oxfordshire.



Technology-enabled living will improve health and wellbeing

As communities become more technology-enabled, they will be enabled to improve health and wellbeing as well as quality of life. The living lab concept will enable businesses to develop and implement technology-led solutions in Oxfordshire communities. Travel will be safer and smoother; the environment cleaner; digital health technologies will improve health outcomes and better meet the needs of an ageing society, delivering better more efficient public services.



Oxfordshire will be more accessible and better connected

Improved infrastructure and connectivity will make Oxfordshire a more accessible and better place to live. The infrastructure improvements we want to deliver will improve physical and digital connectivity. Reduction in congestion and travel times will improve quality of life for people and communities.



Skills programmes will create new opportunities

An improved skills and education programme will make Oxfordshire a place of opportunity for all residents. We will create more pathways to provide young people and local communities with the skills needed to access new employment opportunities. Opportunities for re-skilling and upskilling will ensure everyone is able to engage with the economy as it grows.



Oxfordshire will be a more sustainable and inclusive place to live, now and for future generations

Oxfordshire will be a more affordable, sustainable and inclusive place to live, reducing the levels of deprivation and marginalisation from the economy of those with the least. Job creation, skills opportunities, wage growth and better connectivity will make Oxfordshire more inclusive. Building on the Housing and Growth Deal and Local Plans we will deliver well-designed additional affordable housing, reducing the cost of living challenge in the county. We will ensure that we pass down a healthier, more sustainable Oxfordshire for future generations.

FOR OXFORDSHIRE'S BUSINESSES

Through the Oxfordshire Industrial Strategy we are seeking to improve business productivity and enable business growth – both for breakthrough businesses with the highest potential to drive innovation and technology-led growth in Oxfordshire, and the cornerstone businesses which are integral to the health of the economy as well as inclusive growth.



Businesses will be able to improve productivity and profitability

Oxfordshire's businesses will be supported to integrate technology and innovation to increase their productivity and profitability. Local businesses in Oxfordshire will have more access to new technologies and innovations that can improve their business models to increase productivity – this will help them increase their efficiency and profitability, stimulating growth in the economy through job creation and wage growth.



New investments and opportunities

New investment will create new opportunities for Oxfordshire's businesses – to compete internationally, and better commercialise and capture value from innovations. Oxfordshire's strong global proposition will bring new investment to Oxfordshire and into Oxfordshire's businesses, supporting them to move through the business lifecycle from innovation through to commercialisation and national and international distribution.



Better infrastructure makes businesses easier to operate

Improved infrastructure will enhance connectivity across the ecosystem, making businesses easier to operate. A better connected innovation ecosystem, with seamless digital and physical connectivity, will help businesses operate more smoothly and make it easier for employees to travel across Oxfordshire. Better connectivity and more affordable housing will improve Oxfordshire's quality of life for residents and its attractiveness as a location, to attract top talent and encourage talent to stay.



Skilled talent pool for businesses to recruit from

Improved skills provision at all levels in Oxfordshire will create a more skilled labour market that is aligned to industry needs for Oxfordshire's businesses to recruit from. Developing new apprenticeship and career pathways, including for technical and vocational training, will provide new opportunities for residents and help provide businesses with the specific skill sets they need to succeed. It will also help increase the number of graduates who choose to stay and live and work in Oxfordshire.



Higher R&D spending will support business innovation

Increased public and private R&D spending will support businesses to continue the research and innovation necessary to compete globally. The Oxfordshire Industrial Strategy will help the UK Government deliver on its commitment to work with industry to boost spending on R&D to 2.4% of GDP by 2027, championing cross-sector collaboration and innovation. This investment will enable businesses to create new products and services which will propel forwards their future growth and expansion into new markets.



Business will have a role to play in solving local challenges

Businesses will have an important role in solving challenges and creating benefits for the local population that will in turn support their own needs. Both breakthrough and high potential businesses will benefit from new investment opportunities, technological adoption and innovation uptake. Both types of businesses will have a critical role to play in innovating to solve local and UK-wide challenges, developing solutions that benefit local communities.

FOR THE COUNTRY

Delivering on our vision to become a top three global innovation ecosystem will not only benefit Oxfordshire, but will have significant wider impacts across the rest of the UK. We have calculated that for every £1 invested in Oxfordshire, we will support continuing innovation in Oxfordshire and deliver £4 of benefit for the rest of the UK.



Spillover benefits and supply chain opportunities across the UK

Innovation and technological developments in Oxfordshire will deliver benefits and new supply chain opportunities across the UK. Oxfordshire's strengths in transformative technologies already have spillover benefits for the rest of the UK. As we continue to innovate in Oxfordshire we will deliver an uplift in wider UK manufacturing and supply chain opportunities that will create high-value jobs across the country.



Increased international investment into the UK

Industries and businesses across the UK will benefit from increased access to international investment. Oxfordshire's internationalisation strategy and development of global networks with other global innovation ecosystems will draw attention to the UK from the international investor community. Oxfordshire will become a centre of excellence for international investment in transformative technologies for the UK, channelling investment into key industries across the UK.



Higher contribution to the UK exchequer

Oxfordshire can increase its contribution to the UK exchequer and continue to drive the UK's economic growth. Oxfordshire is already a net contributor to the exchequer. Improving productivity and unlocking transformative growth in Oxfordshire will increase Oxfordshire's total contribution to the UK economy.



Solutions to the UK's Grand Challenges

Oxfordshire's strengths in transformative technologies will be applied to develop solutions to the UK's Grand Challenges that can then be used across the UK. Oxfordshire is a centre of innovation in technologies that are shaping our futures. Innovation in these technologies can be applied and tested in Oxfordshire to develop solutions to some of the biggest challenges that are facing the UK, including clean growth, our ageing society, mobility and artificial intelligence. These solutions can then be used across the UK and internationally, solving real-world problems and improving lives.

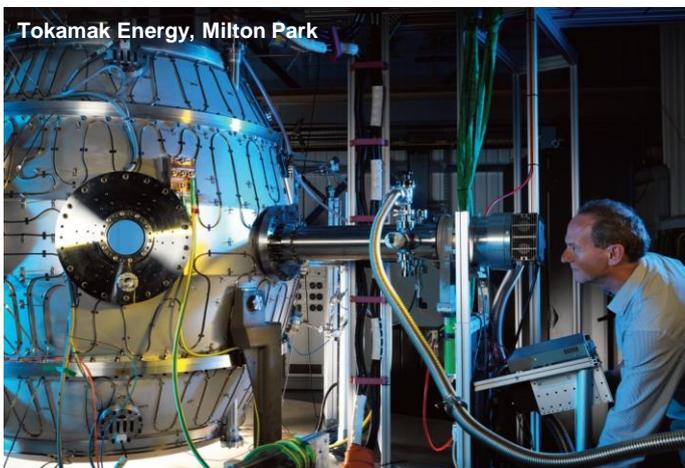
Next steps

Oxfordshire's proposition is clear. Our ambition is to become a top three global innovation ecosystem by 2040, building on our world-leading science and technology clusters to be a pioneer for the UK for emerging transformative technologies and sectors. These assets and this capability provide the innovation ecosystem which can propel the UK to global leadership in new markets and technologies of the future.

Achieving our ambition will deliver innovation-led growth for Oxfordshire that will generate significant additional benefits for the rest of the UK. For every £1 invested in Oxfordshire, we will deliver £4 of benefit for the country. Achieving our ambition will deliver benefits to all of Oxfordshire's businesses and to our local communities, as our strategy sets out how this growth will be inclusive and enhance quality of life and the environment.

To deliver our strategy, we will:

- forge strong, long-term partnerships with local stakeholders, central Government, investors, and national and international partners;
- set out an ambitious Investment Prospectus to take forward the policies in the Oxfordshire Industrial Strategy and detail how we will work with partners to deliver them. This will act as an investment prospectus for both public and private investors to understand how they can invest in Oxfordshire to enable us to achieve our global potential.



Appendix A: Statistical References

Ref No	Figure	Data Source and Rationale
Section: Executive Summary		
1	Quantum computer demonstrator by 2020	http://nqit.ox.ac.uk/
2	Five high tech companies in Oxfordshire that (in 2016) had values of over US\$1bn: Adaptimmune, Circassia, Immunocore, Oxford Nanopore and Sophos	The Oxfordshire Innovation Engine Update, May 2016; Oxfordshire Science and Innovation Audit', August 2017.
Section: Oxfordshire in 2018		
1	£23bn GVA	Office for National Statistics GVA by NUTS 3 region, 2017
2	3.9% GVA growth year on year since 2006	Office for National Statistics GVA by NUTS 3 region and PwC analysis, 2018
3	Oxfordshire is home to around 678,000 people and 31,000 businesses	Office for National Statistics Population Statistics and Business Count, 2017
4	Oxford University the top performing university in the world, and Oxford Brookes the top performing young university in the UK for teaching and research	Times World Education Rankings 2019; Times World Education Rankings: Young University Rankings 2018
5	On a per-head basis the output of our workers is in the top 20% of English regions.	Office for National Statistics, Nomis and PwC analysis, 2017
6	Oxford is the highest ranking city in the UK in PwC's 2018 Good Growth for Cities report	PwC, 'Good Growth for Cities 2018', November 2018
7	We have secured over £600m worth of central Government and European funds	Strategic Economic Plan and City Deal, 2014
8	£23bn GVA	Office for National Statistics GVA by NUTS 3 region, 2017
9	3.9% GVA growth year on year since 2006	Office for National Statistics GVA by NUTS 3 region and PwC analysis, 2018
10	1 of 3 county areas that are net contributors to the UK exchequer	UK Government, Oxfordshire Housing and Growth Deal – Outline Agreement, March 2018
11	51% of working population educated to degree level or above	Nomis Skills and Qualifications by age, 2017
12	2.6% unemployment rate in working age population	Office for National Statistics NUTS 3 Labour Market Statistics, 2018
13	Oxford University ranks 1 st in Times Higher education global rankings	Times Higher Education Global Rankings, 2018
14	£600m largest fund in Europe for University spin-outs and start-ups	Oxford Sciences Innovation Fund (University of Oxford)
15	Five high tech companies in Oxfordshire that (in 2016) had values of over US\$1bn	The Oxfordshire Innovation Engine Update, May 2016; Oxfordshire Science and Innovation Audit', August 2017.

Ref No	Figure	Data source and Rationale
16	43,000 new private sector jobs created since 2011	Office for National Statistics employment split by public and private sector jobs, 2017
17	Nearly 30 million tourists each year	Destination Research, 'Economic Impact of tourism, Oxfordshire 2017'
18	50% higher house prices than UK average	Office for National Statistics - House Price Statistics for Small Areas (HPSSAs), 2017
19	Between 2010-15 Oxfordshire's annual growth in apprenticeships was 3%, far below the UK average of 12.5%.	Skills Funding Agency, 2016
20	7% full fibre rollout well behind many international competitors	Oxfordshire Energy Strategy, 2017
21	55% increase in population aged over 35 by 2031	Oxfordshire Joint Strategic Needs Assessment (JSNA), April 2018.
22	Cornerstone businesses in Oxfordshire are generally more efficient than in the rest of the UK. 2.4% year-on-year growth in the number of cornerstone businesses	PwC Stochastic Frontier Analysis (SFA), 2018; Office for National Statistics business count and PwC analysis, 2017
23	43,000 new private sector jobs created since 2011	Office for National Statistics employment split by public and private sector jobs, 2017
24	9% growth year-on-year in the number of breakthrough businesses	Office for National Statistics business count and PwC analysis, 2017
25	2.4% year-on-year growth in the number of cornerstone businesses	Office for National Statistics business count and PwC analysis, 2017
26	9% growth year-on-year in the number of breakthrough businesses	Office for National Statistics business count and PwC analysis, 2017
27	Oxford University continues to generate more spin-outs than any other University in the country – there are currently 149 active start ups and spin outs from the university	Oxford University Economic Impact Assessment, Biggar Economics, April 2017
28	in 2014/15 a total of 136 spin-out companies generated approximately £147m of GVA, supporting 2,421 jobs in the Oxfordshire economy.	Oxford University Innovation, 2018
29	Science and business parks are at capacity and lack sufficient business space	Bidwells, 'Our view on business space', 2017,
30	Oxfordshire has already created three Unicorn companies in life sciences, valued at over \$1bn	Oxfordshire Sector Profile: Life Sciences, OxLEP, January 2016
31	UK's target market share of 10% of the global space market by 2030	UK Industrial Strategy, BEIS, 2017
32	RAS is predicted to impact 15% of UK GVA worth £266bn to the UK economy by 2035	Remote Applications in Challenging Environments, Culham
33	Cryogenic technologies underpins around 17% of the UK economy	Science and Technology Facilities Council, 'The UK impact of cryogenics', 2016

Ref No	Figure	Data Source and Rationale
34	Over 3,000 digital and creative businesses are based in Oxfordshire generating £1.4bn to the UK economy each year	Oxfordshire Sector Profile: Creative & Digital, OxLEP, January 2016
35	Oxfordshire is at the heart of the iconic 'Motorsport Valley', a £6bn automotive global cluster	Oxfordshire Sector Profile: Motorsports, OxLEP, January 2016
36	2.6% of the working age population unemployed	Office for National Statistics NUTS 3 Labour Market Statistics, 2018
37	51% of working population educated to degree level or above	Nomis Skills and Qualifications by age, 2017
38	The City of Oxford also had one of the lowest levels of workers with no qualifications, at 3.2%, compared with a UK average of 8%.	Nomis Skills and Qualifications by local authority, 2017
39	Between 2010-15, Oxfordshire's annual growth in apprenticeships was 3%, far below the UK average of 12.5%.	Skills Funding Agency, 2017; PwC Analysis (Baseline Economic Review)
40	By 2031, the number of people aged 85 and over is expected to have increased by 55%	Oxfordshire Joint Strategic Needs Assessment (JSNA), April 2018.
41	In 2017 we welcomed nearly 30 million visitors, supporting 10% of all jobs and contributing £2.17 billion to the economy.	Destination Research, 'Economic Impact of tourism, Oxfordshire 2017'
42	50% higher house prices than UK average	Office for National Statistics - House Price Statistics for Small Areas (HPSSAs), 2017
43	12:1 house prices	Office for National Statistics and HM Land Registry, 2017
44	Currently only 10% of Oxfordshire's energy is from renewable sources in comparison to 25% for the UK average	OxLEP Energy Strategy Growth Board
45	Better Broadband for Oxfordshire programme has enabled over 96% of premises across the County have access to superfast broadband	Cambridge-Milton Keynes-Oxford (CaMkOx) SWOT report, 5 th Studio, November 2017
Section: Oxfordshire in 2040		
1	Double the Oxfordshire economy to be worth £46bn GVA. Note: this will have a compound annual growth rate of 2.9%.	PwC Analysis (CGE Modelling), 2018
2	Deliver a minimum of 2% per annum growth in productivity	PwC Analysis (CGE Modelling), 2018
3	Create 108,000 new jobs in Oxfordshire. Note: this will have a compound annual growth rate of 0.8%.	PwC Analysis (CGE Modelling), 2018. This will be from 2019 to 2040.
4	Contribution towards the Government's 2.4% R&D target	PwC Analysis (CGE Modelling), 2018 To be discussed and agreed with university partners and HMG
5	Figure 1. Forecast of growth up to 2040.	Office for National Statistics GVA by NUTS 3 region; PwC Analysis (CGE Modelling), 2018
6	We have also calculated that for every £1 invested in Oxfordshire we will deliver £4 of benefit to the UK economy	PwC Analysis (CGE Modelling), 2018

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