

Economic Growth Potential of the Cambridge Norwich Technology Corridor

Draft Final Report



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1 Introduction

Background Cambridge Econometrics has been commissioned by Breckland District Council and Partners to carry out an evidence review and analysis of sectoral growth potential for the Cambridge-Norwich Technology Corridor (CNTC).

The work is divided into three phases:

- Phase 1: Collection of economic data from a range of official government sources and presentation in graphical and GIS formats. Data on major growth sites is also to be collected and mapped.
- Phase 2: A statistical analysis of current sectoral strengths and weaknesses of the corridor and its sub-areas using location quotient analysis, and an assessment of sectoral growth risks and opportunities based on national trends
- Phase 3: the presentation of a projection for population and economic growth for the next 15 years, combined with some recommendations for policy intervention

The work builds on a previous study carried out by Bruton Knowles' (BK, 2015), along with the marketing research of the Deyton Bell Report (2016), the New Anglia SEP (2017) and GCGP SEP (2013), and this work should be seen in the context of the recommendations outlined in those papers.

In particular, this work expands on the BK report to incorporate a wider spatial area – including the two “ends” of the corridor as well as the “middle” for a more comprehensive picture of the functioning of the corridor as a geographical entity.

The Bruton Knowles report identifies seven major development areas along the corridor, and highlights the need for additional infrastructure improvements to facilitate their growth, and recommends focussing on several key sectors, but particularly the advanced manufacturing & engineering, and agri-tech sectors. It goes on to recommend the development of specific technology hubs at Hethel, Thetford and Red Lodge. **We agree with these core recommendations.**

The CNTC Partnership has already outlined five core propositions for the Cambridge Norwich Tech Corridor:

- Potential to make a greater and significant contribution to the future growth of the UK economy
- Space to grow and space to innovate, both domestic and commercial land and housing offers.
- Improving connectivity, through the dualling of the A11 and A47 and enhanced high-speed broadband and 5G mobile reception.
- The right skills in the right places, both in higher and further education, providing a world class location for ICT, Tech and Life Sciences.
- A desire and need to better explain the CNTC investment case, especially to Government.

Technology Corridor Definition

We also endorse these propositions, and will touch on several of these themes in our own recommendations in chapters 3 -5. However, the purpose of *this* study is to provide an independent and evidence-driven evaluation of the ambitions of the CNTC and place these within the context of the national economy, and goes on to make a series of recommendations as to practical steps that could be undertaken to create the vision of a “technology corridor”.

The first step is to consider what is meant by the term *technology corridor*. There are several possible definitions of an ‘economic corridor’ available in the literature (see for example, Brunner (2013); Hope and Cox, (2015)), all of which emphasise the importance of infrastructure as a means of harnessing and facilitating coordinated growth along a narrow spatial area along which there is a high degree of movement and interaction.

Our central proposed vision then, for a Cambridge-Norwich Technology Corridor, is a place that is:

- **Home to nationally significant and recognised clusters of firms in a variety of high-tech sectors, including both scientific R&D and more applied technological fields,**
- **A leader in technical education in the UK,**
- **A test-bed for technological solutions that drives up productivity across a wide range of sectors,**
- **All linked together through high-class infrastructure (transport, ICT, utilities) which facilitate the connection and synergies between firms, clusters and local economies along the corridor.**

1.1 Recommendations

As a result of our analysis, our central recommendation is that the CNTC Partnership focuses on three ambitions:

- **Ambition 1: To promote the development of a small number of nationally significant and globally competitive tech clusters along the corridor**
- **Ambition 2: To facilitate the continued growth of the Cambridge and Norwich functional economic areas into the heart of the corridor through the provision of high-quality and well-connected housing and employment space**
- **Ambition 3: To prioritise *inclusive* growth by raising skill levels, productivity levels and real wages across all sectors in the corridor economy**

This executive summary proceeds as follows; initially we explore the local and national context, and then we explore each ambition in turn, giving pragmatic recommendations as to their implementation. Although the ambitions are presented separately, it is important to consider the considerable degree of overlap and complementarity between them. In many places, a particular practical initiative proposed as part of one ambition would further all three ambitions simultaneously.

2 Context

2.1 Geographic Context

The Cambridge-Norwich Technology Corridor covers a diagonal stretch of the East of England, including two of its largest and most prosperous cities (Cambridge and Norwich), a significant proportion of its hi-tech industry, and some of its highest quality farmland.

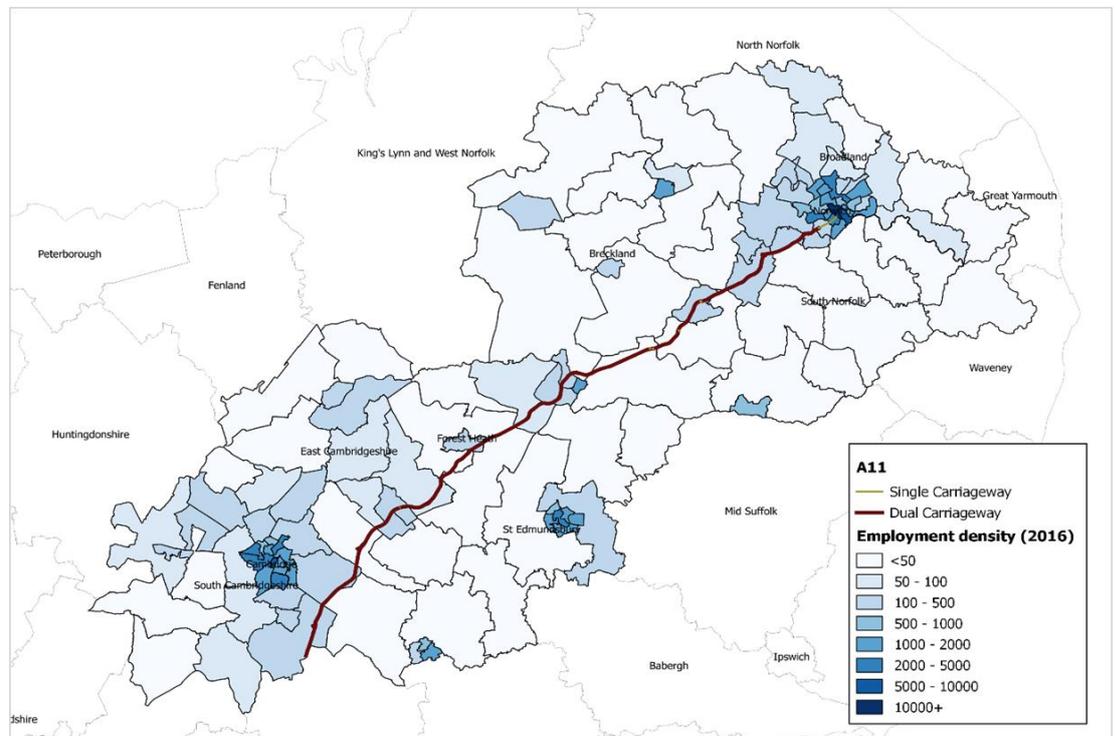
Corridor Economy

The corridor has rebounded strongly in the post-recession period, with growth in population (2.3% pa), employment (1.0% pa), GVA (1.53% pa), productivity (0.54% pa) and wage growth (2.48% pa) all higher than the figures for the UK as a whole. It is important that this momentum is now maintained over the next decade.

CNTC Key Stats 2016	
Population	1.09m
Employment	615,000
Firm Population	43,000
GVA	£28.9bn
Productivity	£49,000
Mean Hourly Wage	£12.27

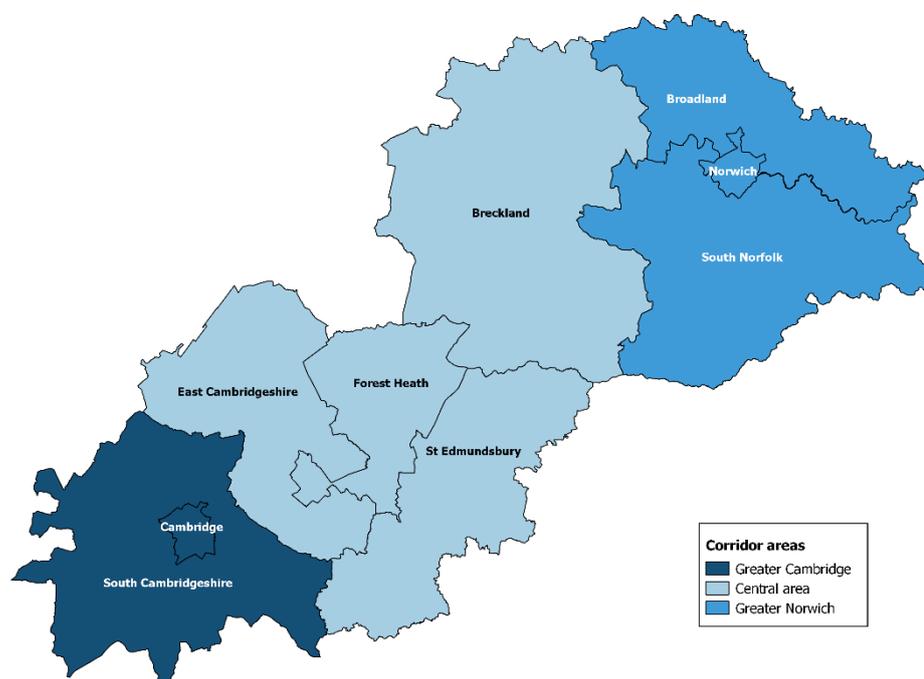
Local Geography

The corridor covers a diverse economic and spatial landscape, comprising two growing, dynamic city regions with quite different economies, facing different challenges and with different roles to play, separated by a large expanse of rural hinterland. The map below shows the 2016 employment density distribution across the corridor, with concentrations of activity visible around the two cities of Cambridge and Norwich.



Broadly speaking, the corridor can be understood as the amalgamation of three distinct economic functional areas:

- Greater Cambridge¹, centred around the City of Cambridge and the district of South Cambridgeshire, but also drawing commuters from surrounding regions in all directions, is a globally significant centre of Scientific R&D, with two co-existing clusters in Biotech/Medtech and Therapeutics Research, and Advanced systems/AI/Big Data Research. These are grounded within, and supported by, a diverse and dynamic knowledge economy, with particular strengths in ICT, Technical Consulting and Higher Education, and a small but highly productive manufacturing sector.
- Greater Norwich² is a major economic hub of East Anglia, centred around the historic city of Norwich, but incorporating city-fringe sites in Broadland and South Norfolk. Although the knowledge economy is not on the same scale as Cambridge, Greater Norwich has significant and growing strengths in Life and Food Sciences, Advanced Manufacturing, ICT, and Finance and Insurance.
- The central A11 region, comprising the border regions of Cambridgeshire, Suffolk and Norfolk, is a largely rural area, interspersed with a variety of settlements ranging from small villages to considerable market towns. It is used as both a commuting base into the Greater Cambridge and Greater Norwich areas, but also contains a series of stand-alone smaller local economies in their own right, with notable strengths in Agri-food and manufacturing.



Regional Context

Regionally, the East of England is the 4th most populous region of the UK. It shows a diversity of sectoral strengths that compare favourably to the UK average in terms of total employment in hi-tech sectors. In comparison to the

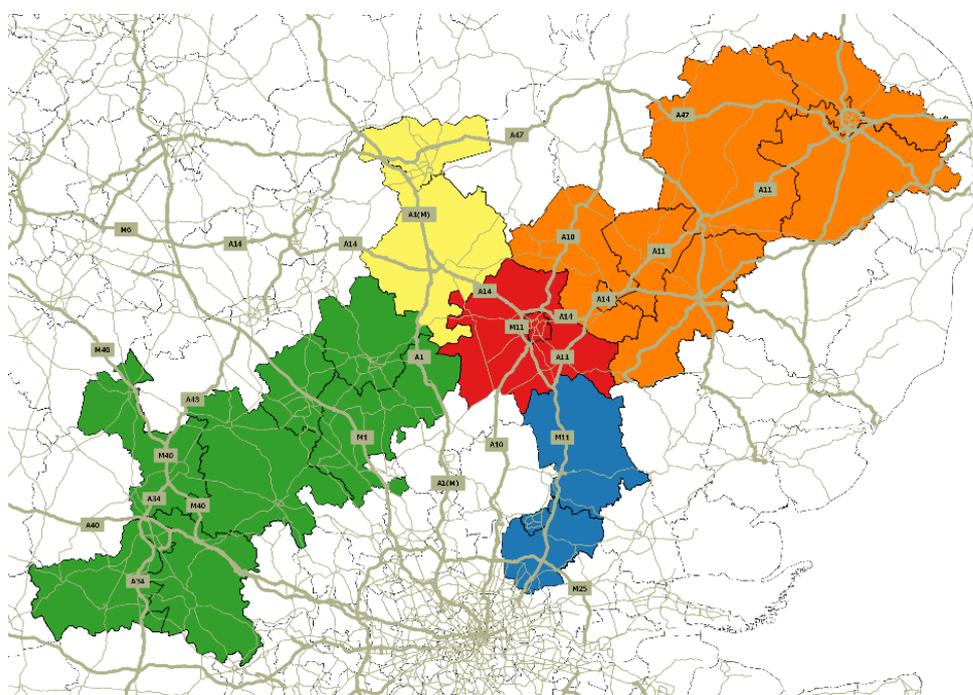
¹ As defined by <https://www.greatercambridge.org.uk/>

² As defined by <http://www.greaternorwich.co.uk/>

other 10 regions of Great Britain³, the East of England ranks 2nd in employment in electronics manufacturing, 3rd in electrical equipment and machinery, and 3rd in pharmaceuticals manufacturing. It also ranks 3rd for both ICT and for Scientific R&D. Along with South-East England and North-West England, it is the only region of the country with nationally significant strengths in both manufacturing and knowledge-intensive services. Yet it receives significantly less national attention than either of the other two regions of comparable status.

Linking in to the Cambridge Growth phenomenon

There are numerous economic corridors within the UK of various lengths and types. The Cambridge-Norwich Technology Corridor is one of four separate economic corridors centred around Cambridge. The map shows Greater Cambridge (Red), surrounded by 4 prospective growth corridors of varying sizes: south-west along the CaMkOx corridor (Green), south along the London-Stansted M11 corridor (Blue), north-west towards Huntingdon-Peterborough (Yellow) and the CNTC (Orange).



This should not be understood as a form of competition, but rather a range of complementary opportunities for future growth and collaboration for all the local areas involved. For the Greater Cambridge economy to continue to grow at historic rates (Greater Cambridge has seen employment growth of 1.4% pa since 2000), then it will need to physically expand in all spatial directions, and along all transport corridors. The Greater Cambridge Partnership has committed to a policy of “360 degree” growth and collaboration.

Strengths of the Cambridge-Norwich Technology Corridor

The Strengths of the Cambridge-Norwich corridor are listed below. A critical factor is the presence of Cambridge cluster, which distinguishes the area from anywhere in the UK, with the exception of similar corridors in the immediate vicinity of Cambridge or Oxford. The CNTC can be seen as an extension of a wider geography surrounding those two key knowledge hubs, with each corridor offering its own combination of assets.

³ Sectoral detail for Northern Ireland was unavailable

- Presence of Cambridge Cluster and highly developed knowledge and innovation ecosystem in the Greater Cambridge Area is a key asset
- Growing knowledge ecosystem in the Greater Norwich Area, with ambitious plans by Hethel Innovation and others
- As a single entity, it has complementary strengths in scientific research, manufacturing and knowledge services that places it on a par with the wider south east – but with much lower housing and employment costs
- High quality of life, with two vibrant, growing cities, a cluster of attractive market-towns, and relatively low levels of crime and deprivation
- Many of the areas with affordable housing and employment space have the potential to grow significantly in value given suitable investment in local infrastructure
- Proximity to London, to the Eastern Energy Coast and to a major port serving European destinations
- Some of the highest quality farmland in the UK

National Context

The Recession, Austerity and Productivity

Since the 2008/9 Global Financial Crisis, many countries have seen stagnating levels of productivity. This problem has often been exacerbated by the implementation of fiscally contractionary policies, nowhere more so than in the UK. The UK has a range of high-quality knowledge assets, high levels of capital liquidity, and relatively a well-educated labour market that should normally lead to a high-skill, high productivity, high wage economic model, but the current combination of tight fiscal and loose monetary policy, combined with more long-term problems related to poor infrastructure and skill-gaps in key mid-level occupations, has incentivised many sectors to follow an “asset sweating” low-skill, low-wage strategy over the past decade. This tendency has had the effect of reducing overall national productivity and damaging international competitiveness. Although unemployment has fallen since the recession, a significant portion of the growth has been in low-wage, low-productivity roles. This tendency has exacerbated existing problems with a regionally unbalanced economy⁴. Over the next decade, this problem is likely to be brought into sharp relief by the outcomes of the UK leaving the European Union.

Brexit Although there is still a huge amount of uncertainty relating to the final details of the deal with the EU, consensus is forming amongst economic and political analysts that the two more extreme outcomes – that of a “No deal”, and any deal that retains free movement of people and services, is unlikely to be accepted by Parliament, implying that the compromise solution of a bilateral trade agreement that retains free movement of goods and a small group of services, is the most likely ultimate outcome. As a result of such a deal, the UK would have to undergo a significant process of sectoral restructuring, with

⁴ Christian Ketels of Harvard

a renewed focus on manufacturing in order to maintain a competitive trade balance, whilst service sectors would be forced to “pivot” away from Europe in order to supply the domestic and/or wider the international market. Whatever the outcome of Brexit, the time is now long overdue for the UK to re-appraise its role in key global supply chains and the wider global economy, in order to ensure a position of global competitiveness, and a return to productive, inclusive growth.

Industry 4.0

Longer-term trends are also an important factor. The current “4th industrial revolution” is producing rapid and transformative changes in the way many, if not all, sectors are operating and will operate within the next 50 years. Early adoption and commitment to development of new technology is essential to obtain and maintain positions of global competitiveness. Despite world-leading knowledge assets in a few key locations (including Cambridge), the UK is only mid-table within the 28 European Union Members in developing and adopting new technologies. Left unaddressed, this trend has the potential to exacerbate our existing productivity and competitiveness deficit.

*Industrial
Strategy White
Paper*

Challenges outlined in the Industrial Strategy White Paper include putting the UK at the forefront of the “artificial intelligence and data revolution”, to build research and innovation excellence across the UK, including carrying out a Science and Innovation Audit, specifically targeting life sciences and agri-tech in the East of England. Other priorities that stand out include the ambition to establish a world-leading technical education system, increasing the money available for infrastructure projects, increase access to finance in the regions, and offer a number of bottom-up sector deals for priority sectors. Most relevant however, is the aim to create local industrial strategies for individual regions.

3 Ambition 1: Cluster Development

At the heart of any vision of a technology corridor must reside an ambition to host the latest in cutting-edge research and innovation. In line with the ambition set out in the Industrial Strategy White Paper, we argue that CNTC should enact a range of measures to deliver the vision of the corridor as the home of nationally significant and globally competitive clusters in a range of hi-tech industries. Such clusters not only bring in significant levels of income to the region, but they provide high-quality employment opportunities, and bring knowledge and innovation spill-over effects to the rest of the economy.

Clusters The term *cluster* is associated with Michael Porter's (1990) seminal work and is essentially about specialised industry location. The geographical proximity of firms in the same location is expected to increase the intensity of both competitive and collaborative processes. These benefits (access to a pool of skilled labour, knowledge spillovers, access to supply chains) are sometimes known as the *economies of localisation*. There may be additional *economies of urbanisation*, whereby the location of a sector in a highly-developed city region affords additional benefits (e.g. access to non-sectoral-specific infrastructure and services).

A widely recognised method for regions to obtain and then maintain global competitiveness is to develop and support a handful of highly competitive *ambidextrous*⁵ clusters that are able to share significant levels of wealth with the regional economy via their supply chains and other induced spending effects. Once a cluster becomes established, it can develop a momentum of its own, whereby increasingly strong economies of localisation make the cluster an equally increasingly attractive place to do business. However, clusters do not flourish in isolation. They must be supported by high-quality infrastructure, a collaborative business environment, and a dynamic knowledge ecosystem that makes innovation "easy". A geographic setting with a high quality of life offer also makes it easy for firms to attract and keep skilled workers of all ages and backgrounds.

Regional Growth The diagram below shows a Framework of Regional Economic Growth developed by Cambridge Econometrics in conjunction with Professor Ron Martin of the University of Cambridge. The dynamic processes of cluster formation, enhanced economies of localisation and urbanisation, and renewed growth, are captured in the centre of the diagram. Beneath these, are depicted several fundamental drivers, that must be maintained above a critical level in order to allow the agglomeration cycle to continue. If they dip below this level, they become a constraint to growth.

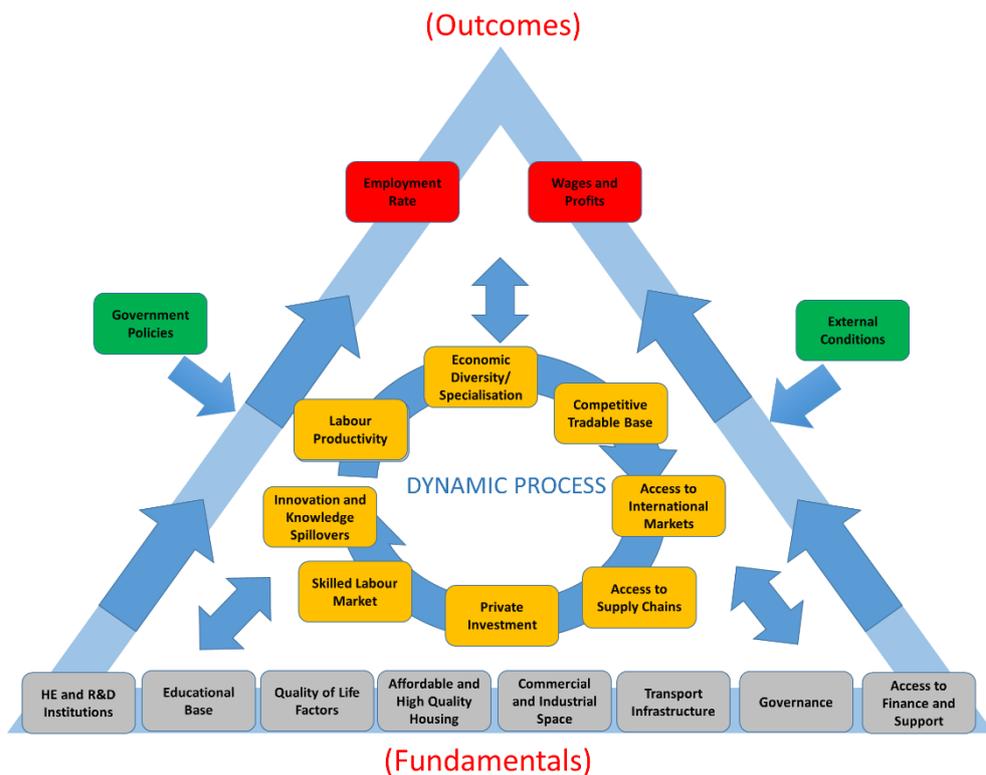
The success of the Greater Cambridge phenomenon can easily be understood in these terms: throughout the 20th century, the right combination of drivers, including the presence of the university with its resulting spin-out companies and knowledge spill-overs, the establishment of a few key occupational sites and institutions, and improved transport infrastructure to London (in particular) were put in place, and the dynamic process of cluster formation in a variety of

⁵ An ambidextrous cluster is one that is able to simultaneously generate income by *exploiting* existing technologies, whilst also growing for the future by devoting resources to *exploring* new technologies.

knowledge sectors began to accelerate. Today, whilst the momentum built up by the Cambridge Cluster and its associated agglomeration economies is significant, the major constraints on growth are unaffordable housing in the city and congested transport systems.

The economy of Greater Norwich has many of the same strengths as the Greater Cambridge economy, but at an earlier stage of development; it is a large East Anglian city with a high quality of life and low levels of deprivation compared to the national average, with a thriving university and a growing tech sector, and in many ways is in a similar place economically to that of Cambridge in the 1990s or early 2000s.

Compared to the Cambridge of 2017, however, its connectivity to London requires further improvement, and both its HE and R&D institutions, and knowledge and innovation eco-systems, are more thinly spread than in the Greater Cambridge economy. It does not, however, suffer the same level of inaccessible house prices and traffic congestion. Although the same dynamic agglomeration processes are taking place in Greater Norwich as in Greater Cambridge, they do not yet possess a comparable degree of momentum.



Which Clusters?

We have attempted to identify key growth clusters based around the following five principles:

- Sectors with a high likelihood of significant future growth in the national and global economy
- Sectors that have been identified in the Industrial Strategy Green and White Papers as being of particular importance for the national economy

- Sectors in which the Cambridge-Norwich Technology Corridor has a comparative advantage (or at least, parity) with other areas of the UK
- Sectors in which the existing clusters are partly distributed along the corridor, as opposed to concentrated solely within one city region
- Sectors that produce technological innovations that are relevant and useful for the wider CNTC economy

Greater Cambridge already has several globally-competitive clusters in life sciences and med-tech, ICT, AI and big data, advanced sensing and electronics that it has ambitions to grow further, and further afield, there are several nascent clusters in the Greater Norwich area, in particular in agri-tech and food sciences, and advanced manufacturing, engineering and material, which show promise of developing into nationally significant industries. The next decade will be crucial for fostering these clusters further, and ensuring their integration with the wider Greater Norwich and Greater Cambridge knowledge economies.

There is a real opportunity for the CNTC to be at the forefront in both driving forward, and taking advantage of, the new innovations being developed as part of Industry 4.0. This should be at the heart of any local Industrial Strategy.

Recommendation 1.1: Our recommendation is that CNTC should, in partnership with the LEPs, contribute to developing an ambitious local Industrial Strategy that includes opportunities brought about by the Industry 4.0 “revolution”.

The four potential clusters we have identified for future growth will already be familiar to the CNTC stakeholders. It is important to note, that the key strength of such a selection is in the complementarity between the four sectors, with many firms operating at the interface between two sectors. In particular, there are obvious synergies and overlaps between the life sciences and food sciences sectors, and in using applications of robotics, AI, sensor technology and big data in advanced manufacturing and engineering.

Recommendation 1.2: We recommend that the CNTC commission focus on the four following sectors:

- **Agri-food/Agri-tech/Food science**
- **Life sciences, Med-tech and Pharmaceuticals**
- **Advanced Manufacturing, Engineering and Materials**
- **IT, AI, Robotics, Sensors, and Big Data**

These clusters represent our understanding of the main areas of overlap between the key “emerging sectors” centred around the Greater Norwich and wider New Anglia economies, which Hethel Innovation define as *bio-tech*⁶, *smart-tech*⁷ and *clean-tech*⁸, and the Cambridge Network’s group of key sectoral clusters⁹ in the Greater Cambridge area.

⁶ www.gobio.uk

⁷ naame.net

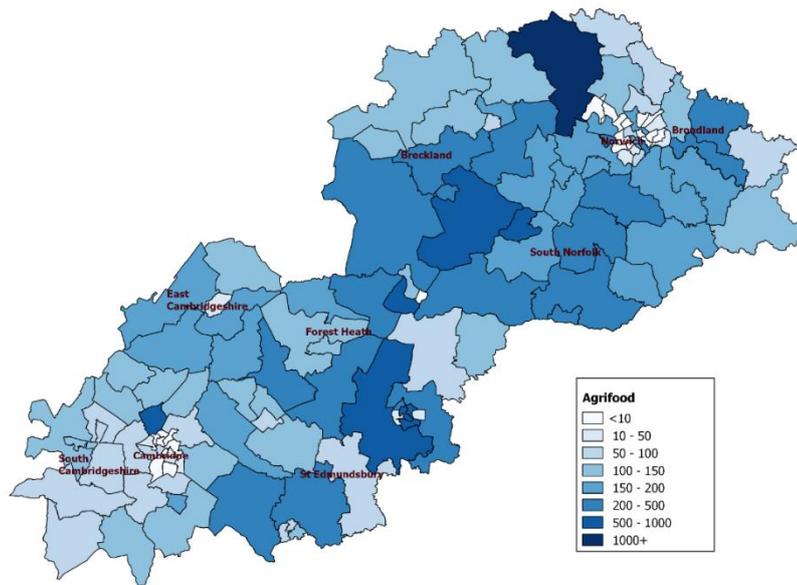
⁸ www.cleantecheast.uk

⁹ <https://www.cambridgenetwork.co.uk/directories/cambridge-cluster/sectors/>

Agri-food/Agri-tech/Food science

Agri-tech is a growing sector within the UK that aims to add value to the entire agri-food value chain through the increased use of technological solutions. Only a few regions of the UK have a similar mix of both high-quality tech firms and a large agri-food industry, and the prominence of Agri-Tech East places the region in a strong position from which to build. Agri-tech is of growing importance and interest globally, with many countries branding Industry 4.0 as the “Industrial and Agricultural Revolution”. There is an existing, significant food science cluster based around Norwich Research Park.

Agri-Food, Agri-Tech, Food Science - CNTC area		
Employment	10,700	1.3% of UK
GVA	£1.5bn	4.0% of UK
Productivity	£67,200	UK average £48,600
5 yr Employment Growth	6.1% pa	UK growth 0.29% pa

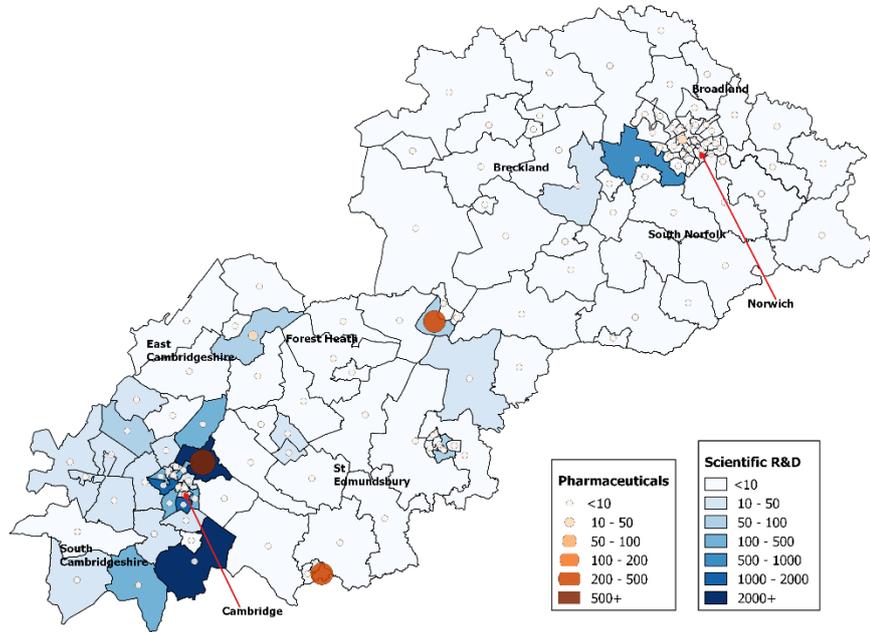


Life sciences, Med-tech and Pharmaceuticals

Life sciences is an area of specialism of the two major economies of the corridor, and represents a tangible opportunity for potential collaboration between NRP and the East Cambridge Cluster, based around Addenbrookes and Babraham Research Park. Approximately 50% of the scientific R&D in Cambridge is dedicated to life science and med-tech research.

Life Sciences, Med-Tech and Pharmaceuticals - CNTC area		
Employment	8,900	2.8% of UK
GVA	£1.1bn	4.4% of UK

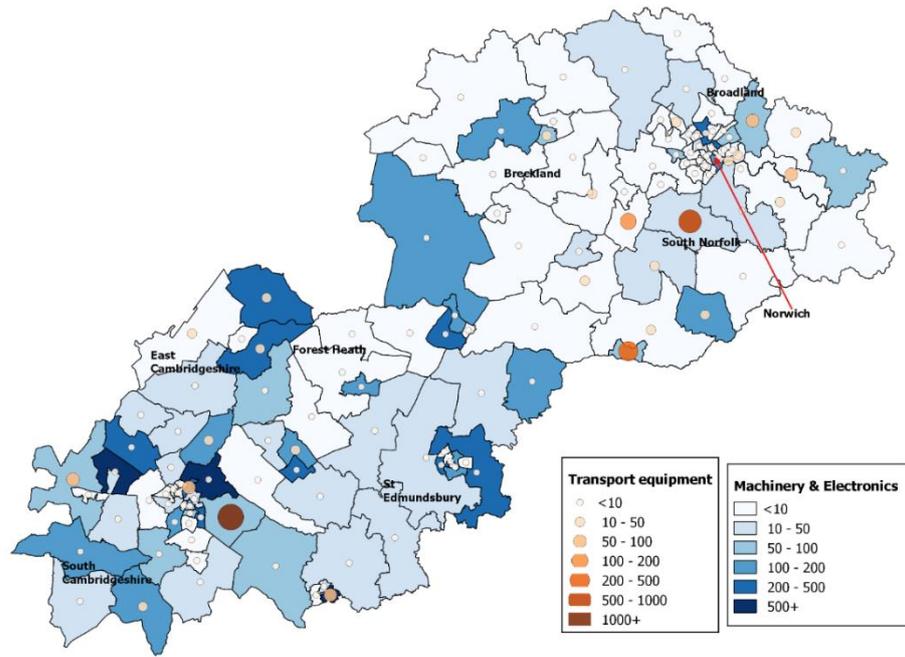
Productivity	£95,000	UK average £80,200
5 yr Employment Growth	9.7% pa	UK growth 4.9% pa



Advanced Manufacturing, Engineering and Materials

Advanced manufacturing in East Anglia is not of the same scale as the Midlands and the North. However, it sees high levels of productivity and innovation compared to the national average, and there is the potential for greater integration and collaboration along the A11 to bring agglomeration benefits and push the sector into a position of national significance. The major sub-sectors here are in automotive technology, precision engineering and composites in the Greater Norwich area, and Electronics and Industrial Machinery in the Greater Cambridge area. The opportunities for growth in sub-sectors related to designing and manufacturing the next generation of both consumer-facing electronics and transport equipment, and hi-tech precision machinery for industry, are significant.

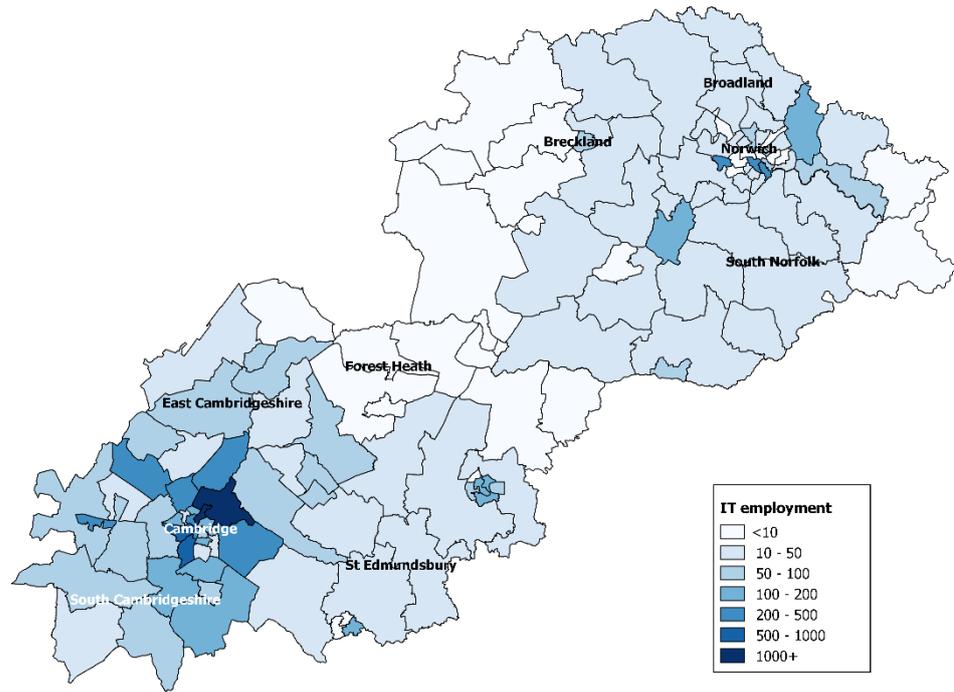
Advanced Manufacturing, Engineering and Materials - CNTC area		
Employment	13,000	1.9% of UK
GVA	£0.8bn	1.7% of UK
Productivity	£59,000	UK average £66,200
5 yr Employment Growth	0.5% pa	UK growth 0.5% pa



IT, AI, Robotics, Sensors and Big Data

Although there is a distinction between commercial ICT, AI and Big Data research, and Robotics and Sensors research, the ultimate application of these differing strands is very similar – to improve efficiency through automotive technology. This is *the* key sector in driving forward Industry 4.0. Cambridge has a globally significant cluster in research into these fields, along with a strong, nationally significant ICT sector. The Norwich ICT sector is flourishing locally but is not currently significant on the national scale.

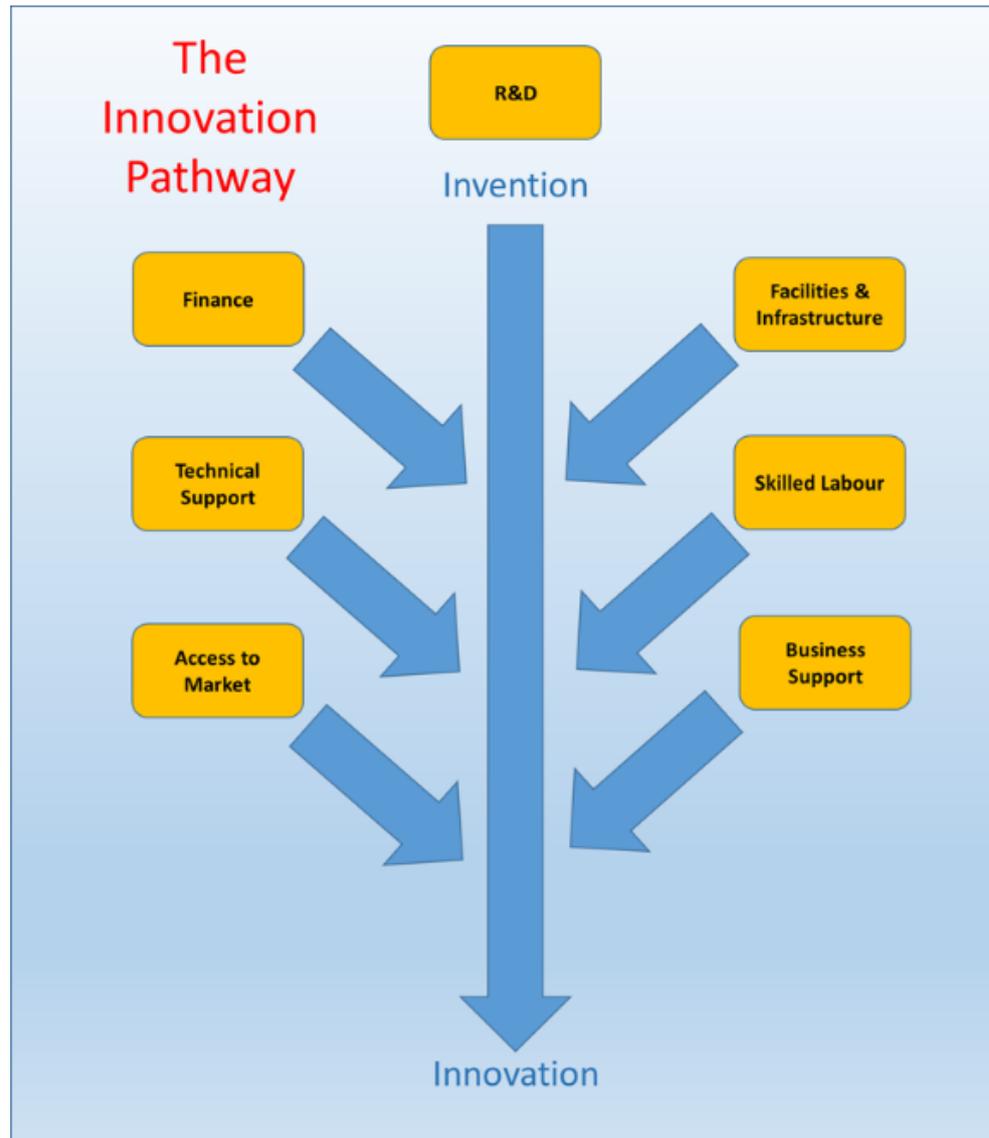
IT, AI, Robotics, Sensors and Big Data - CNTC area		
Employment	23,000	1.8% of UK
GVA	£1.6bn	2.0% of UK
Productivity	£69,000	UK average £69,200
5 yr Employment Growth	7.9% pa	UK growth 4.5% pa



Recommendation 1.3: The CNTC should work closely with existing local sectoral networks in the Greater Cambridge and Greater Norwich economies to identify and promote opportunities for collaboration between firms in the two areas.

The Knowledge Ecosystem

A large part of this is in identifying and understanding the linkages through which the clusters interact both internally, with global sectoral actors, and with the wider economy. Tech Industries and Scientific R&D cannot flourish in isolation, but need to be surrounded by a series of strong public institutions, such as universities and hospitals and a dynamic private sector that embeds the cluster within a flourishing knowledge economy, with access to high quality support services in a variety of sectors that range from legal and accounting services, marketing and technical consulting, to transport and logistics support. The diagram below outlines the various factors that are required to support small firms in driving forward new innovations.



Two areas in particular that should be considered to be of vital importance in the facilitation of hi-tech cluster growth are:

- **Finance**
- **Technical Consulting**

Although the productivity and wages of the Finance & Insurance jobs in Norwich are below the national sectoral average, they are still high: £60k per worker and this sector forms an important part of the local economy. However, partly due to the exact nature of financial sector employment in Greater

Norwich, the link between the high levels of employment in this sector, and the ease of access to finance for SME's in the region is significantly underdeveloped.

The Greater Cambridge area has nationally-significant strengths in Technical Consulting and it is important that these strengths are leveraged for the benefit of the entire corridor. The role that technical consulting firms such as Cambridge Consultants or The Technology Partnership (TTP) play in driving and diffusing knowledge and innovation should not be underestimated.

Recommendation 1.4: CNTC should seek to support innovation and technological diffusion across the corridor by identifying ways to strengthen access to finance and technical consulting support.

Practical Measures

Innovation Support

In general, the innovation ecosystem across the length of the corridor is thin and underdeveloped compared to that of Cambridge. The majority of science parks, research parks, innovation hubs, incubator and accelerator sites are all skewed towards the Cambridge end of the corridor, with 5 Incubators, 5 Accelerators, and 6 other members of the UKSPA in Greater Cambridge, compared to 4 Incubators, 1 Accelerator and 1 member of the UKSPA (NRP).

Recommendation 1.5: CNTC should encourage the development of further accelerator programmes, enterprise zones, and enhanced incubator support, located towards the Greater Norwich end of the Corridor, targeting the four sectors identified above, would be of particular benefit to the CNTC knowledge ecosystem.

Physical Infrastructure

Although the A11 dualling has successfully reduced travel times between Norwich, Thetford and Cambridge, further progress of the East-West Rail project is crucial to the creation of a genuine bi-modal transport corridor that facilitates both commuting and collaboration along the corridor.

Recommendation 1.6: The CNTC commission should proactively engage with the East-West Rail consortium in order to push for timely and ambitious rail developments between Cambridge and Norwich.

East Anglia currently experiences supply constraints of both water and electricity provision. Public intervention may be required in order to alleviate these issues and ensure that this does not become a limiting factor in the locational choices of industry.

Sector Deals, Regional Investment and Catapult Sites

As part of the Industrial Strategy, bottom-up sector deals will be announced next year, with work being undertaken by a range of different consortia including industry and regional representatives to access funding for development of key growth sectors in key regional locations. Proposals include for creative, life sciences, renewable energy, and industry digitalisation. Furthermore, Greater Norwich would be the logical choice for an Agri-Tech Catapult Site or the location of the new proposed Food and Drink Sector Council, although it would face competition from both York Agri-Food Innovation Campus and Harper Adams University in Newport amongst others.

With its existing strengths in finance, Greater Norwich would be the ideal place for the location of a regional investment bank or a regional office of the “British Business Bank”.

Recommendation 1.7: CNTC should be ambitious in finding a role for itself in one or several sector deals, or bidding for the location of a regional investment bank, catapult site or technology centre.

Quality of Life

In order to convince firms that CNTC is the ideal place to set up a business, it is important to remember that businesses are first-and-foremost run by people, and the ability to compete with other areas for highly-skilled mobile workers is of paramount importance. As such, it is extremely important not to underestimate the attractiveness of a place to live as a key precursor to business success. Entrepreneurs tend to set up businesses in places that they themselves would like to live, because they see this as an indicator that other similarly skilled and motivated people would also be attracted to the area. Improving quality of life of residents is therefore at the heart of driving forward economic growth.

Recommendation 1.8: The CNTC should undertake an audit of Quality of Life factors, and identify where possible improvements could be made to maximise the attractiveness of the corridor to young, mobile skilled workers.

The questions that should be asked are: what is the level of quality of life along the corridor? How does it compare to the rest of the UK? Why would a young, mobile knowledge worker want to work or set-up a business here? How can we maximise and maintain our strengths? How can we improve our areas of weakness? How can we market the corridor as a high-quality place to live and work?

Quality of Life Factors that should be audited:

- Open space, parks, views and scenery
- Quality of built environment
- Retail, Entertainment, Sports and Nightlife Offer
- Quality of Public Services, including schools and healthcare
- Low crime and a sense of community
- Affordable housing and ease of commute
- High quality broadband and mobile connectivity
- Ease of access to London and major road and rail networks

4 Ambition 2: Accommodating the Spatial Expansion of the Major City Regions

The UK has been undergoing a process of increasing urbanisation since around the turn of the millennium, with the proportion of people living in urban areas being expected to rise from 78% in 2000 to 86% in 2030¹⁰. Greater Cambridge and Greater Norwich have similarly seen growth in population and are expected to continue to do so. Using the Primary Urban Area (PUA) definition of cities, Greater Cambridge is expected to see total population growth of 7% between 2016-2031 and Greater Norwich 5%, set against a UK total growth of 3%. Part of the CNTC ambition is to develop strategies on how to manage and benefit from this expected increase.

Greater Cambridge Expansion

The recent National Infrastructure Commission, building on previous work by Cambridge Econometrics, highlighted the exceptional potential for future economic growth within the Oxford-Cambridge area. However, it also highlighted the main constraint to this growth in the areas surrounding the two main knowledge centres at either end of that corridor to be an overwhelmed transport system, and a chronic undersupply of housing and employment space. The report recommends that 330,000 homes and employment space for 230,000 jobs, within the wider Greater Cambridge area. The ongoing expansion of the Greater Cambridge is clearly a notable asset to the corridor as a whole, and part of the CNTC's remit should be looking to play a significant part in facilitating and accommodating that expansion. Many of the ~ 20 existing science, research and innovation parks in the Greater Cambridge area are already at capacity and looking to expand, and this provides an opportunity for neighbouring districts to work with the Cambridge Cluster to provide new research and industrial facilities within a short distance of the central cluster.

Greater Norwich Expansion

Greater Norwich already currently sees inwards commuting from all districts of Norfolk. The New Anglia SEP identifies that 40,000 additional homes are expected to be built by 2026, focused on Norwich City Centre, and the key growth areas of the South-West Quadrant (location of Norwich Research Park) and North-East Quadrant (location of Broadland Business Park and Norwich International Airport).

There is no suggestion as yet that the functional economic area of Greater Norwich is expanding beyond the administrative boundaries of South Norfolk and Broadland, however the area's labour hinterland already stretches across much of Norfolk. Eastern Breckland is well-connected into Norwich, and the growing south-west quadrant in particular, via the A47 and A11 and there remains scope for future development to occur along these radial links.

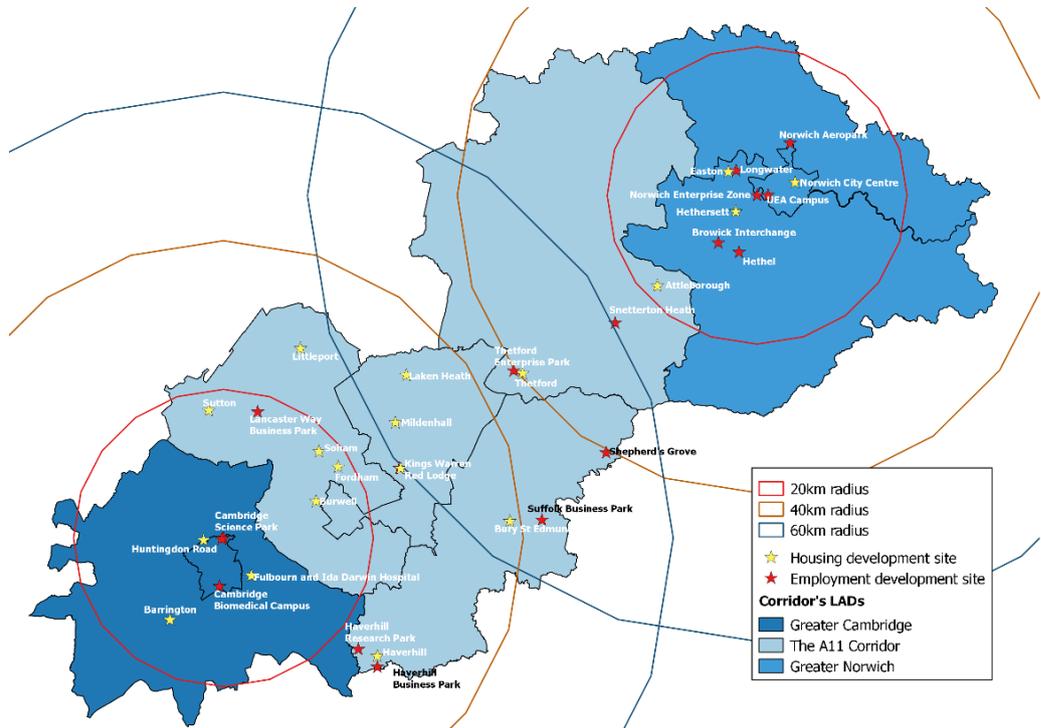
A map showing 20, 40, and 60km travel distances centred around Cambridge Science Park and Norwich Research Park is shown below, in order to illustrate the practical extent of the Greater Cambridge and Greater Norwich functional economic areas in the future. Also shown on the map are major housing and employment developments. Any potential location within 30 minutes (about

¹⁰ UN Country population profile pages - <https://esa.un.org/unpd/wup/Country-Profiles/>

40km) of Cambridge in particular, which is currently more spatially constrained than Norwich, should be considered an area with extremely strong growth potential.

Recommendation 2.1: Our recommendation is that East Cambridgeshire, Forest Heath and St Edmundsbury look target greater integration with the Greater Cambridge city region, through the provision of high quality, well-connected and affordable housing and employment space, whilst Breckland looks towards integrating with the Greater Norwich city region.

Thetford, located at the approximate half-way point, has the opportunity to look in both directions at once.



As discussed in the previous chapter, the progress of the Eastern section of East-West rail, and the increase in accessibility to Cambridge, Norwich, London and beyond that this would bring, is crucial in increasing the attractiveness of new housing and employment sites and creating a genuine bi-modal transport corridor.

Greater Cambridge Transport Vision

Whilst the A11 dualling has reduced travel times by car between the two major cities, the “central area” of the CNTC is still underserved in terms of public transport provision into the main Greater Cambridge and Greater Norwich employment sites. Many companies in Cambridge explicitly discourage their staff from commuting by car by deliberately restricting car parking facilities. The approach being taken by the Greater Cambridge authorities is to provide a greater quality and quantity of transport hubs, where commuters are able to transfer to public transport at key locations in the cities hinterland – for example, at an out-of-town park-and-ride site or rail station.

As part of the NIC work, the transport vision for Greater Cambridge in 2050 has recently been published. Although this is largely a well-considered, ambitious document, CNTC should look to engage in the development of the

detailed vision to ensure that it considers the exceptional scope for development along the A11 corridor. Although the strategy document looks out as far as Alconbury and Royston to the West and South, in places the strategy only looks as far as Newmarket when looking east.

Recommendation 2.2: CNTC should coordinate with the Greater Cambridge and Greater Norwich authorities to devise a coherent transport plan for the entire corridor, ensuring that identified growth hubs within the central section are suitably served with transport hubs that provide fast and affordable connections into the Greater Cambridge and Greater Norwich transport networks.

Housing and Employment Space

Significant levels of work have been done to bring forward the construction of new housing and employment sites along the Cambridge-Norwich corridor, and this has produced great strides forward in bringing the two city regions together as a coherent economic corridor. This is covered in detail in the Bruton Knowles Report.

The momentum of this construction programme now needs to be maintained in an ambitious and intelligent manner. The right *kind* of housing and employment space needs to be built. Both should be located close to major road and rail routes. Employment space should be built through direct collaboration with the Cambridge Cluster in order to encourage their increased involvement. Key tenants of new sites need to be established early, whether from the public or private sector.

Recommendation 2.3: CNTC should work to establish what kind of employment space in particular is currently underprovided in the Greater Cambridge region, and how this is likely to change over the next 15 years.

Workers in different age ranges and socio-demographic groups, or with different commuting needs, are likely to have quite different requirements for housing and amenity provision. A mixture of high- and low-density housing should be provided at different levels of affordability, with access to local employment sites and amenities provided by active transport facilities wherever possible, and direct access to “transport hubs” as well as road and rail access to Norwich, Cambridge and beyond. The importance of a high-quality built environment in forging a sense of place should not be forgotten.

Recommendation 2.4: Careful consideration also needs to be given to identifying what kind of workers each development will be aimed at, in order to provide the right mix of housing and the kind of amenities and entertainment facilities that would make the area an attractive place to live.

5 Ambition 3: Ensuring Inclusive Growth

The increased presence of a high number of hi-tech, high productivity clusters would be of automatic benefit to the wider regional economy, as the increased demand for labour, either directly or through the supply chain, provides additional employment opportunities for local residents, and the increased wealth brought into the region filters through to all other sectors, driving up productivity and wages across the board.

However, in order to fully maximise the benefits of future knowledge-intensive job growth for existing residents, CNTC should take three crucial measures:

- Expand and tailor skills and education provision to ensure residents have sufficiently well-matched education to be able to compete for the influx of high-value jobs
- Assist existing large-employment, low-productivity sectors grow productivity by taking advantage of new knowledge and technological advances in the region
- Ensure that the negative effects of growth (e.g. congestion, house prices) are managed and mitigated

Skills and Education

The Industrial Strategy identifies several National Skills shortages. It concludes that UK's provision of technical FE is poor, and this is holding the technological development of the UK back, resulting in polarised skill levels and an increasingly "two-speed" economy. It goes on to identify that our FE system is overcomplicated, with progression paths within FE courses unclear, and the linkages between FE, HE and Industry muddled. The result of this is a real shortage of high-skill technicians below graduate level, with a mixture of practical and academic skills.

This is clearly an opportunity for regional entities such as the CNTC to take the lead in helping the UK overcoming this problem.

Recommendation 3.1: The Cambridge- Norwich Technology Corridor should aim to become a focus of technical education, using an innovative combination of FE, HE and in-work training programmes such as apprenticeships.

FE, HE and Industry Collaboration

Whilst the UK is generally considered to offer high-quality HE provision, there is a major educational deficit both on a subject-by-subject level, and at an occupational level, with a sizeable gap in skills education existing between graduates from HE and FE. For example, whilst many HE graduates have high-level academic skills, and many FE graduates have acceptable vocational/practical skills, SMEs and innovative start-ups often require workers with a mixture of both skill-sets.

Therefore, a clearer FE pathway is required, and better linkages between FE and HE providers and local innovation hubs need to be forged in order to bridge this gap, and provide a tailored mix of academic and vocational skills. Alongside this, all areas of the UK need to consider how they will provide re-skilling and up-skilling provision in the future for workforces displaced as part of a shift to new production methods.

Recommendation 3.2: CNTC should aim to be a national leader in flexible skills provision, with close coordination between HE, FE and hi-tech clusters.

Existing Sectoral Skills Gaps

The National Skills Audit identifies critical skills shortages in the following areas:

- ICT
- Engineering
- Nursing, Midwifery and Late Life Care
- Finance & Insurance

The above sectors are all well-represented in the Greater Norwich area, with a progressive university with close links to the local economy in UEA, a University Hospital, Norwich Financial Skills Academy, and nascent ICT and Engineering sectors. We therefore recommend that Greater Norwich are encouraged to take the lead in this endeavour, with collaboration from other areas of the corridor where required.

An example of a successful programme occurred at the University of Galway, which has worked in conjunction with the Galway Med-tech cluster to provide specifically tailored training courses for both employees and existing students. The university and the cluster formed a successful, mutually beneficial, symbiotic relationship. This is the kind of vision that CNTC might have of a successful technology corridor.

This programme would not only provide the residents of the corridor with the skills required to obtain some of the high-skill, high-wage jobs within the new sectoral clusters, but would also act as a stimulus for that very growth: progressive educational establishments often act as the focal point for a knowledge-based cluster, they bring in investment, outside expertise and highly motivated young people, who often stay to work in the local economy.

Recommendation 3.3: CNTC should look to work with local universities, clusters and FE providers to expand and augment its education portfolio in key demand sectors where the UK is currently experiencing a skills shortage, in particular offering mixed academic/vocational courses with a variety of entry routes, progression pathways, and links to local industry.

Technological Test-bed

The UK's productivity problem will only be solved by observing examples of international best practice, adopting new and innovative technological and organisational methods and solutions, and enabling and incentivising local firms to access the skills and capital they require to raise the productivity of their workers to globally competitive standards.

The 2013 GCLP outlined the ambition to make Greater Cambridge the test-bed for the next generation of digital technologies.

Recommendation 3.4: CNTC should look to expand on this, and promote the corridor, with its ideal combination of hi-tech clusters and wide range of agri-food, and manufacturing sectors to act as a test-bed for a wide range of different technological innovations.

CNTC should set up a programme to facilitate firms from across the entire corridor, and in a variety of sectors, ranging from agri-food, to logistics, construction, and other low/medium tech manufacturing, to access innovative technological solutions provided by hi-tech clusters within the corridor, including in agri-tech, ICT and hi-tech consulting services, clean-tech, food science and life science research, advanced engineering and materials, and AI and digitalisation solutions. This will create the vision of the corridor as a nationally-significant test-bed for innovative, technological solutions that drives forward quality, efficiency, and sustainability, and address concerns about low productivity levels across wider sectors.

6 Conclusions

We have presented a **vision of a technology corridor** as being a place that is:

- Home to nationally significant and recognised clusters of firms in a variety of high-tech sectors, including both scientific R&D and more applied technological fields,
- A leader in technical education in the UK,
- A test-bed for technological solutions that drives up productivity across a wide range of sectors,
- All linked together through high-class infrastructure (transport, ICT, utilities) which facilitate the connection and synergies between firms, clusters and local economies along the corridor.

And recommended **three general ambitions** that the CNTC Partnership should target, in order to realise this vision:

- **Ambition 1:** To promote the development of a small number of nationally significant and globally competitive tech clusters along the corridor
- **Ambition 2:** To facilitate the continued growth of the Cambridge and Norwich functional economic areas into the heart of the corridor through the provision of high-quality and well-connected housing and employment space
- **Ambition 3:** To prioritise *inclusive* growth by raising skill levels, productivity levels and real wages across all sectors in the corridor economy

Furthermore, we have identified **16 specific, pragmatic recommendations** in support of these more holistic ambitions. These can be found in chapters 3-5.

Quantifying the Benefits of Intervention

It is not straightforward to quantify the potential benefits of these recommendations in exact terms. The outcomes of each recommendation would be likely to have separate impacts on one or several of the following:

- Overall employment and population growth in the corridor
- Employment growth specifically in targeted sectors
- Productivity growth across the economy

Rather than attempt to quantify each recommendation individually, we have taken the approach of treating the combined recommendations as a single scenario, which we denote as “continued growth” scenario, and then compared this to a baseline scenario which assumes no significant intervention or targeted investment in the corridor specifically.

*15-year projections:
2016 – 2031*

In the baseline scenario, the population and employment growth move in-step, with a growth rate of 0.73% pa, implying no significant shifts in the unemployment rate, and with the growth in inactivity rate due to an ageing population off-set by slightly increased net commuting into the corridor. The

corridor as a whole still grows faster than the UK, which is projected to grow at 0.45% pa.

In line with OBR projections, realistic expectations for productivity growth over the next 15 years are lower than long-term historic trends at around 0.72% pa, with resultant GVA growth of 1.45% pa in the corridor. This is slightly higher than the national figure.

CNTC Corridor	2016 Totals	Baseline Scenario (% pa growth)	Baseline Scenario 2031 Total	Continued Growth Scenario (% pa growth)	Continued Growth Scenario 2031 Total
Population	1.09m	0.73	1.22m	0.98	1.26m
Employment	619,000	0.73	690,000	0.98	717,000
Productivity	£47,000	0.72	£52,000	1.06	£55,000
GVA	£28.9bn	1.45	£35.9bn	2.04	£38.7bn
Average Wage	£12.27	0.72	£13.70	1.06	£14.40

In the continued growth scenario, assumptions about the national picture are held the same as the baseline, but assumptions about population, employment and productivity growth within the corridor are adjusted to assume that as a result of the combined interventions, the corridor manages to maintain its long-run 15-year growth rate in population, employment and productivity.

Increased inward migration into the corridor leads to both population and employment growth continuing to grow at the 2001-2016 population growth rate of 0.98% pa. A small shift in the sectoral mix towards high-tech employment, along with direct productivity improvements in existing large-employment sectors, leads to productivity growth of 1.06% pa, matching the productivity growth between 2001 and 2016.

The net result of these changes, compared to the baseline projections, suggest that by 2031, the corridor could house an additional **46,000 additional people, 26,000 additional jobs**, create value of an additional **£2.75bn** to the economy in real terms, with workers each taking home on average an additional **£1,300 per annum**, also in real terms.

Sectoral Growth Prospects

Innovative Industries often see growth occurring in bursts of around 5-10 years, as clusters bring new products or innovations to market, resulting in significant jumps in efficiencies or market share, and then stabilise for a period, as new innovations are developed. Hi-tech sectors (defined at the 2-digit SIC level) in the Greater Cambridge area have seen 5-year GVA growth rate bursts equivalent to of between 5 and 10% pa. since the 1980s. Greater Norwich has seen similar bursts, but at lower scales, on lower frequencies, and in a smaller sub-set of sectors. Expanding and optimising the knowledge economy to promote collaboration and innovation across the corridor would

most likely result in an increase in the range, scale and frequency of these GVA growth spurts across a wider range of sectors.

Priorities for Intervention

The priorities for intervention are listed below.

- Working with the two LEPs and a variety of sectoral representatives to prepare a local industrial strategy built around promoting collaboration, innovation and productivity growth along the corridor, and specifically targeting the key sectors identified.
- Ensuring that the key decisions are taken now that will ensure that the right combination of employment space, business support and key infrastructure is put in place across the corridor to facilitate this vision.
- Ensure that the importance of maintaining the attractiveness of the corridor as a place to live is not forgotten, including the development of a sense of place, and the provision of high quality housing and other soft infrastructure.
- Working with local HE and FE providers to ensure that their interests are fully aligned with the local industrial strategy, and are able and willing to provide the skills and education training required to provide the local populace with access to jobs in high-tech sectors.

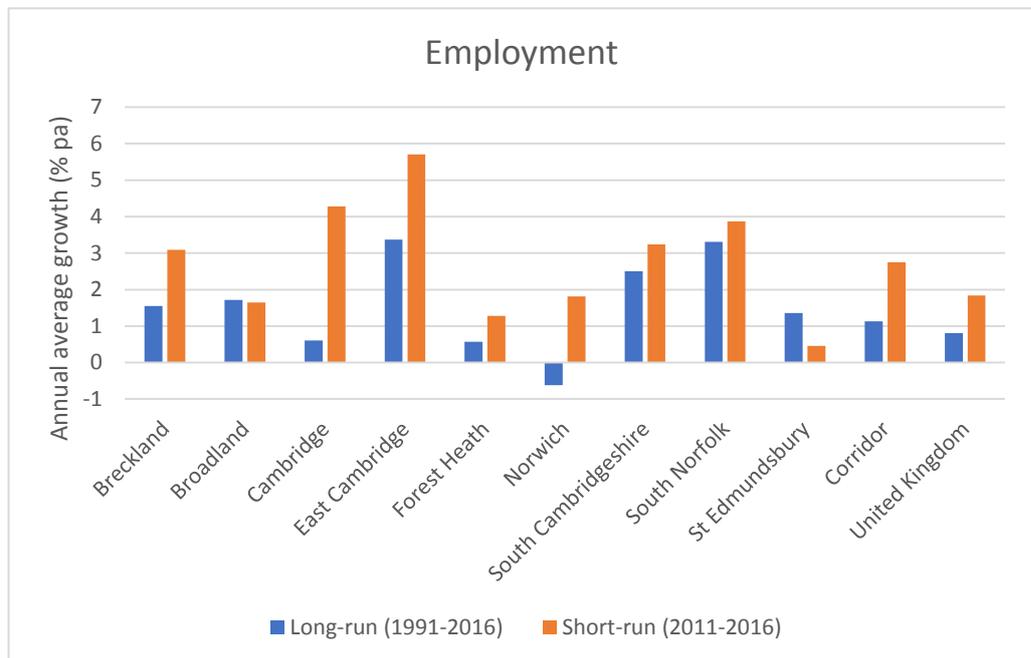
Appendix A Employment

Table A.1: Employment level and growth

	2016 Level (000s)	Long-run annual average growth (% pa)- 1991-2016	Short-run annual average growth (% pa)- 2011-2016
Breckland	58.340	1.55	3.09
Broadland	55.846	1.72	1.65
Cambridge	114.255	0.60	4.28
East Cambridgeshire	38.655	3.37	5.70
Forest Heath	30.124	0.57	1.28
Norwich	97.211	-0.62	1.82
South Cambridgeshire	89.670	2.51	3.24
South Norfolk	69.016	3.31	3.87
St Edmundsbury	65.840	1.36	0.46
Corridor	618.958	1.13	2.75
United Kingdom	34,456	0.80	1.84

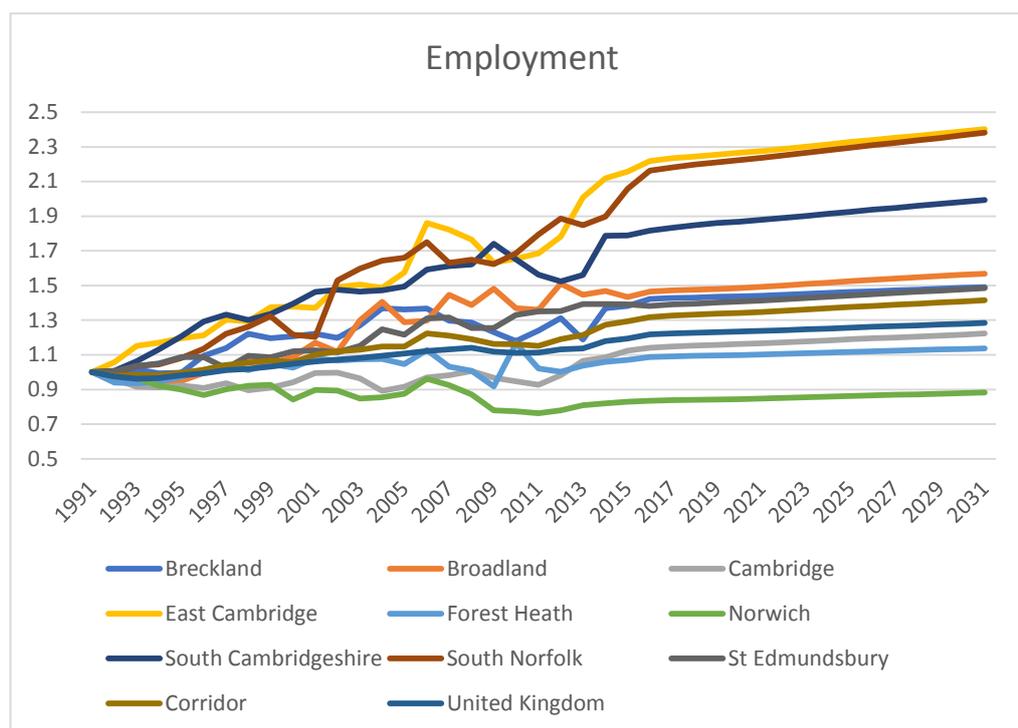
Source: Cambridge Econometrics.

Figure A.1: Long-run versus short-run annual average growth (% pa)



Notes:
Source: Cambridge Econometrics.

Figure A.2: Employment growth index



Notes: Base year: 1991 = 1
 Source: Cambridge Econometrics.

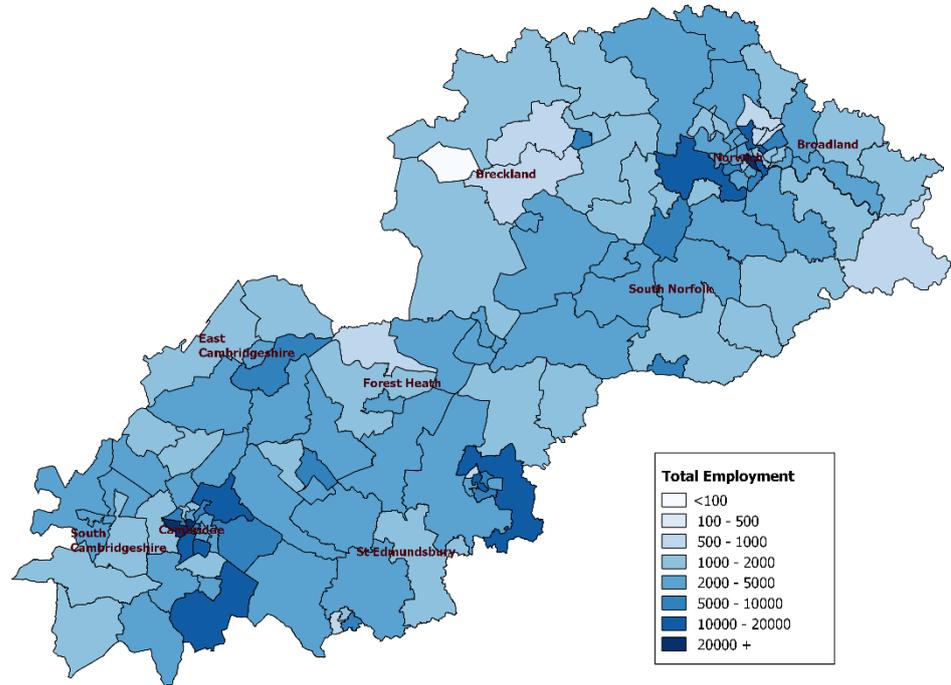
Table A.2: Employment level and growth

Employment	CNTC			UK	
	2016 (000s)	Long-run growth (% pa) 1991-2016	Short-run growth (% pa) 2011-2016	Long-run growth (% pa) 1991-2016	Short-run growth (% pa) 2011-2016
1 Agriculture etc	13.5	2.0	8.7	-1.4	-1.3
2 Mining & quarrying	0.2	10.9	61.6	-2.7	0.9
3 Food, drink & tobacco	10.0	-1.3	3.8	-0.8	2.1
4 Textiles etc	1.0	-3.3	2.6	-5.1	2.8
5 Wood & paper	3.7	0.5	2.9	-1.4	2.6
6 Printing & recording	1.5	-4.0	-10.7	-3.1	-4.4
7 Coke & petroleum	0.0	139.1	-0.5	0.2	2.2
8 Chemicals, etc	1.9	1.1	0.1	-2.6	-1.3
9 Pharmaceuticals	2.0	8.7	2.4	-2.5	0.4
10 Non-metallic min. prods.	4.0	-1.2	-2.5	-1.8	0.4
11 Metals & metal prods.	5.1	-0.1	0.2	-2.0	0.9
12 Electronics	3.5	-1.5	-2.2	-3.1	-2.9
13 Electrical equipment	1.6	0.4	-3.2	-1.6	-0.6
14 Machinery, etc	3.6	0.5	-1.2	-2.5	-1.0
15 Motor vehicles, etc	2.3	7.8	9.4	-1.3	4.4
16 Other trans. equipment	2.2	4.3	17.7	-0.2	2.9
17 Other manuf. & repair	6.4	2.7	0.1	-0.9	1.1
18 Electricity & gas	1.0	6.0	-2.2	-0.5	4.3
19 Water, sewerage &	3.8	4.3	2.4	1.7	1.0

waste					
20 Construction	42.9	0.8	2.6	0.3	1.7
21 Motor vehicles trade	12.4	-0.2	4.8	-0.2	2.7
22 Wholesale trade	19.4	0.6	-3.0	0.2	0.6
23 Retail trade	53.5	0.7	0.4	0.6	1.2
24 Land transport	13.0	1.9	3.2	0.3	1.9
25 Water transport	0.1	16.1	-7.5	-1.8	5.0
26 Air transport	0.3	-1.6	10.7	1.0	1.6
27 Warehousing & postal	9.5	1.8	-1.9	1.8	2.9
28 Accommodation	8.0	1.2	7.1	1.4	3.9
29 Food & beverage services	28.5	1.8	3.7	1.3	2.7
30 Media	7.8	1.2	10.9	1.0	0.2
31 IT services	18.2	3.7	6.5	3.3	4.2
32 Financial & insurance	14.9	0.0	-3.3	-0.2	-0.7
33 Real estate	9.1	5.8	4.6	3.3	4.8
34 Legal & accounting	9.7	3.0	2.7	2.0	1.5
35 Head offices & manag. cons.	9.5	6.0	4.0	5.4	5.7
36 Archit. & engin. services	12.9	3.5	4.9	1.7	4.7
37 Other professional services	28.5	4.3	11.7	2.8	5.7
38 Business support services	49.8	3.5	6.9	2.8	3.8
39 PAD	19.1	-0.8	-1.4	-0.5	-1.8
40 Education	65.8	2.0	3.0	1.6	1.8
41 Health	48.8	3.4	5.8	2.1	1.9
42 Residential & social	32.2	1.9	3.4	1.6	1.0
43 Arts	6.4	4.4	11.2	1.9	3.3
44 Recreational services	9.3	2.0	1.5	2.2	1.4
45 Other services	18.9	2.0	3.9	1.2	2.1

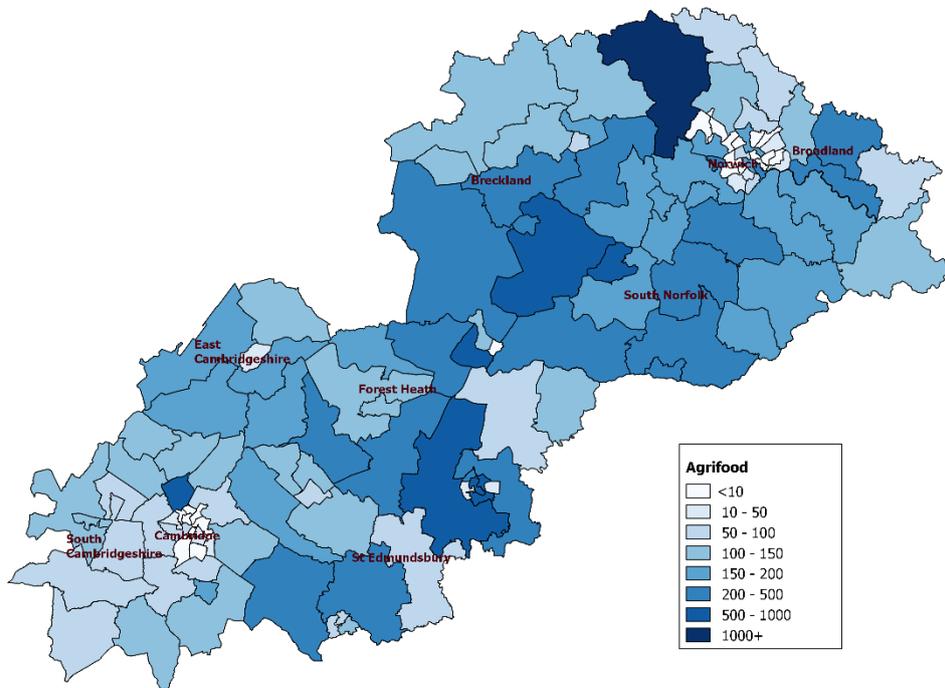
Source: Cambridge Econometrics.

Figure A.3: Total employment in each MSOAs in 2016 (person)



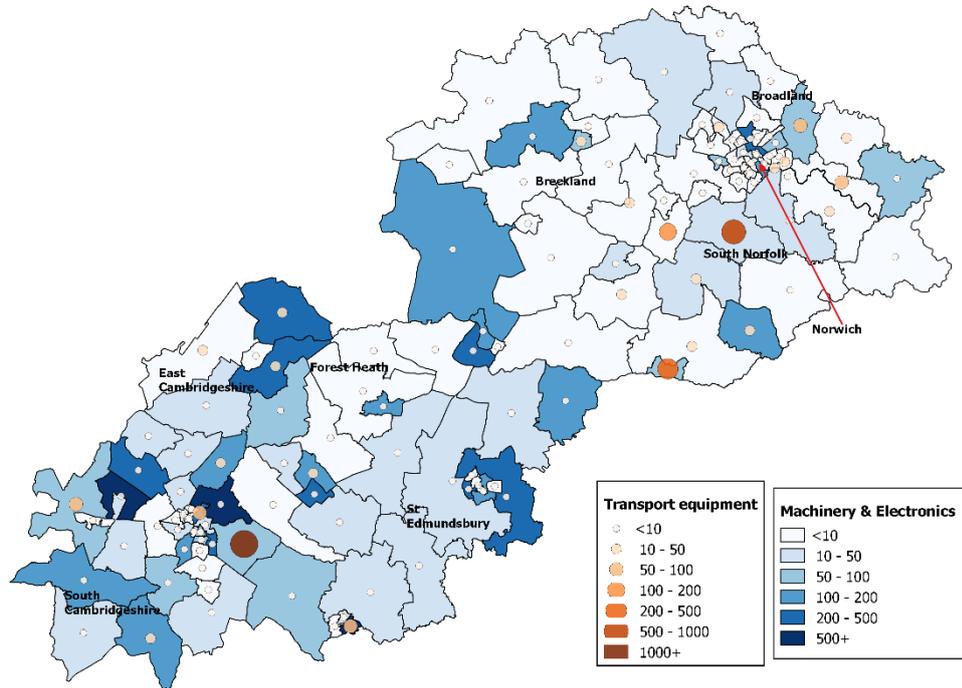
Source: Nomis, Office for National Statistics.

Figure A.4: Employment in Agri-food by MSOAs in 2016 (person)



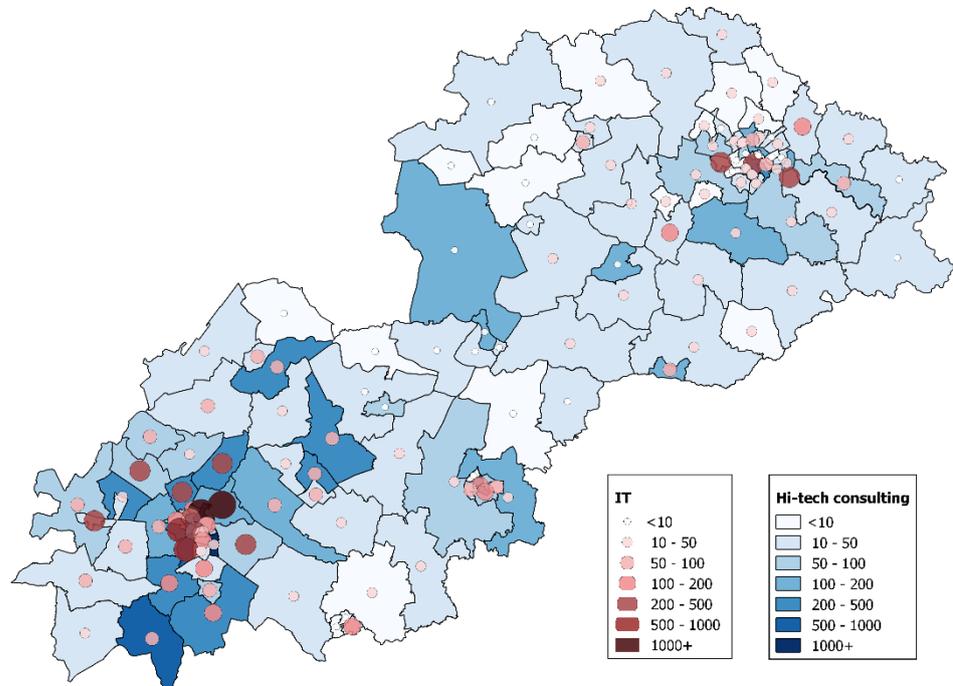
Source: Nomis , Office for National Statistics.

Figure A.5: Employment in Machinery and Electronics and Transport equipment by MSOAs in 2016 (person)



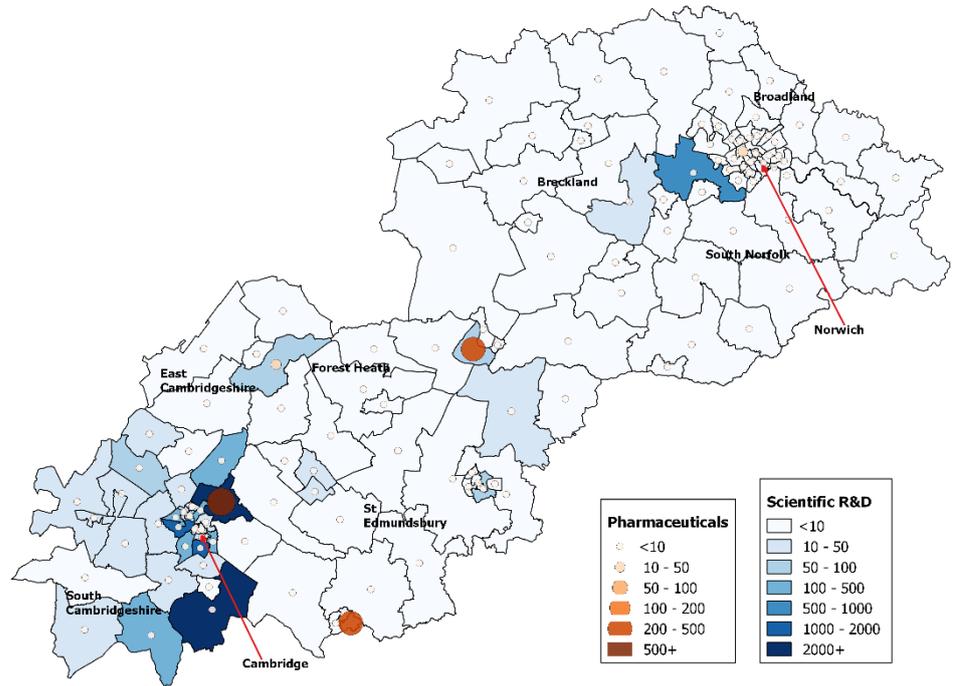
Source: Nomis, Office for National Statistics.

Figure A.6: Employment in IT and Hi-tech consulting by MSOAs in 2016 (person)



Source: Nomis, Office for National Statistics.

Figure A.7: Employment in Pharmaceuticals and Scientific R&D by MSOAs in 2016 (person)



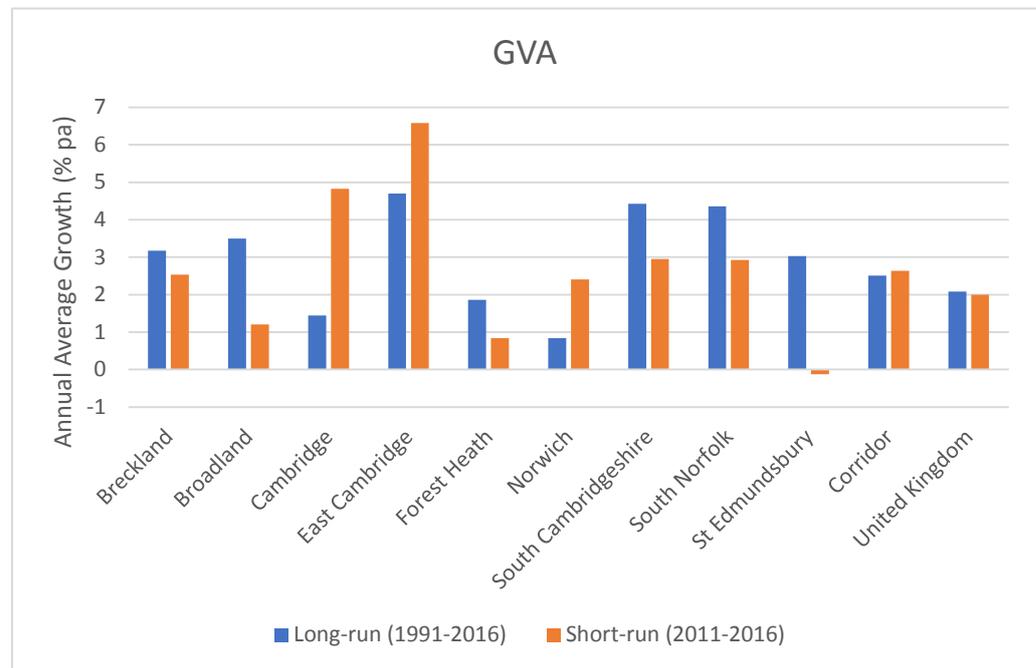
Source: Nomis, Office for National Statistics.

Appendix B GVA

	2016 (£2013m)	Long-run annual average growth (% pa)	Short-run annual average growth (% pa)
Breckland	2,767.3	3.17	2.53
Broadland	2,675.8	3.50	1.21
Cambridge	5,186.3	1.45	4.83
East Cambridgeshire	1,747.8	4.70	6.58
Forest Heath	1,347.5	1.86	0.83
Norwich	4,320.6	0.84	2.41
South Cambridgeshire	4,726.8	4.43	2.96
South Norfolk	3,079.2	4.36	2.93
St Edmundsbury	3,100.3	3.02	-0.12
Corridor	28,951.6	2.51	2.63
United Kingdom	1,672,084	2.08	2.00

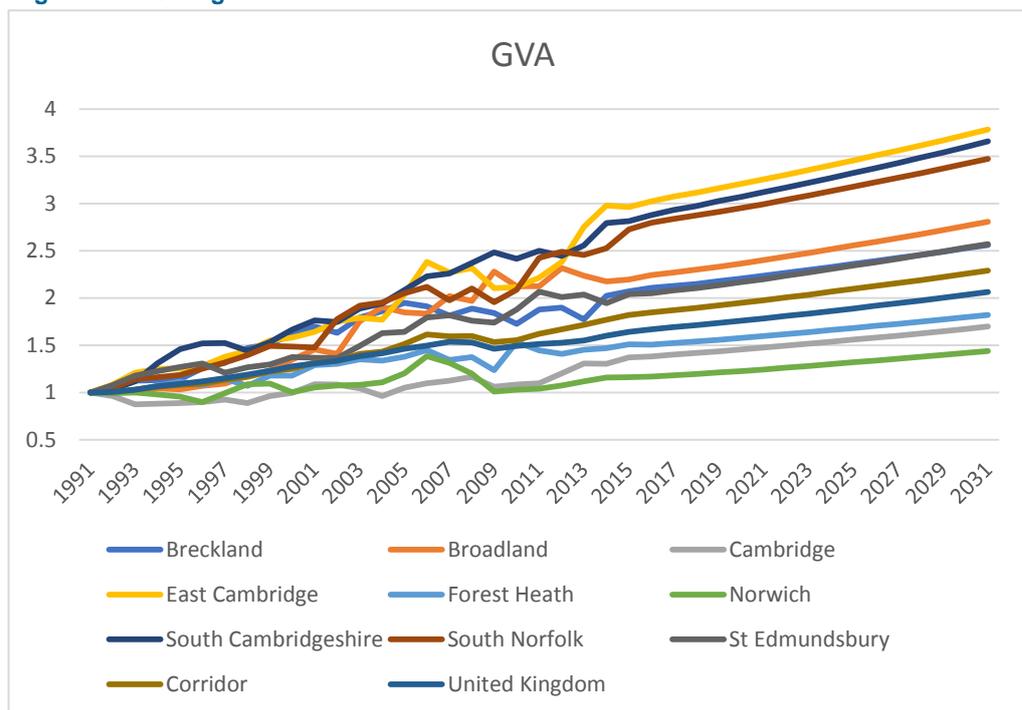
Table B.1: GVA level and growth

Figure B.1 Long-run versus short-run annual average growth (% pa)



Source: Cambridge Econometrics.

Figure B.2: GVA growth index



Notes: Base year: 1991 = 1
Source: Cambridge Econometrics.

Table B.2: Corridor versus UK GVA by sectors

	CNTC			UK	
	2016	Long-run growth (% pa) 1991-2016	Short-run growth (% pa) 2011-2016	Long-run growth (% pa) 1991-2016	Short-run growth (% pa) 2011-2016
1 Agriculture etc	810.3	-0.6	3.2	0.3	0.7
2 Mining & quarrying	46.0	17.2	60.6	-1.9	-1.4
3 Food, drink & tobacco	770.2	1.1	2.1	0.4	-0.2
4 Textiles etc	37.4	1.3	-8.7	-3.2	-3.2
5 Wood & paper	178.0	1.5	1.8	-0.5	0.6
6 Printing & recording	83.3	-1.1	-5.1	-1.0	-2.0
7 Coke & petroleum	1.2	197.6	25.9	-1.4	-4.2
8 Chemicals, etc	183.4	2.7	5.5	1.0	0.8
9 Pharmaceuticals	640.9	8.3	-4.3	2.0	-1.9
10 Non-metallic min. prods.	257.1	0.6	-1.7	0.0	0.8
11 Metals & metal prods.	268.8	1.8	3.2	0.3	2.2
12 Electronics	257.0	3.2	-2.1	0.3	-0.3
13 Electrical	87.4	5.2	-3.2	0.1	-0.4

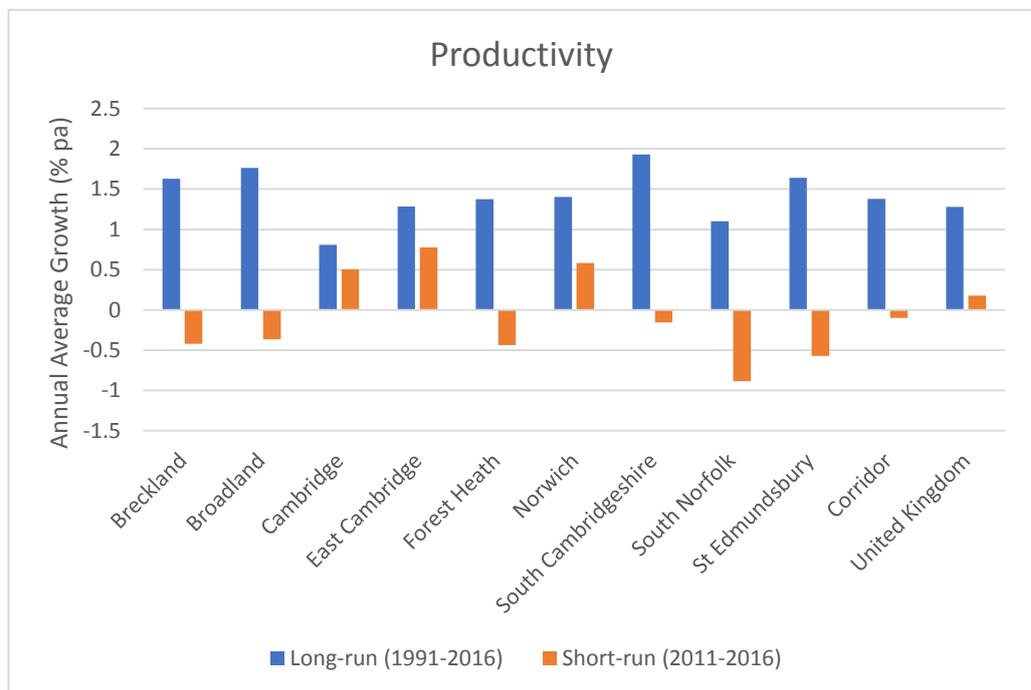
equipment					
14 Machinery, etc	245.9	4.6	-2.4	-0.3	-4.2
15 Motor vehicles, etc	111.7	4.0	5.1	1.9	6.1
16 Other trans. equipment	78.4	4.7	-1.9	3.4	3.2
17 Other manuf. & repair	218.7	2.4	-1.5	0.7	0.9
18 Electricity & gas	162.6	2.9	-7.7	1.1	-1.1
19 Water, sewerage & waste	298.5	1.5	-2.7	2.1	2.6
20 Construction	1757.5	0.8	1.7	0.7	1.8
21 Motor vehicles trade	590.5	2.5	9.7	2.9	9.1
22 Wholesale trade	727.9	2.0	2.0	1.5	3.1
23 Retail trade	1744.1	3.7	3.9	2.9	2.8
24 Land transport	441.9	2.7	3.3	2.3	2.5
25 Water transport	30.6	22.5	-19.4	0.1	-6.6
26 Air transport	50.3	9.8	9.6	4.1	5.1
27 Warehousing & postal	280.1	2.1	-2.2	2.9	0.8
28 Accommodation	183.2	-0.2	0.3	2.3	4.3
29 Food & beverage services	554.4	3.7	5.0	1.6	2.0
30 Media	191.7	-0.6	5.7	2.0	4.0
31 IT services	1426.0	5.7	5.0	6.2	3.2
32 Financial & insurance	1241.2	1.8	-0.4	1.9	-0.2
33 Real estate	891.9	6.7	4.4	4.6	3.0
34 Legal & accounting	525.5	7.2	5.9	4.1	2.8
35 Head offices & manag. cons.	363.9	10.0	9.8	8.3	9.1
36 Archit. & engin. services	955.4	8.6	14.4	4.5	6.2
37 Other professional services	1406.3	4.7	8.9	3.5	5.0
38 Business support services	1244.0	3.2	5.1	3.7	5.7
39 PAD	1211.8	0.5	-2.2	-0.5	-2.1
40 Education	2280.3	1.5	1.5	0.8	0.9
41 Health	1908.6	3.3	6.1	3.5	3.0
42 Residential & social	318.6	4.3	2.6	2.2	0.8
43 Arts	94.4	4.8	1.9	2.6	1.3
44 Recreational services	146.2	1.0	-3.3	1.2	0.8
45 Other services	994.3	2.8	6.5	2.1	3.2

Appendix C Productivity

Table C.1: GVA level and growth

	2016 Level (£)	Long-run annual average growth (% pa) 1991-2016	Short-run annual average growth (% pa) 2011-2016
Breckland	47,433	1.63	-0.42
Broadland	47,915	1.76	-0.37
Cambridge	45,392	0.81	0.50
East Cambridgeshire	45,215	1.28	0.78
Forest Heath	44,733	1.38	-0.44
Norwich	44,446	1.40	0.58
South Cambridgeshire	52,713	1.93	-0.15
South Norfolk	44,615	1.10	-0.89
St Edmundsbury	47,088	1.64	-0.57
Corridor	46,775	1.38	-0.10
United Kingdom	49,000	1.28	0.18

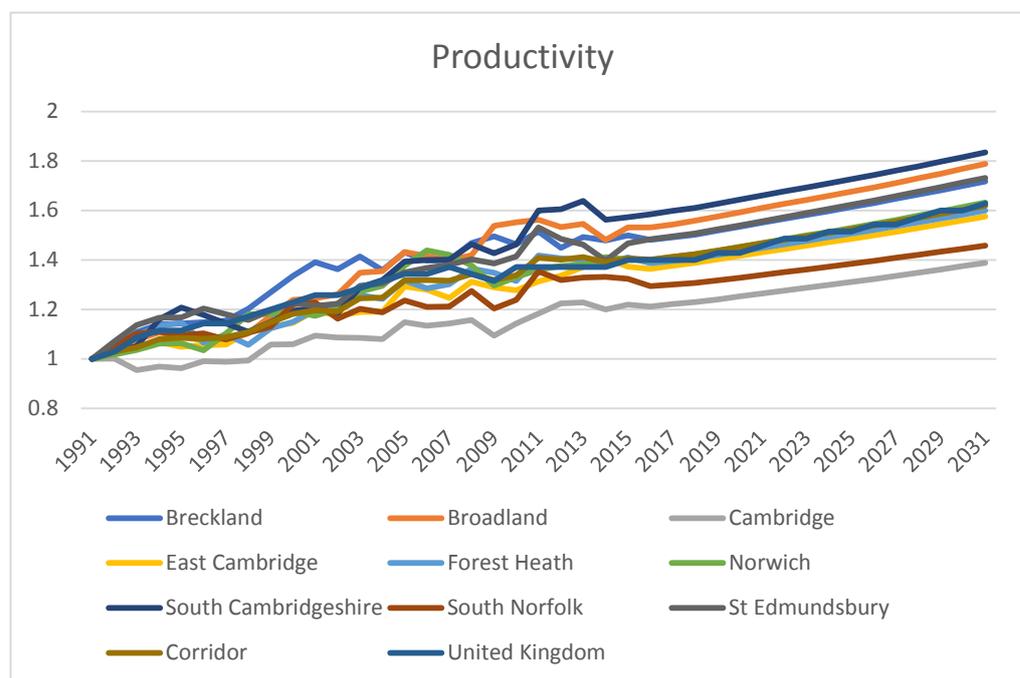
Figure C.2: Long-run versus short-run annual average growth (% pa)



Notes: Add notes if any here.

Source: Cambridge Econometrics.

Figure C.2: Productivity growth index



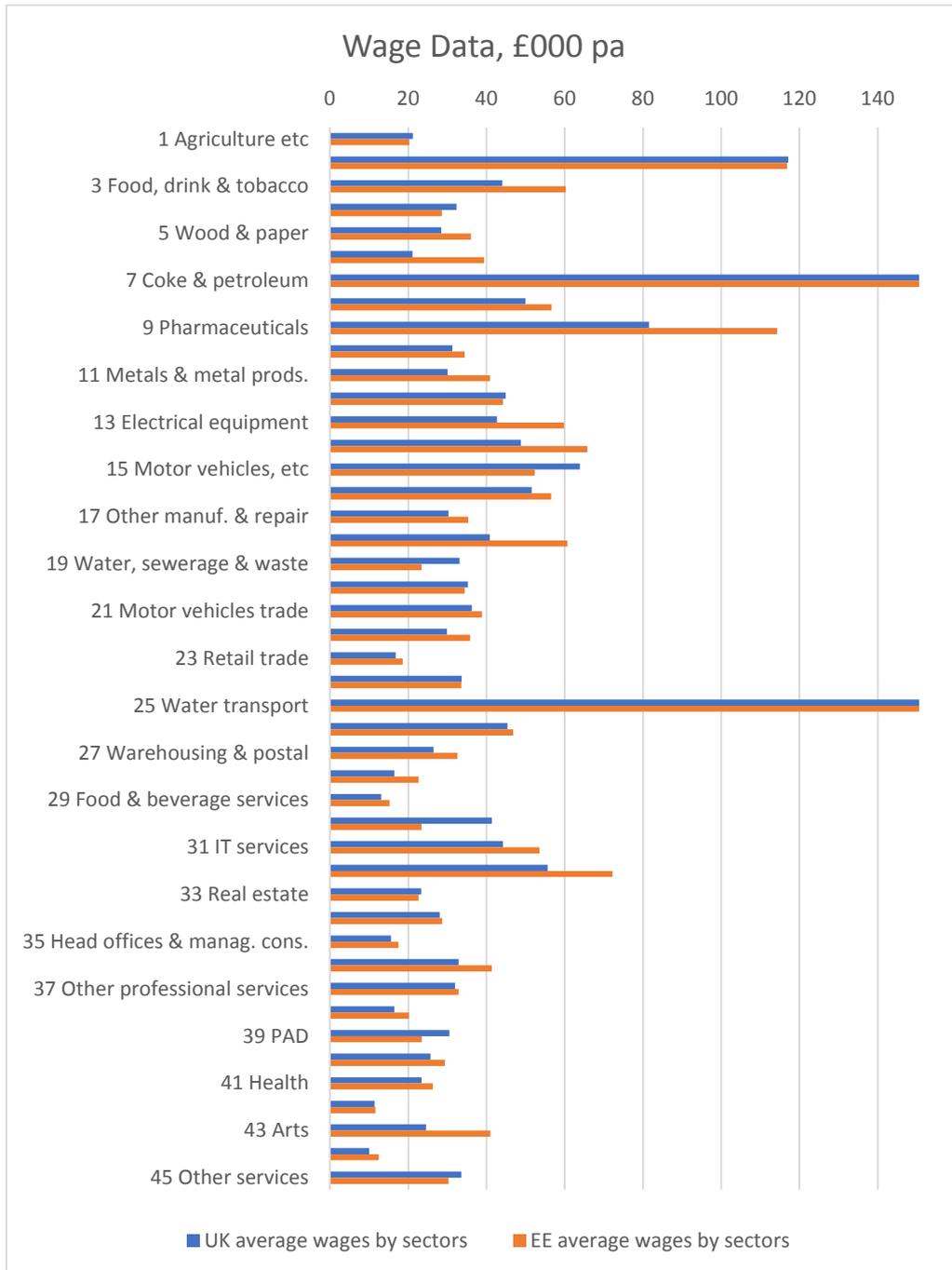
Notes: Base year: 1991 = 1
Source: Cambridge Econometrics.

Table C.2: Productivity level and growth

	CNTC			UK	
	2016 (£000)	Long-run growth (% pa) 1991-2016	Short-run growth (% pa) 2011-2016	Long-run growth (% pa) 1991-2016	Short-run growth (% pa) 2011-2016
1 Agriculture etc	60.0	3.0	-0.1	1.8	5.6
2 Mining & quarrying	213.2	10.7	11.1	1.7	6.2
3 Food, drink & tobacco	76.9	3.1	-0.3	1.0	-1.2
4 Textiles etc	36.7	7.0	-8.5	2.3	-3.0
5 Wood & paper	47.8	3.7	-0.2	1.0	1.1
6 Printing & recording	54.9	5.0	11.2	2.4	3.1
7 Coke & petroleum	303.4	118.4	495.3	-0.1	-1.0
8 Chemicals, etc	95.0	2.9	8.9	3.7	2.3
9 Pharmaceuticals	324.3	5.8	-3.3	5.1	3.1
10 Non-metallic min. prods.	63.6	2.7	3.1	1.8	2.0
11 Metals & metal prods.	52.8	3.3	6.7	2.4	-0.8
12 Electronics	72.5	5.5	1.3	3.3	3.0
13 Electrical equipment	53.1	5.8	3.5	1.9	-2.3

14 Machinery, etc	68.3	3.7	-1.5	2.4	-1.5
15 Motor vehicles, etc	49.6	3.4	9.6	3.4	1.7
16 Other trans. equipment	35.2	2.8	-11.6	3.5	0.8
17 Other manuf. & repair	34.2	1.1	1.3	1.7	3.0
18 Electricity & gas	161.9	5.8	-3.5	2.1	-4.6
19 Water, sewerage & waste	77.6	0.5	-2.7	0.8	2.7
20 Construction	40.9	0.2	-1.0	0.3	1.5
21 Motor vehicles trade	47.5	2.8	4.9	2.8	4.9
22 Wholesale trade	37.6	1.7	5.5	1.1	3.0
23 Retail trade	32.6	3.1	3.6	2.1	2.0
24 Land transport	33.9	1.5	0.8	1.9	0.9
25 Water transport	521.0	14.2	0.5	2.8	-5.1
26 Air transport	175.8	11.2	2.6	3.2	3.6
27 Warehousing & postal	29.6	0.8	0.0	1.0	-1.0
28 Accomodation	22.9	-0.6	-4.7	1.1	0.8
29 Food & beverage services	19.4	2.0	1.4	0.6	-0.1
30 Media	24.6	-0.8	-2.4	1.0	5.5
31 IT services	78.3	2.5	-0.8	3.0	-1.9
32 Financial & insurance	83.6	2.3	3.3	2.2	1.0
33 Real estate	97.5	2.3	3.0	1.3	-1.2
34 Legal & accounting	54.4	4.8	3.7	2.1	1.9
35 Head offices & manag. cons.	38.4	4.0	6.9	3.0	4.5
36 Archit. & engin. services	73.8	5.4	9.8	3.0	0.1
37 Other professional services	49.4	1.4	-2.2	0.7	0.0
38 Business support services	25.0	0.1	-1.0	1.1	2.2
39 PAD	54.9	1.6	-0.7	0.1	-0.5
40 Education	34.7	-0.4	-1.3	-1.0	-1.0
41 Health	39.1	0.0	0.7	1.4	0.5
42 Residential & social	9.9	2.5	-0.5	0.6	-0.5
43 Arts	14.9	3.6	-2.1	0.9	-1.2
44 Recreational services	15.8	-1.0	-4.6	-1.0	-1.6
45 Other services	52.5	1.8	4.4	0.8	0.9

Figure C.2: Wages by sectors- East of England region versus the UK

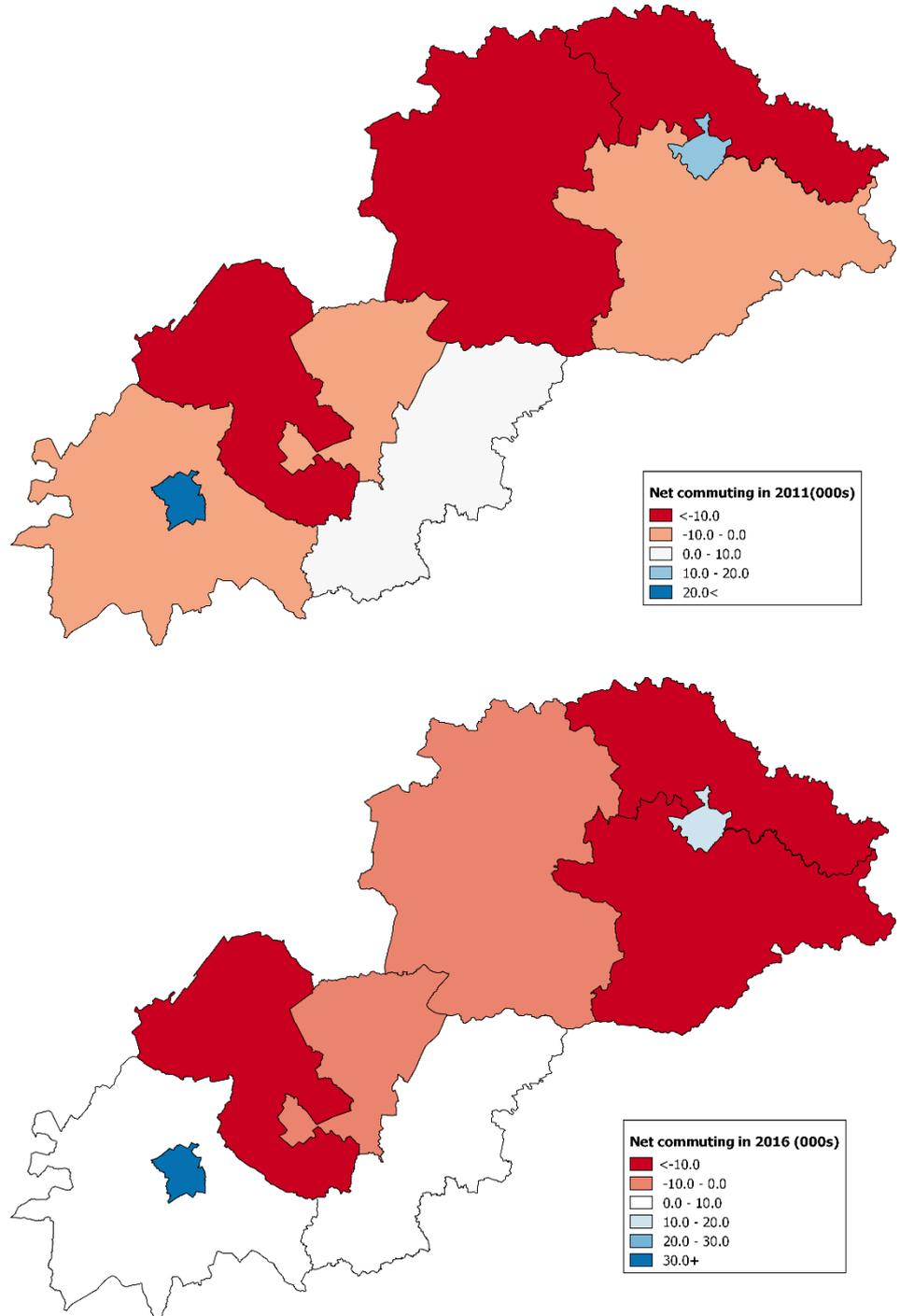


Source: Cambridge Econometrics.

Appendix D Regional Wages

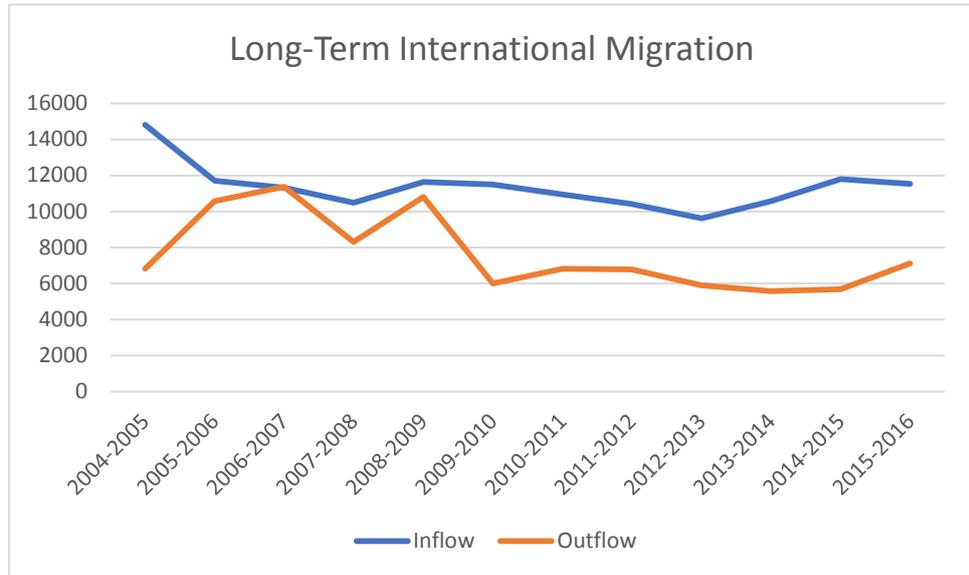
Appendix E Commuting and Migration

Figure D.1: Net commuting in 2011 and 2016



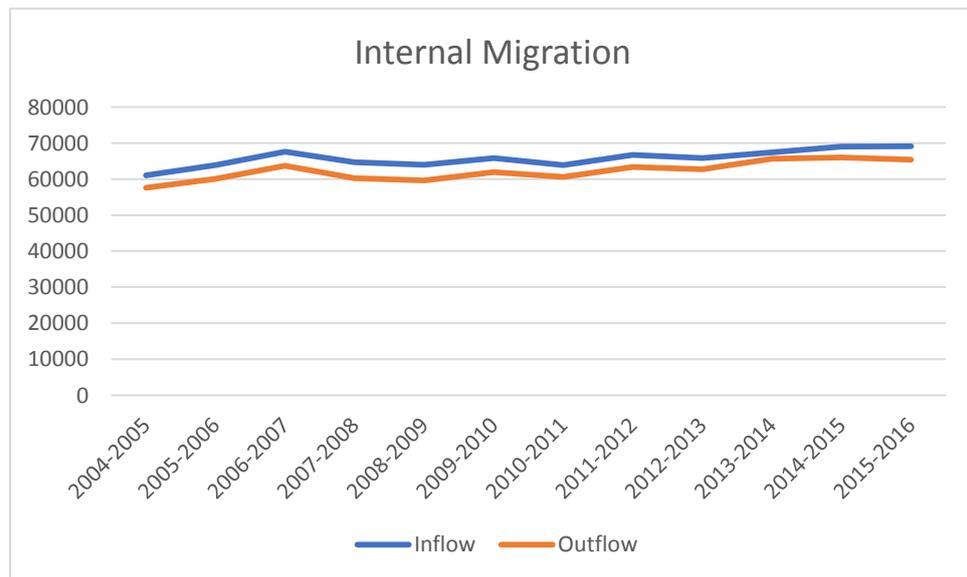
Source: nomis

Figure D.2: Long-Term International Migration flows



Source: Office for National Statistics

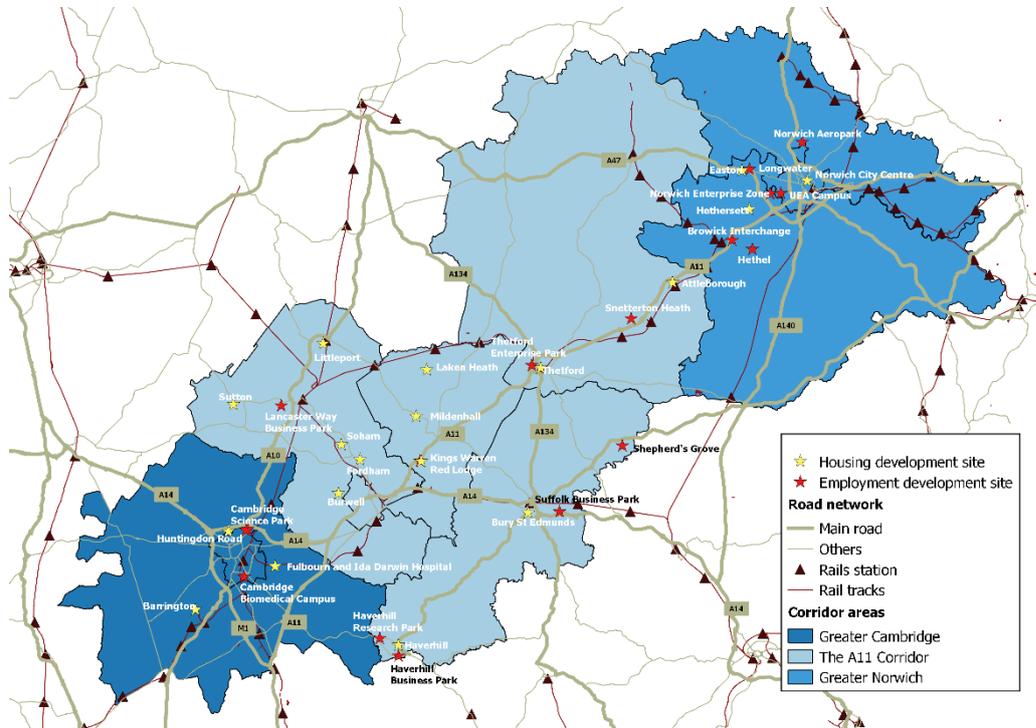
Figure D.3: Internal Migration (within the UK) flows



Source: Office for National Statistics

Appendix F Development sites

Figure F.1: Major development sites in each district in CNTC



Notes:
Source: Ordnance Survey.

Table E.1: Major employment development sites reported to CE

Sites	District	Major Employment site areas (Ha)	Total available employment areas/floor space (ha)	Likely Employment uses
Lancaster Way Business Park – Ely	East Cambridgeshire	82.1	NA	B1, B2, B8
Land north of Turners – Fordham	East Cambridgeshire	8	6	B1, B2, B8
Employment land at and adjoining Lynx Business Park – Fordham	East Cambridgeshire	19.98	NA	NA
Existing employment allocation land at Horse Racing Forensic Laboratories- Fordham	East Cambridgeshire	12	NA	B1, B2
Existing employment allocation land (north and south) of Snailwell Road – Fordham	East Cambridgeshire	12.5	NA	B1, B2, B8
Existing employment allocation land south of Landwade Road- Fordham	East Cambridgeshire	14.5	NA	B1, B2, B8
Land adjacent A142 Soham	East	11	NA	B1, B2, B8

	Cambridgeshire			
Sedgeway Business Park Common Road- Witchford	East Cambridgeshire	5.4	NA	B uses
Snetterton Heath	Breckland	68.1	20	B1, B2, B8
Thetford Enterprise Park	Breckland	18	5.294	B1, B2
Thetford Urban Extension	Breckland	22.26	8.5	B1, B2, B8
Norwich Research Park Enterprise Zone	South Norfolk & Norwich	20	NA	NA
Longwater	South Norfolk	13.3	NA	B1, B2, B8
Browick Interchange	South Norfolk	14.97	7.897	B1, B2, B8
Hethel	South Norfolk	14	5.46	B1
Kings Warren	Forest Heath	8	NA	B1, B2
Shepherds Grove	St Edmundsbury	37	NA	B1, B2, B8
Suffolk Business Park	St Edmundsbury	68	18.58 ha (Suffolk Park)	B1, B8
Haverhill Research Park	St Edmundsbury	8	4.2	B1
Haverhill Business Park	St Edmundsbury	4.597		B1, B2, B8
Norwich Aeropark	Broadland & Norwich	40.47		
Cambridge Science Park	South Cambridgeshire & Cambridge	61.5	1.12	B1
Cambridge Biomedical Campus	Cambridge	8.9	3.07	B1

Table E.2: Major housing development sites reported to CE

Site	Gross Hectares (Ha)	Number of dwellings
Bury St Edmunds	329.3	5440
Haverhill	180	3300
Mildenhall	97	1300
Littleport	85.9	1253
Soham	76.618	1437
Hethersett	70	1226
Easton	52.6	1000
Fulbourn & Ida Darwin Hospitals	50.12	200
Former CEMEX Cement Works, Haslingfield Road, Barrington *	33.5	220
Land between Huntingdon Road, Histon Road and the A14	30.96	1000
Red Lodge	27.4	1129
Burwell	27.3	350
Fordham	24.11	303
Lakenheath	45	828
Sutton	22	275
Witchford	18.97	307

Isleham	12	189
Dales Manor Business Park, Sawston	10.7	200
East of New Road, Melbourn *	10.52	119
Thetford	NA	3250
Attleborough	NA	2650