

The potential implications of Brexit for Norfolk and Suffolk

Threats and opportunities of Brexit for key economic sectors

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Contents

1. Introduction	2
2. Sectoral impacts of Brexit on Norfolk and Suffolk	4
Agriculture	4
Manufacturing	8
Construction	12
Offshore wind energy	15
Digital	19
Life sciences	23
3. Concluding remarks	26
4. Policy recommendations	28
<i>References</i>	29

Introduction

The councils of Norfolk and Suffolk, together with New Anglia LEP, have commissioned Metro Dynamics to assess the potential impact of Brexit on the region's economy, focusing on the potential challenges and opportunities across different economic sectors and identifying individual companies that might be significantly affected.

This report presents the findings of a detailed analysis of the potential impacts of Brexit on six economic sectors that are particularly exposed to Brexit in Norfolk and Suffolk, as agreed with the Steering Group. It is part of a broader research process, undertaken over several stages and in close consultation with our clients. This process is illustrated in the diagram on the next page.

Following a background analysis of the key economic and policy implications of Brexit at the national level based on recent studies and the Government's position, we produced a high-level assessment of potential impacts in Norfolk and Suffolk on 19 different sectors. These were drawn from the strategic sectors identified in the Norfolk and Suffolk Strategy and other prominent sectors in the Norfolk and Suffolk economy. Building on the findings of this work, we agreed with the Steering Group a set of six sectors for a more detailed analysis: **Agriculture, Manufacturing, Construction, Offshore wind energy, Digital and Life sciences**. The analysis was complemented by research into significant Norfolk and Suffolk companies operating in these sectors.

Naturally, the impact of Brexit is not limited to the chosen sectors. As such, the final six sectors and the extent to which they were aggregated (for instance by choosing to focus on Offshore wind rather than the wide energy sector more broadly), were selected on the basis of: (1) their particular significance to the Norfolk and Suffolk economy (both in terms of employment and value added); (2) the likelihood of their being highly impacted by Brexit; and (3) their strategic importance to Norfolk and Suffolk. This was determined in consultation with the Steering Group.

The analysis presented here focuses on these six sectors and considers potential challenges and opportunities brought about by the impact of Brexit on:

- **Workforce** – including the EU labour force and the potential impacts of Brexit on immigration patterns.

- **Trade** – including future arrangements after the expected departure of the UK from the European Single Market.
- **Regulations** – in regards to the many EU directives incorporated into UK law.
- **Funding and Investment** – including the role of European funds and subsidies and the capacity to continue to attract foreign private investment.

Our approach has been to identify local economic strengths, based on an analysis of Norfolk and Suffolk's employment patterns and companies, to sit alongside analysis of the sectoral impacts of Brexit, which are often reflective of national trends.

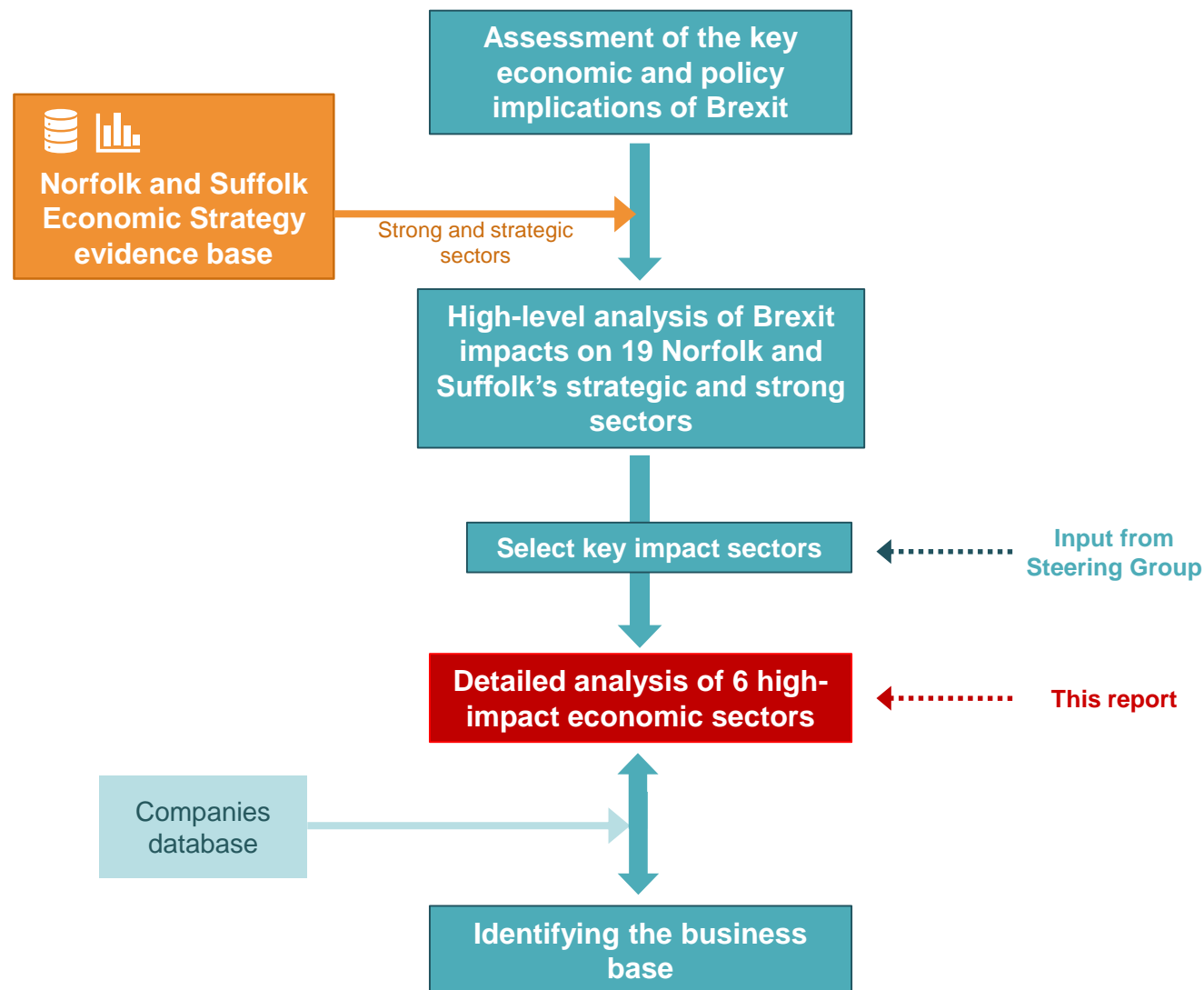
Although considerable uncertainty remains on the specific outcomes of Brexit, this report identified a set of challenges and opportunities for Norfolk and Suffolk, including:

- Retaining the current EU workforce, both low and highly skilled, who are key to the future success of some of Norfolk and Suffolk most important sectors, such as agriculture, manufacturing, construction and life sciences.
- New opportunities to uplift the economy, using innovation and technology to upskill the workforce and create better paid jobs.
- The need for companies to adjust to new trade arrangements and potential tariffs and other barriers, while using the opportunity to increase the UK share of their supply chains and open their products to new markets worldwide.
- The importance of ensuring continued funding for research and development and innovation, as well as alternative sources of funding for agriculture and farming businesses that often rely on EU subsidies.
- The need to continue to be attractive to foreign investment.

The LEP could have a key role in this process, supporting local businesses and institutions in securing the necessary skills and funding to continue to grow, internationalise and innovate, in line with the National Industrial Strategy.

The purpose of this project

Identify the impacts of Brexit on Norfolk and Suffolk's economic sectors and businesses



Agriculture

Agriculture is a crucial sector in the economy of Norfolk and Suffolk. The region is not only strong in in crop farming and animal production, but also in the strong supply chains these agricultural sectors provide to other local sectors of specialism, particularly manufacturing of food, beverages and machinery.

The last official data shows that 16,160 Norfolk and Suffolk residents work in Agriculture, forestry and fishing, which amounts to 2.2% of the region’s workforce, a much higher share than the 0.8% in England (ONS, 2011). Even when farm agriculture activities are excluded, Agriculture, forestry and fishing composes 2.8% of the GVA produced in Norfolk and Suffolk, compared to a figure of 0.7% for the whole of England excluding London (ONS, 2015). Important sub-sectors for Norfolk and Suffolk include the production of sugar, malt, poultry and pork, and potatoes.

For the broader East of England region, the Department for Environment, Food and Rural Affairs estimates a total of 40,698 jobs in agriculture, including short-term and seasonal workers. This region accounts for 13.4% of farming jobs in England, and, as Table 1 shows, sugar beet and potatoes are the of two most significant crops. In fact, the East of England grows 32.3% of England’s total potato crop and 65.6% of England’s sugar beet crop (Defra, 2017).

Sugar beet production is particularly important in Norfolk and Suffolk as the LEP area is home to three of the largest sugar manufacturing facilities in the UK: Wissington, Bury St. Edmunds and Cantley. According to British Sugar (2017), these facilities employ 335, 230 and 180 workers respectively and together make use of over 1,900 suppliers growing sugar beet across the wider region.

Growing cereals for the production of malt is also significant in Norfolk and Suffolk, due to the area’s favourable growing conditions (NFU, 2016b) and links to the regional specialisation in beverage manufacturing. Furthermore, East Anglia has the second largest number of pigs in England.

In Agriculture, forestry and fishing, 10% of workers in the UK are EU nationals (36,000) according to data from the Annual Population Survey (ONS, 2017). It is important to note that the sample used in this survey does not account for short-term or seasonal workers.

Table 1: Crop hectarage in East of England as a percentage of total hectarage in England (2016)

Crop	East of England: percentage of total national hectarage
Wheat	28.0
Barley	21.4
Oilseed rape	24.7
Sugar beet	65.6
Potatoes	32.3
Field grown vegetables	28.8

Table 2: Large Agriculture companies in Norfolk and Suffolk (examples)

Company	Location
Cofco International UK	The Havens, Ipswich
Hutchinson Group	Hunstanton
Banham Group	Attleborough
Heathpatch	Semer, Ipswich,
Traditional Norfolk Poultry	Shropham, Attleborough
Lawson Partners	Stadbroke
H.G. Gladwell & Sons	Copdock, Ipswich

Brexit impact on Agriculture



Trade

The agricultural sector is likely to be significantly impacted by Brexit, as it is highly reliant on trade with EU countries. In 2016, 73.3% of UK exports of agricultural products were to the EU (ONS, 2017). According to the CBI (2016), this is likely to continue due to the difficulty of transporting perishable goods, which would impede trade further afield.

Given this dependence, UK agricultural exports would be particularly vulnerable to the introduction of trade barriers such as tariffs. On average, tariffs are 36% on dairy products, 20% on animal products and 10% for fruit and vegetables. This would reduce competitiveness vis-a-vis EU countries. As the agricultural sector in Norfolk and Suffolk is intrinsically linked to other sectors, most notably food and drink manufacturing, trade barriers to agricultural products could have deleterious effects on interconnected sectors (CBI, 2016).

To mitigate this, Paul Kenwood (2017), the Managing Director of British Sugar, has stated that he would wish for any tariffs which act as barriers to trade with Ireland, France and Italy to be matched by reciprocal tariffs to protect the thriving British sugar beet industry.

Despite the relative dependency of the UK agricultural system on the EU, the sector could become more open looking. Brexit offers the UK the opportunity to expand its exports globally. This optimism is shared by British Sugar (2017), particularly given the removal of the quota system, as will be discussed in the following section.



Regulations

EU rules regarding marketing standards and product safety apply for products sold on the EU market, even for non-EU imports, so continued adherence to these is essential (NFU, 2016a). Regulatory stability and certainty will be necessary to ease trade in agricultural products (CBI, 2016).

However, changes to EU regulations may bring positives by allowing the UK to establish its own domestic regulatory policy (*ibid.*). For example, in an article by the Managing Director of British Sugar, Paul Kenwood (2017) writes that Brexit provides the chance to design a sugar policy which benefits the UK's domestic industry. The EU-imposed quota system has previously controlled the quantity of sugar produced in and sold by the UK (British Sugar, 2017), so that, for instance, when there was a surplus crop in 2015, it could not be sold on the UK, EU or world markets (Kenwood, 2017). In October 2017, this quota system will be revoked (British Sugar Beet Review, 2017).

In the case of regulatory changes to the wider agricultural sector, new policies will need to ensure that favourable access between the UK and EU markets is maintained.

Brexit impact on Agriculture



Workforce

A restriction on the free movement of people in the EU is highly likely to affect the agricultural sector in Norfolk and Suffolk.

Agriculture is a labour-intensive sector which is reliant upon both full-time and seasonal EU labour. Between April 2016 and March 2017, 10% of the workforce (36,000 people) were non-UK EU nationals (ONS, 2017). This figure is unlikely to account for temporary and seasonal workers, as it is from the Annual Population Survey, which uses a sample of UK residents.

UK agriculture's reliance on seasonal EU labour derives from many farms' inability to recruit sufficient domestic workers (NFU, 2016a). According to the National Farmer's Union Deputy President Minette Batters, "...80,000 seasonal workers plant, pick, grade and pack over nine million tonnes and 300 types of fruit, vegetable and flower crops in Britain every year" (NFU, 2017). This underlines the extent to which the official estimate of 36,000 EU workers diverges from the number of seasonal workers in reality.

This reliance on EU labour applies to Norfolk and Suffolk. Across the region, thousands of Eastern European workers pick fruit, vegetables and salads. A supply of both seasonal and permanent workers is similarly important to poultry and pig farming (NFU, 2017).

Without access to a ready supply of relatively cheap EU labour and absent desire among UK nationals for agricultural work, farms may find it difficult to locate sufficient work for the season. Labour shortages may reduce the production and growth of UK farms, necessitating increased imports and price rises (Smithson Hill, 2017).



Funding and investment

The main source of funding for the agricultural sector comes from the Common Agricultural Policy (CAP), which has become central to the agricultural sector in the UK. The aim of CAP is to address the failure of agricultural markets in delivering fair incomes to farmers by helping farmers deal with market volatility and to buffer them against shocks.

In 2015 alone, farmers in the UK received €3.084 billion in direct payments (NFU, 2016a). On average, these payments contribute 55% of the total income from farming (CBI, 2016). CAP payments enable farmers to meet the higher cost associated with higher welfare and environmental standards, without which many farms would be unable to survive (NFU, 2016a).

Alongside CAP subsidies, the UK was allocated €5.2 billion for rural development projects between 2014 and 2020 (NFU, 2016a). These funds are used to support increased farm productivity, micro/small enterprises and farm diversification, rural tourism, rural services, cultural and heritage activities, and forestry productivity, and will no longer be available after the current funding round ends in 2020.

Manufacturing

Norfolk and Suffolk has a wide and diverse manufacturing sector employing over 61,000 workers.

Manufacture of food products is by far the largest sub-sector, employing 13,681 people. Half of these jobs are concentrated in production and processing of poultry meat (detailed analysis on page 9), an area of high employment growth and specialization in Norfolk and Suffolk. Firms operating in the area include Bernard Matthews, Tulip and 2 Sisters Food Group. Manufacturing of beverages is also an area of high local specialisation that employs over 2,000 people in Norfolk and Suffolk. Most of these jobs are in beer manufacturing, with Adhams based in Southwold and Greene King in St Edmundsbury. In addition, Aspalls, based in Mid Suffolk, drives local strength in the production of cider, Muntons, a major malt exporter, is based in Stowmarket, and Britvic, located in Norwich, is an important soft drinks manufacturer. Other significant food products produced in the region include prepared meals, cocoa and chocolate, condiments and animal feeds. Finally, the manufacture of sugar also has a large workforce in the area through the British Sugar manufacturing facilities in Wissington, Bury St. Edmunds and Cantley.

Other important sub-sectors in terms of employment include the manufacture of fabricated metal products, machinery and equipment, and rubber and plastic products – all with more than 5,000 jobs in Norfolk and Suffolk. The manufacture of metal products primarily involves metal structures for industrial use, structures and elements for the construction industry and machining. Machinery and equipment includes non-domestic cooling and ventilation equipment and agricultural and forestry machinery. Plastic and rubber manufacture encompasses a broad range of products, including packing goods and plastic elements for construction.

Other manufacturing sub-sectors with more than 2,000 jobs in Norfolk and Suffolk include the printing and reproduction of recorded media, manufacture of motor vehicles (eg. Hethel Engineering Centre), chemicals, and furniture and wood products. Finally, the manufacture of pharmaceuticals is also an important sector for Norfolk and Suffolk. Although not amongst the top manufacturing sub-sectors in terms of employment (with just below 1,000 jobs), the concentration of pharmaceutical jobs in Norfolk and Suffolk is 17% higher than in Great Britain. This sector is key for innovation in manufacturing based on high-skilled and high-wage jobs. Pharmaceutical companies in Norfolk and Suffolk include Baxter Healthcare, in Thetford, and Genzyme, in Haverhill.

Table 3: Top Manufacturing sub-sectors in employment (Norfolk and Suffolk, 2015)

Main SIC-2 sub-sectors	Number of jobs
Food products	13,681
Fabricated metal products	6,820
Machinery and equipment	6,452
Rubber and plastic products	5,883
Printing/reproduction of recorded media	3,122
Motor vehicles	2,833
Chemicals and chemical products	2,707
Furniture	2,584
Wood products	2,456
Beverages	2,272
Total Manufacturing	61,017

Table 4: Large Manufacturing companies in Norfolk and Suffolk (examples)

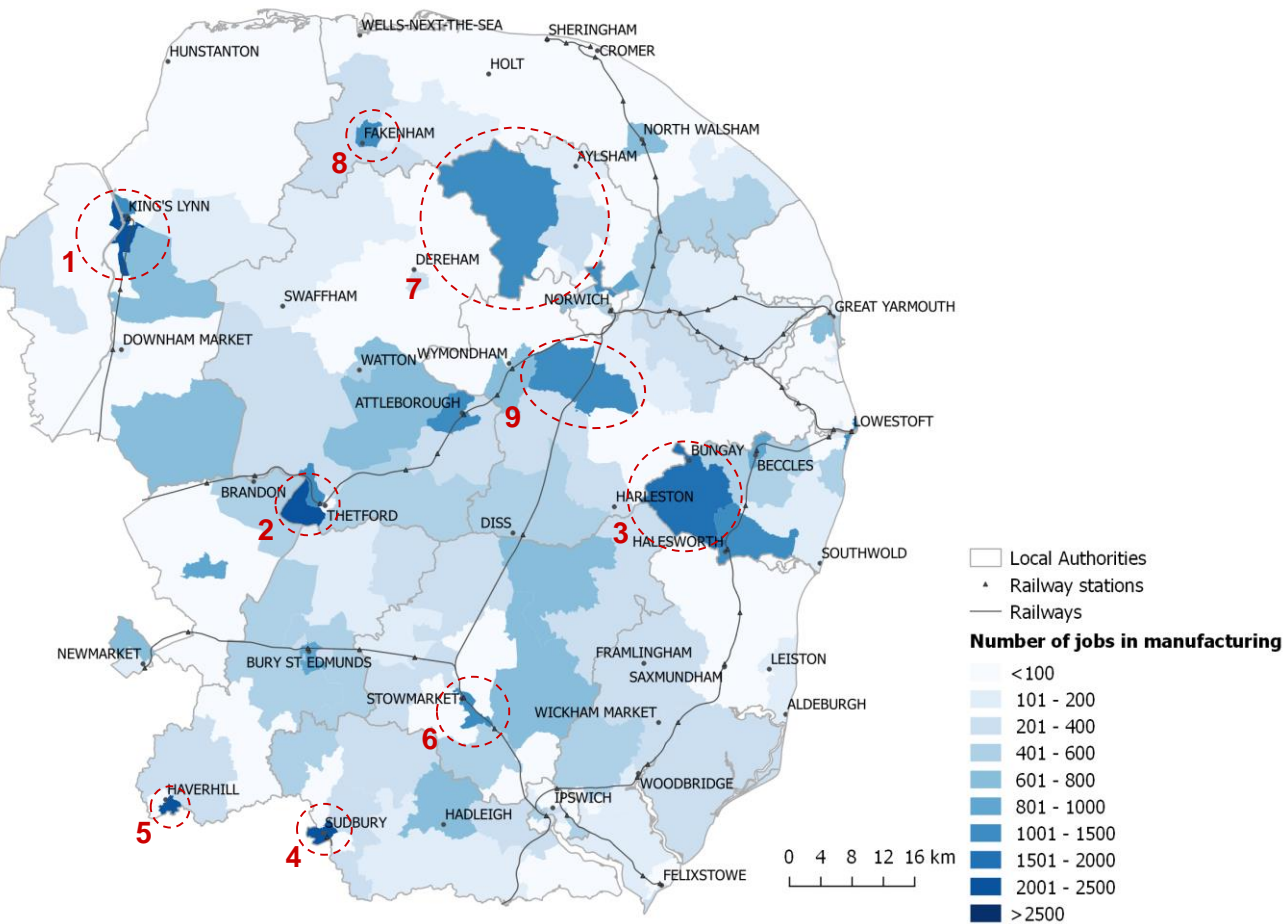
Company	Location
Greene King	Bury St Edmunds
Forfarmers UK	Bury St Edmunds
Baxter Healthcare	Thetford
Bosch Lawn And Garden	Stowmarket
Direct Table Foods	Little Saxham
British Sugar	Wissington; Bury St. Ed.; Cantley
Palm Paper	King's Lynn
Bernard Matthews	Norwich
Tulip	Stadbroke
2 Sister Group	Thetford

Manufacturing

Figure 1 maps the spatial distribution of manufacturing jobs in Norfolk and Suffolk. Overall, it shows that jobs in the manufacturing sector are fairly dispersed across the whole area of Norfolk and Suffolk. Nonetheless, the following areas have particularly high concentrations of jobs in manufacturing:

Geographic area	No. jobs	SIC-2 sub-sectors	Example companies
1 King's Lynn and surrounding area	3,752	Paper and paper products; machinery and equipment	Palm Paper, Cooper Roller Bearings Company, A T Promotions
2 Thetford	3,216	Pharmaceuticals; fabricated metal; rubber and plastic	Baxter Healthcare, Trox UK, Advanced Air (UK), Camvac
3 A144 between Bungay and Halesworth	2,816	Food products	Cleveleys Foods
4 Sudbury	2,135	Textiles	Silk Industries, 4 BG Group, Walters Holdings
5 Haverhill (East)	2,125	Pharmaceuticals; computer, electronic and optical products	Genzyme, IFF, Herbert Group
6 Stowmarket (South East,)	1,417	Chemicals and chemical products; beverages	PPG Industries (UK), Muntons
7 Between Dereham and Aylsham	1,324	Beverages	Broadland Wineries
8 Fakenham	1,256	Machinery and equipment; electrical equipment	PMC Harvesters, P4
9 Hethel Engineering Centre	1,185	Motor vehicles	Lotus, MSF Technologies, Multimac

Figure 1: Spatial distribution of manufacturing jobs in Norfolk and Suffolk (2015)



Poultry and meat processing

Within food production, Norfolk and Suffolk have particular strengths in the processing and preserving of poultry meat, and the production of meat and poultry meat products. Together, these sectors employ nearly 8,000 people in the region. These jobs are mainly located in the following areas:

	Geographic area	Number of jobs (2015)	Example companies
1	Area South East from Bungay and Halesworth	1,589	Cleveleys Foods
2	Attleborough and surrounding area	871	Banham Poultry
3	Between Dereham and Aylsham	862	Bernard Matthews
4	Lowestoft Harbour	543	Waveney Valley Smokehouse
5	Thetford	526	2 Sisters Food Group
6	Outskirts of Bury St Edmunds	502	Direct Table

Figure 2: Spatial distribution of poultry/meat manufacturing jobs in Norfolk and Suffolk (2015)

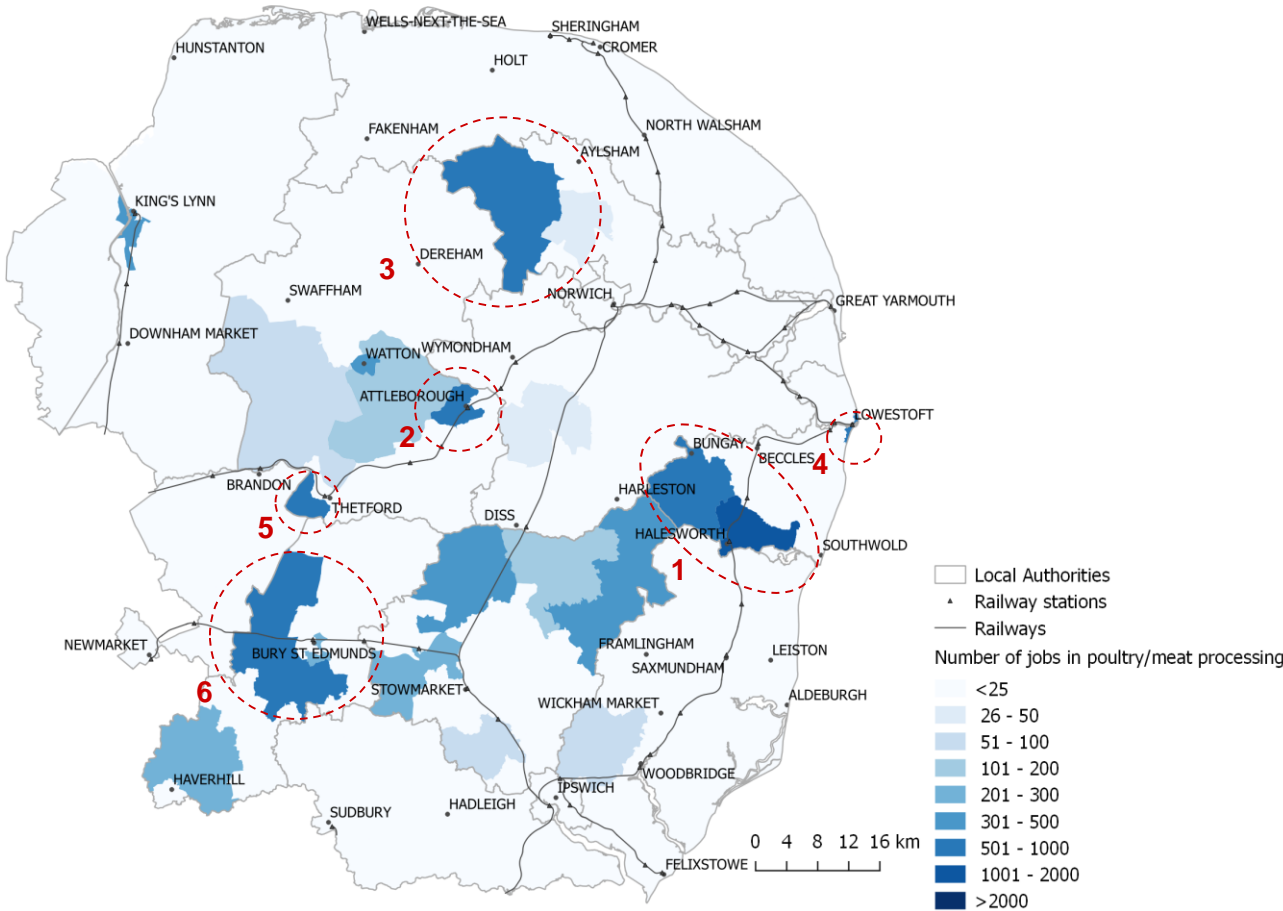


Table 5: Top poultry/meat manufacturing sub-sectors in employment (Norfolk and Suffolk, 2015)

Main SIC-5 detailed sectors	Number of jobs (2015)
Processing and preserving poultry meat	4,347
Production of meat and poultry meat products	3,041
Processing and preserving meat	471
Total Poultry And Meat Processing	7,859

Brexit impact on Manufacturing



Trade

Manufactured products account for 89.8% of total goods exports and 91.0% of total goods imports in the UK, and UK-EU trade is substantial. In 2016, the EU share of exports in manufactured products was 47.7%, whilst the EU share of imports was 57.7% (ONS, 2017). Manufactured goods move along complex supply chains which operate across the EU. The UK is reliant on exports to the EU, and the interdependency of companies along the supply chain in the single market means that the any imposition of tariffs would increase costs for manufacturers (CBI, 2016).

The fall of the value of the pound post-Brexit has impacted trade of manufactured goods in different ways, and sterling appears set to remain weak. Firstly, this has increased the cost of imported manufactured products (Tait Walker, 2016). Auditors Creaseys believe that this may boost the UK domestic market, as companies are forced to source nationally. Secondly, the weak pound cheapens exports, making UK exports more competitive.

The UK pharmaceuticals sector trades a lot with the EU. A total of 44% of UK exports are to the EU. Supply chains in pharmaceuticals operate across borders, which has raised fears of trade barriers at various stages of production. In the EU, there are no import tariffs on pharmaceuticals; however, tariffs exist on raw materials and machinery, which, if imposed, would increase production costs (CBI, 2016). It is unclear whether the UK will be able to negotiate favourable terms of trade for these items (Simmons and Simmons LLP, 2017).

Concerning poultry and meat processing, less than 25% of British meat is exported (Global Meat News, 2016); however the EU is the UK's most important export market. In 2016, exports of preserved meat and meat products to the EU comprised 78.1% of total exports (ONS, 2017). For poultry, it is primarily 'dark meat' (thighs and legs) that is exported, while 'white meat' (breast and wings) serves the domestic market (FWI, 2016). Estimates suggest that tariffs would fall between €187-1,283 per tonne of poultry meat or €1,024-2,765 per tonne of processed poultry meat. Given the disparity in domestic demand for 'dark' and 'white' meat, a fall in exports of dark meat precipitated by the imposition of tariffs would result in its overproduction, severely damaging poultry manufacturers' profitability (ADBH, 2016). A failure to impose tariffs or quotas on imports or form free trade agreements with other countries may flood the domestic market with cheaper global imports (*ibid.*), further damaging the domestic industry.



Regulations

The EU determines many manufacturing regulations and laws which are standardised across EU member states. EU laws and regulations apply to many different legislative areas, including product safety, employment, health and safety, and environmental and consumer protection (EEF, 2016b). Regulatory compliance is central to trade and investment agreements, particularly as many EU laws (for example those concerning labour markets and health and safety) have been integrated into domestic law (*ibid.*). For instance, exports of manufactured goods are subject to various regulations and standards, which facilitates their easy trade between EU countries (CBI, 2016). In order to continue trading in the EU, UK manufacturers would have to conform to EU product safety and product standards (EEF, 2016b). Therefore, it is recommended that the UK continue to comply with certain legislations, such as employment and health and safety regulations, in order to maintain stability. However, the UK may opt for a more flexible legislative and regulatory framework, which is independent of the EU (*ibid.*).

The pharmaceutical sub-sector is highly regulated by the EU, consisting of both regulations, guidelines to be followed by national governments, and directives, which are integrated into domestic law (Bird and Bird LLP, 2017). Prevalent at multiple stages of production, the EU has harmonised regulation in the following areas: clinical trials, pharmacovigilance, joint procurement, marketing authorisations, data flows and intellectual property (*ibid.*, Simmons and Simmons LLP, 2017). Continued regulatory alignment would enable UK medicines to be sold in the EU. It is particularly important that manufacturing standards and safety regulations are consistent (PwC, 2016b), as non-compliance would affect UK pharmaceutical companies' competitiveness if their products were perceived to be of lower standard than those produced in the EU (Norton Rose Fulbright, 2016a). Outside of the EU, the freedom of pharmaceutical companies to assert intellectual property rights could prevent parallel importation into the UK (Bird and Bird LLP, 2017).

Similarly, EU regulations dictate the terms of trade in poultry and meat processing. The majority of export health certificates and trade agreements have an EU dimension (Jean-Pierre Garnier, Head of Exports at AHDB Beef and Lamb, Global Meat News, 2016). The UK has health certification agreements with over 100 countries (FWI, 2016), demonstrating the importance of EU regulation for trade globally, not only with other EU member states. As with manufacturing, it is deemed preferential for regulatory compliance to be maintained in order to ease trade.

Brexit impact on Manufacturing

Workforce

As with agriculture, manufacturing is reliant on EU labour. Sector-wide in the UK, between April 2016 and March 2017, 10.9% of the workforce (318,000 people) were non-UK EU nationals (ONS, 2017). A survey conducted by CBI in 2016 found that nearly two-thirds of manufacturing companies surveyed anticipated recruitment problems in the immediate future.

Underlying the need for EU workers in manufacturing in the UK is a long-standing skills gap, rooted in disparities between the skills provided by education/training and those required by employers (EEF, 2016a). A report presented at the National Manufacturing Debate, an annual conference for the manufacturing industry, listed shortages in technical skills, such as robotics, artificial intelligence, software, data analysis, and electrical/electronic engineering (Cranfield University, 2017). Responding to these shortages is the common practice of moving highly-skilled engineers at short notice across the EU, which may be threatened by the end to freedom of movement (CBI, 2016).

Furthermore, Brexit may result in the movement of manufacturing away from the UK. The increased reliance upon UK workers could lead to higher wages, however as UK workers generally expect to be paid more than their EU counterparts, companies may choose to move their operations abroad where labour costs are lower.

The EU workforce is also important in pharmaceuticals. Multinational pharmaceutical companies in the UK often draw on an international talent base (PwC, 2016b). Skilled workers, mainly from the EU, are seen to have been key to the strength of UK pharmaceutical research and development (Bruegel, 2017b). Restricted freedom of movement may encourage companies to relocate to an alternative EU country with easier access to EU labour, and the UK may become a less attractive destination for highly-educated EU workers (ibid.).

Typically referring to a lower skills set, industries relating to the manufacturing of food products rely heavily on EU migrant labour. EU workers represent 30% of the labour force in the food production sector and 60% in the poultry meat industry, according to the British Poultry Council Chief Executive, Richard Griffiths (Open Britain, 2017). Sourcing these jobs domestically is considered problematic due to their perceived undesirability (AHDB Pork, 2016).

Funding and Investment

EU funding is integral to maintaining a dynamic and innovative manufacturing sector in the UK. In 2015, the majority (68%) of Research and Development expenditure in the UK was channelled to manufacturing (CBI, 2016). A number of specific schemes have benefitted the sector and driven innovation. Between 2007 and 2013, €7 billion was granted to the UK as part of the EU Framework Programme 7 (FP7), €1.2 billion of which was used to support around 10,000 companies (with the majority used for education/training) (EEF, 2016b). Under Horizon 2020, the UK was the second largest recipient of funding of all EU countries, totalling €1.8 billion, with 22% directed to businesses (ibid.). Locally, EU funding has been important, as the Hethel Engineering Centre is funded by the EU Regional Development Fund. Losing eligibility for these funds may damage UK manufacturing's long-term vibrancy and competitiveness.

Foreign investment also maintains the health of the sector. Manufacturing receives a relatively low share of foreign direct investment (FDI); however, it is vital to boosting productivity through efficiency improvements and the development of new products. Therefore, lower levels of investment would diminish potential future productivity gains (Beck, 2016). In a letter from the Japanese government to the UK and EU, the sustainability of inward investment and continued presence of European headquarters of Japanese companies was called into question (Andy Neely, Head of the Institute for Manufacturing at Cambridge University, 2016). The impacts of this have already been felt in the auto industry, which experienced a 30% decrease in investment in 2016 compared to the previous year (Campbell, 2017).

EU funding has been central to the development of the UK as a centre of pharmaceutical research and development, particularly given as the UK is the largest beneficiary of EU funding (Bruegel, 2017b). Key funds for this sector include the Innovative Medicines Initiative and Horizon 2020 (Bird and Bird LLP, 2017). In the face of funding uncertainty, UK multinationals may move their research projects outside the UK to ensure continued access to funding streams or change their lead team (PwC, 2016b). Furthermore, international firms may be reluctant to invest in research and development projects in the UK (UNESCO, 2016).

The impact of EU funding post-Brexit in poultry and meat processing are likely derive from the agricultural sector. If CAP payments were removed from farms without a replacement scheme designed and implemented by the UK government, this could result in farm closures or lower levels of output, impacting the supply of meat to process.

Construction

The construction sector is strong and diverse in Norfolk and Suffolk, employing just under 50,000 people across a wide set of specialisms. Construction activities in Norfolk and Suffolk are mainly related to the general construction of buildings and infrastructure and to the more specialized construction and engineering activities of the energy sector, comprising offshore wind, oil and gas.

As shown in Table 6, there are 22,183 jobs in specialized construction activities in Norfolk and Suffolk. Most of these jobs are related to building construction, including electrical installation (4,800 jobs), plumbing, heating and AC (3,800 jobs), and joinery and building finishing (both with roughly 2,600 jobs). Together with construction of buildings (12,629 jobs), these activities form the core of the construction industry related to building construction. However, there are 2,300 more specialized construction activities based in the area, focusing on different types of structures and requiring specialized skills or equipment. These include activities related to the offshore wind, oil and gas energy sector. Derrick Services (specialized in drilling), East Coast Pipe and Fittings (piping services and equipment), and CLS Global Solutions (engineering, project management, fabrication and personnel services), all based in Great Yarmouth, are examples of companies working in this sector.

Architectural and engineering activities, technical testing and analysis employs 8,781 people in Norfolk and Suffolk and also includes activities related both to building construction (e.g. architectural and engineering design and consulting activities) and to the offshore energy sectors (e.g. technical testing and specialised engineering design and consulting). Gardline, a marine surveying business providing geotechnical services to the offshore wind, oil and gas sectors, and 3Sun Group, which provides skilled technicians for installation, inspections, operation and maintenance of wind turbines, and other services to the oil and gas industry, are examples of companies in this sector, both based in Great Yarmouth.

Finally, civil engineering activities employ 6,176 people in Norfolk and Suffolk. The principal activities are construction of roads and motorways and other civil engineering projects such as industrial facilities (except buildings) and outdoor sports and leisure facilities.

Table 6: Top construction sub-sectors in employment (Norfolk and Suffolk, 2015)

Main SIC-2 sub-sectors	Number of jobs
Specialised construction activities	22,183
Construction of buildings	12,629
Architectural and engineering activities; technical testing and analysis	8,781
Civil engineering	6,176
Total Construction	49,769

Table 7: Large construction companies in Norfolk and Suffolk (examples)

Company	Location
R.G. Carter Construction	Drayton, Norwich
Anglian Windows	Norwich
One Group Construction	Ipswich
Hopkins and Moore (Developments)	Melton, Woodbridge
Derrick Services (UK)	Great Yarmouth
East Coast Pipe and Fittings	Great Yarmouth
CLS Global Solutions	Great Yarmouth
Gardline Shipping	Great Yarmouth
3Sun Group	Great Yarmouth

Brexit impact on Construction



Trade

Trade is not the most significant aspect of Brexit impact in the construction sector. According to Sarah McMonagle, director of external affairs at the Federation of Master Builders, only 25% of construction materials are imported (Allen, 2017). Nevertheless, the EU is an important trading partner. According to a 2010 study conducted by the Department of Business Skills and Innovation (Designing Buildings, 2017), the EU is the origin of 64% of imports and destination for 63% of exports in building materials. Furthermore, of the top four countries from which the UK imports (Germany, China, Italy and Sweden), three are in the EU (Shepherd and Wedderburn, 2016).

Loss of access to the single market will have a significant impact on the industry. If duties or complex restrictions were placed on materials, this may cause shortages (Designing Buildings, 2017) or delays in importing and exporting essential resources (Gateley PLC, 2016). Consequently, materials will become more expensive, increasing the cost of construction, affecting both construction companies and those who use their services (Paul Manchester, Manchester Safety Services, Builder and Engineer, year unknown). The weakness of the pound has already contributed to increased material costs (Scape Group, 2017).



Regulations

Regulatory change following Brexit may be of less concern. According to Burges Salmon (2016), EU law has minimal presence in the construction sector. Instead, its regulatory framework is a combination of UK and EU-directed legislation.

Areas of regulation where the EU is influential include working conditions, climate and the environment, health and safety, and import standards (CBI, 2016). In many cases, the UK chooses to conform to EU standards. For legislation relating to construction materials, continued compliance will be necessary to maintain ease of trade (CBI, 2016; Designing Buildings, 2017). It is unlikely that altering construction legislation and standards will be a priority (Burges Salmon, 2016).

In some instances, EU directives have been fully integrated into UK law. The most significant of which, according to Burges Salmon (2016), are Construction Design and Management (CDM) Regulations (CMS, 2016) and Energy Performance of Buildings (Eversheds-Sutherland, 2016). The repeal or dilution of EU directives is possible in the long term (*ibid.*). Fisher Scoggins Waters (2016) state that if the UK were to establish its own domestic policy, this could reduce the costs associated with complying with EU directives. Deregulation of this type could make the UK seem more attractive to investors (Ashfords, 2016).

Brexit impact on Construction

Workforce

The construction sector is highly dependent upon the free movement of workers from the EU. Both unskilled and skilled positions are filled by EU migrants (Builder and Engineer, year unknown). There are high numbers of non-UK EU nationals working in the sector, accounting for 8.8% of the workforce between April 2016 and March 2017 (ONS, 2017). RICS (2017) have shown that the sector could lose 176,500 workers should restrictions be placed on freedom of movement.

The main reason for the reliance on skilled EU workers, who are typically from Eastern European countries (Fisher Coggins Waters, 2016), is the failure to recruit from the domestic market due to a skills shortage within the sector (Eversheds Sutherland, 2016).

Restrictions on migration are likely to have broad implications for the construction sector. Firstly, it may impact wages and costs. The increased demand for skilled workers may drive up wages, resulting in higher project costs (Eversheds Sutherland, 2016). Monika Slowikowska, Founder of Golden House Developments, predicts that labour costs may rise by 15-20. If labour demand supersedes supply, project costs may increase, eventually impacting the fulfilment of housing targets (Designing Buildings, 2017). Higher material import costs and labour costs are forecast to cost the sector £570 million (Scape Group, 2017).

Secondly, it may have implications for the productivity and dynamism of the sector. A weaker workforce may reduce the capacity of house builders, further contributing to an increase in costs (Gateley PLC, 2016). Another impact may be that a lack of skilled labour results in project delays (Eversheds Sutherland, 2016). Uncertainties over workforce numbers have already begun to impact companies' willingness to bid for future projects (CBI, 2016).

More optimistically, UK workers may benefit from reduced competition for jobs and access to larger selection of roles within the industry (Builder and Engineer, year unknown). Without migrant workers to fill vacancies, a skills shortage may fuel investment in training and upskilling (Ashfords, 2016).

Funding and Investment

Construction is considered to be one of the largest beneficiaries of EU funding (Fisher Scoggins Waters, 2016). It is funded both by the European Investment Bank (EIB) and European Investment Fund (EIF) and has access to the European Structural Investment Fund (ESIF), European Regional Development Fund (ERDF) and Joint European Support for Sustainable Investment in City Areas (Jessica). In 2015, the EIB and EIF together invested €7.8 billion in UK infrastructure projects (CBI, 2016). This is important for construction, as much of the sector is involved in the engineering, construction and design of infrastructure projects. These institutions also lent €665.8 to SMEs in 2015 (Designing Buildings, 2017).

The future sustainability of funding is of vital importance to the sector's continued success, particularly for infrastructure projects (CBI, 2016) and regeneration projects (Ashfords, 2016), and may also impinge on the ability of start-ups to emerge and thrive in the market (Designing Buildings, 2017). Existing UK contributions to these funds could be directed to infrastructure projects (Ashfords, 2016), however, Fisher Scoggins Waters (2016) suggest that projects may consequently receive funding for political reasons rather than based on merit.

In the short-term, the weak pound has attracted international investment (Savills, 2016a), but in the long term, the construction sector will likely suffer from the subdued private investment climate post-Brexit. Of particular concern is a reduction in foreign investment in commercial and residential development (Norton Rose Fulbright, 2017a). There is predicted to be a 30-40% decline across the country in commercial developments over the next five years (Savills, 2016b). Infrastructure projects will also be impacted. A study conducted by EY showed that Brexit has reduced the UK's long-term attractiveness to foreign investors (Construction News, 2017). Overall, this will likely cause an economic slump in the industry.

Offshore wind energy

Norfolk and Suffolk have a strong and diverse offshore wind sector, and the region is key to upholding the UK’s status as the world leader in offshore wind in hosting almost 70% of the UK’s offshore wind capacity.

There are several offshore wind farms located off the coast of the two counties, including Sheringham Shoal (17-23 km north of Sheringham), Scroby Sands (2.5km off coast of Great Yarmouth) and Greater Gabbard (23km off the coast of Suffolk). The farms create jobs while under construction and also thereafter in their long-term operation and maintenance. Sheringham Shoal created 50 permanent jobs, whilst Greater Gabbard created 100 permanent jobs with 95% employed from the local area.

Other projects are currently in the planning and construction phase. Vattenfall are planning to develop Norfolk Vanguard, which will be one of the largest offshore wind farms in the UK. Its sister project, Norfolk Boreas, will be of a similar size. It is likely that the two projects combined will require 160 technicians and managers by the mid-2020s. The Galloper wind farm is currently under construction, creating up to 700 jobs in the process and leaving 90 permanent jobs in operations thereafter. Furthermore, Dudgeon wind farm is also currently under construction and will be fully operational at the end of 2017, employing a further 70 people.

A wider economy surrounds the windfarms. Local companies are present at all stages of the supply chain, offering a range of support services integral to the functioning of the farms. They focus mainly on supply, installation, commissioning, operations and maintenance. Typically, these companies are located in coastal areas so as to be in close proximity to other marine services, ports and the wind farms themselves. Particular clusters exist in Great Yarmouth and Lowestoft.

Figure 3 on the following page illustrates the presence of companies across the supply chain.

Table 8: Large offshore wind energy companies in Norfolk and Suffolk (examples)

Company	Location
Scira Offshore Energy	Walshingham
Scroby Sands Operations and Maintenance Facility	Great Yarmouth
Greater Gabbard Operations Base	Lowestoft
Gardline Shipping	Great Yarmouth

(more examples on next page)

Figure 3: Location of significant wind energy companies and supply chains in Norfolk and Suffolk



Brexit impact on Offshore wind energy



Trade

The UK is a net importer of energy (CBI, 2016) but leads the world in offshore wind, therefore the country exports related services. These include cable installation, equipment repair and construction (Renewable UK, 2016). These services are exported worldwide to Europe, the USA and Asia – in recent years, UK offshore wind sector companies have won 115 contracts to build and service 50 offshore wind projects abroad (*ibid.*). In a report by Renewable UK surveying 36 companies (2017), the UK offshore wind sector had won contracts in 18 countries in 2016.

This sector is considered to have great potential for growth in exports. It presents an opportunity to form new markets abroad, which will be crucial after Brexit (Renewable UK, 2017). The Government has recognised the sector's promise and even invited a delegation of senior Chinese figures to the UK to learn about offshore wind (Renewable UK, 2016). Post-Brexit, it is anticipated that exports will become more competitive due to the weak pound and the falling cost of offshore wind technology (Ambrose, 2017).

However, the UK's status as an ideal location to access the European offshore market, as claimed in a UK Trade and Investment (2015) publication, may be called into question by the removal of the UK from the single market. As with manufacturing and construction, the increased cost of importing materials and parts could impact domestic capacity.



Regulations

Much energy policy has been shaped by the EU, encompassing member states' competitiveness, and security and environment policies (Chatham House, 2016). Post-Brexit, the UK will no longer be represented by EU energy bodies (Allen and Overy LLP, 2016). The most likely outcome of this for the UK offshore wind sector will be the necessity for continued adherence to EU regulations absent UK influence over their formation (RCG, 2016). In the long-term, the UK may choose to determine its own regulations, but this may make the UK less competitive than other EU countries (*ibid.*). Regulatory changes are likely to impact business, funding and investment.

For instance, some contracts may have particular clauses which necessitate continued compliance with EU law. For projects which have secured EU funding, it may be necessary to align regulations, whilst future projects may have problems acquiring funding due to regulatory mismatches. Changes to rules surrounding mergers, acquisitions and joint ventures, which are important given overseas investors' interest in the UK offshore wind sector, would also be significant. It is possible that the UK will need to adopt rules corresponding to the EU Merger Regulation, otherwise EU-based investors would need to consider the application of UK merger control rules as well as those of the EU (Norton Rose Fulbright, 2016b).

Brexit impact on Offshore wind energy

Workforce

One of the major existing challenges for the offshore wind sector relates to its workforce, as there is a shortage of offshore wind farm engineers in the UK (CBI, 2016). The Government's Offshore Wind Industrial Strategy, published in 2013, identified a lack of skills as a major issue, particularly in engineering, offshore skills, technician roles and roles specific to the sector, such as environmental analysis, lifting and helicopter/boat pilots. The general shortage of skilled engineers was identified as the driving factor. Other factors include competition from other sectors and the low profile of the industry; however, this is likely to change as the sector grows.

The offshore wind sector encompasses particular sub-sectors of construction and manufacturing, particularly given the importance of engineers, and is therefore likely to face similar problems post-Brexit. Furthermore, it is reasonable to assume that the skills shortage is likely to persist after the UK leaves Europe and may be worsened by companies finding it more difficult to access EU labour.

Funding and Investment

The development of the offshore wind sector in the UK has greatly benefitted from EU funding. EU funding and European Investment Bank (EIB) loans contribute approximately £2.5 billion per year to energy-related infrastructure, climate change mitigation, and research and development (Chatham House, 2017). Specifically, EIB funding has made up a significant portion of wind farm construction costs, including the Galloper, Sheringham Shoal and Greater Gabbard farms off the coast of Norfolk and Suffolk (Norton Rose Fulbright, 2016b).

Another important source of funding is the European Fund for Strategic Investment (EFSI), which invests in energy infrastructure (Watson Farley and Williams, 2016). The UK has received over €8 billion of EFSI funding, of which around a quarter has been used to fund energy projects, including offshore wind projects (Chatham House, 2016). Furthermore, the European Research Council and Horizon 2020 has funded innovation and research and development in the energy sector (Watson Farley and Williams, 2016).

The UK is likely to lose eligibility for these funding streams upon leaving the EU, which may hold up the expansion of the sector. Watson Farley and Williams (2016) note that the UK may be able to access the 12% of EIB funds for renewable energy projects allocated to non-EU countries, however this does not compensate for lost access to larger funds.

The impact of Brexit on private investment in the sector is uncertain. The investment climate has remained strong with a number of new developments (Maritime Journal, 2017), such as the £300 million invested by Swedish company Vattenfall in Aberdeen Bay (Vaughan, 2016). However, Siemens, a major investor in and manufacturer of components for UK wind farms, has put investment plans on hold (Neslen, 2016), indicating a loss of confidence in the face of uncertainty. Deterred investment is likely to be short-term, which can be managed if the government provides the right incentives (Utilitywise, 2016). In the long-term, issues surrounding policy clarity may impede investment (Durham Energy Institute, year unknown), indeed Jennifer Webber, Director of External Affairs at RenewablesUK, considers this the most important factor in guaranteeing long-term foreign investment (Maritime Journal, 2017).

Digital

The digital sector employs 18,695 people in Norfolk and Suffolk in a wide set of activities ranging from electronics manufacturing to publishing and media production. Two sub-sectors clearly dominate the digital economy in Norfolk and Suffolk in terms of employment: computer programming and consulting (6,891 jobs), and telecommunications (4,324 jobs).

Computer programming, consultancy and related activities cover mostly business services activities, such as software development, data storage and management, computer system design, and other IT support services. Jobs in these activities can be found all across Norfolk and Suffolk, but there are particular concentrations in Norwich, Ipswich, and the areas surrounding the two cities, as well as around Bury St. Edmunds.

Telecommunications, the second largest digital sub-sector, is clearly concentrated around Adastral Park, 7 miles east of Ipswich, where the main BT research facilities are based. This cluster houses roughly 70% of jobs in the telecommunications sector in Norfolk and Suffolk and, besides BT, is home to major companies such as Cisco, Fujitsu, O2, Huawei and a cluster of small, high-tech ICT companies. Besides Adastral Park, there are significant concentrations of telecommunication jobs in Norwich city centre, including Comm-Tech Voice and Data and Matrix Telecoms, and along the Brundall Gardens-Cantley Corridor, where companies such as Aspect International Telecoms are located.

Other high employment digital sectors include publishing, the manufacture of electronic products, computer repair and media production. Most publishing activities relate to the publishing of business and professional journals, a fast growing sub-sector in Norfolk and Suffolk employing roughly 1,000 people. Other activities include the publishing of newspapers, books and software. Publishing activities are mainly concentrated in and around Norwich, where companies such as Archant are based. The manufacture of computer and electronic products and computer repair each employ roughly 2,000 people. Although most of these jobs are relatively evenly distributed across Norfolk and Suffolk, there is a significant concentration in Norwich, where companies like Anovo, a French-owned large computer repair business, is located. Norfolk and Suffolk also have roughly 2,000 jobs in cinemas, film and TV production, and music recording and publishing.

Table 9: Top digital sub-sectors in employment (Norfolk and Suffolk, 2015)

Main SIC-2 sub-sectors	Number of jobs
Computer programming and consultancy	6,891
Telecommunications	4,324
Publishing	2,935
Manufacture of computer and electronic products	2,140
Computer repair	1,953
Film, television and music production	1,905
Total Digital	18,695

Table 10: Large digital companies in Norfolk and Suffolk (examples)

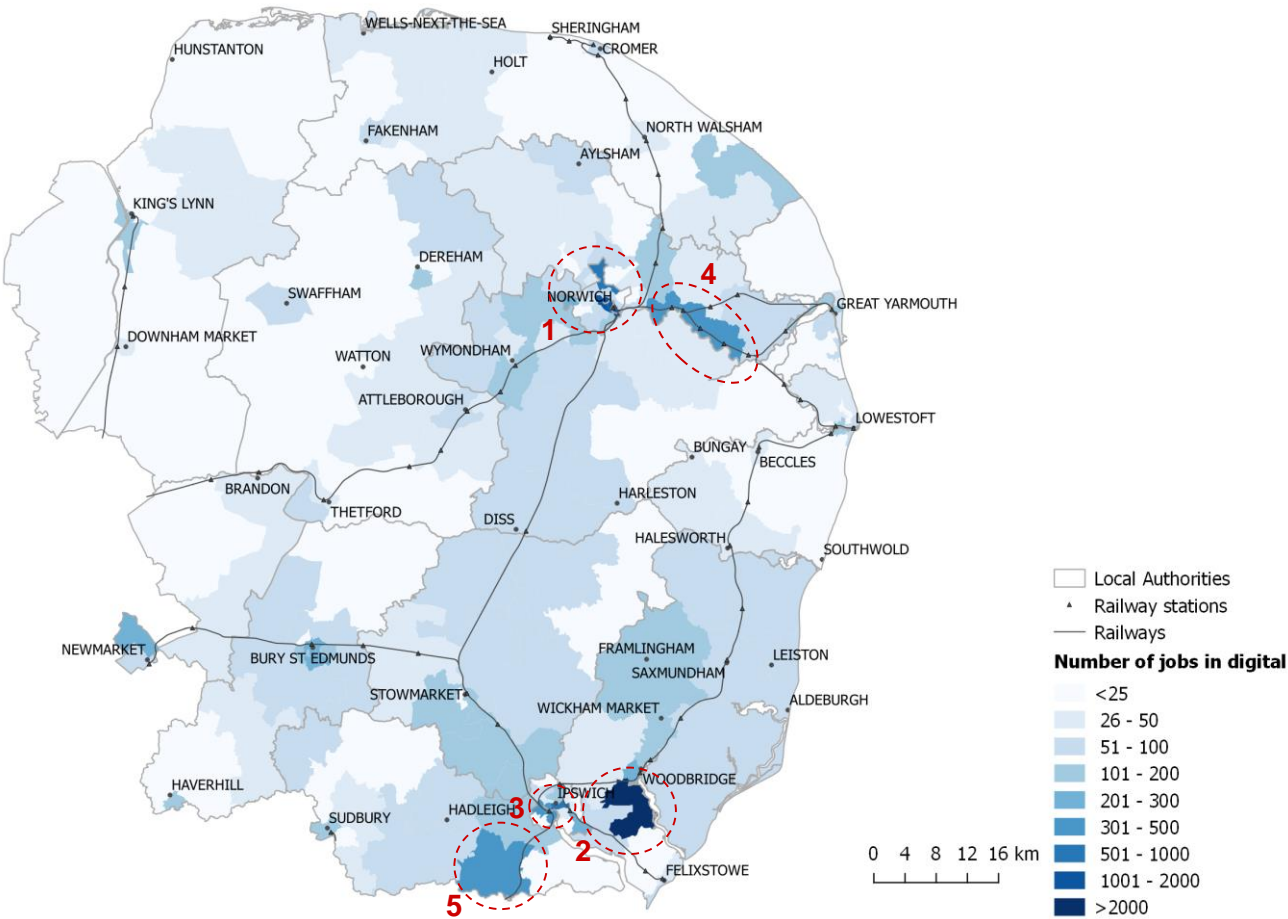
Company	Location
Arrow ECS	Newmarket
Archant Ltd	Norwich
Anovo	Norwich
Access UK Ltd	Holton St Mary
Getech Ltd	Ipswich
Optimise Media Group	Norwich
AST Connections Ltd	Great Yarmouth
BT	Ipswich
Trimble UK Ltd	Ipswich

Digital

Figure 5 maps the spatial distribution of digital jobs in Norfolk and Suffolk, with an emphasis on computer programming, consulting and related activities, and telecommunications. There are digital jobs across the region, but there are clear concentrations in the following locations:

Geographic area		Sub-sector	No. jobs	Example companies
1	Central and outer North East Norwich	Computer programming	609	Optimise Media, Systems Powering Healthcare Ltd
		Telecommunications	388	Comm-Tech Voice and Data, Matrix Telecoms
		Other digital	2321	Archant Ltd, Anovo
2	Adastral Park	Computer programming	143	Blue Novation Ltd, Coderus,
		Telecommunications	2741	BT Research & Development HQ, Huawei
		Other digital	188	Arqiva Ltd
3	Central Ipswich	Computer programming	810	Trimble UK Ltd, Manhattan Software Group Ltd
		Telecommunications	264	Citytalk Comms Ltd, Zen Systems Ltd
		Other digital	396	Double S Design
4	Hoveton & Wroxham – Cantley Corridor	Computer programming	234	Breakwater IT, Geologix
		Telecommunications	269	Aspect International Telecoms
5	SW Ipswich	Computer programming	299	Access UK Ltd, Safe Computing Ltd, Sch 2014 Ltd

Figure 4: Spatial distribution of digital jobs in Norfolk and Suffolk (2015)



Brexit impact on Digital sectors



Trade

The digital sector is by nature borderless (CBI, 2016). However, according to Julian David, CEO of TechUK, tech businesses are still highly reliant upon the single market (2017). There are few concerns over potential barriers to trading digital goods. More pertinent is the trade in services, which makes up 81% of digital sector exports, of which over one third are exported to EU partners (Frontier Economics, 2017). However, WTO tariffs on digital services (and goods) are relatively low (Diginomica, 2017).

Arguably more concerning is the sector's ability to capitalise on the potential of the Digital Single Market (DSM). This aims to ensure the free movement of people, services and capital, enable access to online activities under fair competition, and maintain data protection (European Commission, 2017). Industry professionals hope to maintain access to the Digital Single Market following Brexit (CBI, 2016), and Brent Hoberman, Co-founder of Lastminute.com, sees it as fundamental to the success of the sector (McGoogan, 2016).

The impact of trade on telecommunications is likely to be relatively low, as telecoms services are rarely traded (Clifford Chance, 2017) and most providers serve a domestic customer base (Taylor Wessing, 2016).



Regulations

Regulatory change is a major concern for the digital sector, as it is primarily services-based (Diginomica, 2017). Some areas of EU regulations and law will remain important, for instance data protection. It is essential that UK data protection laws align with EU and international laws so that UK companies can continue trading and processing EU data and transfer data globally (CBI, 2016). Despite Brexit, it has been confirmed that, as of early 2018, UK companies will have to abide by the new General Data Protection Regulation, which aims to unify data protection regulation EU-wide (Pinson-Roxburgh, 2017). Failure to comply with data protection laws can result in compliance costs (Diginomica, 2017).

As a distinct sub-sector, the regulatory challenges faced by the telecommunications industry are quite different to those of the digital sector as a whole. The majority of telecoms regulations are based on EU law (DXP, 2016). The framework is comprised of directives (which have already been incorporated into UK law), regulations and recommendations set by the European Commission (EC) (Clifford Chance, 2017).

Brexit will have divergent implications for different areas of telecommunications regulation and legislation. For instance, Ofcom may choose to deregulate net neutrality, boosting competition and investment (Taylor Wessing, 2016). Alternatively, some regulations may be incorporated into UK law. If the UK were to pursue its own data protection legislation, companies with data in the UK and EU will need to comply with both sets of regulations (DXP, 2017).

Brexit impact on Digital sectors

Workforce

According to Frontier Economics (2017), 18% of the workforce are from outside the UK, a third of which (6% of the total) are non-UK EU nationals. However, the proportion of foreign workers in digital companies can be high, indeed, up to 70% of the workforce of some digital businesses are non-UK nationals (CBI, 2016). As with other sectors, the UK digital sector has a shortage of technical skills, resulting in the need to seek talent from abroad (*ibid.*). Julian David, CEO of TechUK, concludes that access to a global workforce is vital to the sector (TechUK, 2017).

A relatively low number (4.5% in 2015) of telecommunications workers are non-UK EU nationals (ONS, Frontier Economics, 2017). Although small in number, they are often a valuable group of highly skilled workers, as demonstrated by BT Chief Executive Gavin Patterson's concerns about attracting talent (The Register, 2017), which is a particular challenge for senior executive positions (TechUK, 2017).

In a list of the ten best countries for computer programming, compiled by UK Business Insider UK (2016), half of the countries were in the EU, not including the UK. This illustrates the shortage of these skills in the UK. Programmers are particularly mobile within the digital sector, as computer languages are international (Barslund and Busse, 2017), and may choose not to move to the UK if it became difficult to get a visa.

Funding and Investment

Investment is integral to the growth of the digital sector. A major challenge for new digital start-ups is their ability to access capital (Patel, 2016). The European Investment Fund (EIF) provides capital for start-ups (Clarks Legal, 2017) by funding venture capital firms and private equity funds. Between 2011 and 2015, the EIF gave €2.3 billion to UK based funds, which have supported over 27,000 UK companies (Patel, 2016). If the EIF ceased investment in the UK, the sector's dynamism would suffer.

However, private sector investment may remain buoyant. In 2016, UK tech companies raised more capital than any other European country (Turner, 2017). Investors are positive that there remains significant venture capital in the UK (McGoogan, 2016). For instance, Index Ventures, Octopus Ventures, Balderton Capital and Hoxton Ventures have expressed their continued support for the sector despite Brexit (Information Age, 2016).

Ceasing to be a member of the DSM could impact funding and investment. The European Commission website states that funding will be made available for projects relating to the DSM, however companies in the digital sector may lose their eligibility for these funds (Clifford Chance, 2017). Moreover, remaining outside of the DSM and deregulating the sector could affect the investment decisions of mobile and broadband operators (Norton Rose Fulbright, 2017b).

The telecommunications sector is reliant on EU funding streams. Examples include EU Research and Innovation funding through Horizon 2020, which supports emerging technologies such as 5G and the 'Internet of Things', the Investment Plan for Europe, which boosts investment in digital infrastructure, and the European Regional Development Fund, which facilitates broadband roll-out schemes (Broadband UK, 2017). Absent these funding streams, it is unclear how telecommunications companies will finance their investments, as higher costs would hinder research and development (TechUK, 2016). BT Executive Gavin Patterson has voiced his fears about the threat of reduced funding to research and development (The Register, 2017).

Life Sciences

Life Sciences is a strategic sector for Norfolk and Suffolk. Its main local strengths are in the fields of food and health research, plant science, microbiology, animal health, ornithology and pharmaceutical research. According to the ONS Business Register and Employment Survey (2015), Norfolk and Suffolk have 2,128 jobs in natural sciences and engineering (most related to natural sciences), as well as 143 jobs in biotechnology (Table 9). These numbers do not include all of Norfolk and Suffolk’s manufacturing companies’ scientific and R&D activities, for instance the life sciences research carried out by pharmaceutical companies.

The highest concentration of natural sciences and engineering jobs (604) in Norfolk and Suffolk is in West Norwich, where the University of East Anglia and the Norwich Research Park (NRP) are located. The NRP is a campus for world-leading research in food and health, plant science and microbiology. It is home to research groups such as Earth and Life Systems Alliance, Food and Health Alliance and Industrial Biotechnology Alliance, and to institutes such as the Earlham Institute and the John Innes Centre (plant science, microbiology, and biotechnology applied to agriculture and nutrition), the Sainsbury Laboratory (plant diseases), and the recently formed Quadram Institute (food and health research and endoscopy), due to open fully in 2018.

There are 410 life sciences jobs located just south of Lowestoft, as the Centre for Environment, Fisheries and Aquaculture (Cefas) is located there. This is the UK’s most diverse centre for applied marine and freshwater science and research, providing innovative solutions for the aquatic environment, biodiversity and food security.

Lower numbers of life science jobs are found in West Thetford (107 jobs) where The British Trust for Ornithology is located. There is also a cluster of animal health firms at Newmarket, and large pharmaceutical companies at Haverhill and Thetford, which benefit from links to the Cambridge life sciences cluster.

Table 11: Top life science sub-sectors in employment (Norfolk and Suffolk, 2015)

Main SIC-5 detailed sectors	Number of jobs
Natural sciences and engineering	2,128
Biotechnology	143
Total Life sciences	2,271

Table 12: Large life sciences companies and institutes in Norfolk and Suffolk (examples)

Company	Location
John Innes Centre	Norwich Research Park
Quadram Institute	Norwich Research Park
Earlham Institute	Norwich Research Park
The Sainsbury Laboratory	Norwich Research Park
Cefas	Lowestoft
The British Trust for Ornithology	Thetford

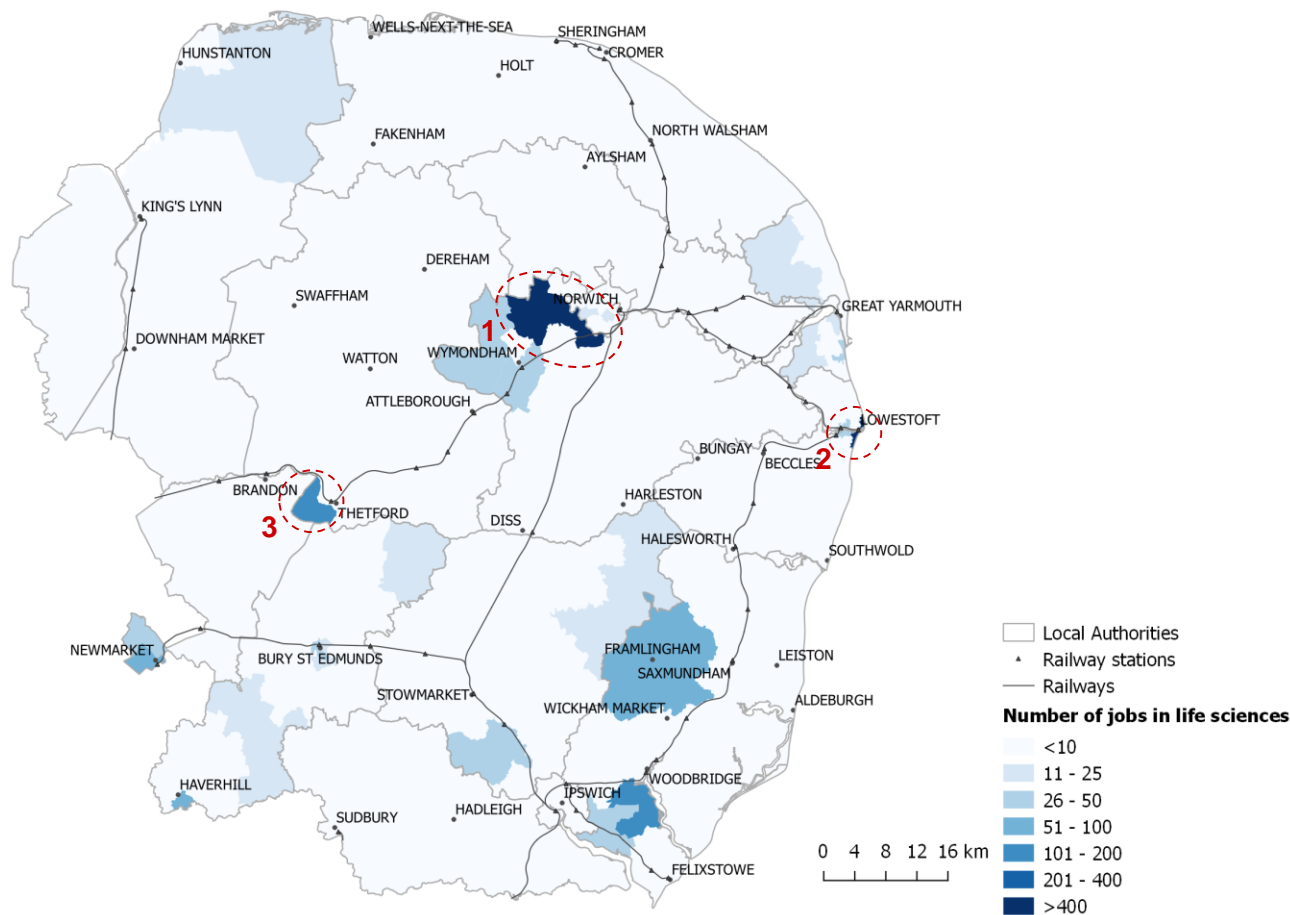
Life Sciences

Figure 6 maps the spatial distribution of natural sciences and engineering jobs in Norfolk and Suffolk. Although this sub-sector includes activities related to physical sciences and engineering too, these represent a minority of scientific jobs in the region, and are mostly concentrated in Adastral Park.

Life sciences jobs are concentrated in the following locations:

Geographic area	No. jobs	Example companies
1 Norwich Research Park	604	John Innes Centre, Quadram Institute, Earlham Institute, The Sainsbury Laboratory
2 Lowestoft Harbour	410	The Centre for Environment, Fisheries and Aquaculture
3 Thetford	107	The British Trust for Ornithology

Figure 5: Spatial distribution of life science jobs in Norfolk and Suffolk (2015)



Brexit impact on Life sciences

Workforce

Global expertise is essential to the vibrancy of the life sciences sector. Scientific research and development is intrinsically international in scope and researcher mobility is seen as critical to the global success of UK science (House of Lords, 2016).

Within UK research institutions, 17% of STEM academics are non-UK EU nationals (CBI, 2016). As discussed in previous sections, the UK has a shortage of STEM skills, therefore, EU migration enables the sector to access the skills it requires from a wider pool of talent (CBI, 2016). Brexit may result in life science academics moving away from the UK (Simmons and Simmons LLP, 2017), as it becomes a less attractive destination.

Collaboration is also important. Internationally co-authored UK publications are cited more frequently than papers with solely UK-based authors, and 60% of UK scientific publications are co-authored with EU researchers (Bruegel, 2017a). In absolute terms, the top collaborative partners are Germany, France, Italy and the Netherlands (The Royal Society, 2017). A report by the House of Commons Science and Technology Committee published in 2016 warned that any restrictions placed on EU immigration would limit collaborative research.

Funding

A generous and flexible funding environment is essential for the exploratory, innovative and research-based life sciences sector. Annually, life sciences companies in the UK spend £4.1 billion on research and development (CBI, 2016). As a net recipient of EU funding for research and development (Simmons and Simmons LLP, 2017), British science will struggle to replicate the automatic access to EU Research and Innovation programmes it has enjoyed until now (PwC, 2016b).

Scientific research and development has benefited greatly from EU funding. Natural and physical sciences (as well as engineering) receive the highest share of EU funding of all academic disciplines (The Royal Society, 2017). In 2015, under Horizon 2020, the largest EU Research and Innovation programme, UK university researchers received the largest share of total projects funded (over 2,000 per year) and the largest share of grants (€1.2 billion, or 16% of the total) (Bruegel, 2017a).

Furthermore, since 2007, the UK has won around 1,400 of 5,000 European Research Council Grants (Lucas, 2016). It is estimated that the UK will lose €1.5 billion per year in direct EU funds following Brexit (Bruegel, 2017a). Furthermore, the UK may lose access to collaborative projects with EU partners, as certain funding streams are directed solely to cross-border projects, indeed Horizon 2020 grants have done much to connect scientific researchers across the EU (Prospect, 2017).

Concluding remarks

Although considerable uncertainty remains on the specific outcomes of Brexit while the UK Government negotiates the terms of its departure from the EU, this research identified a set of challenges and opportunities for six key sectors of Norfolk and Suffolk's economy. These challenges and opportunities will have different impacts across different economic sectors and geographical areas. The following points summarize our main conclusions, focusing on Brexit's impact on workforce, regulations, trade, funding and investment.

Workforce

- Arguably the most significant impact of Brexit in Norfolk and Suffolk will be on the local labour force. There is consensus that non-UK EU nationals currently residing in the UK should be allowed to stay. But recent evidence suggests that many may wish to relocate, as the UK is perceived to be less desirable. In the long-term, it is highly likely that migration from the EU will drop. Moreover, Brexit will impact low and high skilled workers in different ways.
- Lower skilled EU workers often fill vacancies in agriculture, manufacturing and construction, many of which are seasonal or temporary, and therefore are difficult to fill domestically. It will be important to retain the current workforce as far as possible.
- In the future, there is an opportunity for these sectors to uplift the economy, as innovation could lower labour intensity by transforming a high number of low skilled, low paid jobs into higher skilled, better paid jobs. For instance, agri-tech is seen to help overcome labour shortages by reducing labour intensity through further mechanisation and automation (Robert Smith, Russell Smith Farms, Smithson Hill, 2017). The LEP could have a key role in this process, supporting local business in securing the necessary skills and funding to innovate, in line with the National Industrial Strategy.
- Many higher skilled professionals from the EU work in offshore wind, advanced manufacturing, digital (especially computer programming) and life sciences, due to a shortage of STEM skills in the UK. As with the lower skilled jobs, it is crucial to retain these workers. This may be challenging because, on the one hand, these are highly mobile workers who can easily find good jobs in other European countries, and, on the other hand, there might be increased costs for businesses to employ overseas workers (as is currently the case for non-EU workers).
- The LEP should support local businesses in retaining their skilled workers, while working with companies and education and training providers to ensure that STEM skills provision aligns with local skills demand.

Regulations

- Leaving the EU provides the UK the opportunity to formulate its own regulatory regime, which in many industries has been EU-directed over the past several decades. This can be made more in accordance with UK-specific concerns and objectives, and may unlock increased investment. For example, in the digital industry, rules on net neutrality could be overturned, reducing red tape and consequently boosting competition and investment.
- However, the standardisation of regulations across the EU with many EU directives incorporated into UK law means that regulatory alignment and stability will be important across the sectors to maintain 'business as usual', easing trade and ensuring continued access to international funding. Consequently, in order to remain competitive, the UK is likely to have to continue conforming to many EU laws, policies and regulations.
- The relationship between regulation and trade is particularly pertinent in agriculture and manufacturing, including pharmaceuticals and poultry and meat processing, due to the importance of product safety standards. It is no surprise that companies in these sectors may be anxious about regulatory changes following Brexit. Companies in Norfolk and Suffolk will need to remain aware of any regulatory changes and how they may impact them.

Concluding remarks (cont.)

Trade

- The future environment and conditions for trade after the UK leave the European Single Market are still very uncertain. Negotiations on trade are not expected to start before December 2017 at best.
- Outside of the single market, the introduction of trade barriers, such as tariffs, is likely to impact UK exports, particularly in the agricultural and food production sectors, where tariffs are typically very high and Norfolk and Suffolk export a good deal of goods to the EU. Given the importance of farming and food production in Norfolk and Suffolk, this is a key area of concern for the region.
- Although most goods produced in Norfolk and Suffolk are sold on the UK market, tariffs will impact entire supply chains, affecting most manufacturing activities as well as construction, as various components and materials across the supply chain are traded with EU partners. For example, duties or restrictions placed on imports may cause shortages of materials, increasing costs in construction, which in turn will impact the entire region's economy. In this context, it is vital for the region that the UK Government achieves a favourable trade deal with the EU post-2019.
- The region will inevitably have to adjust economically. This is both a challenge and an opportunity. There is a clear opportunity to increase the UK share of companies' supply chains, and open products to new markets worldwide. The lower value of sterling may make UK exports more competitive, but it is important that local companies innovate and actively enter new markets. As companies often rely on imported inputs in their global supply chains, and because some high-value-added products (such as pharmaceuticals) are less sensitive to price changes, the recent depreciation in sterling has not generated a significant boost in UK exports (The Economist, 2017). Firms appear to be using sterling's weakness to bank increased profits in a time of uncertainty, rather than to move into new markets (*ibid.*). Exploiting new markets and cultivating a competitive advantage requires time, innovation and financing. The LEP can play a central role in supporting Norfolk and Suffolk companies in this endeavour.
- The trade of services is important for the digital sector, and whilst any potential tariffs would be low, the inability of the UK digital sector to take advantage of the free movement of services and capital as part of the Digital Single Market would inhibit the sector.

Funding and investment

- EU funding plays a supporting role in all of the important sectors in Norfolk and Suffolk. Across manufacturing, digital and life sciences, EU funding has been integral to driving the evolution of the sector through research and development, and innovation. EU funding has also been important for investing in large scale infrastructure projects, indirectly supporting businesses and job growth in the construction and offshore wind sectors.
- In agriculture, the Common Agriculture Policy (CAP) heavily subsidises farming, without which many farms would close, severely damaging the rural economy. It is important that local businesses find alternative sources of funding – from Central Government or elsewhere – once they are no longer eligible for EU funding. The LEP may play a key role in working with local businesses and supporting them in securing the funding they need to continue to grow and innovate.
- Foreign Direct Investment (FDI) is key to raising national productivity, and, by extension, output and wages across all sectors (most significantly in manufacturing). There is evidence that EU membership has significantly increased FDI – the extent to which FDI will be affected by Brexit depends highly on future trading arrangements with the EU (CEP, 2016). The impacts also vary across sectors. For instance, investment has already declined in manufacturing, whilst investment is likely to slow in commercial and residential development, impacting construction. In the offshore wind sector, there has been a mixed post-Brexit reaction by foreign companies with some continuing to invest whilst others have put investment on hold. The digital sector, on the contrary, has continued to enjoy robust foreign private investment.

Policy Recommendations

This report was commissioned to provide analysis of potential opportunities and challenges and information on companies within specific sectors where those impacts were assessed to be greatest. But the analysis also leads to potential conclusions about the strategic approach that Norfolk and Suffolk might take to supporting businesses in the period ahead. This slide summarises our conclusions about potential policy, very much in the context of the new Norfolk and Suffolk Economic Strategy.

- Local partners should take the opportunity of developing a local industrial strategy to further reinforce the sectoral specialisms that Norfolk and Suffolk have and to ensure that central Government is fully aware of the contribution that those specialisations make to the national economy. Many of these sectors have similar requirements (e.g. for technical skills, leadership skills, new technologies and easier to access funding and partnerships for smaller scale commercial research and innovation). And many face global opportunities for new markets and new products (e.g. clean energy, high tech food and drink production and digital / ICT)
- There is an opportunity to consider reviewing and focussing Growth Hubs, Innovation Hubs and skills deal activity to more proactively reach out to those businesses which could have opportunities for growth and/or be more challenged by Brexit (encouraging innovation and automation in food production is one example).
- As the labour market continues to tighten and if migration continues to slow, then there is a strong case for focussing and strengthening place marketing and inward investment in order to reach out to the people you need to attract and retain as well as the investment needed to drive productivity.
- Attracting large scale private sector investment in infrastructure and development will require places to further focus their investment marketing activity and develop a very strong place based story and proposition.
- Collaborating with other regions and sectors elsewhere to where there is a common interest in reaching out to new markets or designing new products.
- In the context of local industrial strategy consider a more in-depth piece of work in order to understand your business base in more detail and in a way that updates regularly, including the specific needs of individual businesses and how you can work with them. Both for central Government and locally it will be vital to have a more accurate understanding of your leading indicators and of business health and where the challenges and opportunities lie.

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