National Institute of
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Social Research

THE CHANGING WORLD OF WORK

Johnny Runge

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National Institute of Economic and Social Research
2 Dean Trench St
London SW1P 3HE
T: +44 (0)20 7222 7665
E: enquiries@niesr.ac.uk
niesr.ac.uk
Registered charity no. 306083

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Acknowledgements

Executive summary

This report was commissioned by Unions21 to better understand the changing landscape of the future UK labour market. Its purpose is to a) identify industries with high projected employment growth and b) analyse worker characteristics in these industries, in order to inform subsequent market research for Unions21 regarding workers' views towards trade unions and collective bargaining. The report draws on already available forecasting data on the UK labour market, primarily the most recent *Working Futures* report from 2016 by the UK Commission for Employment and Skills (UKCES), which forecasts employment trends in the UK in the decade leading up to 2024. This is supplemented by other forecast data sources, including the Forecasting Skill Demand and Supply data from the European Centre for the Development Vocational Training (Cedefop), sector-specific data on construction and retail, as well as more qualitative sources on the future labour market, including on the impact of Brexit. The research was conducted in the period September – December 2016.

The report highlights three potential growth industries based on the UKCES data, with an additional three industries to watch. These are:

Food and beverage services. UKCES projects a continuation of the trend towards increasing employment levels in the sector, fuelled by increasing population levels and consumers' ever-growing interest in food and dining-out. The negative risk to this forecast is the possibility of automation of jobs, with rising labour costs and potential future immigration restrictions possibly incentivising employers to invest in labour-saving technologies.

Head offices, management consultancy. Leading the rise of jobs in the professional services, the projected employment growth in this industry reflects the UK's comparative advantage and its supportive business environment. However, the UK's exit from the UK could have a negative impact on trade openness and attraction of global talent, which could lead to a slowdown in employment growth.

Retail trade. The sector is highlighted as one of the largest-growing in the forthcoming decade in the UK economy by UKCES, but it should be noted that there are several negative risks to this projection, including structural changes in the industry (rising labour costs, in particular), store closures and productivity improvements.

Construction. The underlying dynamic of a growing population (which increases the demand for housing and infrastructure projects), as well as historically low interest rates, point towards employment growth in the construction sector. The outlook, however, relies crucially on public spending decisions, and could also be negatively impacted by economic uncertainty and loss of funding caused by Brexit.

Health and social work. The underlying dynamic of demographic change (population growth; population ageing) means that in the longer term, employment is likely to increase substantively, particularly because the sector comprises many personal care and service occupational jobs and tasks deemed at a relatively low risk of automation. However, in the short-term public spending restraint is likely to temper employment growth in the sector.

Information technology. The sector is projected to register high growth rates in the coming decades in an industry which has the potential to grow much faster than expected as it penetrates into all sectors of the UK labour market.

Introduction and methodology

This report was commissioned by Unions21[1] to better understand the changing landscape of the future UK labour market. Its purpose is to identify high employment growth sectors and industries in order to inform subsequent market research for Unions21 on workers' views towards trade unions and collective bargaining. Specifically, the aim of this report is to highlight three industries that are deemed to experience high absolute net employment growth in the future. Characteristics of workers in the three industries will then be analysed, in terms of occupation, qualification, gender, job types, union membership and collective bargaining coverage. The research was conducted in the period September – December 2016.

The analysis draws on already available forecasting and projection data on the UK labour market, in particular the UK Commission for Employment and Skills (UKCES) *Working Futures* reports, which provide the most detailed and comprehensive projections for the UK labour market. The Forecasting Skill Demand and Supply data from the European Centre for the Development Vocational Training (Cedefop) is also included. These are, in some instances, supplemented by more sector-specific forecasts, such as those on the construction sector by the Construction Industry Training Board's (CITB), and a forecast on the retail industry by the British Retail Consortium (BRC).

By their methodological nature, forecasts and projections are based on an assumption of a continuation of past and current trends, rather than being precise predictions of the future labour market. In their most recent *Working Futures* report, UKCES (2016) states that "the results should not be seen as definitive and should be used in conjunction with other sources of intelligence about the labour market." Therefore, the descriptive presentation of the existing forecast data, which will form the main part of this report, will be supplemented with qualitative evidence based largely on existing literature, both on overall labour market trends in the UK as well as sector-specific literature.

In addition, the UK's referendum decision to exit the European Union could have vast implications for the future employment trends in some sectors – something which has naturally not yet been incorporated into the existing forecast data, and in any case would be extremely difficult, if not impossible, to incorporate until the uncertainties surrounding the UK's future relations with the EU have been settled. However, through a more speculative approach, this report will make a preliminary assessment of the impact of Brexit. The report does not attempt to provide a full or comprehensive analysis; rather it will use existing evidence to assess whether each highlighted sector's pre-Brexit employment projections are likely to be significantly changed following the referendum decision. The general assumption in the report is that the sectors that are likely to be most affected by Brexit would be the sectors that trade with the EU and the sectors that benefit from the free movement of labour within the EU.

Data sources

UK Commission for Employment and Skills, UKCES (2016): *Working Futures 2014-2024.* The primary source for this report (and the data which will ultimately be used to identify employment growth industries in the UK economy) is the comprehensive forecasting

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[1] http://www.unions21.org.uk/about-us

data in the UKCES' *Working Futures* series. The most recent publication is from April 2016 for the period 2014-2024. Using the UK Standard Industrial Classifications (SIC2007) (ONS 2009), *Working Futures* produces detailed projections for 75 industries in the UK through an econometric analysis. Furthermore, data from sources such as the Labour Force Survey are used to map historical occupational and qualification structures within industries, and then projected forward to 2024 using a combination of econometric methods and expertise judgement. These projections use the full set of Standard Occupational Classification (SOC 2010) 4 digit categories (ONS 2010).

The 75 industries are grouped into broader industry categories of 6 and 22 industries, respectively, hence allowing for the examination of broader labour market trends as well as analysis of developments in more specific industries. The appendix to this report includes tables detailing the industry groupings, but these are also made clear in the presentation of the data. The following analysis starts with the broadest perspective of the labour market (analysing employment trends for the division into 6 and 22 industries), before continuing with a more detailed analysis at the industry-specific levels (75 industries). It is the latter level, which informs the identification of the high-growing industries.

European Centre for the Development of Vocational Training (Cedefop): *Forecasting Skill Demand and Supply, 2016 Skills Forecast.* The skill demand and supply forecast by the European Centre for the Development of Vocational Training, Cedefop, is the second source used in this report. It uses harmonised data and a single methodology to make its forecasting results for each country comparable across EU countries and to enable the aggregated data to provide an overall picture of the entire EU labour market. As such, Cedefop themselves write that its forecast "does not intend to replace skills anticipation and forecasting initiatives taking place at national level." Thus, ultimately, this report relies on the UKCES data to identify high-growing sectors, but the following sections also present the Cedefop data, which enables useful comparison with the UKCES *Working Futures* projections.

In terms of comparability, several things should be noted. First, in its most recent forecasts, Cedefop presents projections for the period 2015 to 2025, but in the following analysis their projections for 2014-2024 have been extracted from the dataset, in order to make it more comparable with the UKCES data. Second, although the six headline categories are largely the same, this masks significant differences within the categories, and in particular the division into subcategories. Furthermore, the forecasts estimate different sizes of the labour force, even in its historical data. Still, a comparison of especially the broader trends is useful, and as we will see, it points towards uncertainties in forecasting for specific sectors, which will be discussed throughout the presentation of the data.

Other sources. These two main sources will be supplemented by more sector-specific forecasts, such as those of the Construction Industry Training Board's (CITB) (2016) and the British Retail Consortium (BRC) (2016).

Section 1: Understanding the past, current and future labour market trends

Before delving into the forecast data, this section will outline the broader labour market trends in order to better understand and contextualise the subsequent presentation of the forecast data. It should be noted at the outset that such trends, by their very nature, are highly uncertain and forecasters will inevitably fail to anticipate every development in the future labour market. As an example, Glover and Hope (2015: 42) note that "twenty years ago there was a widespread belief that a defining feature of the labour market would be radically reduced working hours and increased leisure time. Fast forward to 2015 – the year in which mobile technology is set to overtake the desktop as the principal means of accessing the internet – and our work and leisure hours are increasingly blurred." In light of such uncertainties, this section will not only highlight the most likely trends and their likely impact on the UK labour market, but also discuss potential disruptions, which could undermine these assumptions (see UKCES 2014).

Demographic change

As opposed to many other labour market trends, **demographic change** can be considered a near-certainty, which means that its sectoral implications are very likely to have a substantial impact on the future labour market. In particular, the **growing population** in the UK will lead to increased consumption and demand for food, energy, housing and infrastructure, which could facilitate employment growth in various sectors, such as construction, retail and energy (ibid.). Meanwhile, **population ageing** is expected to lead to an increase in health and social care occupations (ibid.).

Technology and automation

Another highly likely trend is the continuation of **technological progress**, although there is uncertainty as to what extent and how exactly this is going to affect the labour market and employment in specific sectors. Generally, it is likely to continue to reduce the demand for mid-skilled occupations, such as white collar administrative roles and semi-skilled blue collar roles, whilst increasing the demand for high-level workers whose creativity and analytical skills are positioned well to complement the new technologies (Dolphin 2015). Overall, these trends are likely to contribute to a continuation of the observed trend in recent decades, in which the UK, alongside most other European countries, has experienced an **occupational polarisation**, where the fastest employment growth has been observed among high and low-skilled workers, with a shrinking demand for mid-skilled workers (Whittaker 2015).

A crucial question regarding technological change is to what extent robotics, algorithms and artificial intelligence enable **job automation**, most notably in occupations previously thought to be limited to humans, such as nursing, transportation, accountants, journalists, and financiers. A much-cited 2013 study by academics Frey and Osborne estimated that 47% of jobs in the US could be susceptible to automation over the next two decades, whilst McKinsey (2013) estimated that 40 to 75 million jobs worldwide could be automated. In 2014, Frey and Osborne used their methodology in a study on the UK labour market to predict that around 35% of jobs were at risk of automation in the UK in the next two decades. Building on this study and using ONS employment data, Deloitte (2016) provides the most recent predictions of UK jobs in specific industries at high, medium and low risk of automation in the next 10 to 20 years. Their estimations are provided in Figure 1 below.

Figure 1. Percentage of jobs at risk in each sector. Source: Deloitte (2016)
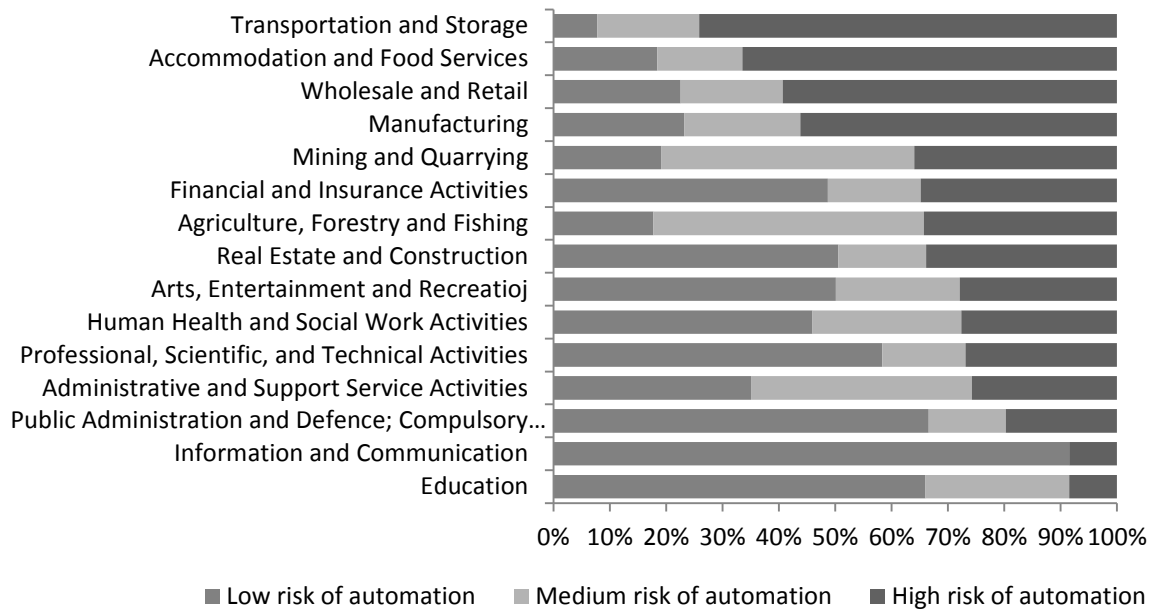
The high risk sectors are predominately in the trade, accommodation and transport sector, with its three subsectors identified as the most vulnerable throughout the UK economy. Specifically, **transportation & storage** ranks first with 74% of jobs at high risk of automation; **accommodation & food services** rank second with 66% of jobs at high risk; and **wholesale & retail trade** ranks third with 59% of jobs at high risk. Meanwhile, jobs in the public sector, most notably education, are at a relatively low risk of automation.

Figure 2 below shows the same data, but taking the size of the different sectors into account by showing the absolute number of jobs in the industry, divided into whether they are at high, medium or low risk of automation. Again, this shows the three main sub-sectors of the trade, accommodation and transport industry at the top. In **wholesale and retail** around 2.2 million jobs are at high risk; in **transportation & storage** 1.5 million jobs are a high risk; and in **accommodation and food services** 1.1 million jobs are at high risk of automation. Due to its large size, health and social care activities are also ranked high in terms of the absolute number of jobs at risk of automation.

Figure 2. Total employment by industry. Source: Deloitte (2016)
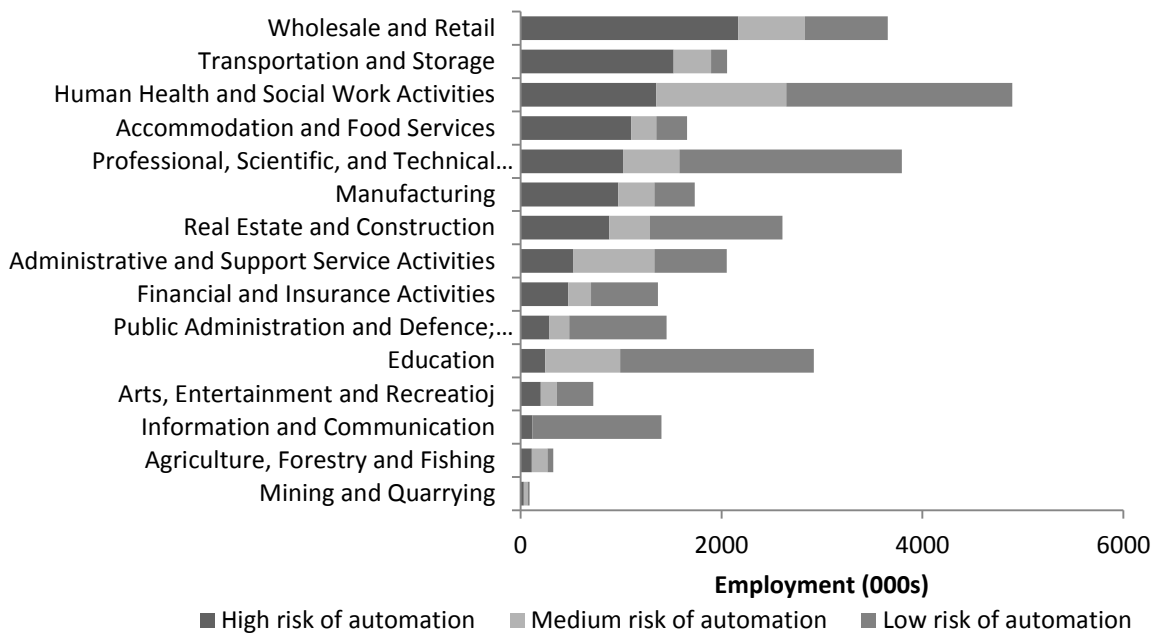
It should be noted that recent research by the OECD (2016) argues that the risk of automation has been overstated in these studies, disputing the occupational approach taken by Frey and Osborne, by arguing that the 'high-risk' occupations may still contain a large share of tasks that are hard to automate. When focusing on tasks, rather than occupations, at risk of automation, OECD (2016) find that the corresponding figure of jobs at risk stand at only 9% in the US. OECD (2016) also emphasise that the proportion of "jobs at risk" should not be confounded with actual projected job losses, for several reasons. First, the utilisation of new technologies is a slow process, due to economic, legal and societal hurdles, so that technological innovations are not always implemented as expected. Take the example of the automotive revolution, where McKinsey (2016) recently estimated that 15% of new cars will be fully autonomous vehicles by 2030. But even if technological obstacles are overcome, humans themselves may represent the biggest hurdle, as people fear relinquishing control to robots due to concerns of safety, cyber-hacking, job losses and even the fear of losing part of their identity as the car losses its symbol of independence and freedom (Thornhill 2016).

A second reason for not equating "jobs at risk" with actual job losses is that technological change has historically not lead to 'technological unemployment', but always led to the creation of additional jobs in other and new areas (Mokyr et al. 2015). For instance, information technology creates employment opportunities in the development of websites and apps, generating jobs in professional, associate professional and managerial occupations (UKCES 2014). The worry, however, is that "this time is different", considering the current pace and penetration of technological change, with robot skills being highly transferable, thus increasing the number of jobs that may be affected (see Ford 2015).

In addition, a recent report by the Resolution Foundation (2016) highlights that certain developments in the UK economy could create the 'perfect storm' in some sectors, making employers in these sectors more inclined to pursue productivity improvements via automation. In particular, some sectors will be affected more by a potential reduction in supply of low-skilled EU migrants amid the UK's exit from the EU and rising labour costs with

the introduction of the National Living Wage, auto-enrolment, defined benefit pension deficits and the apprenticeship levy. The Resolution Foundation highlights that some industries – such as food manufacturing, agriculture, and food and beverage services – have both a high share of EU migrants in their workforce, a high share of workers affected by the National Living Wage by 2020, and a high probability of automation according to Frey and Osborne, perhaps making them more likely to accelerate their investment in computerisation.

Productivity growth

Another question, which could impact UK employment, is whether **productivity growth stagnation** is a temporary or permanent feature of the UK labour market. Historically, labour productivity has grown at around 2% per year in the UK, but since the financial crisis there has been an unprecedented stagnation in productivity growth. Whilst the UK economy has undergone a relatively strong economic recovery since 2013, this has been attained by increases in the total number of hours worked rather than by increases in productivity. Commonly referred to as 'the UK productivity puzzle,' many alternative theories have been proposed to explain the phenomenon, such as measurement error, falling productivity in the oil, gas and financial sectors; weakness in investment; lower lending to productive firms following the banking crisis; slowing rates of innovation and discovery; and an ageing population (see Harari 2016; Barnett et al. 2014, Bryson and Forth 2015). Although most economists expect the productivity stagnation to be a temporary diversion from historical trends (see Harari 2016), many ask themselves whether the development signals the start of a period with permanent lower productivity growth and lower improvements in living standards. In addition, the impact on productivity growth of the UK's decision to leave the EU is "highly uncertain" (Bank of England 2016). The impact could be felt via changes in foreign trade and investment, which is thought to be linked to a country's productivity (Bank of England 2016). The research, produced prior to the referendum, suggested that the greater the barriers to trade and investment in the UK's future trading relationship with the EU, the greater the reduction in the economy's long-term productivity.[2]

Globalisation and migration patterns

In the past decades, **globalisation** has been a prominent trend in the labour market. It has contributed to expanding the global workforce, which has led to production processes being transferred to developing countries and correspondingly reduced the demand for low-skilled workers in developed economies. This development is expected to continue, albeit possibly at a slower pace due to wage levels catching up in the emerging economies and technological innovations making re-shoring tenable (Dolphin 2015). However, generally, the continuous process of globalisation is not as inevitable as it once seemed. For instance, the future development of **international cooperation and trade agreements** may face a downturn considering the increasing protectionist and nationalist tendencies in many countries (UKCES 2014). This could have a large impact on the UK financial and business services, as well as foreign-owned companies in the UK utilities and manufacturing sector. Similarly, UKCES (2014) sees a potential disruption in the form of increasingly **persistent low growth rates** in Western countries, which among other things could cause global migration patterns to reverse, causing shortages in sectors with high levels of immigrant

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[2] For summary of these studies, see House of Commons Treasury Committee report (2016): http://www.publications.parliament.uk/pa/cm201617/cmselect/cmtreasy/122/122.pdf

labour, such as social care, as immigrants in industrialised countries migrate back to their native countries. The **UK's referendum decision to leave the EU** adds to uncertainties about the accessibility to a global talent pool for UK businesses, with likely limits being imposed on the migration of workers from the EU. Brexit could also have consequences for sectors that rely on EU trade such as many professional services. One of these is the often-mentioned financial services, as London may lose its status as the European financial capital. More generally, Brexit may also contribute to the destabilisation of the European project and increase the likelihood of a further fragmentation of the EU, or alternatively, and quite oppositely, it may be the catalyst for further European integration. Either way, this would have implications for the UK labour market, although it is at present hard to predict exactly what these consequences would be. Finally, another financial crisis, either globally or concentrated around the euro area, would impact heavily on output and employment growth rates, as it did in the previous decade.

New contractual arrangements

UKCES (2014) also highlights that the future UK labour market could be impacted by a potential further rise of **new contractual arrangements,** such as zero hours contracts, which favour employers' needs for flexibility and lowering wage costs. This could be facilitated by persistently rising unemployment and underemployment levels, which may shift the balance of power in the labour market towards employers and away from employees. The impact of this disruption, like many others, will to a large extent depend on the regulatory and political environment, but it could potentially contribute to the creation of a highly polarised workforce, with only few employees in core executive positions, whilst others, especially in the low- and medium-skilled occupations, compete for hours. At the same time there is evidence of an increasing **desire for a better work-life balance**, which may result in a rise in project contracts, free-lancing, part-time employment, job-sharing and flexitime (UKCES 2014). Alongside this, there has been a **rise of non-standard employee contracts**, fuelling the speculation that a two-tier labour market will emerge alongside the occupational polarisation (Whittaker 2015). In particular, there has been a rise in temporary contracts in recent years (ONS 2016), although much of this increase may be associated with the financial crisis, with a rising proportion of people stating in surveys that they chose to work on a temporary arrangement because they were unable to find a permanent job. However, despite strong improvements in the labour market, the proportion of temporary contracts has continued to rise, alongside the proportion of 'voluntary temps', maybe suggesting that the trend will continue (Whittaker 2015).

Another development, which also crucially depends on the regulatory approach taken by the British government, is the extent to which the **sharing economy**, or other innovative ways of organising workers in the labour market, will grow in the future.[3] The sharing economy (also known as the collaborative economy, peer-to-peer economy, and the gig economy) is a rapidly growing sector in the UK. Coyle (2016) recently estimated that 3% of the UK workforce provides a service through the collaborative economy, which could fundamentally alter traditional employment structures, social benefits systems and trade unions' presence in the labour market. In terms of sectors, the sharing economy has most prominently made inroads into transportation and hospitality, with companies such as Airbnb and Uber, but the

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[3] See PwC's study on the sharing economy here: http://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/outlook-for-the-sharing-economy-in-the-uk-2016.html

use of online platforms to facilitate the purchasing, hiring and sharing of assets and skills can potentially be utilised across a wide spectrum of sectors. Furthermore, the nature of the sharing economy also means that it is notoriously hard to measure in official output and employment statistics, which could complicate matters for forecasters in the future (see ONS 2016; Bean 2016).

Many more potential trends and disruptions could be listed, but the main point is that, almost by definition, these may either presently be unknown, not yet regarded as important, or if they are regarded as potentially important, it may be that they will penetrate the economy and society to a much greater (or lesser) extent than expected. As such, the following presentation of the best available and most comprehensive forecast data on the UK labour market should be viewed in this light.

Section 2: Employment projections in 6 industries

Figure 3. Historical and projected employment levels, 1990-2024. Source: UKCES
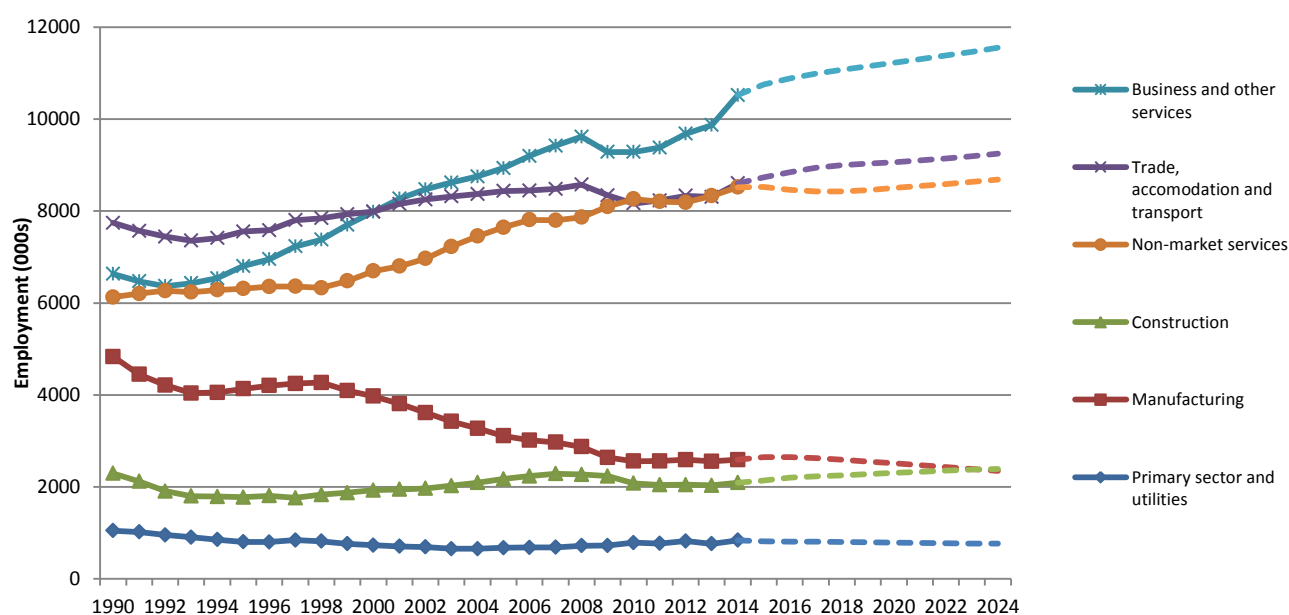
The following sections present and summarise employment projections data on the UK labour market, alongside more qualitative considerations. Figure 3 above depicts the historical development in employment levels across the six broad sectors from 1990 to 2014, according to the data from UKCES' 2016 *Working Futures* report. Most notably, it depicts the well-established, long-term shift towards a service sector economy, as there has been a fall in employment in manufacturing, whilst the service sectors have experienced large expansions, driven by both public services in health, education and social care, as well as the private service sector, which now represents the largest sector in the economy, measured in terms of the number of workers. Turning to the future, Figure 3 (alongside Table 1 below) also depicts UKCES' headline projections across the six main industries for the period 2014-2024. UK employment across all industries is forecasted to increase by 5.5% between 2014 and 2024. This will add around 1.8 million workers to the British workforce, which is projected to reach just under 35.0 million in 2024. Meanwhile, annual output growth is projected to average 2.2%, with an estimated annual productivity growth of 1.7%.

Table 1. Employment in 6 industries. Source: UKCES

Industry	Employment levels (000s)		Net change 2014-2024		GVA growth	Productivity growth
	2014	**2024**	**(000s)**	**(%)**	**(% p.a.)**	**(% p.a.)**
Primary sector and utilities	837	765	-72	-8.6%	0.6%	1.5%
Manufacturing	2,591	2,350	-241	-9.3%	1.8%	2.8%
Construction	2,092	2,393	301	14.4%	3.1%	1.7%
Trade, accommodation and transport	8,604	9,248	644	7.5%	2.1%	1.4%
Business and other services	10,523	11,152	1,029	9.8%	2.4%	1.4%
Non-marketed services	8,520	8,684	164	1.9%	1.8%	1.7%
All industries	**33,167**	**34,992**	**1,825**	**5.5%**	**2.2%**	**1.7%**

On a sectoral level, the broad picture points towards a continuation of the current trend of declining employment in the manufacturing sector, as well as a reduction in the primary sector & utilities. Meanwhile, the three highest growing sectors, in terms of employment growth, over the 10-year period are projected to be **businesses & other services** (1.0 million workers; 9.8% increase); **trade, accommodation & transport** (644,000 workers; 7.5%); and **construction** (301,000 workers; 14.4% increase).

The corresponding Cedefop data in the six broad sectors is shown in Table 2 below. It projects a slightly smaller increase of 4.4% in overall employment levels, with a net employment growth of around 1.3 million workers. In line with the UKCES data, Cedefop highlights manufacturing and primary sector & utilities as sectors that will experience employment decline, whilst **business and other services** is the main source of employment growth over the 10-year period. This sector is projected to add around 1.2 million workers to the economy, which is a 13.3% increase – a slightly bigger increase than the UKCES data predicts. With regard to the growth prospects of some other sectors, notably construction, the Cedefop forecast differs substantially from UKCES. These differences are discussed in the industry-specific sections later in the report.

Table 2. Employment in 6 industries. Source: Cedefop

Industry	Employment levels (000s)		Net change 2014-2024	
	2014	**2024**	**(000s)**	**(%)**
Primary sector and utilities	713	647	-66	-9.3%
Manufacturing	2,481	2,328	-153	-6.2%
Construction	1,928	1,808	-120	-6.2%
Trade, accommodation and transport	8,296	8,497	201	2.4%
Business and other services	9,154	10,371	1,217	13.3%
Non-marketed services	7,804	8,061	257	3.3%
All industries	**30,377**	**31,712**	**1,335**	**4.4%**

Section 3: Employment projections in 22 industries

To obtain a slightly more detailed picture, Table 3 again uses the UKCES data, but now divides the 6 broad sectors into 22 industries.

Table 3. Employment in 22 industries. Source: UKCES

Broad grouping (6)	Industry (22)	Employment levels (000s)		Net change 2014-2024	
		2014	**2024**	**(000s)**	**(%)**
Primary sector and utilities	Agriculture	456	347	-109	-24.0
	Mining and quarrying	64	68	4	6.5%
	Electricity and gas	119	139	20	16.5%
	Water and sewerage	198	211	13	6.8%
Manufacturing	Food drink and tobacco	420	410	-9	-2.2%
	Engineering	414	311	-103	-24.8%
	Rest of manufacturing	1,757	1629	-129	-7.3%
Construction	**Construction**	**2,092**	**2,393**	**301**	**14.4%**
Trade, accommodation and transport	**Wholesale and retail trade**	**4,832**	**5,167**	**335**	**6.9%**
	Transport and storage	1,561	1,547	-14	-0.9%
	Accommodation and food	**2,211**	**2,534**	**323**	**14.6%**
Business and other services	Media	387	382	-5	-1.3%
	Information technology	**943**	**1,096**	**153**	**16.2%**
	Finance and insurance	1,131	1,162	31	2.7%
	Real estate	550	560	10	1.8%
	Professional services	**2,854**	**3,255**	**401**	**14.0%**
	Support services	**2,750**	**3,071**	**321**	**11.7%**
	Arts and entertainment	**950**	**1,034**	**84**	**8.9%**
	Other services	958	993	35	3.6%
Non-marketed services	Public admin. and defence	1,379	1,381	2	0.2%
	Education	2,897	2,890	-7	-0.2%
	Health and social work	**4,244**	**4,413**	**169**	**4.0%**

The eight largest growing sectors in terms of employment growth are marked in bold in Table 3 above. In descending order of employment growth, these high-growing sectors are **professional services**, **wholesale & retail trade**, **accommodation & food**, **support services**, **construction**, **health & social work**, **information technology**, and **arts & entertainment**. The eight highlighted industries are each projected to add more than 80,000 workers to their workforce over the 10-year period, with the five listed first forecasted to increase by more than 300,000 workers each. Together, the eight industries account for projected employment growth of around 2.1 million workers.

The remit of this report is to identify growing industries and sectors in terms of the absolute number of workers, but throughout the report, we will highlight the percentage increases as well. For instance, Table 3 above also shows the percentage growth rates of each sector. Six of the 22 industries are projected to experience net employment growth of more than 10% over the ten-year period. This is true for **electricity and gas** (16.5%), **information technology** (16.2 %%), **accommodation and food** (14.6%), **construction** (14.4%), **professional services** (14.0%), and **support services** (11.7%). However, the relatively

small size of some of these sectors (particularly electricity & gas and information technology) means that their absolute employment growth ranks further down. In contrast, wholesale and retail trade (6.9%) and health and social work (4.0%) have relatively low percentage growth rates (in the case of health and social work, it is lower than the UK economy average of 5.5%), but because they account for a large proportion of the overall economy, these growth rates constitute a fairly substantial proportion of the projected absolute employment growth over the 10-year period.

Section 4: Employment projections in 75 industries

This section outlines each of the six broad sectors in more detail, examining the projected employment growth numbers for the 75 specific industries in the UKCES data. This will give a clearer indication of where specifically the projected employment growth comes from. The analysis of the UKCES data will be supplemented with comparison from other data sources, including the Cedefop forecasting data and sector-specific data, alongside more qualitative considerations, including on the likely impact of Brexit.

4.1 Primary Sector & Utilities

Output in this sector is expected to increase only modestly at an annual increase of 0.6% compared to a UK average of 2.2%. The forecast assumes that competition from imports and cost pressures will drive productivity growth, which is estimated at 1.5% per annum, leading to a fall in employment of 8.6% (72,000 workers) over the decade. The decline in employment is driven by agriculture, which is projected to lose 109,000 workers (24.0%) up until 2024. Meanwhile, the remaining sectors have positive employment growth rates, but due to their small size this does not amount to many additional jobs (see more detailed data in Appendix 2).

Figure 4. Employment trend and projection in primary sector and utilities. Source: UKCES
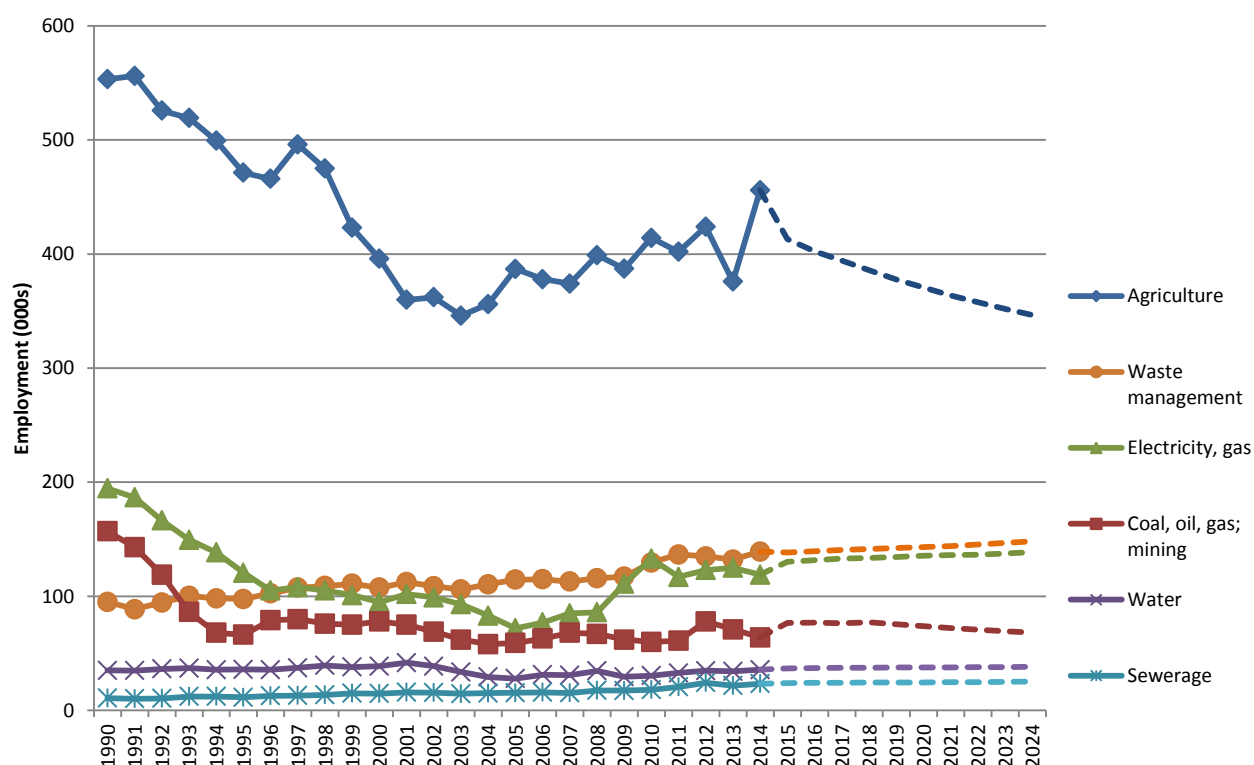
The Cedefop data for the primary sector and utilities (see Appendix 2) predicts negative growth rates across all sub-industries in this sector, and specifically, it forecasts a fairly substantial decline in employment in agriculture, forestry and fishing.

The decline in agricultural employment is part of a consistent trend dating back to the 19th century. The UK census data shows that as a proportion of the total workforce, people

working in agriculture and fishing accounted for 22% in 1841, but in every census since then agriculture has accounted for a smaller share of UK employment, and today less than 1% of the UK population works in the sector (ONS 2013). Devlin (2016) argues that rising labour productivity is the main factor behind this trend. For instance, in 2014 less than half the amount of labour was required to produce a given amount of food compared to in 1973. Devlin (2016) also notes that despite substantial improvements, agriculture is still among the sectors with the lowest labour productivity, implying that further productivity growth and hence continuous declining employment levels are likely to occur, with many analysts expecting robotics and automation technologies to have a profound impact on the agricultural sector. In this regard, the government's agricultural technologies strategy, launched in 2013 and backed by public funding, signals political intent to increase productivity in the sector.[4]

Meanwhile, as in other sectors, technological adaption will require farmers to attain new workforce skills, with jobs potentially becoming increasingly attractive and better paid. This will potentially help transforming the public perceptions of working in the sector and leading to a "rejuvenation of an ageing workforce" (Nesta 2015). Another government strategy, which is likely to reinforce the trend of a smaller but higher skilled workforce, is the government's priority to focus on increasing exports to reduce the trade deficit (Devlin 2016). This is likely to lead to reductions in employment levels, as an export-focused strategy involves focusing on the UK's strongest agricultural sectors, which are low-labour intensive (ibid.).

Likely impact of Brexit

Another factor to consider is the impact on agriculture of Britain's decision to exit the EU. As in most sectors, the impact is heavily dependent on the outcome of the withdrawal negotiations between the EU and the UK, particularly the future UK trading relationship with the EU, as well as the subsequent policy decisions taken by the UK government. In the agricultural sector, the most imminent concern is the loss of funding from the EU's Common Agricultural Policy (CAP), which will happen regardless of the trading arrangement negotiated with the EU, and currently it makes up around 50-60% of farm income in the UK (Downing 2016). In the short term, the Treasury has recently guaranteed that the current level of funding under Pillar 1 (subsidies to farmers) will be maintained until 2020.[5] However, although the UK is currently a net contributor to the EU budget and to CAP, in the longer-term it seems unlikely that any UK government will continue to subsidise farmers at the current levels. Indeed, the Farmer Scientist Network (2016) notes that the government may see Brexit as an opportunity to phase out especially Pillar 1, which is traditionally seen as market-distorting by the Treasury. A House of Commons library briefing (2016) sided with this conclusion, arguing that the UK government views the subsidies as the "overarching market failure in this sector." Others emphasise that Brexit will enable British policymakers to develop a 'British agricultural policy from scratch', getting rid of red tape and building a more competitive industry,[6] whilst others argue that regulatory restrictions will remain post-Brexit.

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[4] https://www.gov.uk/government/collections/agricultural-technologies-agri-tech-strategy
[5] https://www.gov.uk/government/news/chancellor-philip-hammond-guarantees-eu-funding-beyond-date-uk-leaves-the-eu
[6] Farming Minister George Eustice articulated this vision for a 'Plan B' for agriculture during the Brexit campaign. See Downing (2016).

Another issue is the potential future restrictions on EU migration, which will impact the availability of especially seasonal labour. The proportion of migrant workers in agriculture is around 5.4%, slightly lower than the UK average of around 6.3% percent,[7] but EU migrants account for a substantial proportion of casual and seasonal (mainly unskilled) labour. The Migration Observatory (2016) found that 96% of EU workers in agriculture would fail current UK visa requirements, indicating that any future restrictions to EU migration following the referendum decision could have a big impact on the industry, potentially causing labour shortages particularly if not complemented with measures such as reinstating the Season Agricultural Workers Scheme (SAWS).[8] It would be hard to fill out these positions with domestic workers who are generally unwilling or unable to work in these low-paid, highly flexible positions. Alternatively, and similarly to other sectors which will be discussed later in the report, there is a possibility that future restrictions on EU immigration flows and the resultant reduction in the availability of unskilled labour (combined with the increased labour costs due to the introduction of the National Living Wage) could provide the impetus for a quicker adaption to automation technology (Devlin 2016; Corlett 2016). Currently, the remaining labour-intensive areas of agriculture are those dependent on visual perception, such as fruit picking, but with further advancement in precision agricultural technology, such tasks could potentially also be automated in the future (Nesta 2015).

Overall, when considering labour market trends, the employment forecasts by UKCES and Cedefop, as well as considerations on the impact of Brexit, the primary sector and utilities (where agriculture accounts for the most workers) is very unlikely to be among the high employment growth sectors in the future UK labour market.

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[7] http://www.compas.ox.ac.uk/media/BB-2016-Brexit_UK_Labour_Market-1.pdf
[8] https://www.migrationwatchuk.org/briefing-paper/393

4.2 Manufacturing

The UK manufacturing sector has experienced a large employment decline in the last 50 years. In 1966, nine million people were employed in the sector (Foresight 2013b), whilst just over 2.5 million were employed in the sector in 2014, according to UKCES' data. The historical decline has happened in different stages, but overall factors such as low growth, rising productivity, and an increase in production in emerging economies have been main factors contributing to the decline in employment (Foresight 2013b). Between 2004 and 2014 alone, an estimated 682,000 workers left the industry, which was hard hit by the financial crisis relative to the overall UK economy (Rhodes 2015). In this historical context, the UKCES projection that manufacturing is set to lose a further 241,000 workers (9.3% decline) represents a slowing down of the past and current trend. This conclusion is backed up by the Cedefop data, which forecasts an employment decline of 6.2%, amounting to 153,000 workers. Both forecasts predict the loss of employment to happen across almost all of the manufacturing sub-industries (see Appendix 3 for more detailed data).

According to the UKCES forecast, the manufacturing sector is set to reverse the preceding decade's output decline and experience modest output growth of 1.8% over the 10-year period between 2014 and 2014, but at a slower pace than the UK economy as a whole. Strong global demand, mainly due to the rise of middle classes in emerging economies, is one of the main drivers behind the projected positive output growth in the manufacturing sector. This is particularly true in advanced, technology-intensive manufacturing industries, such as aerospace and pharmaceuticals, where the UK has specialised. Meanwhile, technological progress and innovation will be crucial in shaping productivity in the UK manufacturing sector, which is estimated to grow by 2.8% per annum by UKCES, higher than the average annual UK productivity growth of 1.7%. However, technological innovations such as sensor technology, robotics and 3D printing would also be the main driver behind further reductions in the number of jobs, particular in traditional roles in the production process (Foresight 2013a: 19).

The *Working Futures* projections assume that domestic firms will "continue offshoring and outsourcing the manufacturing process, diverting production and employment away from the UK" (UKCES 2016). Whilst Foresight (2013b) argues that high-value, high-productivity manufacturing will not necessarily lead to a further employment decline, and UKCES (2014) argues that a stabilisation in employment levels is plausible, it seems reasonable to assume that, at the very least, there will not be a full rebalancing of the UK economy, where the manufacturing sector re-assumes a larger proportion of the economy. There has been some evidence of "re-shoring"[9], where firms bring production processes back to developed countries, as wage levels have increased across the developing world. But even if this was to become an emerging trend, one of the drivers behind such a shift would probably be that technological improvements result in types of production requiring fewer workers (Dolphin 2015). As such, it seems reasonable to conclude that manufacturing will not be among the highest-growing sectors in terms of employment.

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[9] https://www.gov.uk/government/publications/businesses-are-coming-back/businesses-are-coming-back

4.3 Construction

Figure 5. Employment in construction. Source: UKCES
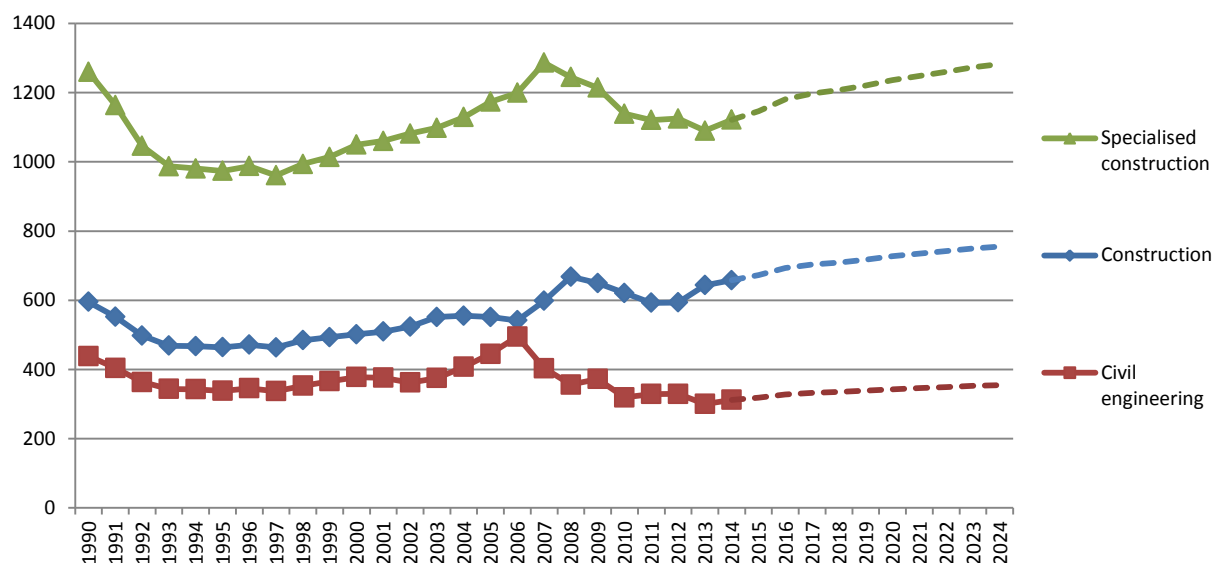
Construction is forecasted to experience the fastest rate of output growth of the six broad sectors, with a projected annual output growth of 3.1%. Productivity growth is forecasted to be the same as the UK average of 1.7%. This results in the largest employment percentage growth rate of the 6 broad sectors of 14.4% over the 10-year forecasting period. In the UKCES data, the construction industry is divided into three components, all of which register employment growth rates of around 14.0%. Overall, this adds a projected 301,000 workers to the construction industry over the 10-year period, with 160,000 additional workers in specialised construction; 98,000 workers in construction of buildings; and 42,000 in civil engineering (see Figure 5 above). However, whilst the construction sector is highlighted by UKCES as one of the highest growing sectors in terms of employment between 2014 and 2024, Cedefop projects an overall reduction of 6.2%, corresponding to a loss of 153,000 workers throughout the decade. Note that the UKCES and Cedefop forecast data agree on the labour market trends up until 2014, with both showing that employment growth was stagnant in the previous decade from 2004 to 2014. Cedefop records a decline of 4,000 workers, whilst UKCES records no net change in employment levels.

Meanwhile, the Construction Industry Training Board (CITB) (2016), focusing especially on the construction sector in the UK, forecasts annual employment growth of 1.1% from 2016 to 2020, estimating an annual output growth of 2.5% and hence implying a 1.4% productivity growth. This rate of growth would take employment in the construction industry up to around 2.73 million in 2020, according to the report, which is 6% higher than in 2015.[10] These large discrepancies in forecasting employment trends in the construction industry reflect the relatively volatile nature of construction activity, which tends to overreact to economic sentiments, and it crucially depends on government infrastructure investment and housing projects. The forecasts will therefore heavily depend not only on assumptions about wider economic developments, investor confidence and the recovery of lending to the private sector, but also on assumptions of government policy and political developments. Generally,

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[10] The CITB's remit includes SIC Code 71.1 (architectural and engineering activities and related technical consultancy).

there are indications that the Theresa May administration will be an improvement compared to David Cameron's lacklustre record on infrastructure investment. In addition to abandoning the last administration's austerity targets, the new Prime Minister has spoken of a revamped industrial strategy, including more government-backed infrastructure bonds and more house-building projects. Recently, May also pledged a continuation of the "Northern Powerhouse" project, backing a specific proposal for a trans-Pennine road tunnel, and made a decision to proceed with the Hinckley Point nuclear power project. The economic context – with interest rates close to zero – certainly provides a favourable environment for large infrastructure investment, whilst the underlying dynamic of population growth should inevitably lead to an increase in demand for housing and infrastructure projects.

Likely impact of Brexit

Whilst the low interest rates and population growth seem to be favourable to an increase in construction activity and employment, the political context – characterised by uncertainties surrounding Britain's withdrawal process from the EU – provides an incentive for private and public investors to put projects on hold. Indeed, PwC (2016) argues in its most recent UK Economic Outlook in July 2016 that construction may be the hardest hit sector in the UK economy following Brexit, as large capital investment projects "may be particularly prone to be delayed or even cancelled due to uncertainty following the vote to leave the EU." This seems to have come true, at least in the short term, considering the latest activity figures from the construction consultancy Barbour ABI (2016).[11] However, in the longer term, as the UK finalise their negotiation with the EU and uncertainty subsides, investor confidence may return, alongside project investment.

A number of other factors also suggest that the construction industry will be negatively impacted by Brexit. First, historically the construction industry tends to overreact to negative economic sentiments, and as such, any possible economic downturn could have even worse consequences for the construction industry than for the wider economy.[12] Second, the construction sector relies heavily on EU migrant labour for both skilled and non-skilled positions (see Rolfe and Hudson-Sharp 2016), and as such, if EU migration is restricted in the future, the industry could face further labour and skill shortages, which could result in higher project costs and project delays. This problem could be exacerbated by the fact that the current construction workforce is relatively old, with 22% of the workforce being over 50 years of age, and 15% over 60 (Shepherd and Wedderburn 2016). This will inevitably result in a relatively high retirement rate in the coming years, leading to a possible skill shortage, which could be hard to fill without EU migrant labour. Third, as a member of the EU, the construction industry has benefited from access to the European Investment Bank (EIB) and the European Investment Fund (EIF), which have provided important funding for especially large infrastructure projects and start-ups. UK government spending decisions post-Brexit, including regarding a possible alternative domestic funding mechanism for infrastructure projects, will to a large extent determine whether the loss of European funding will have a negative impact on the construction industry.

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[11] See also https://www.ft.com/content/439f912c-65f8-11e6-a08a-c7ac04ef00aa

[12] For summary of research on economic impact of Brexit, see House of Commons Treasury Committee report (2016): http://www.publications.parliament.uk/pa/cm201617/cmselect/cmtreasy/122/122.pdf

Overall, the underlying dynamic of population growth fuels demand for construction and infrastructure activities, but broader political and economic developments could have a substantial impact on employment levels in the sector.

4.4 Employment in Trade, Accommodation and Transport

Figure 6. Employment trend and projections in Trade, Accommodation and Transport. Source: UKCES
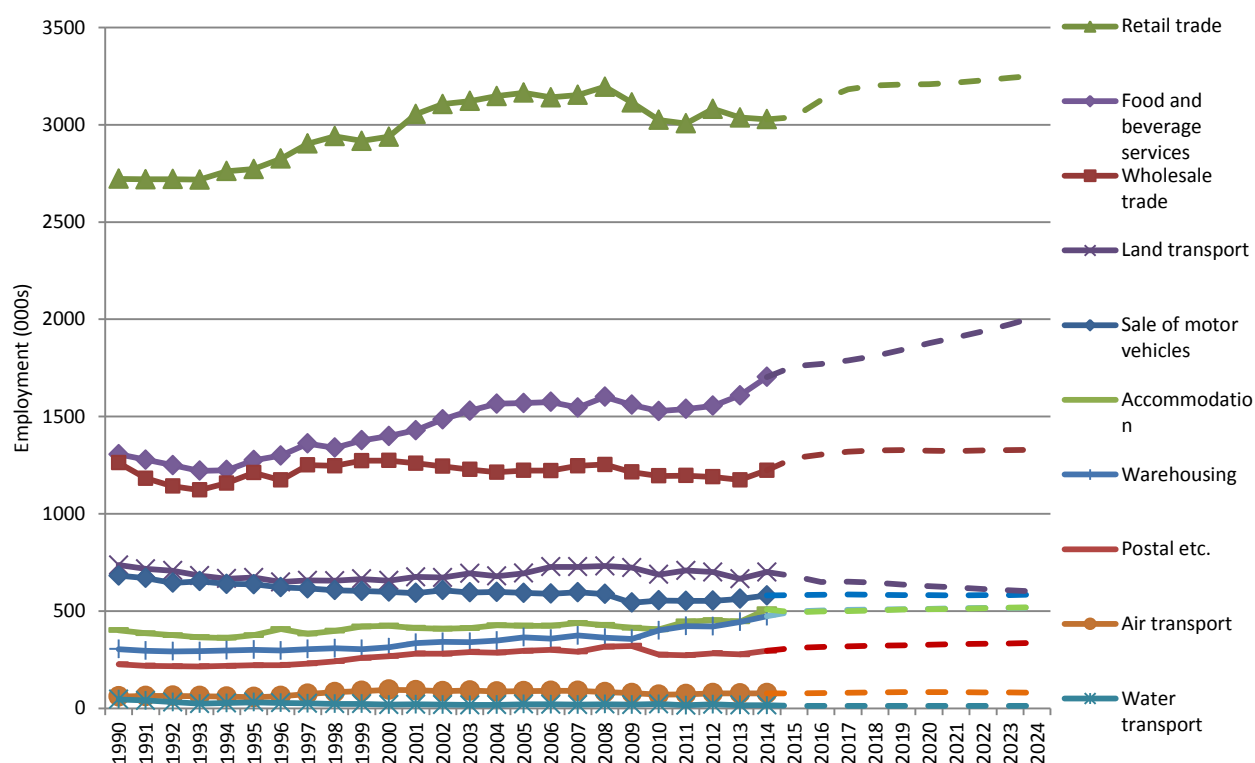
The performance of this sector depends crucially on the amount of activity of the overall UK economy, and in particular factors such as disposable household income. The trade, accommodation and transport sector is projected to see annual output growth rates of 2.1%, according to the UKCES data, roughly in line with the estimated growth of the overall economy. The forecasted productivity growth is 1.4%, leading to an overall increase in employment of 7.5% throughout the decade.

Three specific sectors stand out due to their relatively high absolute employment growth numbers (see Appendix 2 for detailed data tables). These are **food and beverage services** (311,000 workers; 18.3% increase); **retail trade** (225,000 workers; 7.4% increase); and **wholesale trade** (106,000 workers; 8.7% increase). Two slightly smaller sectors that are worth mentioning are **warehousing** and **postal & courier services**, as they register fairly high percentage growth rates (9.5% and 14% respectively), driven by the rise of online purchasing.

According to the projections by Cedefop (see Appendix 2 for data tables), **accommodation and catering** is also highlighted as a high-growing sector, with the addition of 178,000 workers (an 8.6% increase). However, according to the Cedefop forecast, **wholesale and retail trade** experience only a slight increase of 1.4% in the period, which amounts to a modest increase of 66,000 workers – far less than the projection by UKCES, which reported around an 8% increase for wholesale and retail trade, implying increases by 106,000 and 225,000 workers respectively, a total increase of 331,000 workers.

Meanwhile, the British Retail Consortium (BRC) paints a much gloomier picture than UKCES and Cedefop. In the report *Retail 2020: Fewer but better jobs*, published in February 2016, the BRC predicts the loss of 900,000 retail jobs by 2025, taking the total workforce in retail from just over 3.0 million in 2014 to 2.1 million workers in 2025. The report highlights the combined effect of structural changes, store closures and productivity improvements as the leading factors behind the projected employment decline. In particular, the BRC notes that with rising costs and falling prices, there has been a rising incidence of low pay across the retail industry, where 57% of workers are now paid less than 1.2 times the minimum wage (nearly a doubling since 1990), whilst this number is 21% for the overall economy. However, rising labour costs (due to factors such as the introduction of the National Living Wage, pension reform and the apprenticeship levy), combined with falling technology costs, will, according to the BRC, accelerate the diverging costs of labour vis-à-vis technology, which could spur some employers to invest in improving productivity (see also Bamfield 2015). The sources of greater productivity growth will vary across stores and retail industries, but the study argues that greater automation is likely to play a key role, and it predicts that 37,000 jobs per year, or 370,000 jobs over the ten-year period, are lost to automation.

The report also highlights store closures as another important factor behind the employment decline, as online retail becomes increasingly prominent (the UK has the highest proportion of online market share in the EU, see Centre for Retail Research 2015) and smaller retail businesses will struggle to invest in the necessary technological innovations to increase productivity. One may argue that the shift to online retailing does not destroy jobs as such, but merely shifts employment from retailing to warehousing and distribution. However, once the jobs have transitioned to these sectors, they are much more at risk of automation (Ford 2015). Furthermore, the expiration of many retail leases in the coming years is likely to exacerbate the trend of store closures. BRC notes that 60% of retail leases are up for renewal during the next five years, an unprecedented number compared to previous periods, according to the study. Overall, the BRC predicts an acceleration in store closures from the current 2% to a rate of 3%, meaning that of the 270,000 retail shops in the UK today around 74,000 will go out of business by 2025. This equates to a total of 440,000 job losses, compared to 300,000 if the current trend continues.

The two largest industries in the trade, accommodation and transportation sector are highlighted in Figure 7 below, which depicts the projected trajectory of employment. It shows that **retail trade** experienced fairly consistent employment growth from 1990 through to 2008, but since then has seen employment decline and stagnation, which to a large part can be attributed to the financial crisis and the reduction in activity in the economy, on which the retail sector is reliant. The question going forward is whether the trend of employment growth observed between 1990 and 2008 will resume (UKCES assumption), or whether employment growth will continue to stagnate (Cedefop assumption), or whether 2008 represented the peak of employment in retail due to future structural changes and productivity improvements (BRC assumption).

Figure 7. Employment levels in retail trade and food and beverage services. Source: UKCES
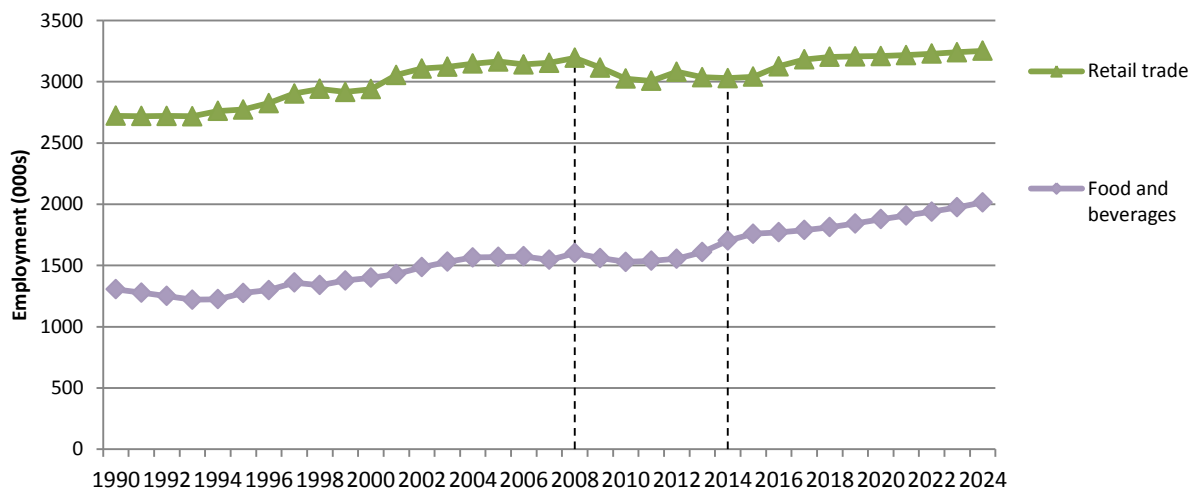
Figure 7 also depicts the development of **food and beverage services**, which have seen fairly consistent employment growth rates through to 2008, followed by a modest employment decline for a couple of years during the financial crisis. However, since 2010 employment growth has again picked up, increasing from around 1.53 million workers to around 1.70 million workers in 2014 (the last year of the historical data). This means that the *Working Futures* projection, as well as the Cedefop projection, of the food and beverage services is not just an assumption of a re-continuation of a past trend (like the retail trade projection), but also an assumption that the most recent trend will continue, driven by population growth and the resultant increase in demand for its services.

However, on the negative side, food and beverage services are regarded by Frey and Osborne as one of the sectors with most jobs at risk of automation, with the fast food sector particularly vulnerable. Combined with rising labour costs in the sector due to a high proportion of workers who will be affected by the introduction of the National Living Wage, estimated at 48% (Corlett 2016), and a high proportion of EU migrants, estimated at 13% (ibid.) who may face immigration restrictions in the future, one may expect a drive towards investments in labour-saving technologies. On the other hand, over the relatively short 10-year forecasting period the price of labour may remain lower than the cost of implementing the new technology (Deloitte 2016) and one may expect some social resistance towards automation of the jobs of waiters and waitresses, as human interaction and quality of service remain integral to the dining-out experience for many customers (ibid.).

Finally, the **transport and storage** sector is projected to have relatively high output growth over the ten-year period, but this may not translate into as high employment growth due to higher productivity growth (UKCES 2016: 46). Frey and Osborne highlight this sector as the one most at risk of automation. For instance, robots (autonomous vehicles, drones) may begin to enter sectors such as the transportation of passengers and goods, which was previously thought not to be affected by automation. Similarly, although the rise of online retail will increase the output of warehousing and storage, automated warehouse systems may mean that this is not translated into as significant growth in employment levels (Ford 2015). Overall, employment in the transport and storage sector is projected to decline by

0.9%, according to the UKCES data. This is primarily driven by a fall in land transport, whilst UKCES projects an increase in employment in warehousing and postal services.

Likely impact of Brexit

The performance of the retail, accommodation and food industries is closely tied to developments in the domestic economy, in particular domestic income and spending. As such, a negative impact on overall economic performance resulting from Brexit (as is forecasted by most economic research institutions) [13] could contribute to declining employment levels. For instance, the impact of the changing macroeconomic environment, particularly the devaluation of the sterling, is key to understanding the retail industry in the immediate post-Brexit environment.[14] At first hand, the weaker pound has some positive implications. It will give British exporters an advantage, particularly online retailers who are selling their products to customers in other countries (although these may eventually choose to create bases within the EU due to possible EU controls and tariffs, hence driving employment away from the UK). In addition, the devaluation of the pound makes it cheaper for foreign tourists to go on holiday in the UK and 'staycations' more attractive for British nationals, which has already led to a rise in tourism. This, of course, benefits the accommodation industry, but also has positive spillover effects on sectors such as food services and retail trade, as tourists spend in shops and restaurants.

However, over the medium and longer term, a weaker pound is expected to increase the price of imports, which will feed through to higher prices in the UK economy, pushing up the cost of everyday purchases, and as a consequence reduce households' spending power, effectively reducing real wages. It could also be expected that uncertainty in the short-term will eventually lead to a fall in consumer confidence, triggering higher levels of savings and consequently reduced consumer spending, although the most recent data from ONS (2016) and BRC (2016) reveal relatively strong retail sale figures after the referendum.

Potential restrictions on migration would also play a factor. Whilst the **retail sector** employs relatively few EU nationals, estimated at around 6% compared to the UK average of around 7.0% (Corlett 2016), related sectors such as warehousing and distribution would be more affected, possibly accelerating the push for automation and productivity growth in those industries. **Food and beverage services** employ a fairly high proportion of EU nationals, estimated at around 13% (Corlett 2016). In recent research, Oxford's Migration Observatory (2016) found that 94% of those employed in hotels and restaurants would fail to meet existing entry requirements to the UK, indicating the importance of any future immigration restrictions for employers' ability to recruit workers and maintain current employment levels in the industry.

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[13] For summary of these studies, see House of Commons Treasury Committee report (2016): http://www.publications.parliament.uk/pa/cm201617/cmselect/cmtreasy/122/122.pdf
[14] http://www.retaileconomics.co.uk/brexit/what-does-brexit-mean-for-UK-retail

4.5 Business and Other Services

The UK's comparative advantage in business and other services is grounded in a number of factors, according to a report by the Department for Business and Innovation (2013), which is cited by UKCES in its *Working Futures* report. These includes the geographic advantage of being between two major markets, the English language, the university system which provides high quality graduates and attracts worldwide talent, a dynamic and competitive market, and a supportive business environment. It is anticipated that the UK will continue to attract new firms to the country, bringing in increased foreign investments, thereby increasing activity and employment. The BIS report does highlight some downside risks, including the growth of the Asia Pacific market, and the possibility that cities like Singapore, Hong Kong and Shanghai become new financial hubs. In addition to this, the impact of the UK's decision to leave the EU will be discussed at the end of this section.

Overall, UKCES expects faster than average growth in business and other services, driven by the UK's comparative advantage, large investment into the sector and technological progress. The sector is forecast to experience annual output growth rates of 2.4%, just above the UK average of 2.2%, which is a moderation of its rate of growth in the previous decade. Meanwhile, annual productivity growth is estimated at 1.4%, slightly lower than the UK average of 1.7%. Due to the sector's large size, this means that the sector as a whole is projected to report the highest absolute employment growth, adding just over 1.0 million workers to the British workforce between 2014 and 2024, although this increase is, again, lower than in the previous decade.

Four of the industry groupings register lower percentage employment growth rates than the UK average of 5.5%. These are **media** (-1.3%), **real estate** (1.8%), **finance & insurance** (2.7%), and **other services** (3.5%). However, the remaining sectors, which will be discussed in turn below, have fairly high percentage growth rates.

The standout industry group is **professional services**. One of its subcategories, **head offices and management consultants**, register both the highest percentage growth (29.9%) and the highest net employment growth (245,000 workers) of any of the 75 industries in the dataset. This category comprises the provision of advice and assistance to client businesses on a range of management issues (management consultancy activities) and the overseeing and managing of units of companies (head offices activities).[15] Another subcategory, **architectural and engineering activities**, should also be highlighted with an increase of 80,000 workers (13.1%).

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[15] http://siccodesupport.co.uk/sic-division.php?division=70

Figure 8. Employment trend and projections in professional services. Source: UKCES
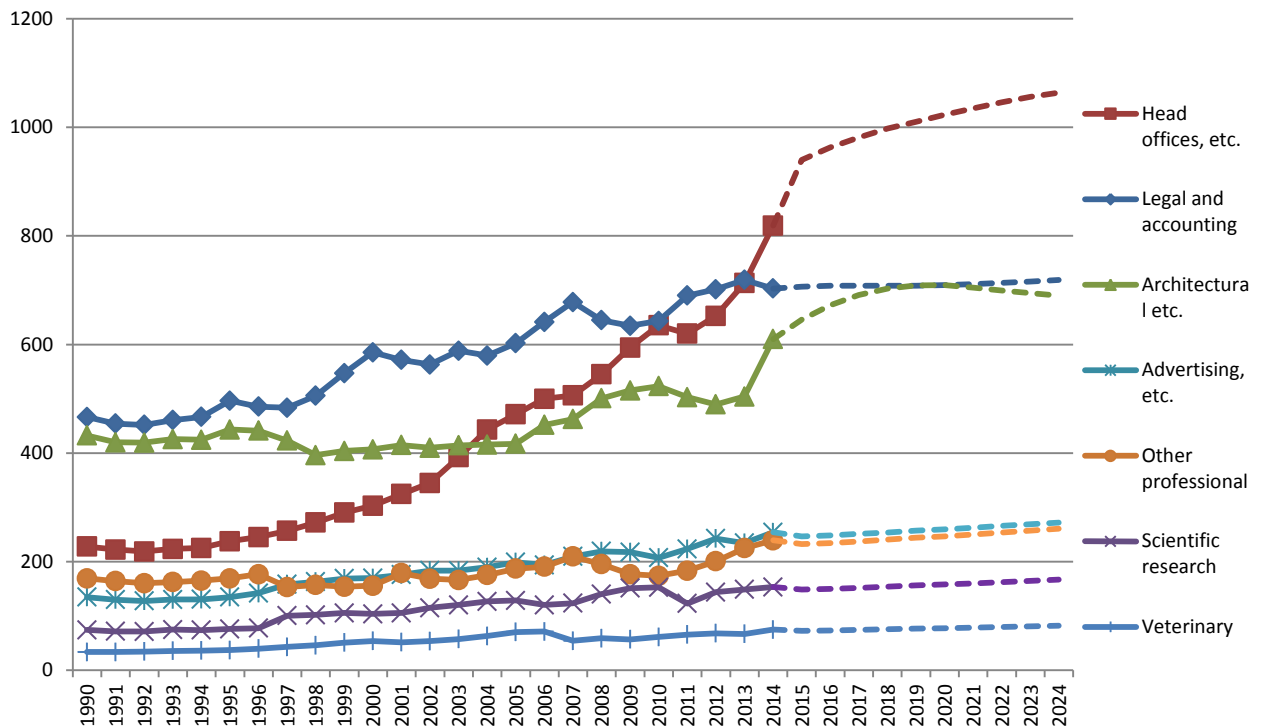
The industry category **information technology** is projected to grow by 13.9% over the 10-year period. As Figure 9 below shows, employment levels in this category expanded substantially in the late-1990s during the internet boom, but have experienced relatively modest increases in employment since then. However, the increase since 2012 is projected to mark the beginning of a new period of employment expansion driven by factors such as the economy-wide digitisation, the increasing risk of cyber threats, mobile and cloud computing, new business models, and big data (Dass et al. 2015). In particular, **computing services** (encompassing computer programming, computer consultancy and related activities), are projected to grow by 106,000 workers, an increase of 16%. **Telecommunications** and **information services** add a further 31,000 and 16,000 workers, respectively, to the economy by 2024.

Figure 9. Employment in information technology. Source: UKCES
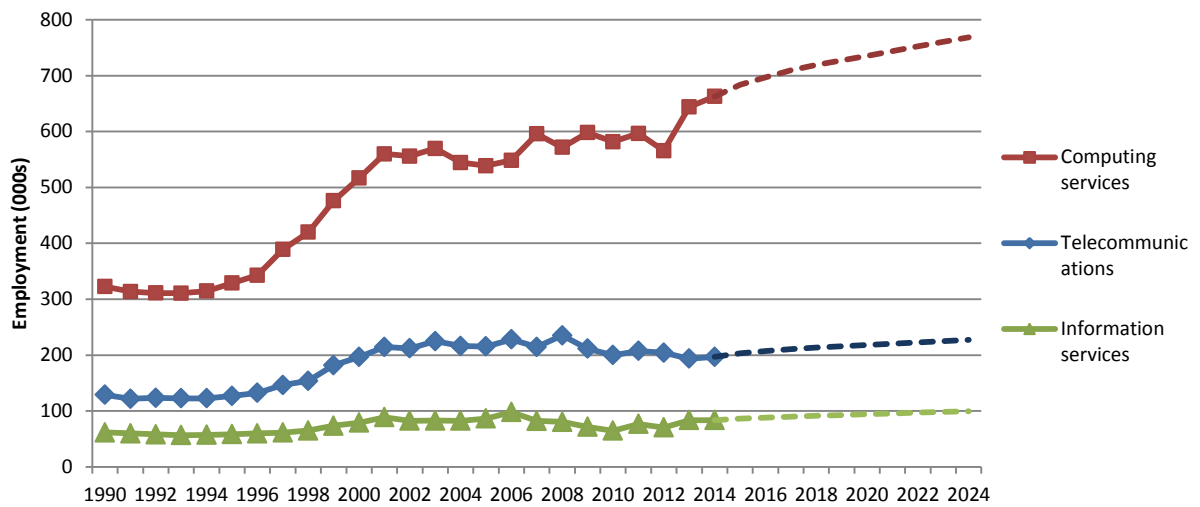
In support services, all sub-industry groupings are registering growth rates of between 9-14%. The largest sub-industry in this category is **employment activities** (activities of agencies providing permanent and temporary job placements, as well as other HR provision for client businesses), which add 116,00 workers to the economy.

Figure 10. Employment trends and projections in support services. Source: UKCES
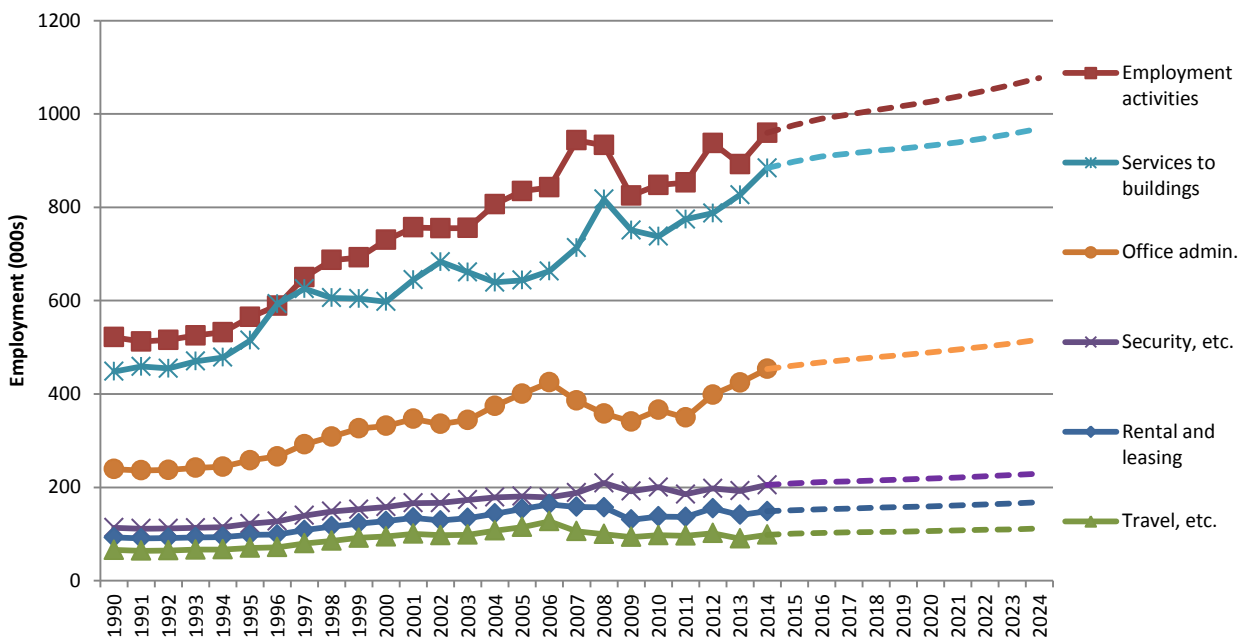
The arts and entertainment category is a relatively small sector in absolute terms, but the two subcategories **arts & entertainment** and **libraries, archives, museums, and other cultural activities** register growth rates above 20%. These categories are part of a broader category, which is sometimes referred to as 'creative industries', which according to a definition by the Department of Culture, Media and Sport include specific subindustries within advertising and marketing, architecture, design, film and TV, computer services,

museums and galleries, music and performing arts, and publishing.[16] The Department for Culture, Media and Sport publishes the annual *Creative Industries Economic Estimates*, which details the employment growth rates for each of these creative industries. The most recent report from 2016, for the period between 2011 and 2015, shows a 19.5% increase in employment levels across the creative industries, with notably high employment growth rates above 20% in advertising and marketing, design, computer services, as well as music, performing and visual arts. Although the categories are different, this trend is broadly expected to continue, according to the UKCES projections for computing services, advertising, arts & entertainment, and libraries and museums, all recording high percentage growth rates. A main factor in the projected employment growth for the creative occupations is that these are likely to be more resistant to automation, which is the main finding in a study of the UK creative industries by Bakhshi, Frey and Osborne (2015). They explain that computers and robots struggle to emulate human labour in highly interpretive tasks where the final form of the product is not fully specified in advance (Bakhshi, Freeman and Higgs 2013), or where tasks require high degrees of social intelligence, such as negotiation, motivation and persuasion, or where it is crucial to create novel products of value. As a counterargument, it is) argued that even in creative industries, robots are likely to make significant inroads, citing the ability of software to produce original music. The advantage of computers when creating original products could be its lack of preconceptions, which is conducive to "outside-the-box" approaches (Ford, 2015).

Figure 11. Employment trends and projections in arts and entertainment. Source: UKCES
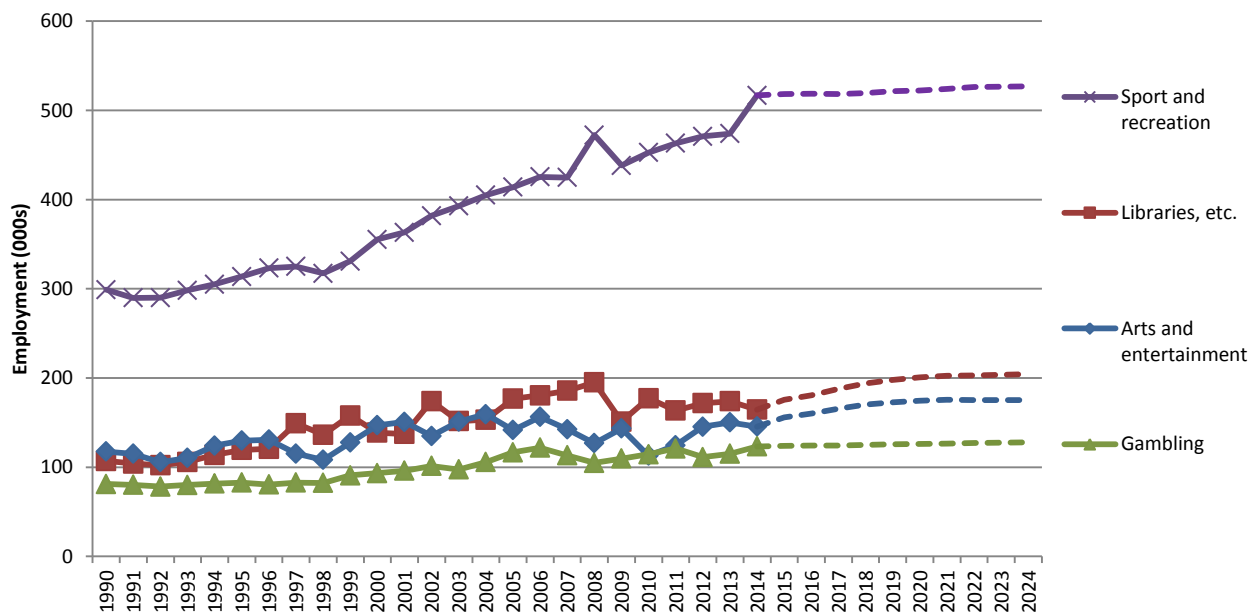
For purposes of overview, Figure 12 below lists the industries in business and other services in descending order, highlighting **head offices and management consultancy** as the, by far, largest-growing industry in terms of absolute employment growth in the forthcoming decade.

Figure 12. Employment change 2014-2024. Source: UKCES
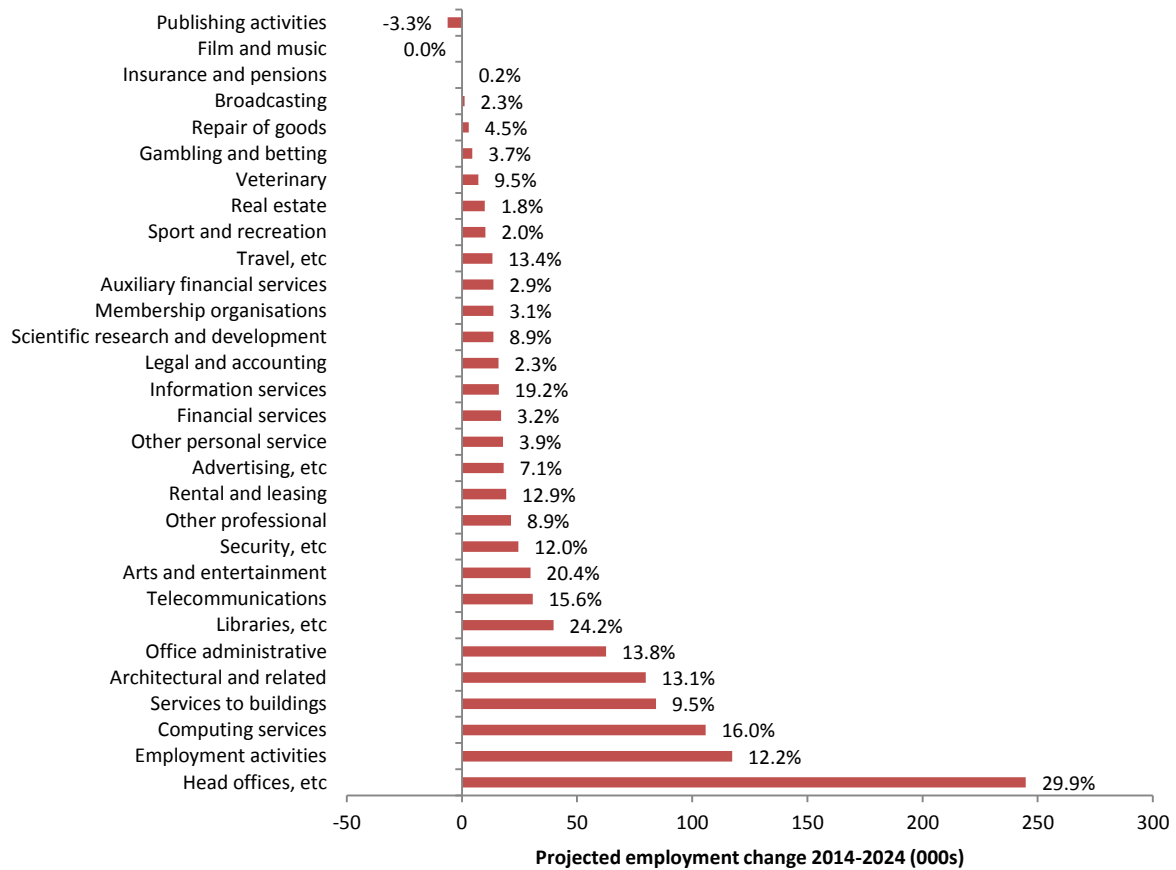
The subcategories in the Cedefop data (see Appendix 2) are different to the subcategories in the UKCES data, but the picture is largely similar. **Legal, accounting and consulting services** is highlighted as a high-growing industry in terms of employment (360,000 workers, 30.7% increase), which is similar to the UKCES data's projection of substantial employment growth in the professional services. The more detailed UKCES data highlighted that consulting services amounted to most of this increase. Cedefop also highlights **Admin and support services** as a high-growing industry, with the addition of 478,000 workers, an increase of 18.9% over the 10-year period. This is broadly aligned with the UKCES projection of the support services, where the underlying data specifically highlights high employment growth rates in employment activities, services to buildings and office administration.

Likely impact of Brexit

A large part of the success of the private service sector in the UK has been attributed to British openness to the world, and as such, Brexit could potentially make substantial inroads into revenues and employment in the sector. As in other sectors, much depends on the

outcome of the negotiations, including the future trading relationship with the EU, the access to the Single Market, and any restrictions to acquiring global talent. Interestingly, the short-term outlook seems good, as law firms and consultancies are recruited to help clients to navigate the uncertain Brexit landscape, setting up specialist units and helping unplugging 43 years of membership, regulation and laws.[17] Hence, the business volumes and profits have remained mostly unchanged, but surveys amongst accountants, lawyers and consultants in professional service firms show a low confidence in growth expectations and expansion plans, reflecting the long-term insecurities. In an Economist article, Mark Paulson of the Law Society describes this difference in the short-term and long-term outlook for the sector: "It's a bit like being a doctor in a plague year; you'll be busy for a while, but it doesn't bode well for the long-term". As such, it is estimated that the employment projections are associated with a negative risk, but it crucially depends on the outcome of the Brexit negotiations during the coming years.

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[17] See for instance: https://www.procurementleaders.com/brexit-resources/brexit-resources/analysis-big-demand-for-big-fours-services-following-uk-brexit

4.6 Non-Marketed Services

Figure 13. Historical and projected employment levels 1990-2024 in non-marketed services. Source: UKCES
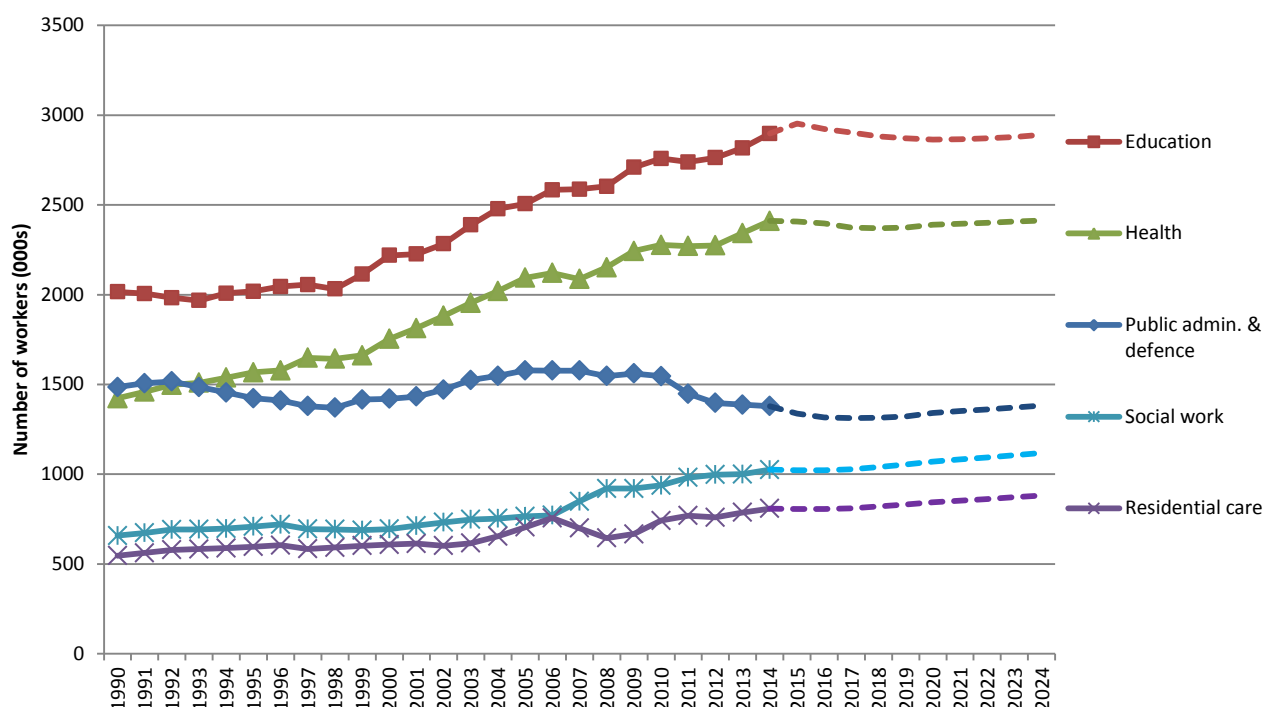
Overall, the UKCES data predicts output growth of 1.8% per annum, with annual productivity growth at 1.7%. This results in a total net employment growth rate over the decade at 1.9%, amounting to 164,000 workers, representing a stagnation compared to the previous decade. Most notably, the UKCES forecast projects a stagnation in employment growth in education and health, which historically have grown substantially, both since 1990 as Figure 13 above shows, but also more generally over the last 50 years (Crib, Disney and Sibieta 2014). Together, the NHS and public education workforce accounted for 23% of the public sector workforce in 1961, 42% in 1991, and 57% in 2013 (ibid).

Generally, demographic change (population growth; ageing population) has a significant impact in the non-marketed service industry. This is the main driver behind the projected employment growth in **social work** by 94,000 workers (9.1% increase) and **residential care** by 73,000 workers (9.0%), and in the longer term UKCES expects such developments to cause an increase in employment in most of the non-marketed services. However, this sector is heavily dependent on government decisions, which to a large extent determines the demand for its services. The main driver behind the projection of a stagnation in public sector activities is the government's commitment to decrease public spending. In this regard, it should be noted that since the UKCES forecast was published, the previous Chancellor George Osborne first effectively abandoned the plan to return government finances to a surplus by 2020, whilst the new Chancellor Philip Hammond has announced a "reset" of fiscal policy. The details of this "reset" is not likely to be fully specified until the Autumn Statement in November 2016, but it is likely to at least involve abandoning the fiscal charter,

although this may not amount to the end of austerity, as the Prime Minister Theresa May is still committed to balancing the fiscal deficit eventually.[18]

Generally, health and social work may represent one of the sectors with the highest demand for its services, reflecting the underlying dynamics of population growth and ageing. In the short term, UKCES expects government policies and economic conditions to impact heavily on the underlying dynamics, whilst over the longer term, the health and social work industry may represent one of the highest growing sectors in terms of employment. This short-term vs. long-term distinction is reflected in the UKCES forecast data, where employment levels in education, health and public administration are projected to stagnate or fall slightly from 2014 to 2019, but then increase slightly between 2019 and 2024. Over the longer run, UKCES expects this trend to continue as an ageing and growing population increases demand for services.

Although it is considered highly likely that employment in health and social care will increase in the longer run, several uncertainties should be noted. In particular, even in the longer term, the government will continuously face competing financial pressures on prioritising public spending due to growing social transfer payments, pension burdens and public debt (UKCES 2014). Furthermore, whilst Frey and Osborne rank health and social care as one of the sectors with the least risk of job automation, reflecting the fact that personal care and service occupations are hard to automate, the impact of technologies may be accelerated by future governments' need to seek savings in public spending (UKCES 2015). For instance, Deloitte (2014) argues that health technologies could change the way doctors and patients interact, through electronic medical records, telemedicine, mobile health apps and electronic prescriptions, whilst telecare could transform social care services.

At the outset, the **education** sector stands to benefit from the developments in the labour market, where people are increasingly required to invest in more upskilling. At the same time, education is ranked as one of the occupations with the lowest risk of automation by Frey and Osborne. The most likely area to be affected in terms of employment levels is arguably further education, but online learning has, as of yet, proved relatively unsuccessful, with the specific problem that qualifications acquired through "mass education" is not yet widely recognised (Ford 2015). Furthermore, as Figure 13 above shows, the upward trend in educational employment is consistent since the beginning of the millennium. Nevertheless, employment in education is projected to stagnate in the UKCES projections, attributed in the report to be driven mostly by the anticipated decrease in public spending, with an expectation of employment growth over the longer term.

Finally, the Cedefop forecast (see Appendix 2) is broadly aligned with UKCES' forecast. Employment levels in education, public administration and defence are stagnating, but health and social work experience an increase of 274,000 workers, which is somewhat larger than the increase of 170,000 workers projected by UKCES, possibly due to different assumptions about future public spending in health and social care.

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[18] https://www.ifs.org.uk/publications/8391

Likely impact of Brexit

The NHS employs around 55,000 EU nationals equating to around 5% of the total workforce.[19] An additional 80,000 is employed in the adult social care sector. These numbers are not particularly high relative to the rest of the economy, but they mask some quite substantial geographical differences between Trusts (Marangozov and Williams 2016). In addition, with shortfalls in the labour supply of various specialities including nursing and doctors, EU staff remains integral in solving recruitment problems and plugging gaps in the workforce. As such, potential future restrictions on the freedom of movement within the EU could have vast consequences for employment levels in the NHS and in the social care sector. Of course, this could be offset by international recruitment outside the EU from countries such as India and the Philippines (the Migration Advisory Committee's decision to put nursing on the Shortage Occupation List earlier this year will help), or alternatively the gap could be offset by a more sustained and longer-term investment in creating a larger domestic supply of nurses and doctors (ibid.). In any case, without any changes from existing workforce planning policies, a restriction in EEA immigration could have consequences for the employment levels in the sector despite high demand for its services.

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[19] http://www.kingsfund.org.uk/publications/articles/brexit-and-nhs

Section 5: Identification of industries with high future employment growth

The objective of this report is to identify three industries in the UK labour market that are deemed to experience high absolute employment growth in the future. Naturally, the identification is not an exact science: In some sectors we can be fairly confident that any unexpected social, political and economic events will not substantially alter the future employment prospects, whilst other sector forecasts may be more vulnerable to unexpected developments. Therefore, in addition to identifying three high employment growth sectors in the UK labour market, based on the data in *Working Futures* (UKCES 2016), the report also includes a list of "industries to watch." Table 4 below provides a brief summary of the future employment prospects in the three industries (see Figure 14 on page 39 for a full overview of the 75 industries in the UKCES data).

Table 4. Industries with high absolute employment growth

Sector	Description
Food and beverage services	Employment in this industry (i.e. traditional restaurants, take-away restaurants, catering, pubs/bars etc.) is projected to increase by 18%, adding 311,000 workers to the economy by 2024, according to the UKCES projections. This would mark a continuation of the current trend of consumers' ever-growing interest in food and dining out, helped by increasing population levels. The negative risk to this forecast is that food and beverage services are among the sectors deemed at highest risk of automation, in particular fast food restaurants. A couple of additional factors may incentivise employers in the sector to accelerate their investment in labour-saving technologies. First, the sector employs a high share of workers who will be affected by the National Living Wage by 2020, which will raise labour costs. Second, a high share of the workforce are EU migrants, which means that any potential immigration restrictions after Brexit could create labour shortages in the sector.
Head offices, management consultancy	Leading the rise of jobs in professional services, this category of workers is projected to increase by around 245,000 – an increase of almost 30%, the highest percentage increase for any single of the 75 categories. The category includes the provision of advice and assistance to client businesses, as well as the overseeing and managing of units of companies. The projected employment growth reflects a continuation of a now relatively long-term trend in professional services, fuelled by the UK's comparative advantage, its openness to foreign markets, its English language, and its supportive business environment. Whilst Brexit in the short-term could impact positively on employment growth, as management consultants are recruited to help clients steer through a challenging landscape, the eventual outcome of the Brexit negotiations could have a negative impact on trade openness and attraction of global talent, which could lead to a loss in business to overseas, a loss of revenue and consequently employment.
Retail trade	Employment in retail trade is projected to increase by 7.4%, adding 225,000 workers to the retail workforce, according to the UKCES projections. The main reason behind the projected employment growth is population growth, which increases the demand for retail services. However, it should be noted that there are several negative risks to this projection, reflected in the much gloomier employment forecasts by Cedefop and the British Retail Consortium (BRC). The BRC highlights the combined impact of structural changes in the industry (rising labour costs, in particular), store closures and productivity improvements as factors, which could lead to a substantial reduction in employment over the next decade. Furthermore, the UK's decision to exit the EU may have negative consequences. In particular, the devaluation of the pound is expected to eventually feed through to import prices, leading to higher prices in the UK economy and a reduction in household spending power. This could cause reduced economic activity, hitting the retail sector and causing declining employment levels.

In light of the substantial uncertainties involved in forecasting, Table 5 below lists a few "industries to watch", which are also identified in the UKCES data as experiencing high employment growth.

Table 5. "Industries to watch"

Sector	Description
Construction	Construction has the largest percentage growth rate of the six broad sectors in the UKCES data (14.4%), with an estimated absolute employment growth of 301,000 workers. The underlying dynamic of a growing population (which increases the demand for housing and infrastructure projects) points towards growth in investment, output and consequently employment. But the outlook for the industry relies on political decisions on public spending, which are hard to predict. On the positive side is the new government's focus on an industrial strategy, including government-backed infrastructure bonds and more house-building projects, its backing for a trans-Pennine road tunnel, and its decision to proceed with the Hinckley Point nuclear power project. The historical low interest rates close to zero also provide a favourable environment for large investment decisions. On the negative side is the economic and political turmoil provided by the UK's decision to leave the EU, which could cause investors to delay projects in the short term. Generally, construction is notoriously volatile, often overreacting to wider economic developments, so any negative impact on the UK growth rates could negatively impact the construction sector. Finally, the sector will lose the access to the funding from the European Investment Bank and the European Investment Fund, but this could be compensated by an alternative domestic funding mechanism, depending on government priorities.
Health and social work	Like construction, health and social work is affected heavily by political decisions. In particular, in the short-term it is expected to be affected by constraints on public spending, resulting in the UKCES forecast over the next decade to be relatively modest, predicting a 4.0% employment increase, amounting to an additional 169,000 workers. However, the underlying dynamic of demographic change (population growth and population ageing) means that in the longer term, employment levels among health and social workers are very likely to increase substantially. Whilst some jobs are at risk of automation, the sector comprises many personal care and service occupational jobs and tasks, which require human interaction and is therefore deemed at a lower risk of automation, although future governments' need to seek savings in the healthcare budget could pave the way for the accelerating use of healthcare technologies. Meanwhile, the UK's exit from the EU could potentially worsen current shortages and recruitment difficulties, which could have an impact on labour supply.
Information technology	This industry is projected by UKCES to register record high percentage growth numbers (16.2%), and in particular computing services ranks high in terms of projected net employment growth. Overall, UKCES forecasts 153,000 additional workers in information technology. The growth prospects of this industry are less uncertain than many of the other industries flagged up in this report, particularly in the longer term. The jobs in this sector are, almost by definition, not at a high risk of automation. The sector also has the potential to suddenly grow much faster than expected as it penetrates into all sectors of the UK labour market.

Figure 14. Employment change 2014-2024. Source: UKCES

Sector	Change
Agriculture, etc [01-03]	-109
Land transport, etc [49]	-99
Machinery n.e.c. [28]	-62
Metal products [25]	-45
Computer, etc [26]	-36
Rubber and plastic [22]	-18
Motor vehicles, etc [29]	-17
Basic metals [24]	-13
Pharmaceuticals [21]	-12
Wearing apparel; Leather, etc [14-15]	-12
Textiles [13]	-12
Wood and cork [16]	-10
Other non-metallic [23]	-9
Food products [10]	-8
Paper, etc [17]	-8
Education [85]	-7
Publishing activities [58]	-6
Other transport equipment [30]	-6
Printing and recording [18]	-6
Coke and petroleum; Chemicals, etc [19-20]	-5
Electrical equipment [27]	-5
Water transport [50]	-4
Beverages and tobacco [11-12]	-1
Film and music [59]	0
Insurance and pensions [65]	0
Broadcasting [60]	1
Sewerage [37]	2
Public administration and defence [84]	2
Health [86]	3
Water [36]	3
Air transport [51]	3
Repair of goods [95]	3
Coal, oil & gas; Mining & related [05-09]	4
Gambling and betting [92]	5
Motor vehicle trade [45]	5
Veterinary [75]	7
Waste management [38-39]	9
Real estate [68]	10
Sport and recreation [93]	10
Accommodation [55]	12
Repair and installation [33]	13
Travel, etc [79]	13
Auxiliary financial services [66]	14
Membership organisations [94]	14
Scientific research and development [72]	14
Furniture [31]	15
Legal and accounting [69]	16
Information services [63]	16
Other manufacturing [32]	16
Financial services [64]	17
Other personal service [96]	18
Advertising, etc [73]	18
Rental and leasing [77]	19
Electricity, gas, etc [35]	20
Other professional [74]	21
Security, etc [80]	25
Arts and entertainment [90]	30
Telecommunications [61]	31
Libraries, etc [91]	40
Postal and courier [53]	41
Civil engineering [42]	42
Warehousing, etc [52]	45
Office administrative [82]	63
Residential care [87]	73
Architectural and related [71]	80
Services to buildings [81]	84
Social work [88]	94
Construction [41]	98
Computing services [62]	106
Wholesale trade [46]	106
Employment activities [78]	117
Specialised construction [43]	160
Retail trade [47]	225
Head offices, etc [70]	245
Food and beverage services [56]	311

Section 6: Worker characteristics

This section will briefly analyse worker characteristics in the highlighted sectors in order to inform the subsequent market research for Unions21. Based on the UKCES data, Table 6 provides a breakdown of the occupational structures, qualifications, gender and job types for each industry, whilst Table 7 highlights the union density as well as the percentage of employees whose pay and conditions are affected by collective bargaining.

Table 6. Worker characteristics by selected industries in 2014 (proportion in %). Source: UKCES

	All industries	Retail trade	Food and beverage services	Head offices; Manage. consultancy	Construction	Health and social work	Information technology
Gender							
Male	52.5	40.8	48.9	55.7	86.9	20.9	74.0
Female	47.5	59.2	51.1	44.3	13.1	79.1	26.0
Job type							
Full-time	58.2	40.3	39.7	68.0	53.6	51.0	79.7
Part-time	28.1	51.4	54.5	20.6	6.6	40.7	8.6
Self-employed	13.7	8.2	5.8	11.4	39.8	8.3	11.7
Occupation							
Managers and Senior Officials	10.0	11.8	13.3	12.9	8.4	4.3	15.5
Professional Occupations	19.9	7.0	2.3	35.7	8.9	30.9	41.8
Associate Prof. & Technical Occ.	14.0	7.6	3.2	22.5	6.7	12.6	19.9
Adm, Clerical & Secretarial Occ.	10.7	6.2	4.2	19.4	7.5	9.5	6.7
Skilled Trades Occupations	10.9	5.4	16.2	3.0	54.0	1.3	7.1
Personal Service Occupations	9.4	0.5	4.0	0.3	0.1	36.7	1.7
Sales & Customer Service Occ.	7.8	47.1	6.1	3.4	1.6	1.2	4.4
Transport & Machine Operatives	6.2	3.5	2.7	1.2	7.9	0.6	1.1
Elementary Occupations	11.0	10.8	48.0	1.6	4.8	2.9	1.8
Highest qualification							
QCF 7-8	9.4	2.6	2.7	18.3	3.1	9.5	13.9
QCF 4-6	31.7	19.6	22.3	48.1	17.9	43.4	49.7
QCF 3	20.0	23.9	21.5	12.0	31.0	19.7	13.1
QCF 2	19.9	26.2	27.4	11.8	25.4	18.5	11.2
QCF 1	13.5	18.7	18.8	7.8	15.6	7.1	9.6
No qualification	5.4	8.9	9.0	2.2	6.9	1.7	2.4

Table 7: Trade union membership in 2015 as a proportion of those in employment, (%) and collective bargaining coverage in 2015 as proportion of those in employment (%).

	All industries	Retail trade	Food and beverage services	Head offices; Manage. consultancy	Construction	Health and social work	Information technology
Union membership	21.9	14.1	3.7	6.5	8.5	38.9	7.5
Collective bargaining	27.8	18.3	6.0	8.6	15.2	37.3	10.3

Source: Analysis based on Labour Force Survey 2015. Not seasonally adjusted.

Table 8 below provides information on what specific groups are projected to experience high increases and decreases in employment levels, in absolute terms and percentage growth terms, respectively. See Appendix 3 for detailed tables on the absolute and percentage changes in each sector by each group.

Table 8. Worker characteristics. Percentage and absolute changes. Source: UKCES

	All industries	Retail trade	Food and beverage services	Head offices; Manage. consultancy	Construction	Health and social work	Information technology
Gender							
Male	+	+	+	+	+		
Female	+		+	+		+	
Job type							
Full-time	+	+	+	+	+		
Part-time	+	+	+			+	
Self-employed							
Occupation							
Managers and Senior Officials	+						
Professional Occupations	+			+		+	
Associate Prof. & Technical Occ.	+						
Adm, Clerical & Secretarial Occ.	-					-	
Skilled Trades Occupations					+		
Personal Service Occupations	+					+	
Sales & Customer Service Occ.							
Transport & Machine Operatives	-						
Elementary Occupations	+		+				
Highest qualification							
QCF 7-8	+						
QCF 4-6	+	+	+	+	+	+	+
QCF 3	-						
QCF 2	-						
QCF 1	-	-	-			-	
No qualification	-	-	-				

More than 15% increase

More than 15% decrease

+ More than 100,000 worker increase

- More than 100,000 worker decrease

Union membership levels and collective bargaining coverage (those whose pay and conditions are affected by agreements between trade union and employer) are not included in the UKCES forecasting data, but the two graphs below provide a description of the historical trends in the previous decade, based on analysis of the LFS.

Figure 15. Union membership as proportion of those in employment (%). Not seasonally adjusted[20]
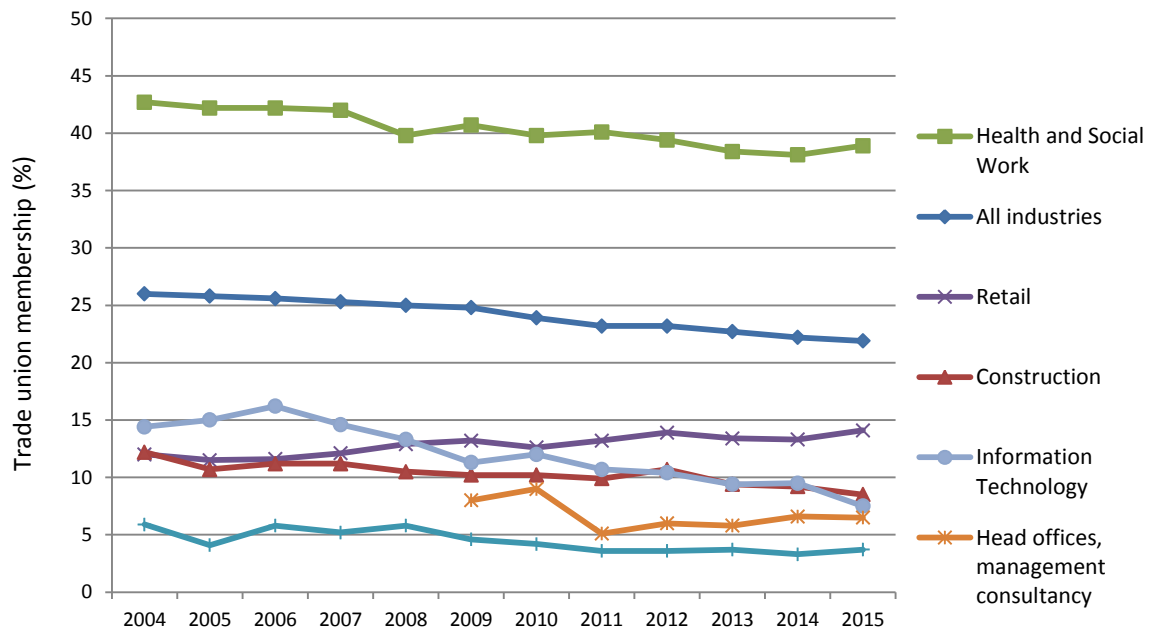
Figure 16. Collective bargaining coverage as proportion of those in employment (%). Not seasonally adjusted

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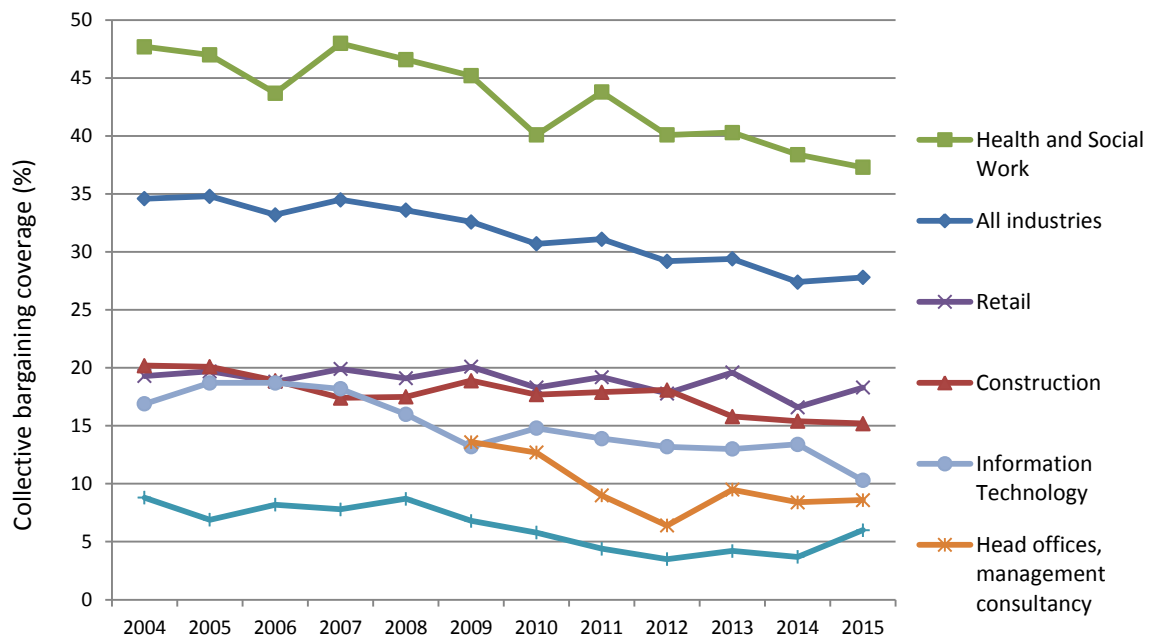
[20] Note that for information technology, the average numbers mask some substantial differences between telecommunications (with relatively high union membership around 26% in 2014) and computing services (with low union membership levels around 4.6% in 2014). Similarly, health care lies around 50%, whilst social care is around 26%.

Retail trade – summary of worker characteristics[21]

Occupations

Sales and customer service occupations will remain by far the largest occupational group in the retail trade industry, according to the UKCES data, although it is projected to experience a reduction of 50,000 workers over the 10-year period. This means that whilst sales and customer service occupations accounted for 47.1% of workers in retail in 2014, this number will decrease to 42.4% in 2024. The twin processes of the automation of checkout processes and the turn to online retailing are behind this shift (UKCES 2014). Instead, the UKCES data points towards the growth of managers and senior officials, professional occupations, associate professionals & technical occupations, and elementary occupations. The growth of managers and senior officials will be moderated by the restructuring of the industry, with the closure of many small retailers and online retailing favouring large companies (ibid).

Qualifications

There is projected to be large changes in the qualification structure in the retail industry within the next 10 years. UKCES estimates a total reduction of 359,000 workers with either no qualification or GCSE & equivalent, whilst other qualification categories are set to increase. In particular, the amount of workers in retail with a first degree is projected to increase by 89%, equivalent to 328,000 workers, reflecting the occupational shift.

Gender

The industry continues to be slightly dominated by women, although the greatest employment growth over the 10-year period is expected to be among men, with an increase of around 182,000 workers compared to an additional 42,000 female workers.

Job types

The number of full-time and part-time workers are both projected to increase, by 9.4% and 10.3% respectively. Thus, the proportion of full-time workers vis-à-vis part-time workers will remain fairly constant, with full-time workers accounting for around 40% of the industry, whilst part-time workers account for 52%. Meanwhile, the number of self-employed workers in the retail trade are projected to decrease by around 49,000 workers (19.8%), accounting for around 8% of workers. The reduction is likely to be caused by the closure of many small businesses in the retail sector. Finally, it should be noted that the rise of zero hours contracts and similar contractual designs could impact substantially on the retail sector, which is pressured on rising costs and falling prices, as well as the demand for a flexible workforce.

Union membership density and collective bargaining coverage

Throughout the last decade, union membership density has remained relatively stable between 12-14% in retail trade. Similarly, the proportion of those whose pay and conditions are impacted by collective bargaining agreements have remained fairly constant at just under 20% most of the decade.

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[21] Annex 3 includes detailed tables for each industry based on the data in UKCES (2016)

Food and beverage services – summary of worker characteristics

Occupations

UKCES projects employment growth across almost all occupations. In terms of percentage growth rates, the most significant increases are recorded among managers and senior officials, professional occupations, associate professionals, and personal services occupations. However, the industry remains **dominated by workers in elementary occupations**, which are set to increase by 19.8%, or by 162,000 workers, taking the total to almost 1.0 million workers, accounting for 48.6% of employment in the industry.

Qualifications

Substantially more people with higher education, foundation degrees and first degrees will obtain employment in the food and services industry by 2024 (461,000 additional workers) reflecting the occupational shift. Meanwhile, the industry will become less dominated by workers with A-level and lower qualifications, although in 2024 this group still cumulatively account for 57.4% of workers.

Gender

The number of women employed in the food and beverage service industry is projected to increase slightly more than for men (190,000 increase compared to 121,000), meaning that slightly more women than men will continue to work in this industry in 2024.

Job types

The food and beverage service industry continues to be dominated by full-time and part-time jobs in 2024, increasing with 144,000 workers (21.3%) and 145,000 workers (15.6%) respectively. In contrast, the number of self-employed workers increases only modestly in absolute terms, accounting for around 6.0% of the workforce in 2024, making it one of the lowest rates of self-employment. There continues to be marginally more part-time workers than full-time workers, with just under 1.1 million part-time workers vis-à-vis 820,000 full-time workers.

Union membership density and collective bargaining coverage

Trade union levels in the food and beverage services remains minimal. Union membership density has declined from 5.9% in 2004 to 3.7% in 2015, whilst the proportion of those whose pay and conditions are affected by collective bargaining agreements has fallen from 8.8% to 6%.

Head offices, management consultants – summary of worker characteristics

Occupations

This industry is heavily dominated by four occupations: managers and senior officials, professional occupations, association professional and technical occupations, as well as administrative, clerical and secretarial occupations. Together these four groups account for around 91% of workers in both 2014 and 2024. It is the biggest of these groups – professional occupations – which accounts for the largest absolute employment growth over the 10-year period, with the addition of 114,000 workers (a 39% increase). The only of the four main occupational groups that do not experience employment growth of around 40% is the administrative, clerical, and secretarial occupations, which continue the previous trend of relatively stagnant employment growth, highlighting the dominance of the highest-skilled occupations in the industry.

Qualifications

The industry will be even more dominated by workers with first degrees and other higher degrees in 2024. In particular, UKCES projects there will be an additional 184,000 workers with a first degree in 2024, which means that the group will account for almost half of the workforce.

Gender

There continues to be slightly more men than women in the industry in 2024, with the male workforce projected to amount to 594,000 workers (56% of workers) and women for 469,000 workers (44% of workers). This is roughly the same proportions as in 2014, as both female and male workers register similar percentage increase over the 10-year period (around 30%).

Job types

The three different job types all experience similar growth rates over the 10-year period (around 30% increases). This means that the largest group of full-time workers represent the largest employment increase with an estimated expansion of 172,000 workers. Full-time workers make up around 69% of the industry in 2024, part-time workers 20% and the self-employed 11%, largely the same proportions as in 2014.

Union membership density and collective bargaining coverage

The sample set prior to 2009 was deemed to be too small to make a reliable estimate, whilst the data from 2009 onwards show low trade union levels. The union membership density falls from 8% in 2009 to 6.5% in 2015, whilst collective bargaining coverage falls from 13.6% in 2009 to 8.6% in 2015.

Key points

- In their most recent employment trend forecast from April 2016, the UK Commission for Employment and Skills' (UKCES) *Working Futures* report predicts employment growth of 5.5%, equivalent to 1.8 million workers, between 2014 and 2024.

- At the sectoral level, the data points towards employment decline in manufacturing and the primary sector and utilities, but employment growth in construction; trade, accommodation and transport; and the private service sector. Public services are projected to experience some employment growth, but its long-term growth potential is tempered by expected public spending restraint over the forecasting period.

- This report highlights three potential growth industries based on the UKCES data, with an additional three industries to watch. These are:

- **Head offices, management consultancy**. Leading the rise of jobs in the professional services, the projected growth among management consultants reflects the UK's comparative advantage and its supportive business environment. However, the UK's exit from the UK could have a negative impact on trade openness and attraction of global talent, which could lead to a slowdown in employment growth.

- **Food and beverage services**. UKCES projects a continuation of the trend towards increased employment levels in the sector, fuelled by increasing population levels and consumers' ever-growing interest in food and dining-out. The negative risk to this forecast is the possibility of automation of jobs, with rising labour costs and potential future immigration restrictions possibly incentivising employers to invest in labour-saving technologies.

- **Retail trade**. The sector is highlighted as one of the largest-growing in the UK economy by UKCES, but it should be noted that there are several negative risks to this projection, including structural changes in the industry (rising labour costs, in particular), store closures and productivity improvements, which could all lead to reductions in employment levels.

- **Construction.** The underlying dynamic of a growing population (increasing demand for housing and infrastructure projects), as well as historically low interest rates, point towards growth in the construction sector. The outlook for employment, however, relies crucially on public spending decisions, and could also be negatively impacted by economic uncertainty and loss of funding caused by Brexit.

- **Health and social work.** The underlying dynamic of demographic change (population growth; population ageing) means that in the longer term, employment is likely to increase substantively, particularly because the sector comprises many personal care and service occupational jobs and tasks deemed at a relatively low risk of automation. However, in the short-term public spending restraint is likely to temper employment growth in the sector.

- **Information technology.** UKCES expects the sector to register high growth rates in the coming decade in an industry which has the potential to grow much faster than expected as it penetrates into all sectors of the UK labour market.

References

Bakhshi, H., Frey, C. and Osborne, M. (2015) Creativity vs. robots: the creative economy and the future of employment, Nesta, April 2015. https://www.nesta.org.uk/sites/default/files/creativity_vs._robots_wv.pdf

Bamfield, J. (2015) What does the government's living wage mean for UK retail? Centre for Retail Research. http://www.retailresearch.org/livingwage.php

Barbour ABI (2016) Economic & Construction Market Review. http://www.barbour-abi.com/economic-and-construction-market-review/

Barnett, A. Batten, S., Chiu, A., Franklin, J, and Sebastia-Barriel, M. (2014) The UK productivity puzzle, Quarterly Bulletin 2014 Q2, Bank of England Monetary Analysis Directorate, http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q201.pdf

Bean, C.B. (2016) Independent Review of UK Economic Statistics, March 2016. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507081/2904936_Bean_Review_Web_Accessible.pdf

British Retail Consortium (BRC) (2016) Retail 2020: Fewer but better jobs, February 2016. http://www.brc.org.uk/downloads/Retail_2020_(final).pdf

Centre for Retail Research (2015) Online Retailing: Britain, Europe, US and Canada 2015. http://www.retailresearch.org/onlineretailing.php

Department for Culture, Media and Sport (2016): Creative Industries Economic Estimates https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/534305/Focus_on_Employment_revised_040716.pdf

Downing, E. (2016) EU referendum: Impact on UK agriculture policy. http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7602#fullreport

Deloitte (2016) Transformers: How machines are changing every sector of the UK economy, http://www2.deloitte.com/content/dam/Deloitte/uk/Documents/technology-media-telecommunications/deloitte-uk-transformers-2016.pdf

Deloitte (2014) 2014 Global health care outlook: Shared challenges, shared opportunities. http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/dttl-lshc-2014-global-health-care-sector-infographic.pdf

Construction Industry Training Board (CITB) (2016) Industry Insights: Construction Skills Network Forecasts 2016-2020. https://www.citb.co.uk/documents/research/csn%202016-2020/csn_national_2016.pdf

Corlett, A. (2016) Robot wars: automation and the labour market, Resolution Foundation Briefing, July 2016. http://www.resolutionfoundation.org/wp-content/uploads/2016/07/Robot-wars.pdf

Crib, J., Disney, R. and Sibieta, L. (2014) The public sector workforce: past, present and future, Institute for Fiscal Studies, February 2014. https://www.ifs.org.uk/bns/bn145.pdf

Dass, M., Goodwin, A., Wood, M., Luanaigh, A. (2015) Sector insights: Skills challenges in the digital and creative sector, UK Commission for Employment and Skills, Evidence Report 92, June 2015. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/433755/Skills_challenges_in_the_digital_and_creative_sector.pdf

Devlin, S. (2016) Agricultural labour in the UK, Food Research Collaboration, New Economics Foundation, July 2016. http://foodresearch.org.uk/wp-content/uploads/2016/07/Agricultural-labour-briefing-FINAL-4-July-2016.pdf

European Centre for the Develop of Vocational Training (Cedefop) (2016) Forecasting Skill Demand and Supply, 2016 Skills Forecast. http://www.cedefop.europa.eu/en/publications-and-resources/data-visualisations/employment-trends

Farmer Scientist Network (2016) The implications for 'Brexit' for UK agriculture, a report for the Yorkshire Agricultural Society, January 2016. http://yas.co.uk/uploads/files/YAS_FSN_Brexit_-_Full_Report.pdf

Foresight (2013a) The Future of Manufacturing: A new era of opportunity and challenge for the UK, Project Report, The Government Office for Science, London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255922/13-809-future-manufacturing-project-report.pdf

Foresight (2013b) The implications for employment of the shift to high-value manufacturing, Future of Manufacturing Project: Evidence Paper 0, The Government Office for Science, London. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283885/ep9-shift-to-high-value-manufacturing-implications.pdf

Ford, M. (2015) The Rise of the Robots: Technology and the Threat of Mass Unemployment, Oneworld Publications.

Glover, P. and Hope, H. (2015) Preparing for Tomorrow's World of Work, in Institute for Public Policy Research (2015) Technology, Globalisation and the Future of Work in Europe, March 2015. http://www.ippr.org/files/publications/pdf/technology-globalisation-future-of-work_Mar2015.pdf?noredirect=1

Green, B. (2015) CIOB perspectives: An analysis on migration in the construction sector, The Chartered Institute of Building. http://kj06q2hv7031ix2143c36tpx.wpengine.netdna-cdn.com/wp-content/uploads/2016/01/CIOB-research-Analysis-on-Migration-in-the-Construction-Sector_0.pdf

Institute for Public Policy Research (2015) Technology, Globalisation and the Future of Work in Europe, March 2015. http://www.ippr.org/files/publications/pdf/technology-globalisation-future-of-work_Mar2015.pdf?noredirect=1

Knowles-Cutler, A., Frey, C. and Osborne, M (2014) Agiletown: the relentless march of technology and London's presence, Deloitte. http://www2.deloitte.com/content/dam/Deloitte/uk/Documents/uk-futures/london-futures-agiletown.pdf

Marangozov, R. and Williams M. (2016) How will Brexit affect the NHS? The English trusts that depend on EU nurses. http://blogs.lse.ac.uk/brexit/2016/07/29/how-will-brexit-affect-the-nhs-the-english-trusts-that-depend-most-on-eu-nurses/

McKinsey Global Institute (2013) Disruptive technologies: Advances that will transform life, business and the global economy, May 2013. http://www.mckinsey.com/business-functions/business-technology/our-insights/disruptive-technologies

McKinsey & Company (2016) Automotive revolution – perspective towards 2030. How the convergence of disruptive technology-driven trends could transform the auto industry, January 2016. http://www.mckinsey.com/industries/high-tech/our-insights/disruptive-trends-that-will-transform-the-auto-industry

Miller, V. (2016) Brexit: impact across policy areas, House of Commons Library Briefing Paper, Number 07213, 26 August 2016. http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7213#fullreport

Mokyr, J., Vickers, C. and Ziebarth, N (2015) The History of Technological Anxiety and the Future of Economic Growth: Is This Time Different?, The Journal of Economic Perspectives, 29.3 (2015), pp. 31-50.

Office for National Statistics (2009) UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007). Structure and explanatory notes. http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html

Office for National Statistics (2010) Standard Occupational Classification 2010: Volume 1: Structure and description of unit groups. http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/soc2010-volume-1-structure-and-descriptions-of-unit-groups/index.html

Office for National Statistics (2013) 2011 Census Analysis, 170 years of Industry.
http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/rel/census/2011-census-analysis/170-years-of-industry/170-years-of-industrial-changeponent.html

Office for National Statistics (2016) The feasibility of measuring the sharing economy, April 2016.
https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/thefeasibilityofmeasuringthesharingeconomy/2016-04-05

PwC (2016a) UK Economic Outlook, March 2016. https://www.pwc.co.uk/assets/pdf/ukeo/ukeo-sectoral-employment-march-2016.pdf, https://www.pwc.co.uk/assets/pdf/ukeo/uk-economic-outlook%20slides-march-2016.pdf

PwC (2016b) UK Economic Outlook, July 2016. http://www.pwc.co.uk/assets/pdf/ukeo/uk-economic-outlook-july-2016.pdf

Rhodes, C. (2015) Manufacturing: statistics and policy, House of Commons Library, Briefing Paper, Number 01942, 6 August 2015. http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN01942

Rolfe, H. and Hudson-Sharp, N. (2016) The impact of free movement on the labour market: case studies of hospitality, food processing and construction, April 2016. http://www.niesr.ac.uk/publications/impact-free-movement-labour-market-case-studies-hospitality-food-processing-and#.WBMPt-DhD7B

Shepherd and Wedderburn (2016) Brexit Analysis Bulletin: Construction and Infrastructure.
https://www.shepwedd.co.uk/sites/default/files/Brexit_Analysis_Bulletin_Construction_Infrastructure.pdf

The Economist (2016) Professional Services and Brexit: A lob and a smash, 24 September 2016.
http://www.economist.com/news/britain/21707585-law-firms-and-consultancies-enjoy-brexit-boost-probably-not-long-lob-and-smash

Thornhill, J. (2016) Humans are the main obstacle to the driverless revolution, Financial Times, 29 August 2016.
https://www.ft.com/content/e961f914-6ba3-11e6-ae5b-a7cc5dd5a28c

UKCES (2012) Sector Skills Insights: Retail, Evidence Report 53, July 2012.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304319/Sector_Skills_Insights_Retail_evidence_report_53.pdf

UKCES (2014) The Future of Work: Jobs and skills in 2030, Evidence Report 84, February 2014.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/303334/er84-the-future-of-work-evidence-report.pdf

UKCES (2016) Working Futures 2014-2024, Evidence Report 100, April 2016.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/513801/Working_Futures_final_evidence_report.pdf

Vokes, C. and Limmer, H. (2015) Sector Insights: Skills and performance challenges in the retail sector, UK Commission for Employment and Skills, Evidence Report 95, July 2015.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/466696/151008_Retail_SLMI_report_edited.pdf

Whittaker, M. (2015) What do current trends tell us about the British labour market of tomorrow, in Institute for Public Policy Research (2015) Technology, Globalisation and the Future of Work in Europe, March 2015.
http://www.ippr.org/files/publications/pdf/technology-globalisation-future-of-work_Mar2015.pdf?noredirect=1

Annex 1: Industry Groupings in UKCES data

(Standard Industrial Classification codes in parentheses)

	22 Industries		75 Industries
1	Agriculture [01-03]	1	Agriculture, etc [01-03]
2	Mining and quarrying [05-09]	2	Coal, oil & gas; Mining & related [05-09]
3	Food drink and tobacco [10-12]	3	Food products [10]
3	Food drink and tobacco [10-12]	4	Beverages and tobacco [11-12]
4	Engineering [26-28]	16	Computer, etc [26]
4	Engineering [26-28]	17	Electrical equipment [27]
4	Engineering [26-28]	18	Machinery n.e.c. [28]
5	Rest of manufacturing [13-25,29-33]	5	Textiles [13]
5	Rest of manufacturing [13-25,29-33]	6	Wearing apparel; Leather, etc [14-15]
5	Rest of manufacturing [13-25,29-33]	7	Wood and cork [16]
5	Rest of manufacturing [13-25,29-33]	8	Paper, etc [17]
5	Rest of manufacturing [13-25,29-33]	9	Printing and recording [18]
5	Rest of manufacturing [13-25,29-33]	10	Coke and petroleum; Chemicals, etc [19-20]
5	Rest of manufacturing [13-25,29-33]	11	Pharmaceuticals [21]
5	Rest of manufacturing [13-25,29-33]	12	Rubber and plastic [22]
5	Rest of manufacturing [13-25,29-33]	13	Other non-metallic [23]
5	Rest of manufacturing [13-25,29-33]	14	Basic metals [24]
5	Rest of manufacturing [13-25,29-33]	15	Metal products [25]
5	Rest of manufacturing [13-25,29-33]	19	Motor vehicles, etc [29]
5	Rest of manufacturing [13-25,29-33]	20	Other transport equipment [30]
5	Rest of manufacturing [13-25,29-33]	21	Furniture [31]
5	Rest of manufacturing [13-25,29-33]	22	Other manufacturing [32]
5	Rest of manufacturing [13-25,29-33]	23	Repair and installation [33]
6	Electricity and gas [35]	24	Electricity, gas, etc [35]
7	Water and sewerage [36-39]	25	Water [36]
7	Water and sewerage [36-39]	26	Sewerage [37]
7	Water and sewerage [36-39]	27	Waste management [38-39]
8	Construction [41-43]	28	Construction [41]
8	Construction [41-43]	29	Civil engineering [42]
8	Construction [41-43]	30	Specialised construction [43]
9	Wholesale and retail trade [45-47]	31	Motor vehicle trade [45]
9	Wholesale and retail trade [45-47]	32	Wholesale trade [46]
9	Wholesale and retail trade [45-47]	33	Retail trade [47]
10	Transport and storage [49-53]	34	Land transport, etc [49]
10	Transport and storage [49-53]	35	Water transport [50]
10	Transport and storage [49-53]	36	Air transport [51]

10	Transport and storage [49-53]	37	Warehousing, etc [52]
10	Transport and storage [49-53]	38	Postal and courier [53]
11	Accommodation and food [55-56]	39	Accommodation [55]
11	Accommodation and food [55-56]	40	Food and beverage services [56]
12	Media [58-60]	41	Publishing activities [58]
12	Media [58-60]	42	Film and music [59]
12	Media [58-60]	43	Broadcasting [60]
13	Information technology [61-63]	44	Telecommunications [61]
13	Information technology [61-63]	45	Computing services [62]
13	Information technology [61-63]	46	Information services [63]
14	Finance and insurance [64-66]	47	Financial services [64]
14	Finance and insurance [64-66]	48	Insurance and pensions [65]
14	Finance and insurance [64-66]	49	Auxiliary financial services [66]
15	Real estate [68]	50	Real estate [68]
16	Professional services [69-75]	51	Legal and accounting [69]
16	Professional services [69-75]	52	Head offices, etc [70]
16	Professional services [69-75]	53	Architectural and related [71]
16	Professional services [69-75]	54	Scientific research and development [72]
16	Professional services [69-75]	55	Advertising, etc [73]
16	Professional services [69-75]	56	Other professional [74]
16	Professional services [69-75]	57	Veterinary [75]
17	Support services [77-82]	58	Rental and leasing [77]
17	Support services [77-82]	59	Employment activities [78]
17	Support services [77-82]	60	Travel, etc [79]
17	Support services [77-82]	61	Security, etc [80]
17	Support services [77-82]	62	Services to buildings [81]
17	Support services [77-82]	63	Office administrative [82]
18	Public admin. and defence [84]	64	Public administration and defence [84]
19	Education [85]	65	Education [85]
20	Health and social work [86-88]	66	Health [86]
20	Health and social work [86-88]	67	Residential care [87]
20	Health and social work [86-88]	68	Social work [88]
21	Arts and entertainment [90-93]	69	Arts and entertainment [90]
21	Arts and entertainment [90-93]	70	Libraries, etc [91]
21	Arts and entertainment [90-93]	71	Gambling and betting [92]
21	Arts and entertainment [90-93]	72	Sport and recreation [93]
22	Other services [94-99]	73	Membership organisations [94]
22	Other services [94-99]	74	Repair of goods [95]
22	Other services [94-99]	75	Other personal service [96]

Annex 2: Tables of employment projections

Table 9: Employment in manufacturing. Source: UKCES

Industry grouping (22)	Industry (75)	Employment levels (000s)		Net change 2014-2024	
		2014	2024	(000s)	(%)
Food drink and tobacco	Food products	378	370	-8	-2.2%
	Beverages and tobacco	42	41	-1	-2.3%
Engineering	Computer, etc	132	96	-36	-27.5%
	Electrical equipment	83	78	-5	-5.9%
	Machinery n.e.c.	199	137	-62	-31.0%
Rest of manufacturing	Textiles	56	44	-12	-21.7%
	Wearing apparel; Leather, etc	57	44	-12	-21.9%
	Wood and cork	75	65	-10	-13.0%
	Paper, etc	60	52	-8	-12.8%
	Printing and recording	128	122	-6	-4.5%
	Coke and petroleum; Chemicals, etc	117	112	-5	-4.5%
	Pharmaceuticals	53	41	-12	-23.5%
	Rubber and plastic	167	149	-18	-10.7%
	Other non-metallic	76	66	-9	-12.2%
	Basic metals	73	60	-13	-17.2%
	Metal products	316	271	-45	-14.3%
	Motor vehicles, etc	143	126	-17	-11.6%
	Other transport equipment	139	133	-6	-4.3%
	Furniture	84	99	15	18.0%
	Other manufacturing	96	112	16	17.0%
	Repair and installation	119	131	13	10.8%
Manufacturing	**Total**	**2,591**	**2,350**	**-241**	**-9.3%**

Table 10. Employment in manufacturing. Source: Cedefop

Industry	Employment levels (000s)		Net change 2014-2024	
	2014	2024	(000s)	(%)
Food, drink, tobacco	415	380	-35	-8.4%
Textiles, clothing, leather	114	101	-13	-11.4%
Wood, paper, print, publishing	264	234	-30	-11.4%
Coke, ref petroleum	10	9	-1	-10.0%
Other chemicals	120	115	-5	-4.2%
Pharmaceuticals	57	44	-13	-22.8%
Rubber non-metal min products	241	227	-14	-5.8%
Basic metals, metal products	353	347	-6	-1.7%
Optical, electronic equipment	104	88	-16	-15.4%
Electrical equipment	81	65	-16	-19.8%
Other machinery, equipment	180	138	-42	-23.3%
Motor vehicles	136	166	30	22.1%
Other transport equipment	135	135	0	0.0%
Manufacturing nes	270	277	7	2.6%

Table 11. Employment in primary sector and utilities. Source: UKCES

Industry grouping (22)	Industry (75)	Employment levels (000s)		Net change 2014-2024	
		2014	**2024**	**(000s)**	**(%)**
Agriculture	Agriculture	456	347	-109	-24.0%
Mining and quarrying	Mining and quarrying	64	68	4	6.5%
Electricity and gas	Electricity and gas	119	139	20	16.5%
Water and sewerage	Water	36	38	3	7.3%
	Sewerage	23	25	2	7.8%
	Waste management	139	148	9	6.5%
Primary sector and utilities	**Total**	**837**	**765**	**-72**	**-8.6%**

Table 12. Employment in primary sector and utilities. Source: Cedefop

Industry	Employment levels (000s)		Net change 2014-2024	
	2014	**2024**	**(000s)**	**(%)**
Agriculture, Forestry, Fishing	332	286	-46	-13.9%
Mining, quarrying	60	50	-10	-16.7%
Electricity	84	74	-10	-11.9%
Gas, steam, air conditioning	31	29	-2	-6.5%
Water supply	206	208	2	1.0%

Table 13. Employment in construction. Source: UKCES

Industry (75)	Employment levels (000s)			Net change 2014-2024	
	2004	**2014**	**2024**	**(000s)**	**(%)**
Construction of buildings	555	658	756	98	14.9%
Civil engineering	408	312	355	42	13.6%
Specialised construction	1,129	1,122	1,282	160	14.3%
Total	**2,092**	**2,092**	**2,393**	**301**	**14.4%**

Table 14. Employment in construction. Source: Cedefop

Industry	Employment levels (000s)			Net change 2014-2024	
	2004	**2014**	**2024**	**(000s)**	**(%)**
Construction	1,932	1,928	1,808	-153	-6.2%

Table 15. Employment in trade, accommodation and transport. Source: UKCES

Broad grouping (22)	Industry grouping (75)	Employment levels (000s)			Net change 2014-2024	
		2004	2014	2024 (projected)	(000s)	(%)
Wholesale and retail trade	Sale of motor vehicles	598	580	585	5	0.8%
	Wholesale trade	1,214	1,224	1,330	106	8.7%
	Retail trade	3,148	3,028	3,253	225	7.4%
Transport and storage	Land transport	680	700	601	-99	-14.2%
	Water transport	18	16	12	-4	-22.4%
	Air transport	86	77	80	3	3.4%
	Warehousing etc.	348	473	518	45	9.5%
	Postal etc.	286	295	336	41	14.0%
Accommodation and food	Accommodation	427	508	520	12	2.3%
	Food and beverage services	1,566	1,703	2,014	311	18.3%
Trade, Accommodation and Transport	**Total**	**8,371**	**8,604**	**9,248**	**644**	**7.5%**

Table 16. Employment in trade, accommodation and transport. Source: Cedefop (2016)

Industry	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Wholesale, retail trade	4,773	4,599	4,665	66	1.4%
Land transport	667	724	681	-43	-5.9%
Water transport	17	16	17	1	6.3%
Air transport	81	79	79	0	0.0%
Warehousing, postal services	600	611	610	-1	-0.2%
Telecommunications	225	210	208	-2	-1.0%
Accommodation, catering	1,752	2,058	2,236	178	8.6%

Table 17. Employment in business and other services. Source: UKCES

Broad grouping (22)	Industry grouping (75)	Employment levels (000s)			Net change 2014-2024	
		2004	2014	2024 (projected)	(000s)	(%)
Media	Publishing activities	178	186	180	-6	-3.3%
	Film & music	128	152	152	0	0.0%
	Broadcasting	35	49	50	1	2.3%
Information technology	Telecommunications	216	197	227	31	15.6%
	Computing services	544	663	769	106	16.0%
	Information services	82	84	100	16	19.2%
Finance and insurance	Financial services	645	538	555	17	3.2%
	Insurance & pensions	143	125	125	0	0.2%
	Auxiliary services	390	468	481	14	2.9%
Real estate	Real estate	357	550	560	10	1.8%
Professional services	Legal & accounting	579	703	719	16	2.3%
	Head offices, etc.	443	819	1,064	245	29.9%
	Architectural, etc.	416	610	690	80	13.1%
	Scientific research	127	153	167	14	8.9%
	Advertising	190	254	272	18	7.1%
	Other professional	175	240	261	21	8.9%
	Veterinary	63	75	82	7	9.5%
Support services	Rental & leasing	144	149	168	19	12.9%
	Employment activities	807	960	1,077	117	12.2%
	Travel	107	99	112	13	13.4%
	Security	179	205	230	25	12.0%
	Services to buildings	639	884	968	84	9.5%
	Office administration	374	454	516	63	13.8%
Arts and entertainment	Arts & entertainment	159	145	175	30	20.4%
	Libraries	153	165	204	40	24.2%
	Gambling	106	123	128	5	3.7%
	Sport & recreation	405	517	527	10	2.0%
Other services	Membership organisations	405	434	448	14	3.1%
	Repair of goods	59	68	71	3	4.5%
	Other personal services	505	457	474	18	3.9%
Business and other services	Total	8,754	10,523	11,552	1,029	9.8%

Table 18. Employment in business and other services. Source: Cedefop

Industry	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Media	342	357	372	15	4.2%
Computer programming, information services	532	699	753	54	7.7%
Financial, insurance activities	1,110	1,089	1,096	7	0.6%
Real estate activities	283	516	580	64	12.4%
Legal, accounting, consulting	972	1,173	1,533	360	30.7%
Architectural, engineering	413	527	529	2	0.4%
Research & development	93	119	144	25	21.0%
Market research, other prof	347	528	595	67	12.7%
Admin, support services	1,860	2,525	3,003	478	18.9%
Arts and entertainment	705	737	825	88	11.9%
Other service activities	807	885	942	57	6.4%

Table 19. Employment in non-marketed services. Source: UKCES

Broad grouping (6)	Industry grouping (22)	Employment levels (000s)		Net change 2014-2024	
		2014	2024	(000s)	(%)
Public admin. and defence	Public admin. and defence	1,379	1,381	2	0.2%
Education	Education	2,897	2,890	-7	-0.2%
Health and social work	Health	2,411	2,414	3	0.1%
	Residential care	**808**	**881**	**73**	**9.0%**
	Social work	**1025**	**1,118**	**94**	**9.1%**
Non-marketed services	**Total**	**8,520**	**8,684**	**164**	**1.9%**

Table 20. Employment in non-marketed services. Source: Cedefop

Industry	Employment levels (000s)		Net change 2014-2024	
	2014	2024	(000s)	(%)
Public administration, defence	1,475	1,468	-7	-0.5%
Education	2,496	2,486	-10	-0.4%
Health and social work	3,833	4,107	274	7.1%

Annex 3: Tables with detailed worker characteristics

Table 21. Retail trade: occupational structures. Source: UKCES

Occupation	Employment levels (000s)			Net change 2014-2024	
	2004	**2014**	**2024 (projected)**	**(000s)**	**(%)**
Managers and senior officials	331	359	425	66	18.4%
Professional occupations	163	213	276	63	29.7%
Associate professional and technical occupations	200	229	289	60	26.2%
Administrative, clerical and secretarial occupations	236	189	206	17	9.2%
Skilled trades occupations	205	164	159	-5	-3.0%
Personal services occupations	14	16	20	4	22.9%
Sales and customer service occupations	1,562	1,427	1,378	-50	-3.5%
Transport and machine operatives	97	105	116	11	10.9%
Elementary occupations	339	326	383	57	17.6%
All occupations	**3,148**	**3,028**	**3,253**	**225**	**7.4%**

Table 22. Retail trade: qualification structures. Source: UKCES

Qualification	Employment levels (000s)			Net change 2014-2024	
	2004	**2014**	**2024 (projected)**	**(000s)**	**(%)**
No Qualification	447	270	105	-165	-61.0
QCF1 GCSE (below grade C) & equivalent	729	566	373	-194	-34.2
QCF2 GCSE (A-C) & equivalent	855	794	766	-28	-3.6
QCF3 A level & equivalent	667	724	801	77	10.6
QCF4 HE below degree level	104	119	196	77	64.5
QCF5 Foundation degree; nursing; teaching	82	108	187	79	72.9
QCF6 First degree	220	368	696	328	89.3
QCF7 Other higher degree	41	74	121	47	63.4
QCF8 Doctorate	2	6	9	3	58.2
All qualifications	**3,148**	**3,028**	**3,253**	**225**	**7.4**

Table 23. Retail trade: gender structure. Source: UKCES

Gender	Employment levels (000s)			Net change 2014-2024	
	2004	**2014**	**2024 (projected)**	**(000s)**	**(%)**
Male	1,219	1,236	1,418	182	14.7%
Female	1,929	1,793	1,835	42	2.4%

Table 24. Retail trade: Job types structure. Source: UKCES

Job type	Employment levels (000s)			Net change 2014-2024	
	2004	**2014**	**2024 (projected)**	**(000s)**	**(%)**
Full-time	1,260	1,221	1,336	114	9.4%
Part-time	1,636	1,558	1,717	160	10.3%
Self-employed	253	249	200	-49	-19.8%

Table 25. Food and beverage services: occupational structures. Source: UKCES

Occupation	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Managers and senior officials	221	226	288	62	27.3%
Professional occupations	35	39	52	13	33.9%
Associate professional and technical occupations	35	54	74	21	38.8%
Administrative, clerical and secretarial occupations	63	72	82	10	13.8%
Skilled trades occupations	251	276	274	-2	-0.6%
Personal services occupations	57	69	92	23	33.0%
Sales and customer service occupations	72	104	121	17	16.6%
Transport and machine operatives	30	47	52	6	11.9%
Elementary occupations	802	818	980	162	19.8%
All occupations	**1,566**	**1,703**	**2,014**	**311**	**18.3%**

Table 26. Food and beverage services: qualification structures. Source: UKCES

Qualification	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
No Qualification	223	154	62	-92	-59.6%
QCF1 GCSE (below grade C) & equivalent	343	321	232	-88	-27.5%
QCF2 GCSE (A-C) & equivalent	448	466	489	22	4.8%
QCF3 A level & equivalent	367	365	373	8	2.1%
QCF4 HE below degree level	46	77	154	77	100.4%
QCF5 Foundation degree; nursing; teaching	28	71	154	83	117.1%
QCF6 First degree	95	202	463	261	128.9%
QCF7 Other higher degree	14	45	83	38	84.9%
QCF8 Doctorate	2	2	4	2	85.6%
All qualifications	1,566	1,703	2,014	311	18.3%

Table 27. Food and beverage services: job type structure. Source: UKCES

Job type	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Full-time	590	676	820	144	21.3%
Part-time	886	928	1074	145	15.6%
Self-employed	90	99	121	22	22.2%

Table 28. Food and beverage services: gender structures. Source: UKCES

Gender	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Male	674	832	954	121	14.5%
Female	892	871	1,061	190	21.9%

Table 29. Head offices, management consultants: occupational structures. Source: UKCES

Occupation	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Managers and senior officials	44	106	150	44	41.5%
Professional occupations	147	292	406	114	39.0%
Associate professional and technical occupations	91	185	254	69	37.6%
Administrative, clerical and secretarial occupations	129	159	161	2	1.4%
Skilled trades occupations	8	25	30	5	20.8%
Personal services occupations	1	3	4	1	38.0%
Sales and customer service occupations	10	28	33	6	19.9%
Transport and machine operatives	5	10	12	2	19.7%
Elementary occupations	7	13	14	2	14.0%
All occupations	443	819	1064	245	29.9

Table 30. Head offices, management consultants: qualifcation structures. Source: UKCES

Qualification	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
No Qualification	13	18	10	-7	-40.6
QCF1 GCSE (below grade C) & equivalent	61	64	41	-23	-36.7
QCF2 GCSE (A-C) & equivalent	70	96	90	-6	-6.2
QCF3 A level & equivalent	65	98	88	-10	-10.4
QCF4 HE below degree level	28	60	90	30	49.4
QCF5 Foundation degree; nursing; teaching	35	26	34	7	28.2
QCF6 First degree	119	307	491	184	59.9
QCF7 Other higher degree	44	128	188	60	47.3
QCF8 Doctorate	8	22	32	10	46.7
All qualifications	443	819	1,064	245	29.9

Table 31. Head offices, management consultants: job type structure. Source: UKCES

Job type	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Full-time	294	557	729	172	30.9%
Part-time	103	169	215	46	27.3%
Self-employed	46	93	120	27	28.7%

Table 32. Head offices, management consultants: gender structure. Source: UKCES

Gender	Employment levels (000s)			Net change 2014-2024	
	2004	2014	2024 (projected)	(000s)	(%)
Male	239	456	594	139	30.4%
Female	204	363	469	106	29.3%

Table 33: Worker characteristics. Absolute changes in employment levels 2014-2024. Source: UKCES

	All industries	Retail trade	Food and beverage services	Head offices; Manage. consultancy	Construction	Health and social work	Information technology
Gender							
Male	810	182	121	106	250	40	68
Female	1,016	42	190	139	51	129	85
Job type							
Full-time	893	114	144	172	199	70	64
Part-time	975	160	145	46	28	118	74
Self-employed	-43	-49	22	27	75	-19	14
Occupation							
Managers and Senior Officials	499	66	62	44	58	7	32
Professional Occupations	875	63	13	114	57	117	58
Associate Prof. & Technical Occ.	538	60	21	69	40	43	30
Adm, Clerical & Secretarial Occ.	-389	17	10	2	1	-126	6
Skilled Trades Occupations	-98	5	-2	5	113	-15	0
Personal Service Occupations	409	4	23	1	1	193	8
Sales & Customer Service Occ.	3	-50	17	6	7	-4	13
Transport & Machine Operatives	-131	11	6	2	18	-5	2
Elementary Occupations	119	57	162	2	6	-40	3
Highest qualification							
QCF 7-8	923	50	40	16	53	66	46
QCF 4-6	4,371	484	421	221	297	389	195
QCF 3	-391	77	8	-10	-29	81	-34
QCF 2	-472	-28	22	-6	99	-97	-28
QCF 1	-1,480	-194	-88	-23	-30	-213	-21
No qualification	-1.125	-165	-92	-7	-90	-57	-6

Table 34. Worker characteristics. Percentage changes in employment levels 2014-2024. Source: UKCES

	All industries	Retail trade	Food and beverage services	Head offices; Manage. consultancy	Construction	Health and social work	Information technology
Gender							
Male	4.7	14.7	14.5	23.2	13.7	4.5	9.8
Female	6.4	2.3	21.8	38.3	18.7	2.5	34.6
Job type							
Full-time	4.6	9.3	21.3	30.9	17.8	3.2	8.5
Part-time	10.5	10.3	15.6	27.3	20.3	6.8	91.2
Self-employed	-1.0	-19.7	22.2	29.0	9.0	-5.4	12.7
Occupation							
Managers and Senior Officials	15.1	18.4	27.3	41.5	32.9	3.7	21.7
Professional Occupations	13.3	29.7	33.9	39.0	30.4	8.9	14.7
Associate Prof. & Technical Occ.	11.6	26.2	38.8	37.6	28.6	8.0	16.1
Adm, Clerical & Secretarial Occ.	-10.9	9.2	13.8	1.4	0.5	-31.3	9.6
Skilled Trades Occupations	-2.7	-3.0	-0.6	20.8	10.0	-27.2	-0.3
Personal Service Occupations	13.1	22.9	33.0	38.0	33.1	12.4	51.4
Sales & Customer Service Occ.	0.1	-3.5	16.6	19.9	20.4	-7.7	32.5
Transport & Machine Operatives	-6.3	10.9	11.9	19.7	10.7	-19.7	21.8
Elementary Occupations	3.3	17.6	19.8	14.0	6.2	-32.9	16.0
Highest qualification							
QCF 7-8	29.7	63.1	85.0	47.2	81.4	16.4	35.3
QCF 4-6	41.5	81.3	120.3	56.2	79.3	21.2	41.6
QCF 3	-5.9	10.6	2.1	-10.4	-4.5	9.6	-27.0
QCF 2	-7.2	-3.6	4.8	-6.2	18.7	-12.4	-26.8
QCF 1	-33.0	-34.2	-27.5	-36.7	-9.1	-70.2	-23.0
No qualification	-62.3	-61.0	-59.6	-40.6	-62.5	-77.6	-25.9