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**Managing Editor**  
Dr. Russell Crawford

**Administrator**  
Samantha Mottram

**Telephone**  
+44 (0)1782 733007

**Email**  
jade@keele.ac.uk

**Web**  
<http://jadekeele.wordpress.com/>

**Address**  
59-60 The Covert, Keele University, Keele,  
ST5 5BG

**Article:**

**Project Overview: Keele University Higher Level Skills Needs Research**

**Kathrine Jackson\***, Barbara Dale and Lou Taylor-Murison  
Directorate of Research, Innovation and Engagement, Keele University

\*Corresponding Author: [kathrinejackson@outlook.com](mailto:kathrinejackson@outlook.com)

## Project Overview: Keele University Higher Level Skills Needs Research

**Kathrine Jackson\***, Barbara Dale and Lou Taylor-Murison  
Directorate of Research, Innovation and Engagement, Keele University

\*Corresponding Author: [kathrinejackson@outlook.com](mailto:kathrinejackson@outlook.com)

### Introduction

Between January and March 2018, research was carried out by a team from the Directorate of Research, Innovation and Engagement at Keele University into Higher Level Skills needs both nationally and in Staffordshire and the surrounding area. It was planned that this research would be used to inform the development of future higher-level apprentice provision, standard degrees and continuing professional development (CPD) opportunities by the university.

This research paper gives an overview of the research process and an insight into some of its findings. It will provide a methodology for the research, discussion of the local and national higher skills needs picture and an overview of skills needs relating to government National Strategy areas of focus.

This insight into the research process may be useful to other Further Education and Higher Education providers that are looking to expand their course provision in response to local and national skills needs. The paper will also be relevant to HE and FE careers advice and support professionals and lecturers that help students to make decisions about their future careers.

### Research Project Methodology

The first stage of the research was to complete a literature review. This included reading through the government's recently published 'Industrial Strategy' (2017), sector specific reports and relevant local policy documents and reports. These gave a picture of recruitment trends, existing businesses and future opportunities as well as skills needs. The literature review also involved reading through information on degree level apprenticeships from HEFCE<sup>1</sup> and looking at examples of the new apprenticeship standards from level four upwards. This gave the research team an up-to-date knowledge of issues surrounding higher level apprenticeships, skills needs, the government's 'Industrial Strategy' and the economic growth plans of Local Enterprise Partnerships

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<sup>1</sup> Higher Education Funding Council for England (closed at the end of March 2018 with many functions continued by the Office for Students, the new regulator of higher education in England, and Research England, the new council within UK Research and Innovation.)

(LEPs).

After the literature review, it was decided that the final report would focus upon the four 'Grand Challenges' that were identified by the 'Industrial Strategy' (2017): 'AI and the Data Economy', 'Clean Growth', 'The Future of Mobility' and 'An Ageing Society'. The four Grand Challenges were selected as a framing device because these presented significant areas of economic growth for the UK. They are forward looking and encompass a range of existing and upcoming sectors. It was also important that the research focused upon the national picture and then related other sources to this. Keele serves a national market, so its potential higher-level apprenticeship and CPD provision needs to respond to both national and local skills needs.

This provision would need to be demand-led and procured through employer partners. This would necessitate different and flexible models of delivery that would have the capacity to resolve any issues of distance.

Each of the four Grand Challenges were considered in their own section of the final report. The sections included: 1) A brief introduction to the 'Grand Challenge' to give an idea of its scope, 2) An overview of the sectors which would be/are able to respond to the 'Grand Challenge', 3) An overview of the skills that will be needed to respond to the 'Grand Challenge'. The next section then considered what the local skills needs are, including an indication of how local priority growth sectors link to the 'Grand Challenges'. The local areas considered were: Stoke-on-Trent and Staffordshire, Cheshire and Warrington and The Marches (including Shropshire, Telford and Wrekin, and Herefordshire). Finally, the report made some recommendations upon how to develop future provision that would respond to existing skills gaps as well as some opportunity areas relating to current Keele University provision.

Because the research focused upon sector needs relating to the four 'Grand Challenges', it is possible that other more niche skills needs were missed. In the same vein, not all professions that see opportunities and growth moving forward were considered. Further research would therefore need to look specifically at local and national employment trends and growth in niche sectors. There is also variation in the extent to which sectors understand future skills needs and thus, the depth to which they are able to conceptualise them. Due to this and other dependencies in the predictions, the skills needs should be periodically reviewed in line with technological development and market sectoral change.

## Research Context

### Skills Needs: National Context

The Industrial Strategy (2017) asserts that modern society needs to be built on the firm foundations of 'the skills of its workers, the quality of the infrastructure, and a fair and predictable business environment' (p.4). It sets four 'Grand Challenges' for government and the wider economy as: 1) artificial intelligence and data revolution, 2) clean growth, 3) the future of mobility, and 4) an ageing society (Ibid., p.10), where 'Britain can lead the

global technological revolution' supported by government and commercial investment (Ibid., p.30).

Business, academia and civil society are invited to collaborate on the innovation and development of new technologies and industries in 'areas of strategic importance to our country' (Ibid., p.23). In its Industrial Strategy Challenge Fund<sup>2</sup>, funding has been allocated to 6 key areas to drive progress and innovation for creating opportunities for businesses and sectors across the UK. The fund is part of the government's £4.7 billion increase in research and development over 4 years and the 6 key areas are:

- healthcare and medicine
- robotics and artificial intelligence
- batteries for clean and flexible energy storage
- self-driving vehicles
- manufacturing and materials of the future
- satellites and space technology

To achieve this ambition and to position Britain as a world leader, existing and emerging sectors of the economy will require new skills and roles fit for the future. In its Strategy, the government set out its commitment to developing vocational skills, with a high value placed on apprenticeships for extending opportunity, diversifying participation and increasing work-place productivity. The Strategy explains that:

Apprenticeships are a vital UK-wide vehicle for employer investment in their workforce, enabling employers to develop the skills and behaviours that they need, as well as offering opportunities for those already in work and those entering it for the first time. ('Industrial Strategy', 2017, p.120)

'Research predicts around 1.8 million new jobs will be created between 2014 and 2024, and 70 per cent of them will be in the occupations most likely to employ graduates' (Ibid., p.101). Higher education institutions therefore have an important role to play in providing the higher-level skills required for future growth, which can be achieved through degree apprenticeships and collaborative working with local employers on specific skills needs.

The government aims to increase the quantity and quality of apprenticeships and has set a target of 3 million people starting apprenticeships by 2020. The Apprenticeship Levy (made under Section 6 of the Finance Act 2016) came into force in April 2017 to support productivity growth by increasing investment in employee training. Government strategy is committed to improving the quality and reputation of technical education, 'establishing a technical education system that rivals the best in the world, to stand alongside our world-class higher education system' (Ibid., p.94).

## Skills Needs: Local Context

For the final report, research into the local skills needs focused on Keele University's immediate market area covered by Stoke-on-Trent and Staffordshire, Cheshire and Warrington, and The Marches Local Enterprise Partnerships(LEP). For this summary report, only the Stoke-on-Trent and Staffordshire LEP area has been considered, which includes the local authority areas of Newcastle-under-Lyme, South Staffordshire, Stafford, Staffordshire Moorlands and Stoke-on-Trent.

The Department for Education's publication, 'Social Mobility - Stoke on Trent Opportunity Area, 2017-2020', states that 'Stoke-on-Trent is leading the way in innovative practice in engineering, manufacturing and digital technologies and was recently recognised as one of the best cities in the UK to start a business' (p.5). Science, Technology, Engineering and Maths (STEM) skills-related opportunities exist across Stoke-on-Trent, in partnership with Cheshire, in the rail, civil engineering and construction industries and supported through the Constellation Partnership<sup>3</sup> (p.11).

Investment in the LEP area of £100m secured 'Growth Deal' funding, can facilitate the development and expansion of 'high-value priority industries', resulting in more skilled jobs in the area, 'particularly in advanced manufacturing and technology, but also in logistics and business & professional services' (p.29).

In its January 2016 'Skills Action Plan - Priority Sectors Evidence Summary', Stoke-on-Trent and Staffordshire Enterprise Partnership identified advanced manufacturing as having 'the greatest growth potential locally' (p.3), as follows:

- Applied Materials: exploiting opportunities in applied uses for polymers, ceramics, glasses and composites with local ceramic and metal industries such as Steelite International, Wedgwood, Bostik Fuchs Lubricants Michelin;
- Auto-Aero: supply-chain opportunities emerging from global businesses such as JCB, Michelin, Jaguar Land Rover, Moog, and Zytex;
- Medical Technologies: 'in which Keele University and its Science Park are internationally recognised leaders'. Medical technology and healthcare companies include TRB Chemedica, Biocomposites, Cobra Biologics and Intelligent Orthopaedics;
- Agri-Tech: increasing the existing 'global focus on food security and the agri-plant capacity at JCB' and nearby Harper Adams University;
- Energy generation: through diversification into geothermal, anaerobic digestion, biomass and energy from-waste – Alstom, ABB, Siemens Wind Power, GE Power Conversion.

('Strategic Economic Plan Part 1 – Strategy', March 2014, p.2)

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□ Ministerial backed partnership between Stoke-on-Trent and Staffordshire and Cheshire Local Enterprise Partnerships and their seven Local Authorities, for plan-led economic development including the delivery of 100,000 new homes and 120,000 new jobs by 2040, and related investment opportunity linked to government investment in High Speed 2 (HS2). <http://constellationpartnership.co.uk/>

In addition, for achieving diversity in the local economy, locally important 'barometer' industries also exist and include tourism and leisure, digital and creative, and professional and business services, ('Skills Action Plan - Priority Sectors Evidence Summary', January 2016, p.4)

With an ambition to grow the Stoke-on-Trent and Staffordshire economy by 50 per cent over ten years, generating 50,000 new jobs, the LEP acknowledges the importance of developing 'a modern and flexible skills offer which enables all people to accessibly up-skill and re-skill' and 'match the growing needs of Stoke-on-Trent and Staffordshire's priority sectors' (Stoke-on-Trent and Staffordshire Enterprise Partnership, 'Strategic Economic Plan Part 1 – Strategy', March 2014, p.33)

The LEP's aim of achieving a skilled workforce includes the development of higher level skills through initiatives for a wider use of higher apprenticeships; internships and placement schemes for graduates in local businesses; progression pathways to raise aspirations of residents to go to University; and by developing career colleges/University Technical Colleges linked to the local priority sectors and a leadership & management centre at Keele University (Ibid., p.35).

In terms of skills gaps, the December 2016 Stoke-on-Trent and Staffordshire Enterprise Partnership publication entitled 'Skills Demand and The Labour Market', noted that 'the Education, Human Health & Social Work, Manufacturing, Transportation & Storage, and Professional, Scientific & Technical services industrial sections stood out as being of significant importance to the Staffordshire & Stoke-on-Trent economy' (p.4) and more than half of the skills-needs referenced by employers are linked to STEM subjects (p.6). The effect on the area of an ageing society is expected to further strengthen the 'human health and social work' sector, with a potential increase in demand due to 'low healthy life expectancies and a growing elderly population' in the LEP area (Ibid.).

## Findings Overview

### AI and the Data Economy

The government's 'Industrial Strategy' sees Artificial Intelligence (AI) as being a 'fourth industrial revolution' – one of a 'scale, speed and complexity that is unprecedented'. It is characterised by a 'fusion of technologies that [... are] blurring the lines between the physical, digital and biological worlds' (2017, p.32). It is expected that it will have an impact upon nearly every UK sector. However, the government anticipates that six key business areas will be involved in the meeting of this grand challenge: cyber security, life sciences, construction, manufacturing, energy and agricultural technology (p.40).

Traditionally taught subjects related to this 'grand challenge' are: mathematics, computer science, ethics and linguistics (p.37). The government plans to invest in maths, digital and technology skills to help with the achievement of this 'grand challenge' (p.40). To partially meet this challenge, the government also plan to introduce technology qualifications called 'T Levels' (p.102). The first post-16 T levels will be introduced in 2020 and will include Digital, Construction and Education and Childcare.

The 'Industrial Strategy' establishes three core development areas that will help the UK to meet this 'grand challenge': 1) Artificial Intelligence and Machine learning, 2) The Data Revolution and 3) Digital Technologies and Investment in the Digital Infrastructure.

The area of artificial intelligence [AI] and machine learning will be used as a brief example of application and skills needs. According to the 'Growing the Artificial Intelligence Industry in the UK' report (2017), AI has a range of applications which will support UK economic growth. Examples include:

- Communicating with computers in natural language
- Deriving new insights from transport data
- Operating autonomous and adaptive robotic systems
- Managing supply chains
- Designing more life-like video games
- Applied AI is already changing business practices across financial services, law, medicine, accounting, tax, audit, architecture, consulting, customer service, manufacturing and transport. (p.8)

Priority skills that will be needed within this area to meet these applications will include: Research and development in artificial intelligence and virtual reality, Development of virtual reality gaming and applications, development of health tech and edutech, cyber security and robotics.

## Clean Growth

The government plans to make significant investments in 'Low Carbon technologies and efficient use of resources' which will revolutionise 'power, transport, heating and cooling, industrial process and agriculture' ('The Industrial Strategy', 2017, p.36). These investments plan to build upon what the government sees as strong 'automotive, aerospace and construction industries', as well as the new markets of 'smart energy and the "bio-economy"' (p.43.). Further, the UK has 'world-leading capabilities in: 'electrical vehicle manufacture, offshore wind, smart energy systems, sustainable construction, precision agriculture and green finance' (Ibid.).

The government has recently published its 'Clean Growth Strategy' (2017). Within the report, 'clean growth' is seen as a 'duty' which is owed to the next generation, commenting that, 'economic growth has to go hand-in-hand with greater protection for our forests and beaches, clean air and places of outstanding natural beauty' (p.1). The low carbon sector is considered to have 'high value jobs, industries and companies' and is judged to be 'high growth and high value' (p.7). As of 2017, there were '430,000' jobs in low carbon businesses and their supply chains (Ibid.).

A commitment to clean growth is also necessary as part of the actions and investments that are necessary to meet Paris Agreement commitments. It is estimated that '\$13.5 trillion of public and private investment in the global energy sector alone will be required between 2015 and 2030 if the signatories to the Paris Agreement are to meet their national

target' (p.8). This kind of investment brings with it considerable economic opportunities.

Future investment and innovation in clean technologies is highly likely to bring down their costs, thus 'nurturing better products, processes and systems' (p.11). To work towards achieving this, the government have pledged to invest '£2.5 billion [...] to support low carbon innovation from 2015-2021' (Ibid.). A further '4.7 billion' will be invested into 'science, research and innovation' through the 'Productivity Investment Fund'. The UK is also a core member of 'Mission Innovation' - a 'group of leading countries which aims to drive forward clean energy innovation on a global scale' (Ibid.). The 'Industrial Strategy' (2017) also announced an 'Industrial Strategy Challenge Fund' which will promote research and innovation in areas such as 'Driverless Vehicles', 'Prospering from the Energy Revolution', 'Transforming Food Production' and 'Transforming Construction' ('Industrial Strategy', 2017, p.45-46).<sup>1</sup>

The UK low carbon economy can be considered to consist of activities such as: 'the design and building of low carbon power and heat projects, the manufacture of electric vehicles, the development of energy efficient products and systems for buildings, and green finance'. It also encompasses expertise in 'technologies such as 'offshore wind and power electronics for low carbon vehicles and electric motors' ('Clean Growth Strategy', 2017, p.25).

### The Future of Mobility

The government's 'Industrial Strategy' (2017) highlights the opportunity for the UK to become a 'world leader in shaping the future of mobility' through early engagement and by drawing on its transport innovation history, strengths in engineering, artificial intelligence and research and development, delivering different mobility solutions in future years (p.49). It identifies four early priorities as:

1. Establishment of a flexible regulatory framework to encourage new modes of transport and new business models, for example connected and autonomous vehicles and Smart Ticketing. This will be necessary to 'support the emergence of new technologies and new business models' (p.50).
2. Support for the transition from hydrocarbon to zero emission vehicles, with the introduction of a £400m Charging Infrastructure Investment Fund and publication of a government support strategy to ensure 'the UK continues to be a world leader in the development, manufacture and use of these vehicles' (p.50).
3. Preparation for 'a future of new mobility services, increased autonomy, journey sharing and a blurring of the distinctions between private and public transport'. Measures include the planned publication of a government strategy on the Future of Urban Mobility, £5m investment in a 5G Testbeds and Trials programme (starting in 2018), and the National Infrastructure Commission's launch of a future roadbuilding innovation prize (p.51).



4. Exploration of data for accelerating the development of new mobility services and more effective transport system operations. Continued investment in connected and autonomous vehicle research and development (R&D) and testbed infrastructure.

The government's ambition to create a 'more reliable, less congested and better-connected transport network' ('Transport Investment Strategy - Moving Britain Ahead', p.137) relies on the 'emergence of new technologies, with smart motorways and the Digital Railway' (Ibid. p.7). The operation and maintenance of a 'more technically advanced and data rich infrastructure' will necessitate different skills and capabilities for the future (p.7). A proactive approach is therefore needed to address the wider skills shortages, with an estimated shortfall of more than 55,000 in transport infrastructure by 2020 (Ibid., p.12), and to meet the new technological challenges in the industry, for example, new emerging markets for Intelligent Mobility (Ibid., p.42).

The 'Industrial Strategy' highlights the government's commitment to improving the skills of the current and future workforce to deliver its ambition to become a 'world leader in shaping the future of mobility' (p.49). The 'Transport Investment Strategy – Moving Britain Ahead' explains the need to 'improve technical education, training and qualifications, particularly in key sectors such as infrastructure, and in Science, Technology, Engineering and Maths (STEM) subjects' (p.66) and refers to the 2016 'Transport Infrastructure Skills Strategy', which sets out priorities for developing industry-related skills. Government plans to invest an additional £406m in digital, technical and maths education is expected to help address the shortage of skills in these areas ('Industrial Strategy'. p.15).

Since 2009, motor vehicle manufacturers' expenditure in research and development has increased year on year, with a 20% growth between 2015 and 2016, reaching £3.4bn in 2016 ('Automotive Sector Deal', p.6). The 'Automotive Sector Deal' (2018) aims to build on the strengths of the UK automotive sector and further develop the 2009 collaborative partnership established between government and industry, securing joint investment and long-term commitments in areas including the design and development of connected and autonomous vehicles (CAV), the research and development of battery technology and accelerating the manufacture of ultra-low and zero emission vehicles. New challenges facing this sector include: remaining competitive by adapting to changes in the way 'cars are built, powered and driven'; the modernisation of existing infrastructure to ensure accessibility in the future; and preparing for the impact on the sector post Brexit with a current 50% reliance on exports to the EU (Ibid., p.6).

Engineering accounts for a significant proportion of the overall UK workforce. The Office for National Statistics analysed the engineering sector on Engineering UK's behalf and found that some '5.66 million people worked in UK engineering enterprises in 2016'. This represents 18.9% of the UK's total workforce ('Engineering UK 2018 – State of Engineering', p.175). Demand for high-skilled jobs in this sector is rising due to technological advancement.

In the Industrial Strategy, the government refers to 'the essential attributes of every successful economy' as the five foundations of productivity, with infrastructure being one of these (p.14). To build the skills needed for the future, the deal with the construction

industry commits the sector to adopting a new strategic approach to skills development, involving a government and industry collaboratively produced skills strategy and government ambition for a 'a major upgrade to the UK's infrastructure' (p.13) and key infrastructure related priorities (p.11).

## An Ageing Society

The ageing society 'Grand Challenge' is built on forecasts which suggest that, 'by 2040, one in eight people in the UK will be aged over 75 – an increase from one in 12 today' (Industrial Challenge. 2017, p.77). With an increasing number of older citizens, Britain needs to create the right kind of environment to facilitate independent living for longer. This can be achieved with innovative practice and the production and facilitation of age-related products and services, for example:

- new technology such as smart home technologies, wearable devices and tech enabled health and care services (p.53).
- opportunities for older citizens to continue to contribute through the re-design of jobs and workplaces to better use older workers' skills and experience (Ibid.).
- employer investment in career long learning for their workforce (p.94).
- worker flexibility to help balance work with caring responsibilities (p.53).
- new housing models (p.52).
- innovative savings products for retirement and retirement planning (Ibid).

In addition, there are increasing caring demands on those of working age and increased health and social care costs, which necessitate innovative thinking and a strategic approach. The Strategy states that 'without action, an ageing population could reduce the size of our workforce and lead to lower productivity' (Ibid., p.53) and employers will need to play a vital role by adopting new ways of working in relation to the retention, retraining and recruitment of older workers.

On 12 March 2018, a government press release<sup>4</sup> announced a £300m competitive fund through the Industrial Strategy Challenge Fund. This is to fund research and business development of innovations and new technologies, with £98 million of the fund committed to a 'healthy ageing programme' and £210 million for making improvements to the diagnosis of disease and the development of new medical treatments and technologies through a 'data to early diagnosis and precision medicine programme'. An extra £40m is provided for the UK Dementia Research Institute for creating a new research hub in

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□ 'Government Announces 300 Million for Landmark Ageing Society Grand Challenge', March 2018.

<https://www.gov.uk/government/news/government-announces-300-million-for-landmark-ageing-society-grand-challenge>. [Accessed on 16<sup>th</sup> March 2018].

partnership with University College London that will host 350 leading scientists and research into new treatments.

The 'Life Sciences Sector Deal' has been developed through collaborative working between government and the life sciences sector, involving more than 25 organisations 'across biopharma, medtech and diagnostics, charities and academia' (p.6). To support the ambition of making the UK a 'top tier global hub for biomedical and clinical research and medical innovation', (Ibid., p.6) public and private investment up to £80bn could be realised for research and development (R&D) over next 10 years.

The pharmaceuticals manufacturing sector accounts for 22% of all business R&D and exists within growing global health and life science markets, which are predicted to grow up to 10% per year over the next 10 years. This creates the need for skills, including highly skilled research and development skills, for the sector to fully achieve its potential and 'maintain the UK's position at the forefront of life sciences' ('Bridging the Skills Gap in the Biopharmaceutical Industry - Maintaining the UK's leading position in life sciences', 2015, p.3). The 'Life Sciences' strategy suggests that sectors should collaborate on 'a skills action plan across the NHS, commercial and academic sectors', which would be based on a 'gap analysis that identifies the key skill areas for future focus' and is 'expected to include clinical pharmacology, clinical trials, manufacturing, data science, clinical science, engineering and biosciences' ('Life Sciences Industrial Strategy'. 2017, p.62).

Other skills relevant to this sector ('across industry, the NHS, academia and regulators') will be regulatory skills, for 'medicines development, regulation and delivery to patients' and 'to develop standards for emerging technologies and methodologies'(Ibid.).

The strategy points to 'an acute shortage of well-trained individuals' with data and digital skills (Ibid., p.63).

## Conclusions / Moving Forwards

To build and sustain the aspirational modern society that is discussed in the Industrial Strategy, with its thriving economy, prosperous communities and greater earning power, firm foundations are needed. The skills of the workers represent one of these foundations. What has become evident in this study is that there is a consensus that up-skilling, conversion, continuing professional development and retraining for existing workers is critical to keep up with the data revolution and ensure future productivity in an ageing society.

Apprenticeships, updating standard degrees and CPD have been identified as mechanisms for providing universities and employers with an opportunity to invest in the existing and future workforce by developing the required industry-specific skills in the years to come. Government has identified four Grand Challenges for businesses, academia and civil society to work together on to innovate and develop new technologies and industries in areas seen as strategically important to Britain. In considering these four Grand Challenges: 1) artificial intelligence and data revolution, 2) clean growth, 3) the

future of mobility, and 4) an ageing society, it has become clear that future skills needs traverse all sectors – and in the case of Keele University, across all disciplines – particularly in relation to innovation and new technology, the promotion of digital and STEM skills and investment in AI and clean growth.

In order for it to respond with an integrated whole systems approach, one of the report's recommendations was that Keele University could use a collaborative approach amongst faculties and industry to develop higher level apprenticeships, degrees and CPD opportunities which respond to local and national skills needs. This would involve being future facing by, for instance, developing non-tradition standard degree courses alongside industry partners and short CPD courses which specifically respond to a high-need local skills gap. For instance, Keele Management School could choose to work with the Department of Geography, Geology and the Environment and industry partners to create a Green Finance Masters course.

## Bibliography

'Annual Report 2017', (2017). Stoke-on-Trent and Staffordshire LEP,  
<https://www.stokestaffslep.org.uk/app/uploads/2015/11/SSLEP-Annual-Report-2017-web-1.pdf>.

'Bridging the Skills Gap in the Biopharmaceutical Industry - Maintaining the UK's leading position in life sciences', (2015). ABPI.  
[https://www.abpi.org.uk/media/1365/skills\\_gap\\_industry.pdf](https://www.abpi.org.uk/media/1365/skills_gap_industry.pdf)

'Careers of the Future', (2014). UK Commission for Education and Skills.  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/391911/15.01.05\\_UKCES\\_Career\\_Brochure\\_V13\\_reduced.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/391911/15.01.05_UKCES_Career_Brochure_V13_reduced.pdf).

Caswell, Rachel and Stuart Nicholls, (2015). 'The Story of Staffordshire', Staffordshire County Council,  
<https://www.staffordshireobservatory.org.uk/documents/StaffordshireStory/Story-of-Staffordshire-2016-Full-report-VERYFINAL.pdf>,

'Digital Skills for the UK Economy', (2016). HM Government: Department of Business, Innovation and Skills and Department for Culture, Media and Sport.  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/492889/DCMSDigitalSkillsReportJan2016.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492889/DCMSDigitalSkillsReportJan2016.pdf).

'Education Trust Skills Strategy, 2016-2020', (2016). Stoke-on-Trent and Staffordshire LEP, <https://www.stokestaffslep.org.uk/app/uploads/2015/04/82528-ET-SKILLS-STRATEGY-JULY-2016.pdf>.

'Employer Skills Survey 2015 Skills in the Labour Market', (2016). UK Commission for Employment and Skills. Last updated 14 July 2016. <https://www.gov.uk/government/publications/ukces-employer-skills-survey-2015-uk-report>.

'Government Announces 300 Million for Landmark Ageing Society Grand Challenge', (March 2018). <https://www.gov.uk/government/news/government-announces-300-million-for-landmark-ageing-society-grand-challenge>.

Hall, Professor Dame Wendy., and Jérôme Pesenti, 'Growing the Artificial Intelligence Industry in the UK', (2017). Independent Review Commissioned by HM Government: Department for Digital, Culture, Media and Sport and Department for Business, Energy and Industrial Strategy, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/652097/Growing\\_the\\_artificial\\_intelligence\\_industry\\_in\\_the\\_UK.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf).

'Industrial Strategy - Automotive Sector Deal', (January 2018). HM Government. <https://www.gov.uk/government/publications/automotive-sector-deal>.

'Industrial Strategy - Life Sciences Sector Deal', (December 2017). HM Government. <https://www.gov.uk/government/publications/life-sciences-sector-deal>.

'Immigration Rules Appendix K: Shortage Occupation List', (2018). Pub. February 2016, updated January 2018. HM Government. <https://www.gov.uk/guidance/immigration-rules/immigration-rules-appendix-k-shortage-occupation-list>.

Nicholls, Stuart and Darren Farmer, (2016). 'Economy & Employment: Staffordshire & Stoke-on-Trent', LEP and Staffordshire County, Council . <https://www.staffordshireobservatory.org.uk/documents/Economy-Infrastructure-and-Skills/Economy/Right-for-business-Economy-Employment-Business-in-Staffordshire-Stoke-on-Trent-2016-FINAL-20160318.PDF>,

'Overview of Skills Participation & Issues Affecting the Demand for Skills in Stoke-on-Trent and Staffordshire', (January 2016). v.7. Staffordshire Observatory.

<https://www.staffordshireobservatory.org.uk/documents/Economy-Infrastructure-and-Skills/Skills/Post-16-Area-Review-Report-v7.PDF>.

'Post-16 Technical Education Reforms: T Levels Action Plan', (2017). HM Government: Department for Education.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/650969/T\\_Level\\_Action\\_Plan.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/650969/T_Level_Action_Plan.pdf).

'Skills Action Plan Priority Sectors Evidence Summary', (January 2016). Stoke on Trent and Staffordshire Enterprise Partnership.

<https://www.staffordshireobservatory.org.uk/documents/Economy-Infrastructure-and-Skills/Skills/LEP-ET-Skills-Plan-Evidence-Summary-DF-MS-v2.PDF>.

'Skills Demand and the Labour Market', (2016). Staffordshire and Stoke-on-Trent LEP and Staffordshire County Council.

'Skills for Future Growth: Tackling Skills Gaps and Supporting Growth'. (June 2016). HM Government. <https://www.local.gov.uk/sites/default/files/documents/skills-future-growth-tack-a88.pdf>.

'Social Mobility: Stoke-on-Trent Opportunity Area, 2017-2020', (2017). HM Government: The Department of Education,

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/674871/Social\\_Mobility\\_Delivery\\_Plan\\_Stoke-on-Trent.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/674871/Social_Mobility_Delivery_Plan_Stoke-on-Trent.pdf).

'Stoke-on-Trent and Staffordshire Strategic Economic Plan: Part One Strategy', (2014). Stoke-on-Trent and Staffordshire LEP.

[https://www.stoke.gov.uk/directory\\_record/331772/sslep\\_strategic\\_economic\\_plan\\_march\\_2014/category/343/adults\\_strategic\\_partnership\\_plan](https://www.stoke.gov.uk/directory_record/331772/sslep_strategic_economic_plan_march_2014/category/343/adults_strategic_partnership_plan).

'Transport Investment Strategy - Moving Britain Ahead', (2017). HM Government.

<https://www.gov.uk/government/publications/transport-investment-strategy>

'The Clean Growth Strategy: Leading the Way to a Low Carbon Future', (2017). HM Government,

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/651916/BEIS\\_The\\_Clean\\_Growth\\_online\\_12.10.17.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf).

'The Future of Work Jobs and Skills in 2030 – Key Findings', (February 2014). HM Government.

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/303335/the\\_future\\_of\\_work\\_key\\_findings\\_edit.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/303335/the_future_of_work_key_findings_edit.pdf).

'The Industrial Strategy White Paper', (2017). HM Government, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf).

'The Right Combination: Education and Skills Survey', (July 2016). CBI & Pearson. <http://www.cbi.org.uk/cbi-prod/assets/File/pdf/cbi-education-and-skills-survey2016.pdf>.

'The State of Engineering', (2018). Engineering UK. <https://www.engineeringuk.com/research/> .

'UK Digital Strategy', (2017). UK Government: Department for Digital, Culture, Media and Sport. <https://www.gov.uk/government/publications/uk-digital-strategy>.