

HS2

Getting the best out of
**the Advanced
Manufacturing sector**





High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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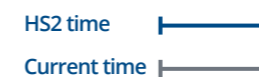
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All times compare fastest HS2 service (full network) with current fastest time.



Newcastle to



Darlington to



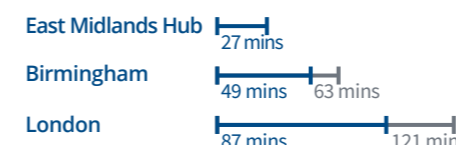
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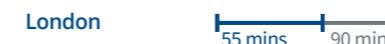
Preston to



Sheffield to



Crewe to

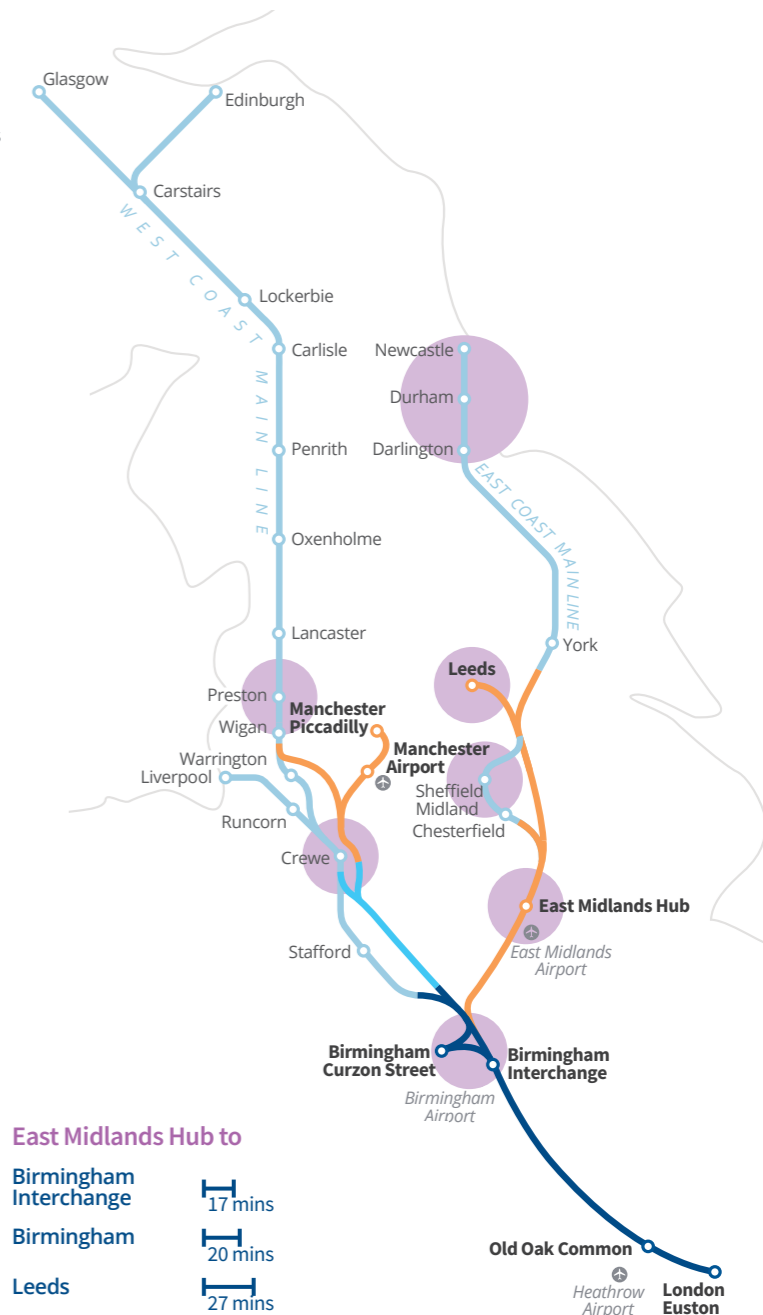


Birmingham to

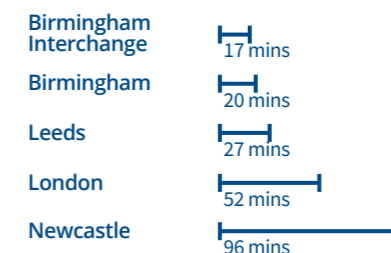


HS2 Route Map

- Destinations served by HS2
- HS2 line (Phase One - Completed 2026)
- HS2 line (Phase 2a - Completed 2027)
- HS2 line (Phase 2b - Completed 2033)
- HS2 services on existing network
- Highlighted Advanced Manufacturing Clusters



East Midlands Hub to



HS2 will enable engineers, researchers and scientists to engage in the face-to-face collaboration and sharing of knowledge that underpins the competitiveness of British advanced manufacturing

The UK is a research and innovation powerhouse. Ranked in the top five in the global innovation index in 2017¹, the UK is home to the most productive science base in the G7². For the UK's high value manufacturing sectors – such as pharmaceuticals, automotive, aerospace, chemicals and electrical/electronic industries – this excellence in research and innovation is vital to their global success.

Innovation thrives on face-to-face contact. Knowledge sharing, new discoveries and serendipity are encouraged when engineers, scientists, researchers and suppliers are able to come together and collaborate. HS2 will support face-to-face collaboration in research and innovation by effectively shrinking the distance between manufacturers, their suppliers, universities and research centres.

Maintaining the global competitiveness of high value manufacturing in the UK will require British advanced manufacturers to have access to cutting edge knowledge and research

High value advanced manufacturing increasingly relies on intensive use of capital and knowledge and requires a high level of technology and R&D³. Competitiveness and success in such high value industries can depend as much on quality, performance, design and innovation in their processes and products, as it does on price. Advanced manufacturing firms often compete by seeking out the best know-how, technology and inputs, both nationally and internationally.

Collaboration between manufacturers, centres of research and supply chains increasingly cuts across traditional sector and geographic boundaries and may require long-distance travel to meet with partners

- » The manufacturing supply chain is not limited to the supply of physical components to make up a final product. The supply chain system also includes services such as planning, design, purchasing, distribution and sales⁴.
- » New digital technologies offer manufacturers the opportunity to work more collaboratively with their suppliers. Enhanced data sharing will allow manufacturers to automatically communicate changes in their production plans to suppliers and to reduce inventories and lead times for supplies⁵.

- » These new digital innovations require manufacturers and their suppliers to collaborate with research and development bodies that cross the boundaries between sectors and may not be located in close proximity to manufacturing businesses.
- » These collaborations across traditional sector boundaries encourage businesses to seek partners for their research and development projects from across the UK, placing a premium on fast, frequent and reliable transport connections between regions.



Image: Alamy stock photo

Many of the major UK advanced manufacturing and research clusters will be connected by HS2 services

The UK automotive sector is Europe's largest investor in research and development. UK automotive manufacturing is enjoying a renaissance with booming exports, built on this commitment to innovation⁶. UK automotive manufacturers and their supply chains are embracing new digital technologies to deliver productivity gains, new innovative products, quality improvements, greater flexibility and shorter times to market⁷.

For example, the Digital Engineering and Test Centre (a spoke of the nation-wide Automotive Propulsion Centre) is a centre of excellence within the Loughborough University London Campus on the Queen Elizabeth Olympic Park in London. The Centre brings together industry and academia from the automotive and digital communities to work collaboratively to develop next generation propulsion systems⁸.

Large automotive manufacturers, including Ford, McLaren, Jaguar Land Rover and Nissan, are affiliated with the Centre and actively engage with its projects and development activities⁹. HS2 will bring London's world leading digital sector closer to automotive manufacturing clusters in the Midlands, the North West and the North East of England.

The UK aerospace sector is the second largest in the world and creates over a quarter of a million jobs in the UK in a series of clusters that include the East and West Midlands, Lancashire, Cheshire and Edinburgh. As well as global giants, the UK is home to over 3,000 companies in the aerospace supply chain:

- » The Midlands aerospace cluster is centred around Rolls-Royce, one of the world's leading manufacturers of aircraft engines, in Derby and around suppliers of aircraft control systems in Birmingham, Wolverhampton and Coventry¹⁰. HS2 will cut journey times between the East Midlands and Birmingham to just 20 minutes, while services to Birmingham Interchange station in Solihull will be just 17 minutes, bypassing congested roads and slow existing rail links¹¹.
- » There is an alliance of over 200 aerospace companies in the North West with a combined turnover in excess of £7 billion¹². HS2 will almost halve the rail journey time between Preston, which sits within the Lancashire aerospace cluster, and the West Midlands aerospace cluster to 50 minutes.

Improved transport connectivity will help universities and research centres to act as sources of new ideas and innovation for manufacturing businesses across Britain

The Midlands has a strong science and research base, including 20 universities, three of which have been ranked in the top 150 in the world – Warwick, Birmingham and Nottingham. This is a source of competitive advantage for manufacturing businesses in the Midlands, which employ over 600,000 people in the region and deliver over one-fifth of the UK's annual manufacturing output¹³.

HS2 will spread the benefits of the science and research base in one region to businesses and suppliers in other regions of the UK:

- » The eastern leg of Phase Two of HS2 will connect the West and East Midlands, Yorkshire and the North East, improving links between LEP regions that are home to around 11 million people. Connecting some of the UK's best universities and research centres in the East

Midlands, with advanced manufacturers in the West Midlands, Leeds and South Yorkshire, will create the potential for even greater research collaboration.

- » The Cheshire Science Corridor encompasses many fields of scientific analysis and research including life sciences, chemical engineering and energy and environmental technology parks¹⁴. Researchers and scientists working in The Corridor will have access to the UK's high speed rail network via HS2 stations at Liverpool, Runcorn, Crewe, Warrington and Manchester Airport. This will provide connections to London – which sits within the UK's 'golden triangle' life sciences cluster – in just over one and a half hours from Liverpool and in less than one hour from Crewe.

International Manufacturing Centre, University of Warwick



The Advanced Manufacturing sector

HS2 will better connect Britain's world class manufacturers to global markets, supply chains and networks

Airports connect UK businesses with the global marketplace. Aviation connectivity supports export growth for manufacturing businesses. A survey of manufacturing businesses showed that the more export intensive a firm becomes, the more critical aviation becomes to their business. Over half of the most export-intensive businesses (with over 75% of their turnover coming from exports) reported that aviation was critical to their company¹⁵. HS2 will provide fast, frequent and reliable connections between businesses in our city regions and the UK's international airports.

As an example, the Constellation Partnership brings together two Local Enterprise Partnerships (LEPs) and seven Local Authorities in Cheshire and Staffordshire¹⁶. Manufacturing strengths allow the region to export to global markets. In Cheshire and Warrington around a fifth of employment is in export-intensive industries,

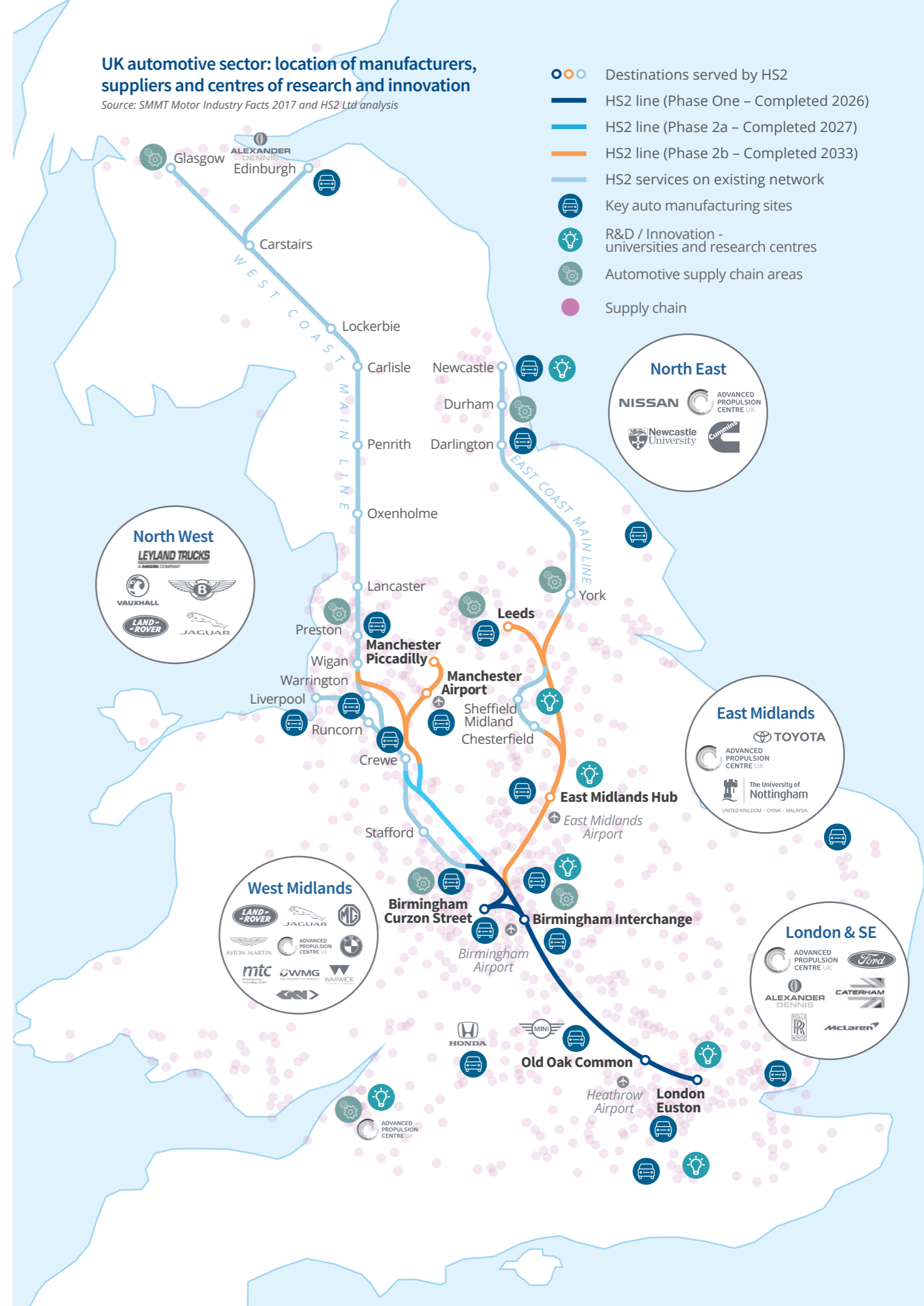
this is the third highest of any LEP area in England¹⁷. Crewe is home to Bentley's world class production facilities, employing more than 4,000 people and accounting for more than £1 billion of UK exports each year¹⁸.

HS2 will help the export competitiveness of the region's advanced manufacturing sector by improving access to supply chains and sources of knowledge, research and innovation and by providing fast, frequent and reliable access to Heathrow Airport via an onward connection from the HS2 station at Old Oak Common in West London. Old Oak Common will be less than 50 minutes' journey time by HS2 services from Crewe. A dedicated HS2 station will also expand the catchment area of Manchester Airport, providing the opportunity to expand the number of flights and destinations.

East Midlands Airport



Image: The Studio 17



UK aerospace sector: location of manufacturers, suppliers and centres of research and innovation

Source: SMMT Motor Industry Facts 2017 and HS2 Ltd analysis

- ● Destinations served by HS2
- HS2 line (Phase One – Completed 2026)
- HS2 line (Phase 2a – Completed 2027)
- HS2 line (Phase 2b – Completed 2033)
- HS2 services on existing network
- Key aero manufacturing sites
- R&D / Innovation – universities and research centres
- Aerospace supply chain areas
- Supply chain



^ HS2 is capable of a journey time of 49 minutes for services directly between Birmingham and Leeds that travel entirely on the high speed line. The 2017 HS2 business case showed such services routed via Sheffield.

- 1 Global Innovation Index 2016.
- 2 <https://www.gov.uk/government/news/safeguarding-funding-for-research-and-innovation>.
- 3 UKCES 2015 – Sector insights: Skills and performance challenges in the advanced manufacturing sector.
- 4 ‘Strengthening UK manufacturing supply chains: An action plan for government and industry’, HM Government, February 2015.
- 5 ‘The Digitalisation of the UK Automotive Industry’, KPMG on behalf of the Society of Motor Manufacturers and Traders, November 2016.
- 6 <https://www.smmt.co.uk/industry-topics/technology-innovation/>.
- 7 ‘The Digitalisation of the UK Automotive Industry’, KPMG on behalf of the Society of Motor Manufacturers and Traders, November 2016.
- 8 ‘An Introduction to the Digital Engineering and Test Centre’, the Digital Engineering and Test Centre. Available at: <http://www.detc.uk/wp-content/plugins/download-attachments/includes/download.php?id=1189>.
- 9 <http://www.detc.uk/>.
- 10 <http://www.midlandsaerospace.org.uk/aerospace>.
- 11 ‘Midlands Connect Strategy: Powering the Midlands Engine’, Midlands Connect, March 2017.
- 12 <http://www.aerospace.co.uk/about-us>.
- 13 ‘Midlands Engine Strategy’, HM Government, March 2017.
- 14 Cheshire Science Corridor Enterprise Zone – Prospectus: <http://cheshiresciencecorridorez.com/wp-content/uploads/2015/05/5843-CSC-BROCHURE-MASTER.pdf>.
- 15 ‘Written evidence from EEF – the manufacturers’ organisation to the Airports Commission on Shortlisted options for a new runway’, EEF, January 2015.
- 16 The Constellation Partnership <http://constellationpartnership.co.uk/>.
- 17 A strategic economic plan for Cheshire and Warrington – Cheshire and Warrington LEP.
- 18 <http://www.crewechronicle.co.uk/news/crewe-south-cheshire-news/council-backs-bentley-masterplan-13010350>.

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