

AUTOMATION AND BRITAIN'S NEW POLITICAL LANDSCAPE

EXECUTIVE SUMMARY



New technologies have always reshaped the world of work. Recent developments in artificial intelligence (AI) and big data are no different. As these technologies progress, economists, policy professionals and technologists disagree about what the future of work will look like. In 'A World Without Work', published in January 2020, the economist Daniel Susskind suggests that 'this time really is different... the threat of technological unemployment is real'¹. Others have insisted that new technology will create new kinds of jobs we can't currently imagine and that increased productivity will increase demand in the economy which will keep employment levels high. Certainly, low current rates of unemployment do not support the argument that a world without work is near, although arguably it is precarious gig work that is picking up the slack. Despite these disagreements over the net impact of automation, there is a near consensus that change is coming and that its scale and scope will be unprecedented.

Our 2017 report, *The Impact of AI in UK Constituencies*, argued that the government should be taking steps to prepare for these future scenarios. We looked at the impact

of automation in each parliamentary constituency in England, Scotland and Wales, and found that an adequate policy response must take account of how different parts of the country, genders and socio-economic groups will be affected. In this briefing paper, we update this work using the latest employment figures from the Labour Force Survey. We examine the industries and areas at risk in the context of a new political landscape, and pay particular attention to the 'red wall' seats, the 24 historically Labour-supporting constituencies won over by the Conservatives in the 2019 General Election, which are likely to be a key area of focus for the current government.² It is important to note that we do not address the issue of job creation in detail.

In his first speech as Prime Minister, Boris Johnson has announced plans to 'level up' different parts of the UK, improving the infrastructure, employment, and economic performance of regions outside of London and the South East.³ Automation will make this task more challenging, and will require careful thought and planning. In the final section, we suggest some policy ideas that the government should consider.

Future Advocacy is a non-partisan consultancy and think tank working at the intersection of advocacy, global affairs, and technology.

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Credits

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1. Susskind, D. (2020). *A world without work*. London: Allen Lane.
2. Johnson, J. (2019). 'The 24 Labour heartland seats lost to the Tories for the first time in decades.' Telegraph. Available at: <https://www.telegraph.co.uk/politics/2019/12/13/stunning-tory-seat-victories-2019-general-election/>.
3. BBC News (2019). 'Boris Johnson: First speech as PM in full'. Available at: <https://www.bbc.co.uk/news/uk-politics-49102495>.

Key points

- ▶ The effects of automation will be unevenly spread across the country. In the so-called 'red wall' constituencies won by the Conservative Party in the 2019 General Election, 32% of jobs could be automated by the early 2030s, compared to the national average of 27%.
- ▶ 8 million jobs in Britain are at risk of automation by the early 2030s.
- ▶ The British industries that will be hit hardest by automation by the early 2030s are retail (1.2m jobs at risk), manufacturing (1.1m jobs at risk), and transport (800k jobs at risk).
- ▶ The 'red wall' seat of Heywood and Middleton is predicted to be hit the hardest nationally, with an estimated 39% of jobs at risk of automation.
- ▶ A slightly higher proportion of jobs are at risk of automation in constituencies classified as medium towns (29.7%) and small towns (29.6%) than in core cities (27.2%). Job creation concentrated in cities is likely to amplify this disparity.

The UK government should consider the following areas:

01 EDUCATION AND TRAINING

- ▶ Establish **training centres** for work in renewable energy, in areas affected by automation.
- ▶ Support employees by offering ongoing **training opportunities**, particularly to develop skills that are harder to automate, such as critical thinking, creativity, communication and care.

02 DEVOLUTION

- ▶ Relocate the **Department for Business, Energy, and Industrial Strategy** from London to the North.

03 TAXATION

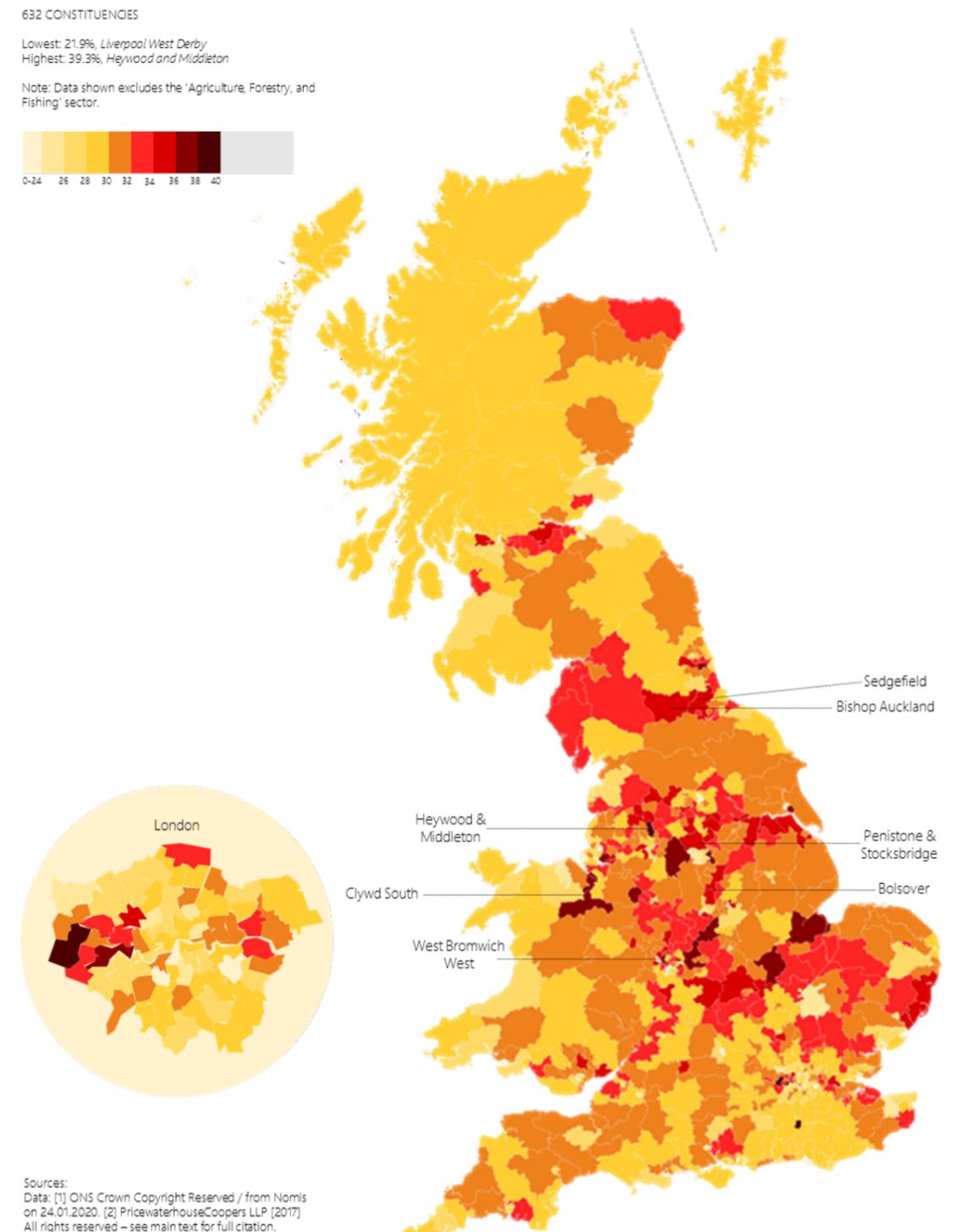
- ▶ Conduct research into **localised tax relief** options for businesses creating jobs in areas affected by automation
- ▶ Reform **income and taxation models** so that they result in fairer distribution of the wealth that these technologies will create.

04 INFRASTRUCTURE

- ▶ Improve **infrastructure** in areas affected by automation, such as reliable transport links and broadband.

Geographical differences in the impacts of automation

Jobs at potential high risk of automation by parliamentary constituency



▲ **Figure 1:** Heat map showing how the impact of automation could vary across Great Britain. Each constituency is colour-coded according to the percentage of current jobs that are at high risk of automation by the early 2030s. Highlighted are some of the heavily impacted 'red wall' seats. An interactive version is available on our website.

AUTOMATABLE INDUSTRIES



TRANSPORT

800k jobs at risk of automation by early 2030s (56.4%)

The transportation sector has the highest proportion of jobs likely to be affected by automation. Of the 1.4 million transportation jobs in Britain, that amounts to 800,000 at risk of automation by the early 2030s. Partially automated technology has already been around for a few years, while fully driverless vehicles are being developed and tested by companies such as Tesla, Mercedes and BMW.⁴ In December 2019, the Scottish Cabinet Secretary Michael Matheson declared Scotland 'open for business' to spearhead driverless technology.⁵ Counter-intuitively, short-haul trucking is harder to automate than long-haul trucking, and also constitutes the majority of jobs.⁶ Changes to the sector may therefore be more sweeping in the long-term, once these challenges are overcome.

MANUFACTURING

1.1m jobs at risk of automation by early 2030s (46.4%)

The UK is often considered to be lagging behind on the automation of its manufacturing sector. The UK has just 33 robots per 10,000 manufacturing

jobs, in comparison to 150 in Germany, and a staggering 300 in South Korea.⁷ The Business, Energy and Industrial Strategy Committee recently concluded that 'the future of manufacturing in the UK depends on higher levels of productivity' and that 'robotics and automation provide possibilities' to do this.⁸ Post-Brexit, there will be additional pressure as the UK's biggest employers have depended heavily on immigrant labour. Food and drink companies, in particular, have relied on EU migrants for almost a third of their combined workforce.⁹ Some have suggested that automation could help fill the impending labour shortage gap. Of the 2.4 million manufacturing jobs in Britain, 1.1 million could be automated by the early 2030s.

RETAIL

1.2m jobs at risk of automation by early 2030s (44%)

From Amazon's robotised warehouses, to Waitrose's 'farmbots', automation is sweeping through the UK's retail sector.¹⁰ Self-checkout stations, partially automated backroom unloading, and shelf-scanning robots have also been rolled out by many high street shops. A recent study suggested that a typical retail store can now operate with up to 55-65% fewer hours of labour using available automated technologies.¹¹

Between 2015 and 2018, there were 136,000 fewer jobs in retail across Great Britain.^{12, 13} In 2019 alone, major retailers such as Karen Millen, Jack Wills, and Mothercare disappeared from high streets. Many more made heavy reductions in staff, with Tesco announcing in June that it would cut 4,500 jobs at 153 Metro supermarkets.¹⁴ Due to the volume of retail and wholesale jobs in Britain, this is the greatest absolute volume of expected jobs to be automated by the early 2030s. Of a total of 2.8 million retail jobs, 1.3 million are at risk of automation. Similarly, of 1.2 million wholesale jobs, 520,000 are at risk of automation.

Jobs least at risk - health, education and creative industries

Jobs that are least likely to be affected typically involve 'non-routine' tasks, as well as interpersonal skills such as care, communication and empathy. Only 66,000 of Britain's 3.9 million health-related jobs are likely to be automated by the early 2030s, or 17%. Similarly, only 220,000 of Britain's 2.6 million education-related jobs are at risk, an even lower proportion of 8.5%. As living standards improve and the population ages, more employment opportunities are likely to be created in the service, care and leisure industries. Of the current 1.3 million jobs in the arts, entertainment, recreation and service sectors, only 300,000 (22%) jobs are likely to be automated.

4. Woollaston, V. (2020). Driverless cars of the future: How far away are we from autonomous cars?. Alphr. Available at: <https://www.alphr.com/cars/1001329/driverless-cars-of-the-future-how-far-away-are-we-from-autonomous-cars>.
5. BBC News. (2020). Scotland 'open for business' in driverless cars. Available at: https://www.bbc.co.uk/news/uk-scotland-50948624?intlink_from_url=https://www.bbc.co.uk/news/topics/c90ymkd8lgt/driverless-cars&link_location=live-reporting-story.
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8. House of Commons, Business, Energy and Industrial Strategy Committee. (2019). Automation and the future of work. Available at: <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1093/1093.pdf>
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11. Begely, S. et. al. (2019). 'Automation in retail: An executive overview for getting ready'. Mckinsey. Available at: <https://www.mckinsey.com/industries/retail/our-insights/automation-in-retail-an-executive-overview-for-getting-ready>

12. ONS. (2019). 'Employees in the UK by industry: 2018'. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/employeesintheukbyindustry/2018>
13. ONS. (2017). 'UK business register and employment survey (BRES): provisional results 2016, revised results 2015'. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/businessregisterandemploymentsurveybresprovisionalresults/2016revisedresults2015>
14. Kollewe, J. and Butler, S. (2020). 'High street crisis: which big names closed stores in the past year?'. Guardian. Available at: <https://www.theguardian.com/business/2019/nov/06/high-street-crisis-big-names-job-losses-store-closures>.

THE 'RED WALL' SEATS

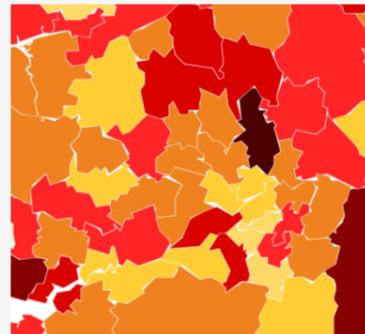


The 2019 election saw Conservative victories in many constituencies with historically strong ties to Labour. Our analysis found that the so-called 'red wall', running from north Wales through the Midlands to the north east of England, is predicted to see higher rates of automation than the rest of the country.¹⁵ 32% of jobs in all 24 red wall constituencies could be automated by

the early 2030s, compared to 27% across the whole country. The red wall seat of Heywood and Middleton is predicted to be hit the hardest nationally, with an estimated 39% of jobs at risk. Below we examine three case studies: these are the red wall constituencies with the highest proportions of automatable jobs.

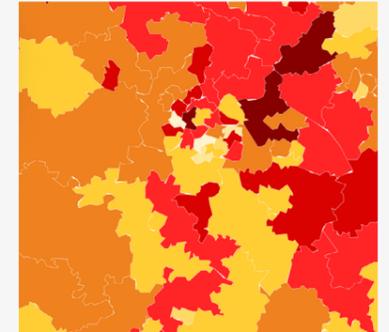
▶ HEYWOOD AND MIDDLETON

Heywood and Middleton, Manchester, was won from Labour by Conservative MP Chris Clarkson with a margin of 663 votes in 2019. The constituency houses 6000 people working in transportation, 5000 in manufacturing, and 3500 in retail, the three industries with the highest predicted automation rates. An additional 4500 people work in business administration and support services. The average weekly wage is £485 and 20% of people have a university degree, compared with 30% in Manchester Central, and 52% in Kensington, the richest constituency in London. The average age in Heywood and Middleton is 41 years.¹⁶



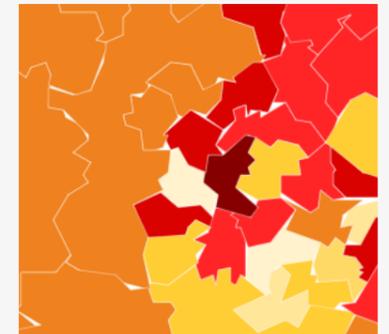
▶ CLWYD SOUTH

Clwyd South, in northern Wales, saw the Conservative Simon Baynes win by 1329 votes in 2019. The constituency includes several suburbs of Wrexham, which has the largest retail sector in North Wales, and which saw the demise of coal and steel industries through the 20th century. Today, 3500 people work in manufacturing, 1000 in retail, and 1750 in business administration and support services. Tourism is also a major contributor to the local economy. The average weekly wage is £444, and 22% have a university degree. The average age is 42 years.¹⁷



▶ WEST BROMWICH WEST

In West Bromwich West, manufacturing is the biggest employer, providing jobs for 9000 people. Retail and transportation employ 5000 people respectively. Nearby coal mining disappeared through the 20th century, and during the recessions of the 1970s and 80s, a host of steelworks and factories also closed down. The constituency was also hit hard by the financial crisis in 2008, and has seen some of the highest unemployment rates in the country. In 2012, registered jobseekers made up 8.1% of the local population, in comparison to a national average of 3.8%.¹⁸ The average weekly wage is £429 and only 13% have a university degree. The average age is 45.¹⁹



15. Johnson, J. (2019). 'The 24 Labour heartland seats lost to the Tories for the first time in decades'. Telegraph. Available at: <https://www.telegraph.co.uk/politics/2019/12/13/stunning-tory-seat-victories-2019-general-election/>
16. Office for National Statistics. (2015). 'Visualising your constituency'. Available at <https://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/visualisingyourconstituency/2015-03-26>

17. Ibid.
18. Guardian blog. (2016). Unemployment: the key UK data and benefit claimants for every constituency <https://www.theguardian.com/news/datablog/2010/nov/17/unemployment-and-employment-statistics-economics>.
19. Office for National Statistics. (2015). 'Visualising your constituency'. Available at <https://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/visualisingyourconstituency/2015-03-26>

CITIES VS TOWNS



A 2019 report by the US-based Brookings Institute wrote that 'the victory of Donald Trump highlighted the emergence of a stark and widening divide between two Americas: one based in large, digitally oriented metropolitan areas; the other found in lower-tech smaller cities,

towns, and rural areas.'²⁰ The report analysed the link between digitisation and the 'clustering' of industries in particular places, concluding that digital technologies tend to 'amplify the productivity of the skilled and 'substitute' for rote or 'routine' work.



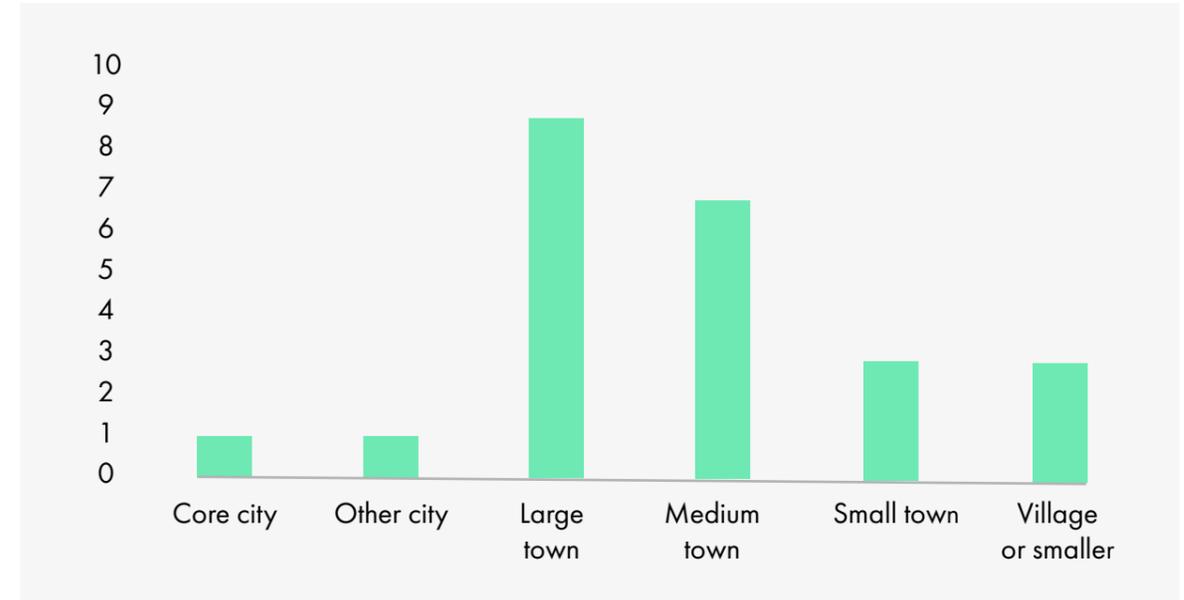
▲ **Figure 2:** Percentage of jobs at risk of automation by by early 2030s, across constituencies grouped by size of settlement ²¹

It is possible that we are witnessing a similar phenomenon in Britain. Figure 4 shows that slightly more jobs are at risk of automation in constituencies primarily classified as medium towns (29.7%) and small towns (29.6%) than in core cities (27.2%) and other cities (27.7%).

In addition, the creation of new jobs is likely to be concentrated in cities, which may amplify this disparity. There is a growing body of research showing that new employment opportunities are clustering in 'skilled cities' including London, Oxford, Cambridge, Manchester and Edinburgh.²² These cities contain high numbers

of people working in education, health, and creative industries. In 2004, the share of workers in new types of jobs spanned a wide range,

from 4.1% in 'Rest of Northern Region' to 8.2% in Central London. In 2014, the Central London figure had gone up to 9.8%.²³



▲ **Figure 3:** 'Red wall' constituencies won by the Conservatives, by size of settlement.²⁴

Of the 24 'red wall' constituencies examined here, 9 fall into the 'large towns' bracket, and 7 into 'medium towns'. Only 1 'red wall' seat was won in each of the 'core cities' and 'other cities' brackets.

towns and cities increased from 40% to 48% over the same period.²⁵ It is too early to suggest a causal link between digitisation and voting patterns, but this does point to an increasing political divide between the highly connected, highly skilled urban centres, and smaller towns and rural areas that have not fully benefited from digital advances.

This may be part of a wider trend. Between 2010 and 2017, Labour's share of voters in cities increased from 35% to 49%. The Conservatives' share of voters outside of large

housing/articles/visualisingyourconstituency/2015-03-26.

20. Muro, M. (2019). Countering the geographical impacts of automation: Computers, AI, and place disparities'. Brookings Institute. Available at: <https://www.brookings.edu/research/countering-the-geographical-impacts-of-automation-computers-ai-and-place-disparities/>.

21. Classifications based on: House of Commons Library. (2018). 'City & Town Classification of Constituencies & Local Authorities.' Available at: <https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP8322>. Frey, C. and Hawksworth, J. (2015) 'New job creation in the UK: which regions will benefit most from the digital revolution?'. PWC. Available at: <https://www.pwc.co.uk/assets/pdf/ukey-regional-march-2015.pdf>

22. Ibid.

23. Ibid.

24. Ibid.

25. BBC News. (2019). 'General election 2019: The towns and cities least likely to vote'. Available at: <https://www.bbc.co.uk/news/election-2019-50417767>.

RECOMMENDATIONS



An adequate policy response must take account of how this phenomenon will affect different parts of the country, as well as different genders and socio-economic groups. A solution will require

thoughtful action on the part of government, business and civil society. Below are some ideas the government should consider.

The government should consider:

01 EDUCATION AND TRAINING

- ▶ Establish training centres for work in renewable energy, in areas affected by automation. The Centre for Alternative Technology estimates that providing 100% of UK primary energy from renewables by 2030 would generate a net number of 1.33 million jobs.²⁶
²⁷ The government should support training for the jobs of the future in areas affected by automation.
- ▶ Support employees by offering ongoing training opportunities. The workers of the future need to develop skills that are harder to automate, such as critical thinking, creativity, communication and care.

02 DEVOLUTION

- ▶ Relocate the Department for Business, Energy, and Industrial Strategy (BEIS) from London to the North. Following the news that the House of Lords may be moved to outside of London, the government should consider establishing BEIS in the North, to help move the centre of policy making on business, energy and industrial strategy to the areas most affected by automation.²⁸

03 TAXATION

- ▶ Conduct research into localised tax relief options for businesses creating jobs in areas affected by automation. The aim would be to enhance the competitiveness of regions across the UK, particularly non-metropolitan areas.
- ▶ Reform income and taxation models so that they result in fairer distribution of the wealth that these technologies will create. The Government's fiscal and welfare policies must be updated to ensure that wealth is not increasingly concentrated in the hands of a few commercial entities who own robots and other automated technologies.

04 INFRASTRUCTURE

- ▶ Improve infrastructure in areas affected by automation, such as reliable transport links and broadband. Britain's 'digital divide' has been well documented: regional Internet use varies from 60% in the North East and 71% in Wales to 86% in London and 83% in the South East.²⁹ Broadband access and reliable transportation are both key to 'levelling up' different parts of the UK.

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27. Marcacci, S. (2019). 'Renewable Energy Job Boom Creates Economic Opportunity As Coal Industry Slumps.' Forbes. Available at: <https://www.forbes.com/sites/energyinnovation/2019/04/22/renewable-energy-job-boom-creating-economic-opportunity-as-coal-industry-slumps/#4892aa563665>
28. Jenkins, S. (2020). 'Shipping the House of Lords north is a great idea. Let's send the MPs as well. Guardian. Available at: <https://www.theguardian.com/commentisfree/2020/jan/20/house-lords-north-york-mps-palace-westminster>.

29. Blank, G., Graham, M., Calvino, C. 2017. Local Geographies of Digital Inequality. Social Science Computer Review. DOI: <https://doi.org/10.1177/0894439317693332>.

METHODOLOGY AND LIMITATIONS



We consulted the Office of National Statistics' 'Business Register and Employment Survey' (BRES). This is a survey of businesses in Great Britain that are VAT registered (indicating that they have a turnover of more than £85,000 a year) or are in the Pay-As-You-Earn (PAYE) system (meaning that have employees). In these figures, the number of employees in each employment sector in 2018 is counted for each English, Scottish and Welsh Parliamentary constituency. Note that the term 'employees' also includes working owners, who are typically sole traders, sole proprietors or partners who receive drawings or a share of the profits. BRES therefore includes self-employed workers as long as they are registered for VAT or PAYE schemes. The employment sectors correspond to the Standard Industrial Classification of economic activities (SIC) 2007.³⁰

We then consulted the estimates for the percentage of jobs at high risk of automation in each of these SIC 2007 sectors provided by Berriman and Hawksworth in their "Will robots steal our jobs? The potential impact of automation on the UK and other major economies" report for PwC.³¹

By multiplying the number of 'employees' in each sector by the percentage at high risk of automation, we calculate a figure for the number of employees whose jobs are at high risk of automation, per sector, in each constituency. We then summed the number for each sector, calculating a total number of jobs at high risk

of automation by the early 2030s in each constituency. We also expressed this figure as a percentage of total existing jobs in each constituency.

The 24 'red wall' seats examined in this paper include Ashfield, Bassetlaw, Bishop Auckland, Blyth Valley, Bolsover, Clwyd South, Don Valley, Dudley North, Great Grimsby, Heywood and Middleton, Leigh, Newcastle-under-Lyme, North West Durham, Penistone and Stocksbridge, Rother Valley, Scunthorpe, Sedgefield, Stoke-on-Trent Central, Stoke-on-Trent North, Wakefield, West Bromwich East, West Bromwich West, Workington, Wrexham.³²

Limitations

This analysis relies on calculations for the number of jobs at high risk of automation for each employment sector, published by Berriman and Hawksworth of PwC in March 2017. As they and others have made clear, sectoral mix is just one of the factors that may influence the number of jobs that are at high risk of automation in a particular area. Indeed, it may not be the most important factor in some cases.

Berriman and Hawksworth provide the example of Japan. Both Japan and Germany have a relatively similar sectoral mix to the UK, apart from a greater proportion of employment in manufacturing. Despite these similarities, the proportion of jobs calculated to be at high risk

of displacement by automation in Japan (21%) is far lower than that in Germany (38%) and the UK (30%). A deeper analysis of the specifics of employment in Japan provides clues as to why this may be, with the majority of sectors being less automatable in Japan than in the UK. Retail, for example, is considered to be 19% less automatable in Japan than in the UK, because a greater proportion of time in Japanese retail jobs is spent on performing management tasks rather than manual ones.³³

This example illustrates the value of taking a task-based view of the impact of automation on employment, as well as highlighting how the same sector in different employment environments may have vastly different predicted automatability. Our analysis does not address these other factors that may impact on the automatability of a particular sector in a specific region or area, and further research is needed to better identify these factors and to quantify their contribution.

There are also a set of limitations related to the BRES data. Although an important source of seasonal and regular employment in some constituencies, agriculture is a very small industry in the United Kingdom. Indeed, farm agriculture is excluded from BRES - given that is a survey that relies on self-reporting by local businesses, the data on agricultural employment is considered to be less reliable when this is split

up into small areas such as constituencies.³⁴ In view of these limitations, we have presented no data for employment in 'Section A: Agriculture, Forestry and Fishing'. Furthermore, the BRES excludes self-employed people who are not registered for VAT or PAYE, along with HM Forces and Government Supported trainees.

No data was available from BRES for sectoral employment for the Northern Irish constituencies, as this resource covers Great Britain but not Northern Ireland.³⁵ Counts in the BRES are rounded to the nearest 5 employees.

Lastly, the mapping between the sectors presented in the PwC report and the BRES survey is imperfect. However, reasonable assumptions can be made, as below:

- ▶ 'Property (L)' in the constituency data is mapped to 'Real estate' in the PwC data.
- ▶ 'Health (Q)' in the constituency data is mapped to 'Human health and social work' in the PwC data.
- ▶ 'Motor trades', 'Wholesale' and 'Retail' are all part of Section G of the SIC classification. The same value for "percentage at potential high risk of job automation" as the risk for 'Wholesale and retail trade' (44%) was applied to all three columns.

30. Office for National Statistics. (2008). 'UK SIC 2007'. Available at <https://www.ons.gov.uk/methodology/classificationsandstandards/ukstandardindustrialclassificationofeconomicactivities/uksic2007>.

31. Berriman, R. and Hawksworth, J. (2017), 'Will robots steal our jobs? The potential impact of automation on the UK and other major economies', in 'UK Economic Outlook March 2017', PwC, available at <https://www.pwc.co.uk/economic-services/ukeo/pwc-uk-economic-outlook-full-report-march-2017-v2.pdf>

32. Johnson, J. (2019). 'The 24 Labour heartland seats lost to the Tories for the first time in decades.' Telegraph. Available at: <https://www.telegraph.co.uk/politics/2019/12/13/stunning-tory-seat-victories-2019-general-election/>.

33. Berriman, R. and Hawksworth, J. (2017), 'Will robots steal our jobs? The potential impact of automation on the UK and other major economies', in 'UK Economic Outlook March 2017', PwC, available at <https://www.pwc.co.uk/economic-services/ukeo/pwc-uk-economic-outlook-full-report-march-2017-v2.pdf>

34. House of Commons Library, personal communication to MF, 13th September 2017

35. The 18 constituencies in Northern Ireland are Belfast East, Belfast North, Belfast South, Belfast West, East Antrim, East Londonderry, Fermanagh and South Tyrone, Foyle, Lagan Valley, Mid Ulster, Newry and Armagh, North Antrim, North Down, South Antrim, South Down, Strangford, Upper Bann, and West Tyrone.



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