



Skills and Training for a 21st Century Workforce



Dear Colleagues,

Paper 1/2018: Skills and Training for a 21st Century Workforce

Hopefully you will notice some small changes in format to this discussion brief. The purpose of our papers is to stimulate informed discussion around the issues, so we want to hear from you. Let us know what you find useful, what you do not find helpful, and any suggestions you have for how we might improve future briefings.

The closing date for this brief is 28 February. We look forward to receiving your responses to this paper via CPF.Papers@conservatives.com in due course. Please send your responses, using the response form published on the CPF website. A summary of all responses will be considered by the CPF Chairman, George Freeman MP, who will take the best ideas and suggestions to the PM's Policy Unit and Government Ministers.

The next paper will be on the environment and will be published at the start of March.

Thank you. We look forward to your ideas on this important topic.

The CPF Team

www.conservativepolicyforum.com

[@ConservativePF](https://twitter.com/ConservativePF)

One Page Summary

"Boosting productivity is the economic challenge of our age." (The Rt Hon Sajid Javid MP, Secretary of State for Business, Innovation and Skills)

"Should driverless cars become ubiquitous, families will be able to spend their savings on something far more useful than a steel box that spends most of its life sat on the driveway. Everywhere we turn, digital technology is driving improvements in almost every sphere of life. ... The fact is we are just in the foothills of a new technological revolution that will do even more to lift living standards and improve the human condition." (The Rt Hon Matt Hancock MP, Minister of State for Digital and Culture)

"This government is committed to...ensuring the UK is the best place to start and grow a digital business, trial a new technology, or undertake advanced research - and that the UK digital sectors remain world-leading. This requires supportive regulation but also first-class digital infrastructure and an advanced skills base." (The Rt Hon Karen Bradley MP, Secretary of State for Digital, Culture, Media and Sport)

Introduction: The Challenge

A. Productivity & Globalisation

B. Technological Change

C. Changing Skill Requirements

The Conservative Track Record

What Our Manifesto Said

Questions for discussion

1. Whose responsibility should training be: the citizen, schools and universities, the employer, the state, or all of them? In the Armed Forces when you sign-up all training is paid for in return to several years' service, but this is not the case in the rest of the public sector. Is this fair? What new contract might we offer our citizens?
2. How might a Conservative Government seek to boost productivity across the UK?
3. In what ways could the UK build on its world-class reputation for training and expand opportunities for lifelong vocational education and training? Do we need a top-down national skills programme or a bottom-up sectoral or geographical approach?
4. In what ways does training need to catch up with the changing skill requirements of modern technology? Are there any new and innovative models of training in your area that could be used elsewhere?
5. How should a Conservative Government deal with possible widening income gaps arising from increased automation?
6. What policies should a Conservative Government adopt to balance the need for improved training and productivity in the UK with any desire to reduce our reliance on skilled technical expertise from abroad? How might these be paid for?

Appendix: Facts and Figures

Introduction: The Challenge

The career landscape is constantly evolving and workers require very different skills today than in generations past. Even since today's school-leavers were born, there are now fewer personal assistants, typists and bank clerks but more care workers, nurses and teachers. Emerging challenges for the 21st-century workplace include:

- Productivity & globalisation—productivity has for many years been slowing in many economies, hitting wages and exacerbating income and wealth inequalities.
- Technological change—over 10 million UK jobs could potentially be at high risk of automation by the early 2030s.
- Changing skill requirements—the UK lacks professionals with STEM (science, technology, engineering and mathematics) skills, especially in engineering and IT.

A. Productivity & Globalisation

"Boosting productivity is the economic challenge of our age."
(The Rt Hon Sajid Javid MP, Secretary of State for Business, Innovation and Skills, 10 July 2015¹)

According to the OECD, productivity growth is the central driver of rising economic output and material living standards across countries. Improving productivity is therefore one of the Chancellor's central aims and will be a major issue for the country's success after we have left the European Union. Yet, for many years, productivity has been slowing in many advanced and emerging economies.²

Underlying long-term trends suggest that the slowdown predates both the 2008 economic crisis and the current technological wave that created the digitalised economy. Paradoxically, the observed slowdown in productivity has occurred at a time of rapid technological change, increasing participation of firms and countries in international production chains ("global value chains"), and rising education levels in the labour force, all of which are generally associated with higher productivity growth.

In most OECD countries the slowdown has cut across nearly all sectors, affecting both large and small firms alike. It has been particularly marked in industries where new digital and technological innovations were expected to generate productivity dividends, such as in the information, communication, finance and insurance sectors. Factors behind the paradox may be skills mismatches, sluggish investment, and declining business dynamism, particularly since the 2008 economic crisis. This slowing productivity growth has hit wages and may exacerbate income and wealth inequalities, by trapping many workers in low productivity activities with high job insecurity, so creating a vicious circle.

London has the highest levels of productivity, by some margin, of any region or country in the UK. Wales has the lowest.³ Internationally, comparisons of GDP per hour worked show that productivity in the UK is just above average among OECD countries, but is lower than that of the G7, Euro area and European Union averages. Workers in neighbouring Ireland outperform those in the UK by 75 per cent.⁴

B. Technological Change

"Should driverless cars become ubiquitous, families will be able to spend their savings on something far more useful than a steel box that spends most of its life sat on the driveway. Everywhere we turn, digital technology is driving

improvements in almost every sphere of life. From 3D printers producing jet engine components, to the sensors in concrete that report on its own structural integrity. From smart traffic planning, to dynamic energy demand. The fact is we are just in the foothills of a new technological revolution that will do even more to lift living standards and improve the human condition.” (The Rt Hon Matt Hancock MP, Minister of State for Digital and Culture, 8 June 2016⁵)

Historically, automation has increased productivity, which in turn has led to a net increase in employment. Nevertheless, increased investment in lifelong vocational education and training will be required to help people adapt to increased automation.

“Central and local government bodies also needs [sic] to support digital sectors that can generate new jobs, for example through place-based strategies centred around university research centres, science parks and other enablers of business growth. This place-based approach is one of the key themes in the government’s new industrial strategy and its wider devolution agenda. It also involves extending the latest digital infrastructure beyond the major urban centres to facilitate small digital start-ups in other parts of the country.”²³

These are themes that very strongly came through CPF responses to the cost of living discussion paper’s skills question. For instance, around one-in-eight groups explicitly called for more lifelong learning and many others for a focus on reskilling for older people. Other key areas included: STEM, ICT and computer-coding; apprenticeships; and careers advice services.

C. Changing Skill Requirements

“This government is committed to...ensuring the UK is the best place to start and grow a digital business, trial a new technology, or undertake advanced research - and that the UK digital sectors remain world-leading. This requires supportive regulation but also first-class digital infrastructure and an advanced skills base.” (The Rt Hon Karen Bradley MP, Secretary of State for Digital, Culture, Media and Sport, 1 March 2017⁶)

Over the period 2003-2013, the UK saw a marked shift towards attainment at the highest qualification levels and away from those without formal qualifications or qualifications at the lowest levels. Although these trends are expected to continue, the UK still lacks professionals with STEM (science, technology, engineering and mathematics) skills, especially engineering and IT professionals. The development of Robotics and Autonomous Systems, for example, requires highly skilled workers in disciplines like robotics, computer science and statistics.

There also appear to be gaps in the coverage of higher apprenticeship standards and frameworks in some in areas of need. So, the principal focus of existing frameworks is on technicians at level 4, rather than at the higher skills level required for professional roles, and there do not appear to be any standards and frameworks that focus specifically on physical scientists.⁷

Concerns have been raised that the relative lack of integration of vocational elements into UK academic programmes could ultimately damage perceptions of UK graduates’ employability and of the quality of UK universities.⁸ As competitor nations in the developing world increasingly invest in their skills base, they are able to exploit markets

that have traditionally been dominated by developed nations like the UK. Consequently, the UK must “run to stand still” in order for it to maintain its relative performance.²⁴

The UK’s strength is—and will continue to be—its bank of higher skills, but improving the performance of lower level and intermediate skills will likely prove a greater challenge. Possibly, the most pressing priority for the UK’s skill profile is to accelerate the rate of reduction in the proportion of low-skilled people in the population. This will involve both supporting training to help those already in the labour force to improve their skills and minimising the proportion of new entrants to the labour market who lack attainment at intermediate or higher level.⁹

The Conservative Track Record

- Published the Government’s 15-point productivity plan: *Fixing the foundations: Creating a more prosperous nation*. The plan aims to improve the UK’s transport and digital infrastructure, increase investment in the economy, enhance the skills of the workforce, build more houses, move people off welfare and into work, encourage exports, and rebalance the economy away from London.¹⁰
- Announced the creation of a National Productivity Investment Fund (NPIF). Over the course of the four years from 2017/18 to 2021/22, the Government has allocated £23 billion in spending for the new fund to be spread across four main areas: housing, transport, digital communications, and research and development (R&D).¹¹
- Published a green paper on the Government’s industrial strategy. This states that improving productivity is a key objective of the strategy.¹²
- Worked with over 2,000 businesses to test new ways to improve workplace productivity as part of the UK Futures Programme, an £8.8 million co-investment programme between public and private sectors.¹³
- Set out the biggest overhaul of post-16 education in 70 years with over half-a-billion pounds a year of new funding to improve technical training, including the introduction of new technical versions of A-levels (so-called T-Levels) and 900 hours of teaching each year.¹⁴
- Launched new industry-designed degree apprenticeships in 2015.¹⁵ These combine a full degree with professional training, with the cost shared by the employer and the government.¹⁶
- More than £100 million of funding from the Research Councils has been committed for Robotics and Autonomous Systems (RAS) projects alongside additional private investment.¹⁷ This includes:
 - £35 million investment in research centres across the UK in key areas including marine RAS, transport, healthcare and manufacturing, with a further £14.5 million of private funding;
 - £18.6 million for four doctoral training centres in RAS, supplemented by £20 million of private investment;
 - £5.9 million funding for a Centre for Innovative Manufacturing in Intelligent Automation.

Beyond the UK Research Councils, public funding includes:

- £100 million for an Intelligent Mobility Fund to support the research, development and deployment of connected and autonomous vehicles (with up to an additional £100 million in matched funding from industry);
- £19 million to test connected and autonomous vehicles in four cities across the UK;
- €3.8 million from the EU Horizon 2020 program for UK RAS in 2014-2015;
- £33 million invested by Innovate UK since 2009, including intelligent mobility and unmanned vehicle demonstrator projects.

What Our Manifesto Said

“Our modern industrial strategy is designed to deliver a stronger economy that works for everyone – where wealth and opportunity are spread across every community in the United Kingdom, not just the most prosperous places in London and the south east. It will help young people to develop the skills they need to do the high-paid, high-skilled jobs of the future. And it will back Britain for the long term: creating the conditions where successful businesses can emerge and grow, and helping them to invest in the future of our nation.”

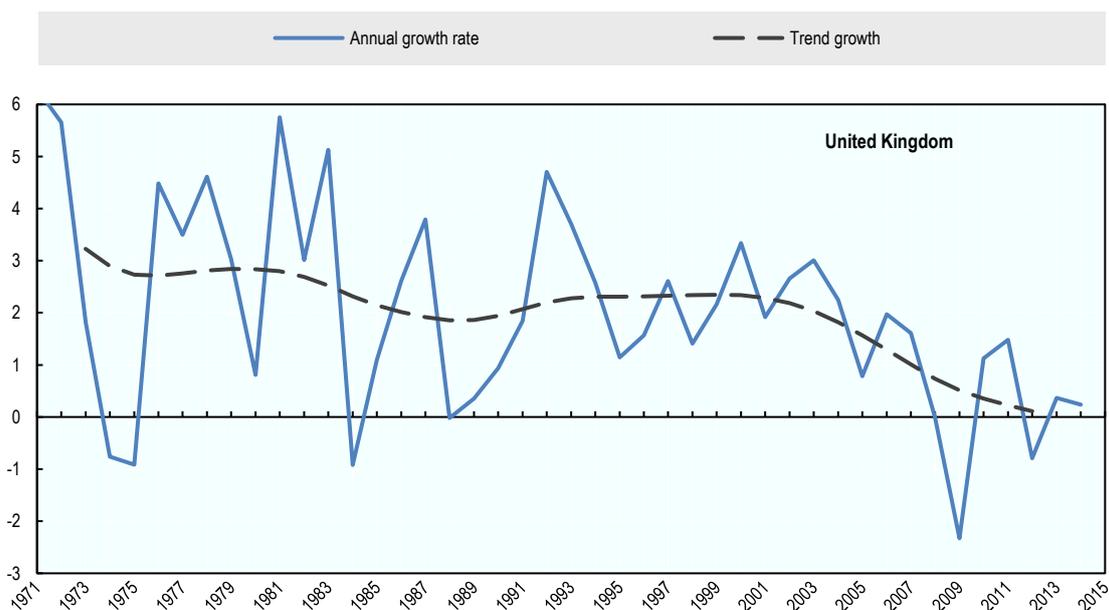
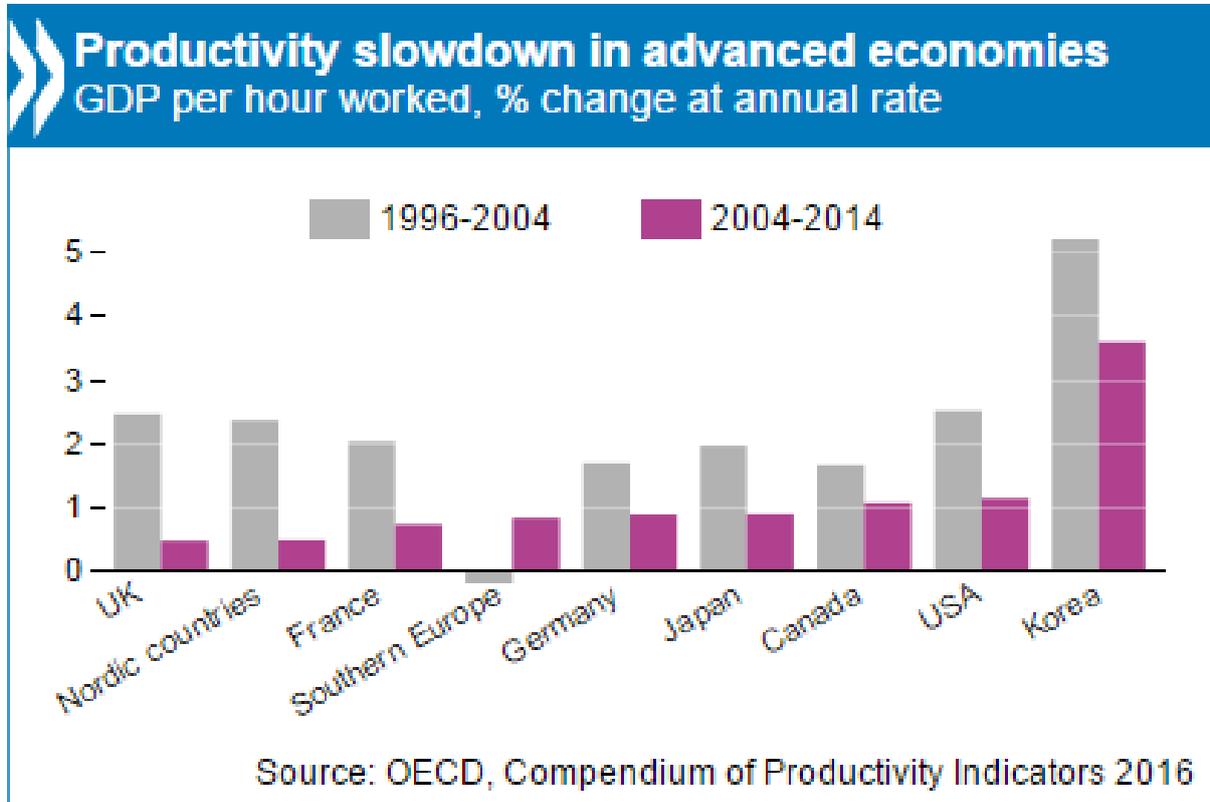
“If our modern industrial strategy is to succeed, it must address the UK’s slow productivity growth and it must be funded properly from the start. So we have launched a new £23 billion National Productivity Investment Fund. The government will target this spending at areas that are critical for productivity: housing, research and development, economic infrastructure and skills. This will include £740 million of digital infrastructure investment, the largest investment in railways since Victorian times, £1.1 billion to improve local transport and £250 million in skills by the end of 2020. The National Productivity Investment Fund will take total spending on housing, economic infrastructure and R&D to £170 billion during the next parliament.”

What next? Questions for discussion

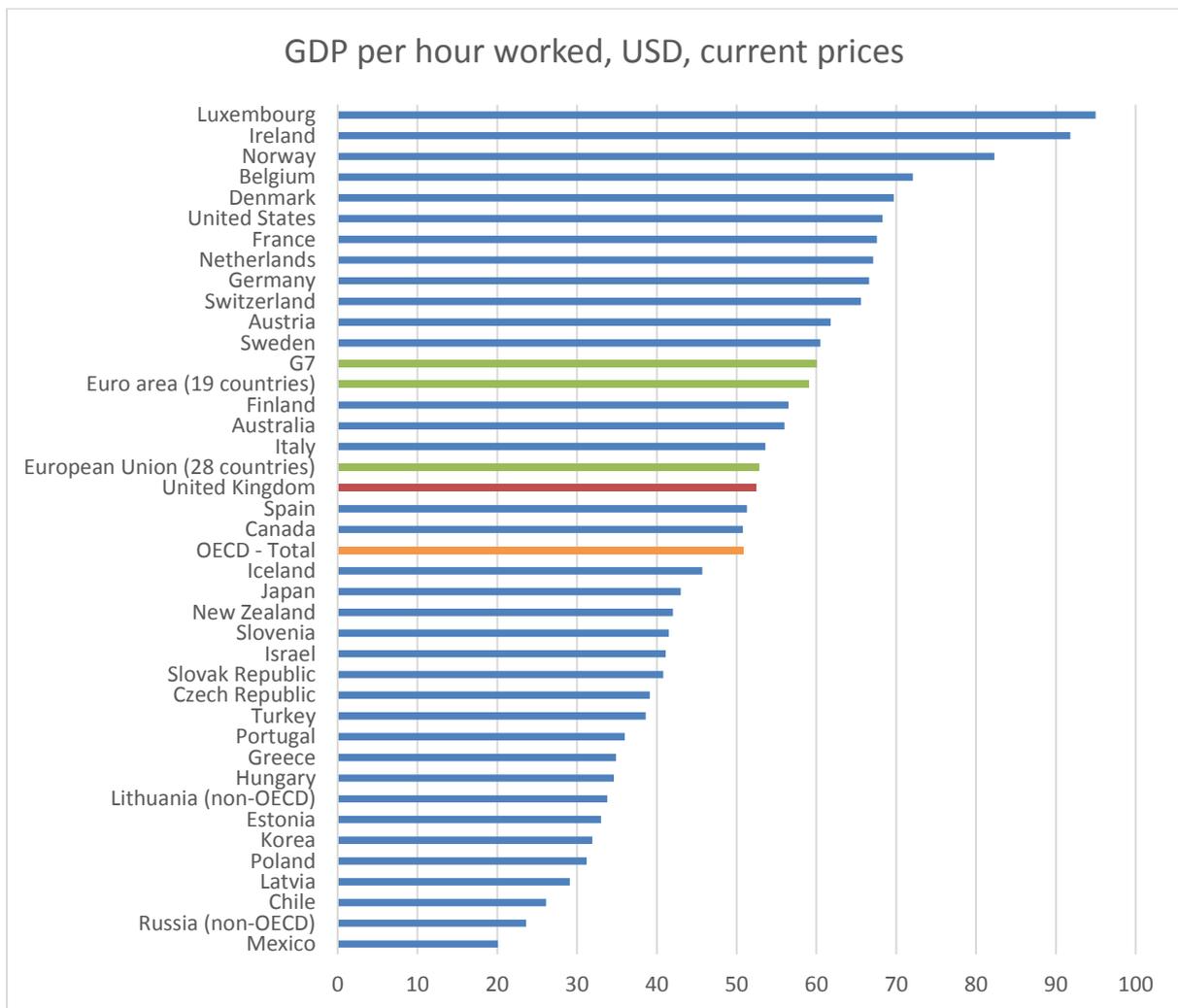
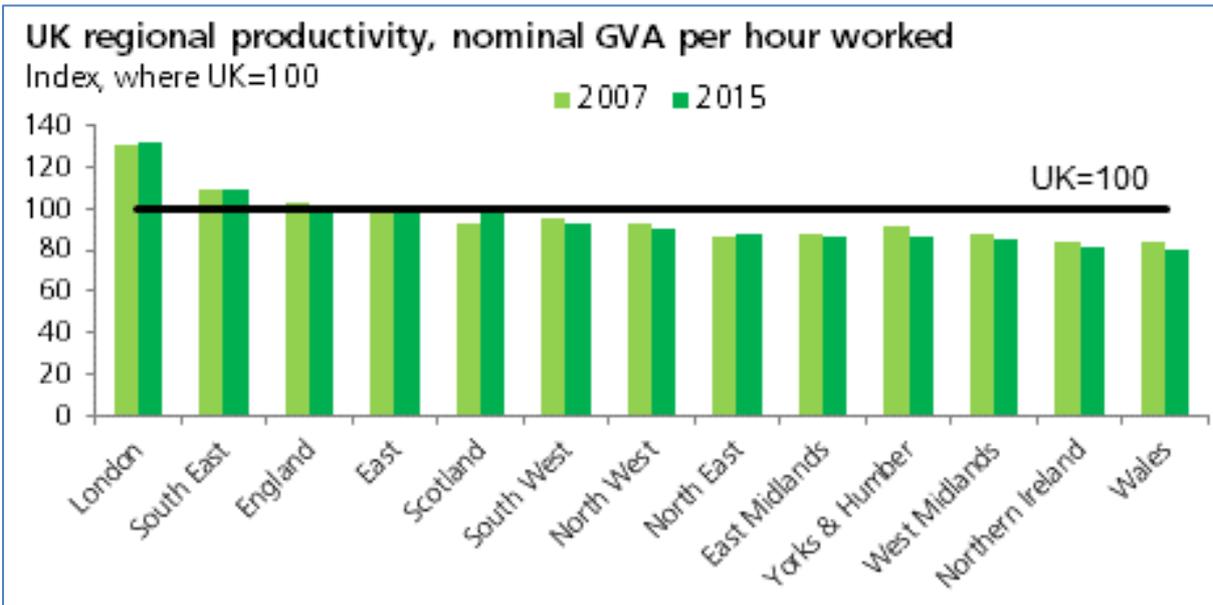
1. Whose responsibility should training be: the citizen, schools and universities, the employer, the state, or all of them? In the Armed Forces when you sign-up all training is paid for in return to several years’ service, but this is not the case in the rest of the public sector. Is this fair? What new contract might we offer our citizens?
2. How might a Conservative Government seek to boost productivity across the UK?
3. In what ways could the UK build on its world-class reputation for training and expand opportunities for lifelong vocational education and training? Do we need a top-down national skills programme or a bottom-up sectoral or geographical approach?
4. In what ways does training need to catch up with the changing skill requirements of modern technology? Are there any new and innovative models of training in your area that could be used elsewhere?
5. How should a Conservative Government deal with possible widening income gaps arising from increased automation?
6. What policies should a Conservative Government adopt to balance the need for improved training and productivity in the UK with any desire to reduce our reliance on skilled technical expertise from abroad? How might these be paid for?

Appendix: Facts and Figures

A. Productivity & Globalisation



Labour Productivity Growth Trend, average annual rate, percentage¹⁸



B. Technological Change

A recent study of actual changes in employment over the previous 15 years concluded that “while technology has potentially contributed to the loss of approximately 800,000 lower-skilled jobs, there is equally strong evidence to suggest that it has helped to create nearly 3.5 million new higher-skilled ones in their place. Each one of these new jobs pays, on average, £10,000 more per annum than the one lost.”¹⁹

The research also found that between 2001 and 2015, the Midlands, South West, and North West all experienced above average losses in jobs they considered to be at high risk of automation. However, these and every region and nation of the UK benefitted overall, and the technology-driven changes added £140 billion to the UK’s economy in new wages.

A variety of other studies also suggest that:

- Existing technology could automate 45 per cent of the activities people are currently paid to perform.²⁰
- About 60 per cent of all occupations could see 30 per cent or more of their constituent activities automated with technologies already available today.²⁰
- Over 10 million UK jobs (around 30 percent) could potentially be at high risk of automation by the early 2030s. Workers with just GCSE-level education or lower are at greatest risk.²¹
- Over half of these potential losses are in four key sectors: wholesale and retail trade, manufacturing, administrative and support services, and transport and storage.²¹
- Productivity gains²² will “generate additional wealth and spending that will support additional jobs of existing kinds, primarily in services sectors that are less easy to automate.”²³
- “Average pre-tax incomes should rise due to the productivity gains, but these benefits may not be evenly spread across income groups.”²³

C. Changing Skill Requirements

Over the period 2003-2013, the proportion of the adult population qualified at a high qualification level increased from 26.8 per cent to 37.5 per cent, whilst the proportion with no qualifications or low level qualifications as their highest qualification fell from more than one third (34.1 per cent) to less than a quarter (23.4 per cent).²⁴

The Global Employability University Rankings²⁵ includes eleven UK universities in its top 100 list, while the *Times Higher Education* World University Rankings²⁶ includes twelve in its top 100.

At least 60 universities and other higher education institutions across England are currently implementing degree apprenticeships or plan to do so in the next academic year. Engaging with employers and local organisations to train over 7,600 degree apprentices, they envisage significant growth over the next three years.²⁷

Endnotes

- ¹ *Fixing the foundations: boosting Britain's productivity*, Department for Business, Innovation & Skills, 10 July 2015: [link](#)
- ² *New OECD indicators trace productivity growth slowdown pre- and post- crisis*, OECD, 26 May 2016: [link](#)
- ³ *Productivity in the UK*, House of Commons Library, 27 February 2017: [link](#)
- ⁴ *Level of GDP per capita and productivity - most recent year*, OECD.Stat, Data extracted on 29 Mar 2017: [link](#)
- ⁵ *Technology, innovation and the future of the UK workforce*, Keith Joseph Memorial Lecture, Centre for Policy Studies, 8 June 2016: [link](#)
- ⁶ *UK Digital Strategy*, Department for Digital, Culture, Media & Sport, 1 March 2017: [link](#)
- ⁷ *High level STEM skills requirements in the UK labour market*, UK Commission for Employment and Skills, 10 July 2015: [link](#)
- ⁸ *The Global University Employability Ranking 2016*, The Times Higher Education, 16 November 2016: [link](#)
- ⁹ *UKCES bulletin: UK skills and international competitiveness*, UK Commission for Employment and Skills, 30 October 2015: [link](#)
- ¹⁰ *Fixing the foundations: creating a more prosperous nation*, Department for Business, Innovation & Skills, 10 July 2015: [link](#)
- ¹¹ *Autumn Statement 2016: some of the things we've announced*, HM Treasury, 23 November 2016: [link](#)
- ¹² *Building our Industrial Strategy*, Department for Business, Energy & Industrial Strategy, 23 January 2017: [link](#)
- ¹³ *Over 2000 businesses test ways to improve productivity*, UK Commission for Employment and Skills, 24 August 2016: [link](#)
- ¹⁴ *Spring Budget 2017: 21 things you need to know*, HM Treasury, 8 March 2017: [link](#)
- ¹⁵ *Government rolls-out flagship Degree Apprenticeships*, Department for Business, Innovation & Skills, 12 March 2015: [link](#)
- ¹⁶ *The Complete Guide to Higher and Degree Apprenticeships*, Which? University, 6 November 2015, updated 20 March 2017: [link](#)
- ¹⁷ *Automation and the Workforce*, Parliamentary Office of Science and Technology, POSTnote 534, August 2016: [link](#)
- ¹⁸ *The productivity slowdown: explaining the "paradox"?* OECD Compendium of Productivity Indicators 2016, OECD: [link](#)
- ¹⁹ *From Brawn to Brains: The Impact of Technology on Jobs in the UK*, Deloitte, 2015: [link](#)
- ²⁰ *Where machines could replace humans-and where they can't (yet)*, McKinsey Quarterly, July 2016: [link](#)
- ²¹ *Will robots steal our jobs? The potential impact of automation on the UK and other major economies*, UK Economic Outlook, pp.30-45, PwC, March 2017: [link](#)
- ²² *Artificial intelligence promises to boost productivity by 25 per cent in the UK by 2035. Why artificial intelligence is the future of growth*, Accenture, 2016: [link](#)
- ²³ *Why Britain Needs More Robots*, Centre for Policy Studies, 8 November 2017: [link](#)
- ²⁴ *UK Skill Levels and International Competitiveness 2014*, UK Commission for Employment and Skills, 22 October 2015: [link](#)
- ²⁵ *Best universities for graduate jobs: Global University Employability Ranking 2016*, 16 November 2016: [link](#)
- ²⁶ *World University Rankings 2016-2017*, The Times Higher Education, 21 September 2016: [link](#)
- ²⁷ *Degree apprenticeships: realising opportunities*, Universities UK, March 2017: [link](#)