



RSA

Action and Research Centre

Good work in an age of radical technologies

Introducing the RSA
Future Work Centre

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About the RSA and the Future Work Centre

The RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) believes that everyone should have the freedom and power to turn their ideas into reality – we call this the Power to Create. Through our ideas, research and 29,000-strong Fellowship, we seek to realise a society where creative power is distributed, where concentrations of power are confronted, and where creative values are nurtured. The RSA Action and Research Centre combines practical experimentation with rigorous research to achieve these goals.

With the support of our partners, the RSA is launching a Future Work Centre to explore the impact of new technologies on workers. Our goal is to cut through the hype and hysteria that often plagues this debate, and present a more accurate account of how the world of work is changing.

This essay marks the start of our journey in understanding how policy-makers, educators and employers can prepare today's workers for a new machine age.

About the authors

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Foreword

The world is gripped by a frenzy about what technology means for workers. Barely a week goes by without another prediction of how many jobs are set to be lost to new machines. The consultancy PwC says seven million in the UK by 2040. The Bank of England claims it will be closer to 15 million, five years sooner.

These fears are understandable given the technological feats achieved of late. DeepMind – a leading light in the field of deep learning algorithms – recently found that its software can diagnose 50 types of eye disease with 94 percent accuracy. Elsewhere, the Press Association has begun deploying algorithms to generate 30,000 local news stories each month.

Should we be afraid? Or should we welcome the apparent dawn of a new machine age?

This paper warns against lurching to conclusions. It rightly argues that technology is still limited in what it can do, for all the recent progress. No machine can fully replace a retail assistant, a warehouse worker, an insurance broker or a graphic designer. Moreover, when machines are deployed, they often augment work, allowing people to achieve more than they could alone.

Blink and you would miss it, but wiser voices are gaining traction with their message that the mass automation of jobs is a highly unlikely prospect. Just look at the latest labour market statistics: unemployment at its lowest level in 40 years, declining redundancy rates, and overemployment now a bigger problem than underemployment. These are not harbingers of a jobless future.

But just because technology will not destroy swathes of jobs does not mean it won't transform them. Indeed, it seems likely – as Adair Turner has suggested – that we will see an expansion in two types of job: 'hi-tech' ones that involve creating, maintain and interpreting machines; and 'hi-touch' ones that are almost entirely resistant to automation, such as social care workers and hospitality staff.

Less clear is how technology will change the quality of work. Will software be used to monitor workers and put them under increasing scrutiny? Will people face algorithmic judgement every time they apply for a job? Will technology remove the interesting elements of a job or will it eliminate the drudgery and danger, leaving us to focus on the things that matter?

The Populus survey undertaken to coincide with this paper presents a bleak picture. Just six percent of UK workers think they have the most to gain from new technologies being deployed in the workplace. 37 percent say employers while 42 percent point to tech companies as coming out on top.

The good news is that we have a choice in how we respond. In the words of the authors: “Investors can choose which technologies to throw money behind. Tech companies can choose which projects to prioritise and which features to build into their products. Employers can choose which technologies to purchase and how to deploy them. Educators can choose which skills to equip young people with. Policymakers can choose the terms of our tax and welfare systems.”

We can and must approach the future of work with pragmatic optimism. Whether you believe our greatest hope is a Universal Basic Income or a revitalised trade union movement, a radical overhaul of taxation or a large scale investment in lifelong learning – we have the tools to spread the gains of technology widely and fairly.

Yet nothing will happen of its own accord. That’s why the RSA Future Work Centre is so desperately needed: to establish the facts, consider the best response, and push for reform wherever it is warranted. We may not feel the full effects of new technology for some time, but that isn’t an excuse to rest on our laurels.

Matthew Taylor
Chief Executive, RSA

Introducing the RSA Future Work Centre

2018 has been a year of astounding technological feats. JD.com, a giant Chinese e-commerce platform, recently opened a Shanghai fulfilment centre that can process 200,000 orders a day with just four employees.¹ At its annual conference in May, Google introduced an AI virtual assistant called Duplex that can mimic the human voice with uncanny precision.² Amazon, meanwhile, will soon open checkout-less grocery stores in Chicago and San Francisco,³ in what could be the first major transformation of bricks-and-mortar retail in decades.

From autonomous vehicles to cancer-detecting algorithms, and from picking and packing machines to robo-advisory tools used in financial services, every corner of the economy has begun to feel the heat of a new machine age. The RSA uses the term ‘radical technologies’⁴ to describe these innovations, which stretch from the shiny and much talked about, including artificial intelligence and robotics, to the prosaic but equally consequential, such as smartphones and digital platforms.

But what do these technologies mean for workers? Here there is still little consensus. Leading robotics expert Rodney Brooks describes fears of mass automation as “ludicrous”,⁵ whereas Amazon CEO Jeff Bezos claims “it’s hard to overstate how big of an impact [AI is] going to have on society over the next 20 years”.⁶ Adair Turner, Chairman of the Institute for New Economic Thinking, believes automation will be “rapid, unstoppable and limitless”.⁷

Disagreements can also be seen in the predictions of job losses, which range from the catastrophic to the subdued. The University of Oxford estimate that 35 percent of UK jobs have the potential to be automated.⁸

1. Levine, S. (2018) *In China, a picture of how warehouse jobs can vanish*. Axios, 13 June.
2. *Google Duplex Demo from Google IO 2018* [video online] Available at: www.youtube.com/watch?v=bd1mEmzFyo8 [Accessed 15 August 2018]
3. Del Ray, J. (2018) *Amazon Go — a cashierless version of 7-Eleven — is expanding to San Francisco and Chicago*. Recode, 14 May.
4. See Greenfield, A. (2018) *Radical Technologies: The Design of Everyday Life*. London: Verso.
5. Brooks, R. (2017) *The Seven Deadly Sins of AI Predictions*. MIT Technology Review, 6 October.
6. Levy, A. (2016) *Amazon’s Bezos sees AI at early stages of decades-long trend*. CNBC, 31 May.
7. Turner, A. (2018) *Capitalism in the age of robots: work, income and wealth in the 21st century*. Lecture at School of Advanced International Studies, Johns Hopkins University. Washington D.C., 10 April. Available at: www.ineteconomics.org/uploads/papers/Paper-Turner-Capitalism-in-the-Age-of-Robots.pdf [Accessed 15 August 2018]
8. Frey, C.B. and Osborne, M. (2016) *Technology at Work v2.0: The Future Is Not What It Used to Be*. Oxford Martin School and Citigroup.

In contrast, PwC suggest the figure is more likely to be 30 percent,⁹ while a 2017 McKinsey report said 5 percent of UK jobs are highly automatable.¹⁰ MIT Tech Review has identified at least 18 automation predictions, no two of which are alike.¹¹

What is certain is that the world of work will evolve as a direct consequence of the invention and adoption of radical technologies – and in more ways than we might imagine. Alongside eliminating and creating jobs, these innovations will alter how workers are recruited, monitored, organised and paid. Companies like HireVue (video interviewing), Percolata (schedule setting) and Veriato (performance monitoring) are eager to reinvent all aspects of the workplace.

With support from our partners, the RSA is launching a new Future Work Centre to explore these impacts in more depth. Our goal is to equip policymakers, employers and educators with the insights they need to prepare today's workforce for tomorrow's workplace. Where necessary, we will push for policy and practice reform, but more importantly we will seek to reimagine our social contract – that web of explicit and implicit rights and obligations that govern the way we work.

Past experience tells us nothing can be left to chance. Globalisation, the last turbulent force to rock our labour market, left too many workers and communities behind in its wake. While radical technologies hold out the promise of creating a better world of work, this is an outcome that must be worked towards rather than blindly hoped for. The Future Work Centre aims to do just that, using a combination of research, policy and practice advocacy, campaigning and practical pilots.

The rest of this essay sets out our stall on what the future may hold, and what we can do to prepare for it.

Sizing up the good work gap

Any attempt to predict where the world of work will head tomorrow must start with an understanding of where it is today. The UK labour market is in many respects thriving. Our unemployment rate is at its lowest since the 1970s, there are now more people who want to work fewer hours than who want to work more, and redundancy rates have been falling steadily over time. These are no small feats. The unemployment rate in France is double ours. In Spain it is triple.

But as the RSA's CEO Matthew Taylor emphasised in his Review of Modern Working Practices,¹² the quantity of work is only one indicator of a healthy labour market. What also matters is the quality of work – pay, progression and purpose – and here the UK performs poorly.

Real average wages are still below their pre-crisis level in 2008. The median worker is getting by on the same pay packet they had in 2006, marking a decade of lost wage growth.¹³ More than 7 million people live in working households that sit below the poverty line, including 2.6

9. PwC (2017) *UK Economic Outlook*. PricewaterhouseCoopers LLP.

10. Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P. and Dewhurst, M. (2017) *Harnessing automation for a future that works*. McKinsey Global Institute.

11. Winick, E. (2018) *Every study we could find on what automation will do to jobs, in one chart*. MIT Technology Review, 25 January.

12. Taylor, M. (2017) *Good work: the Taylor review of modern working practices*. London: Department for Business, Energy & Industrial Strategy.

13. Resolution Foundation (2018) *The Resolution Foundation Earnings Outlook*. [online] Available at: www.resolutionfoundation.org/earningsoutlook/ [Accessed 15 August 2018]

million children.¹⁴ A third of workers have less than £500 in savings.¹⁵ All in all, the notion that having a job is enough to make ends meet in life rings increasingly hollow.

Far from being a challenge limited to the poorest in the society, the enduring pinch of **economic insecurity** has been felt acutely by middle income families. Of those who reported to be ‘just about managing’ in a recent RSA survey, 31 percent live in households with gross incomes above £31,000.¹⁶ For this phenomenon we can blame higher costs of living, not least childcare which has risen seven times faster than wages since 2008.¹⁷

Just as workers are struggling materially, so too have they been let down by poor **working conditions**. Stories of mistreatment in the workplace are all too common: warehouse workers threatened with the sack merely for sitting down; call centre staff constantly logged and monitored to assess their performance; care workers denied more than 15 minutes to attend to patients. These are not isolated cases. One in four workers feel unhappy or depressed by their job.¹⁸

Public concern has centred on atypical workers, whose number has grown significantly in recent years. The number of people on a zero hour contract (ie with no minimum guaranteed hours) reached 1.8 million in 2017,¹⁹ while the UK’s army of the self-employed is today close to 5 million.²⁰ As many people now work in the gig economy – via online platforms like Uber, Deliveroo and UpWork – as are employed in the NHS.²¹

Atypical workers lack protections that employees take for granted. Depending on their circumstances and how they are defined in law, many will not be entitled to Statutory Sick Pay, full Maternity Pay, or the right to be auto enrolled on an occupational pension. Labour MP Frank Field warns we are entering a new era of the ‘Wild West Workplace’, where workers are being left to fend for themselves.²²

What about purpose? According to the anthropologist David Graeber, many people now toil away in jobs that make no meaningful impact on the world. His new book *Bullshit Jobs: A Theory*²³ contains a series of absurd anecdotes, from concierge officer Bill, who spends half his time pressing a button to let in residents of an apartment block, to retail worker Patrick, who mindlessly rearranges items on shelves to while away the time.

Graeber’s claims can at times feel exaggerated, but his notion that workers could be doing more worthwhile activities has struck a chord.

14. Walker, P. (2016) *Study finds 7m Britons in poverty despite being from working families*. The Guardian, 7 December.

15. Balaram, B. and Wallace-Stephens, F. (2018) *Thriving, striving, or just about surviving? Seven portraits of economic security and modern work in the UK*. London: RSA.

16. Ibid.

17. Siddique, H. (2017) *Childcare costs in England rise up to seven times faster than wages*. The Guardian, 20 October.

18. Balaram, B. and Wallace-Stephens, F. (2018). Op cit.

19. Office for National Statistics (2018) *Contracts that do not guarantee a minimum number of hours*: April 2018. [article] Office for National Statistics, 23 April.

20. Office for National Statistics (2018) *Trends in self-employment in the UK*. [article] Office for National Statistics, 7 February.

21. Balaram, B. Warden, J. and Wallace-Stephens, F. (2017) *Good Gigs: A fairer future for the UK’s gig economy*. London: RSA.

22. Field, F. and Forsey, A. (2016). *Wild West Workplace: Self-employment in Britain’s ‘gig-economy’*. [online] Available at: www.frankfield.co.uk/upload/docs/Wild%20West%20Workplace.pdf [Accessed 15 August 2018].

23. Graeber, D. (2018) *Bullshit Jobs: A Theory*. London: Simon & Schuster.

Previous RSA research found that just over half of workers (51 percent) agree their job provides their life with meaning and purpose.²⁴ But that leaves the other half who do not. Whether it is telemarketers who must sell inane products through cold calling, or warehouse staff who have little variety in their picking and packing duties, too many workers clock in and out without ever feeling engaged in what they do.

Then there is the matter of **work-life balance**. The good news is that the proportion of people working over 45 hours a week has been in steady decline since the early 1990s. However, a significant number continue to work excessive hours – often without compensation. The TUC estimate that two billion hours of overtime went unpaid last year.²⁵

Long hours are hardly a novel problem. But what has changed in recent years is the intensification of work. This means more activities are expected to be completed in a shorter timeframe, whether that means laying bricks, dropping off parcels or completing legal case work. A study by Cardiff University suggests the share of jobs involving ‘high speed’ work rose from 23 percent in 1997 to 40 percent in 2012 (the last date for which survey data is available).²⁶

Taken together, these findings paint a picture of a dysfunctional labour market – a world of work that offers little in the way of material security, let alone satisfaction. But that may be going too far. Overall, most workers enjoy what they do and relish the careers they have established. The British Social Attitudes survey found that twice as many people in 2015 as in 1989 strongly agreed they would enjoy having a job even if their financial circumstances did not require it.²⁷

The problem is not with work per se but rather with how it is orchestrated in the modern economy, and how rewards are meted out. As a society we have a vision of what work could and should look like – well paid, protective, meaningful, engaging – but the reality too often falls short.

Automation anxiety

The question the Future Work Centre are interested in answering is whether new technologies will widen this ‘good work gap’ or serve to close it.

Pessimistic scenarios are conjured more easily than optimistic ones. It is not hard to imagine self-driving cars pushing the UK’s 230,000 taxi drivers out of business, just as it is not hard to picture picking and packing machines displacing warehouse workers up and down the country. Headlines such as “Robots will take our jobs. We’d better plan before it’s too late”²⁸ and “Government urged to act over automation inequality”²⁹ are increasingly commonplace.

24. Balam, B. and Wallace-Stephens, F. (2018). Op cit.

25. Sellers, P (2018) *Work Your Proper Hours Day – tackling the culture of unpaid overtime*. [blog] TUC, 22 February.

26. Felstead, A., Gallie, D., Green, F. and Inanc, H. (2012) *Work Intensification in Britain: First Findings from the Skills and Employment Survey, 2012*. University of Cardiff. [online] Available at: www.cardiff.ac.uk/_data/assets/pdf_file/0006/118653/5.-Work-Intensification-in-Britain-mini-report.pdf [Accessed 15 August 2018].

27. McKay, S. and Simpson, I. (2018) *British Social Attitudes 35*. NatCen Social Research.

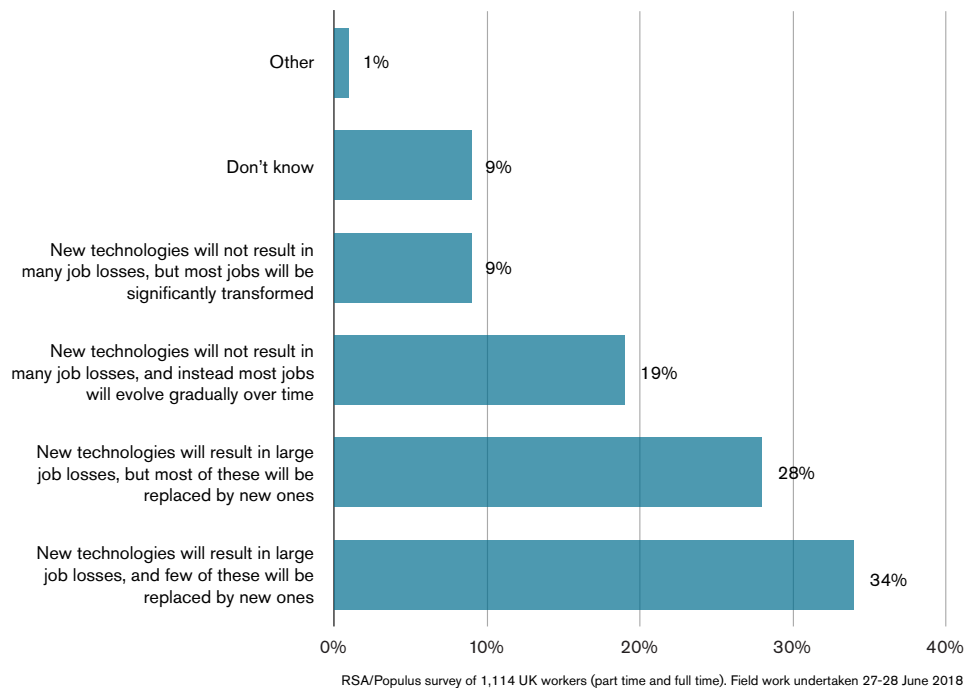
28. Elliott, L. (2018) Robots will take our jobs. We’d better plan now, before it’s too late. *The Guardian*, 1 February.

29. Wright, R. (2017) *Government urged to act over automation inequality*. *Financial Times*, 28 December

Some workers share this sentiment. Our RSA/Populus poll found that 34 percent of workers believe new technologies will result in large job losses, and that few of these will be replaced by new ones. A further 28 percent think mass automation is likely but that new jobs will emerge to take the place of ones lost to machines (see Figure 1).

Such fears are understandable given the impressive feats being achieved in the fields of AI and robotics. IBM only recently launched Project Debater, an AI-powered machine that can converse with humans on a range of topics.³⁰ In June, a robot was used by Oxford’s John Radcliffe Hospital to perform eye surgery for the first time.³¹ Online grocery provider Ocado has established a fulfilment centre in Andover that will soon process 65,000 orders a week using a ground-breaking system of machines.³²

Figure 1: Which of these scenarios do you think is most likely in the next 10 - 15 years?



But there is also plenty of evidence to suggest fears of mass automation are exaggerated, at least in the short to medium term. First, these machines are still limited in what they can do. The IBM Project Debater stumbles as it gives answers. The surgical robot used by John Radcliffe Hospital still requires a human operator. And Ocado’s fulfilment centre cannot function without plenty of humans to handle more delicate tasks.

30. Lee, N. (2018) *IBM’s machine argues, pretty convincingly, with humans*. BBC News [online], 19 June.

31. Oxford Biomedical Research Centre (2018) *First human test of robotic eye surgery a success*. [article] Oxford Biomedical Research, 18 June.

32. Vincent, J. (2018) *Welcome to the Automated Warehouse of the Future*. The Verge, 8 May.

Creativity, social communication and manual dexterity are all skills stubbornly resistant to automation. Moreover, automation tends to displace tasks rather than whole jobs. And because jobs usually encompass a range of functions, the automation of one task means workers can often pivot into new roles. No machine can wholly substitute for retail assistants, doctors, hotel receptionists, warehouse workers or financial advisers. A study by McKinsey identified at least 2,000 different types of work activity across all occupations, each of which in turn demand a bundle of separate capabilities (from mobility to sensory perception to natural language generation).³³

Where automation does occur, it can act as a complementing force, enabling workers to achieve more and better quality work. Robotic systems can help overburdened care workers to lift and carry patients, algorithms can enable clinicians to identify illnesses and recommend more appropriate treatments, chatbots can support call centre staff by generating partially automated responses, and agricultural AI systems can help farmers spot blight on crops and redirect the placement of pesticides.

Moreover, automation rarely eliminates spending power. If automation allows for more things to be produced with less effort, and this in turn results in lower prices, the savings made by consumers can be spent either on the same good/service or in another part of the economy – a phenomenon known as recycled demand. The Economist thinks this is one reason why, for example, the introduction of legal software did not lead to a decrease in the number of clerks during the first part of the 21st century: lower costs meant consumers bought more legal services, keeping people in work.³⁴

Taken together, it is hard not to view predictions of mass automation with anything but scepticism. Just as job numbers is a non-issue today, so too is it unlikely to register as an issue a decade from now. Humans have an insatiable appetite for more and better things, and that will spur the expansion and creation of new markets – and therefore jobs – for many years to come.

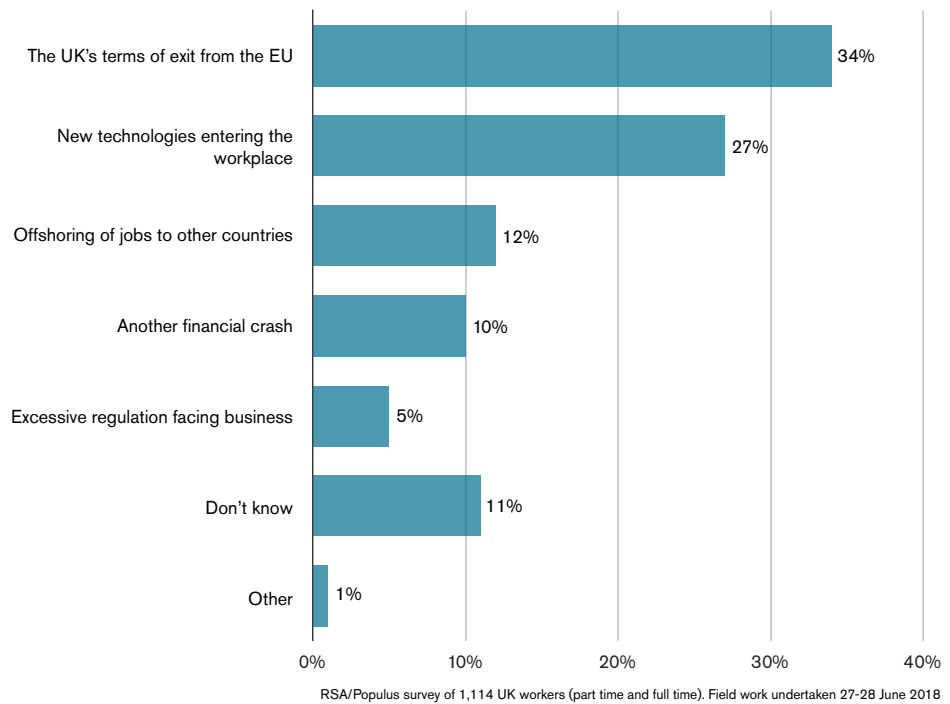
Technology is rarely the main destroyer of jobs. As Deloitte’s Chief Economist Ian Stewart put it recently, “more prosaic forces – recessions, competition, consolidation, bad decisions, changes in consumer preferences, and the many vagaries of a market economy – wipe out far more jobs”.³⁵ Our RSA/Populus survey found that workers are more likely to believe the UK’s terms of exit from the EU will lead to the greatest job losses (33 percent), than they are to fear the effects of technology (27 percent) (see Figure 2).

33. Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P. and Dewhurst, M. (2017). Op cit.

34. Economist (2016) *Automation and Anxiety: Special Report*. The Economist, 25 June..

35. Stewart, I (2018) *Robots and jobs, ten thoughts*. [blog] Deloitte, 11 June.

Figure 2: Which of the following factors do you think will lead to the greatest loss of jobs over the next 10 - 15 years?



Still, some groups will be more affected than others by automation and these distributional impacts are far from trivial. Previous RSA polling found that business leaders in the manufacturing, finance, and transport/logistics sectors predict higher job losses than sectors based on person-to-person interaction, such as education and healthcare³⁶. (what Adair Turner calls the ‘hi-touch’ sectors).

Most automation studies indicate low-skilled workers will bear the greatest brunt of any disruption. And, on a geographic basis, we can expect single-industry towns and areas outside of cities to be more vulnerable. The social enterprise Future Advocacy estimates that places with the highest levels of automation are also former industrial heartlands.³⁷

Automation vs evolution

As we launch the RSA’s Future Work Centre, our hypothesis is that the automation of jobs matters less than their evolution. Whether it is carpenters, cleaners or architects, we believe most jobs will continue to exist a decade from now but in a very different form. And we are not alone in this view. While a recent OECD report indicates that only 14 percent of jobs are highly automatable, it finds a further 32 percent are likely to undergo significant transformation.³⁸

Not only will radical technologies alter the skillsets required of workers, they will also affect how they are recruited, the degree to which they

³⁶. Dellot, B. and Wallace-Stephens, F. (2017) *The Age of Automation: Artificial intelligence, robotics and the future of low-skilled work*. London: RSA.

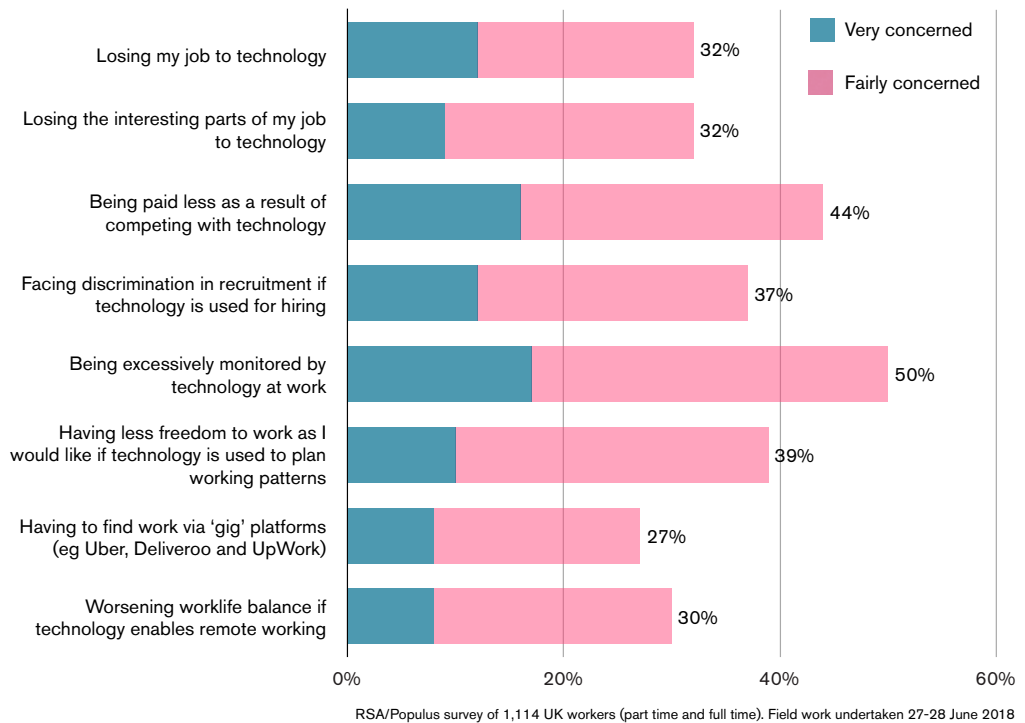
³⁷. Fenech, M., Elliston, C. and Buston, O. (2017) *The Impact of AI in UK Constituencies: Where will automation hit hardest?*. London: Future Advocacy.

³⁸. Nedelkoska, A. and Quintini, G. (2018) *Automation, skill use and training*. Paris: OECD.

are monitored, how their schedules are set, and whether they have salaried employment or find their work ‘on demand’. Radical technologies are also likely to influence pay levels via their underlying impact on productivity and business performance.

Figure 3 shows the degree to which workers are concerned about the potential impact of technology across these dimensions. A noteworthy finding is that workers are more concerned about how the nature of their job is likely to change than whether they will have a job at all. While 32 percent fear losing their job to technology, 50 percent worry about the prospect of being excessively monitored and 39 percent about having less freedom to work as they would like.

Figure 3: To what extent are you concerned about each of the following?



Are these concerns warranted? Experts continue to disagree, while the available evidence is inconclusive.

Take the matter of **pay**. Pessimists believe the introduction of technologies like AI and robotics will deskill jobs, in turn diluting the bargaining power of workers. Radiologists who have trained for 8-10 years to handle and interpret medical images, may soon find that parts of their job are farmed out to a machine. As a result, the training regime for radiologists may shorten, allowing more workers into this career path (including nurses) and in turn giving employers more choice of who to employ and how much to pay.

Others take a different view. Consultancies including McKinsey and Accenture claim that AI and robotics could raise productivity levels, generating more wealth in the process that can be shared with workers.

New technologies may both amplify the cognitive abilities of workers as well as free them to work on higher value activities. Fitness monitors could help personal trainers better understand the performance of their clients, just as fintech applications could help financial advisers give more appropriate guidance.

Technology's enthusiasts point to empirical research to make their case. A 2015 study looking at the use of robotics across 17 countries found they raised labour productivity by 0.36 percentage points annually over the period 1993-2007.³⁹ They also lifted wages and total factor productivity. Looking to the future, Accenture predict that AI applications on their own could increase labour productivity in the UK by 25 percent by 2035.⁴⁰

What about management practices? Some economic commentators warn that AI could lead to excessive surveillance in the workplace, with apps that can monitor our performance and track our movements to an alarming degree. Veriato is a company that has developed software to log staff behaviour on office computers, including browsing history, email messages, keystrokes and document use. Data is then crunched to create a productivity baseline and flag anyone performing poorly.

Particular concern has arisen over the use of technology in recruitment. Unilever, for example, has sought to partially automate its hiring and onboarding processes. This includes using algorithms to shortlist applications and AI-powered video software to analyse body language during interviews.⁴¹ Elsewhere, chatbots have been deployed to take over frontline conversations with candidates, while algorithms are being used to search through social media posts for context that might support applications.⁴²

Many see these developments as intrusive and unwarranted. Yet there is also hope they could make management fairer and recruitment less discriminatory. Percolata creates AI software that can set work schedules, with decisions based on perceived performance rather than the whims of managers.⁴³ Infor Talent Science claim their recruitment algorithm led to an average 26 percent rise in African American and Hispanic hires across the industries where it was used.⁴⁴

Algorithmic management could also protect vulnerable groups. Microsoft has developed an AI-enabled 'smart camera' to detect unmanned tools, spillages and potential accidents in warehouses and factories.⁴⁵ In the banking industry, surveillance algorithms have been drafted in to crack down on fraudulent behaviour and prevent a repeat of mis-selling scandals.

39. Graetz, G. and Michaels, G. (2018) *Robots at Work*. [online] Available here: personal.lse.ac.uk/michaels/Graetz_Michaels_Robots.pdf [Accessed 15 August 2018].

40. Purdy, M. and Daugherty, P. (2016) *Why Artificial Intelligence is the Future of Growth*. Accenture.

41. Jeffrey, R. (2017) *Would you let AI recruit for you?* *People Management* [online], 12 December.

42. Ibid.

43. O'Connor, S. (2016) *When your boss is an algorithm*. *Financial Times*, 8 September.

44. Lam, B. (2015) *For More Workplace Diversity, Should Algorithms Make Hiring Decisions?* *The Atlantic*, 22 June.

45. Hughes, M. (2017) *Microsoft's wicked-smart camera AI tracks people and equipment to keep workers safe*. *The Next Web*, 10 May.

Another area of disagreement is the impact of technology on **business models**. Sophisticated algorithms underpin many of the gig platforms that have emerged in recent years, allowing consumers and producers to connect with one another in a new kind of marketplace.⁴⁶ But in doing so, these tech-enabled platforms have also ruptured traditional employment models. Uber, Deliveroo and Helping all insist that people selling services through their apps are self-employed.

Whether or not this trend is a positive development for workers is one of the hottest debates in policymaking circles. The fear among unions like the IWGB is that gig platforms put excessive risk on the shoulders of workers, who by being classed as self-employed forgo sick pay, holiday pay and other important protections. Others say the autonomy supposedly granted by such platforms is illusory. Uber drivers, for example, face pressure to accept most ride requests or be temporarily barred from the platform.

Again, however, these claims are contested. The RSA's research on gig platforms shows how they have democratised markets by supporting more producers to participate.⁴⁷ Many gig workers also enjoy the safety and formality of working via a platform, which they may not have had previously (eg cleaners who are now paid electronically via Helping). Flexibility to work when one likes – even if it is constrained by a platform's veiled rules – is undoubtedly valued.

Beyond AI and robotics

From pay to productivity, recruitment to business models, the development of AI and robotics will change the workplace across several dimensions. Yet radical technologies encompass more than these two innovations. Indeed, policymakers, researchers and the media often overlook the more prosaic but no less profound technologies that are already rooted in most workplaces. This includes basic software, smartphones, ICT equipment and e-commerce platforms.

Software in its broadest sense has enabled the digitisation of economic activities across every sector – a trend that continues to unfold. The information stored within music, books, newspapers and literature has been transferred to the internet, and there onwards to digital devices. If we want to check our bank balance, find out the cost of nearby properties, or learn how to fix a bicycle, this information can now be found on the internet with minimal effort.

The result of this gradual process of digitisation has been the emergence of 'winner takes most' markets. As John van Reenen and Christina Patterson of MIT argue, when information can be accessed by anyone with an internet connection, it becomes easy and cheap for companies to amass large consumer bases around the world.⁴⁸ Netflix has become dominant in TV entertainment, Instagram in image collection and sharing, Goldman Sachs in investment banking, and so on.

Van Reenen and Patterson say this trend is the main reason why the overall share of global GDP going to labour (ie workers) has fallen in

46. Balam, B. Warden, J. and Wallace-Stephens, F. (2017). Op cit.

47. Ibid.

48. Van Reenen, J. and Patterson, C. (2017) Research: *The Rise of Superstar Firms Has Been Better for Investors than for Employees*. Harvard Business Review, May 11.

the last few decades. Superstar firms tend to employ few people while generating extraordinary profits, leaving an ever-shrinking share of the economic pie for everyday businesses and their workers.

Digitisation has also powered the growth of e-commerce marketplaces. Fifteen years ago, white goods could have been bought in Dixons, books in Borders and groceries in Woolworths. Today, none of these companies exist, largely owing to the rise of online retailers like Amazon and Asos. Online sales of non-food items grew from 11.6 percent of total sales in 2012 to 24.1 percent in 2017.⁴⁹

Retail workers have not been spared this disruption. The planned closure of 100 M&S stores, which is partly a result of fierce competition from online retailers, may lead to thousands of job losses. Some of the roles lost in bricks and mortar retail will be replaced by new ones in distribution warehouses, which our research suggests are on average better paid. But these opportunities also tend to be concentrated in central regions rather than dispersed as current high street jobs are.⁵⁰

The smartphone is another technology that is often overlooked. Yet its impact on workers has been and will continue to be significant. In the words of technologist Adam Greenfield, “The smartphone is the signature artefact of our age. Less than a decade old, this protean object has become the universal, all-but-indispensable mediator of everyday life.”⁵¹

This mediation extends to how and when we work. In one sense, these “slabs of polycarbonate”, as Greenfield calls them, have enriched our working lives. GPS-enabled maps have eased the burden on taxi drivers and delivery riders, while gig platforms like Deliveroo have enabled people to access work on demand through their phones. Email and other office applications are used by many workers to communicate more seamlessly with colleagues.

But with connection comes the risk of overworking. Academic Phoebe Moore believes smartphones are part of a suite of technologies that risk ushering in an ‘always on’ and ‘hyper employed’ culture, where workers are expected to respond to requests at all hours.⁵² The drain on our attention spans, by constantly checking these devices, has been well documented. A 2017 survey by CIPD found a third of UK employees say remote access to work means they can ‘never fully switch off’.⁵³

On our own terms

In summary, the lives of workers will be shaped by more technologies than AI and robotics, and in more ways than through the loss of jobs.

Fears surrounding automaton should be taken seriously. Yet anxiety over job losses should not distract us from the subtler impacts of radical technologies, including on recruitment practices, employee monitoring and people’s work-life balance. Nor should we become so fixated on AI

49. Bowsher, E (2018) Online retail sales continue to soar. Financial Times, 11 January.

50. Dellot, B. and Wallace-Stephens, F. (2017). Op cit.

51. Greenfield, A. (2018) *Radical Technologies: The Design of Everyday Life*. London: Verso.

52. Moore P.V., Akhtar P., Upchurch M. (2018) *Digitalisation of Work and Resistance*. In: Moore P., Upchurch M., Whittaker X. (eds) *Humans and Machines at Work. Dynamics of Virtual Work*. London: Palgrave Macmillan, Cham.

53. Cited in Chapman, B. (2017) *Remote access: 40% of people check work emails five times a day outside office hours*. The Independent, 27 April.

and robotics that we lose sight of the conventional technologies bringing about change in the present moment.

It has become a cliché to say that technology is neutral – that its effects are not predetermined and that they can be shaped to work in our favour. This is only partly true. Technology that is created for surveillance will be used for surveillance, and technology that is crafted to monitor worker performance will be used to monitor worker performance.

However, we do have choices. Investors can choose which technologies to throw money behind. Tech companies can choose which projects to prioritise and which features to build into their products. Employers can choose which technologies to purchase and how to deploy them. Educators can choose which skills to equip young people with. Policymakers can choose the terms of our tax and welfare systems.

This is what the RSA means when we talk of applying technology ‘on our own terms’. Developed and deployed in the right way, these tools could make work more productive, purposeful and humane. Those who talk up the threat of a new machine age forget that the world of work today is hardly a utopia. Stagnant wages, flatlining productivity and lousy jobs are the status quo.

For evidence of how technology can strengthen the hand of workers, we can look to our European neighbours. Germany is the most automated country in Europe, with 309 industrial robots per 10,000 workers.⁵⁴ By embracing innovations, it has become a world leader in manufacturing, which has boosted exports and improved the lot of workers. Real wage growth in Germany averaged 0.81 percent between 2006 and 2017⁵⁵ – a pace that far exceeded the UK’s.

Or take Sweden. “The robots are coming, and Sweden is fine”, ran a recent New York Times headline.⁵⁶ The country has a generous welfare system that means workers are cushioned in the rare event of losing their job to a machine, while unions are powerful enough to ensure workers take home their fair share of technology’s spoils. Eighty percent of Swedes have a positive view of AI and robotics, according to an EU Commission survey.⁵⁷

How different the situation is in the UK. When asked in our RSA/Populus survey about which group has the most to gain from the introduction of new technologies in the workplace, just 6 percent said workers (see Figure 4). By far the greatest number pointed to technology companies who might benefit from higher sales of their technology (42 percent), followed by employers who could benefit from better performance (37 percent).

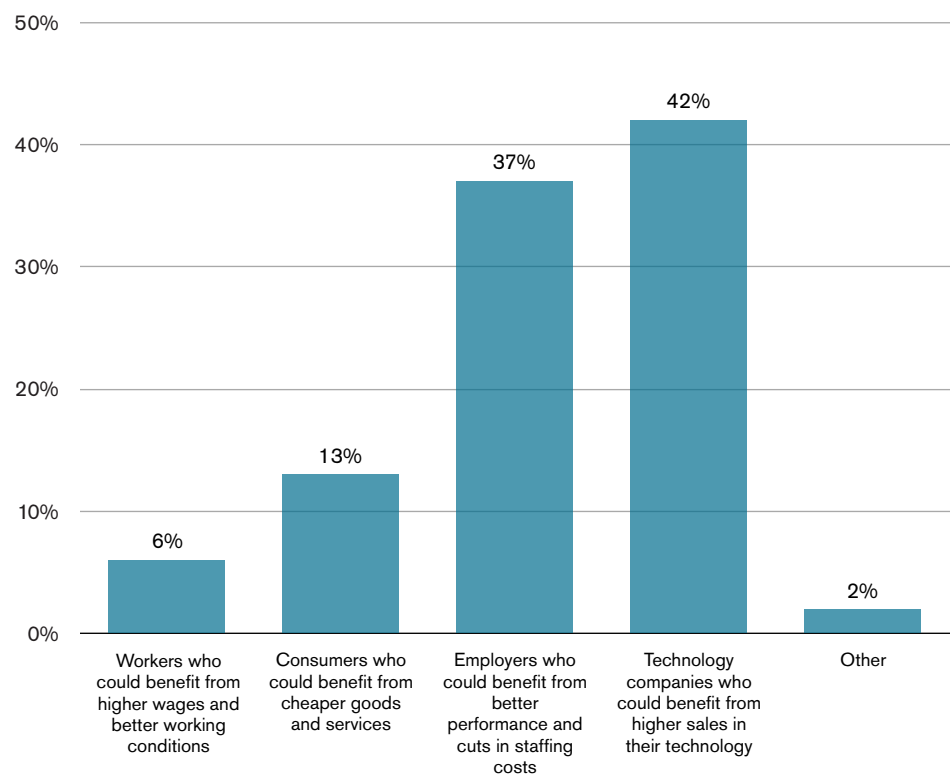
54. Juskalian, R. (2018) *Rebuilding Germany’s centuries-old vocational program*. MIT Technology Review, 22 June.

55. Trading Economics (2018) *Germany Real Wage Growth YoY 2006-2018*. [online] Available at: tradingeconomics.com/germany/wage-growth [Accessed 15 August 2018]

56. Googman, P. (2017) *The Robots Are Coming, and Sweden Is Fine*. The New York Times, 27 December.

57. See *Attitudes towards the impact of digitisation and automation on daily life*. (2017). Available at: ec.europa.eu/digital-single-market/en/news/attitudes-towards-impact-digitisation-and-automation-daily-life

Figure 4: Which of the following groups do you think will gain the most from the introduction of new technologies in the workplace?



RSA/Populus survey of 1,114 UK workers (part time and full time). Field work undertaken 27-28 June 2018

So what can we do to spread the gains of technology more equitably? No policy has received greater attention in the last few years than Universal Basic Income (UBI), which proponents on both the left and right view as the go-to solution to technological upheaval (not: the RSA is a proponent of UBI⁵⁸ but for reasons unrelated to the threat of automation). Others have talked about a ‘robot tax’ that would be charged on the use of new machines, possibly to fund a basic income or a more extensive programme of lifelong learning.

Ideas like these have merit. Yet they are often pitched as a response to mass automation, which as we have already seen appears unlikely in the near to medium term. Rarely do we hear of interventions that might rein in surveillance or rid bias from recruitment algorithms, possibly because these problems are less sensational and therefore less newsworthy.

More fundamentally, they are just ideas – a sporadic set of proposals that seldom gel as a cohesive whole. If policymakers, educators and employers are to be effective custodians of radical technologies, they will need an underlying set of principles that bring coherence to their efforts. Put another way, they will need a ‘social contract’ that sets out an appropriate division of rights and responsibilities for a modern age.

Thinking about a social contract helps to surface questions that are often overlooked, or whose answers are taken for granted. It makes plain

⁵⁸. Painter, A., Cooke, J. and Thorold, J (2018). Available at: <https://www.thersa.org/discover/publications-and-articles/reports/pathways-to-universal-basic-income-the-case-for-a-universal-basic-opportunity-fund> [Accessed May 2018]

the trade-offs that are present in any decision taken by those with power. If workers are to be entitled to greater protections, for example, who pays for these? How much is left to individuals versus their employer and the state? And what is the quid pro quo? Higher taxes? More liberal laws on hiring and firing?

A social contract for a modern age

A principal aim of the RSA's Future Work Centre is to present a vision for this renewed social contract. Over the next 18 months we will use a combination of scenario forecasting, deep dive sectoral investigations, and policy and practice roundtables to build a more vivid picture of the obligations and entitlements that could underpin modern work – and how these might be realised in practice.

Already we can see the contours of a new settlement emerging.

One principle the RSA has championed previously is to **accelerate the take-up of technology**. The irony of the frenzied commentary surrounding automation is that UK businesses and public services significantly underinvest in new technology. Previous RSA polling of UK business leaders found that only 14 percent were actively investing in AI and/or robotics, or soon planned to.⁵⁹ Our conversations with public service chiefs revealed that many are struggling to integrate even the most basic of innovations.

Some view the slow diffusion of technology positively. It will give society time to adjust. Workers can keep hold of their jobs for longer. There will be less need to retrain and shift careers. But it also means depriving workers of one of the major sources of productivity growth – and therefore wage growth – in our economy. The other risk is of market concentration. If large tech companies are the only ones to innovate, we can expect them to eviscerate their competition and move into ever more sectors. Amazon's purchase of Wholefoods should serve as a warning against complacency.

The government's Industrial Strategy has set out several promising commitments to boost tech take up, including to establish Data Trusts that support businesses to share and make use of each other's data.⁶⁰ The World Economic Forum, meanwhile, is advising governments on how to streamline tech regulation and make adoption a less painful process.⁶¹ The power of networks could also be better harnessed. Be The Business, a new outfit geared towards addressing the UK's productivity puzzle, is grouping businesses together by sector to share best practice, including on their use of technology.⁶²

A second principle could be that it is **everyone's responsibility** to ensure good work prevails. To the extent that we do see the take-up of technology, it will place new pressures on workers that must be carefully managed. But too often those responsibilities fall on the shoulders of a

59. Dellot, B. and Wallace-Stephens, F. (2017). Op cit.

60. Department for Business, Energy & Industrial Strategy (2017) *Industrial Strategy: building a Britain fit for the future*. London: Department for Business, Energy & Industrial Strategy.

61. For more information, see: www.weforum.org/centre-for-the-fourth-industrial-revolution

62. For more information, see: www.bethebusiness.com/

narrow group. Read any article on the gig economy and the focus will be on the behaviour of the platform. Read any report on stagnating living standards and there is a good chance the blame will be placed on employers for paying poverty wages.

It is right that employers are held up to the highest ethical standards, including when it comes to choosing and applying technologies. But they are not the only ones whose behaviour shapes the quality of work. Equally important is the role of consumers. Our insatiable appetite for cheap goods has powered the growth of e-commerce platforms, and in turn the shift from bricks and mortar jobs to warehouse work. Likewise, our desire to access services on-demand, and to see ratings for the providers of those services, is one reason for the popularity of gig platforms.

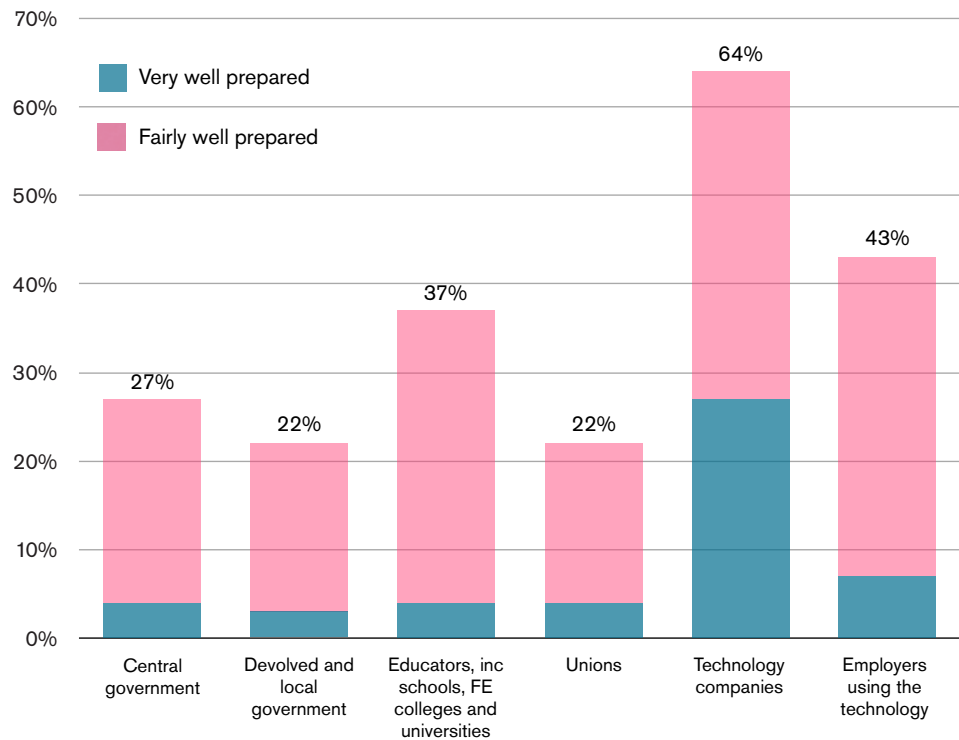
Taking this broader view of responsibility throws up more remedies to tech disruption. Rather than just urge and cajole employers to play by fairer rules, perhaps we should demand more from consumers. One way to achieve this is would be through a consumer transaction tax. This would aim to respond to the rise in self-employment, which has been partly driven by technology. Anyone who uses the services of the self-employed would need to pay the tax, with the revenue used to extend protections to this group of workers (e.g. full Statutory Maternity Pay).

More could also be asked of tech companies, software engineers and tech investors. Whereas the government can only mitigate the effects of technology after it has been deployed, the tech community can nip problems in the bud during its design and development stages. A company developing recruitment software could commit to testing its training data for bias before it is deployed in hiring,⁶³ while a VC investor could choose not to plough money into start-ups whose surveillance software is overtly intrusive.

Nearly two thirds (64 percent) of workers in our RSA/Populus poll said tech companies are prepared to protect workers from the effects of new technologies (see Figure 5). Just 27 percent said central government and 21 percent devolved and local governments. If the intuition of workers is right, the responsibility to steward radical technologies must extend well beyond the confines of Whitehall and other government institutions.

63. See for example Accenture's 'AI Fairness Tool', as cited in McLeod, J. (2018) *AI might be biased against you, but Accenture wants to give business a tool to fix that*. Financial Post, 4 July.

Figure 5: To what extent do you think each of the following institutions are well prepared or not well prepared to protect workers from the effects of new technologies?



RSA/Populus survey of 1,114 UK workers (part time and full time). Field work undertaken 27-28 June 2018

Flexicurity could be a third hallmark of a modern social contract. The Taylor Review into Modern Employment Practices emphasised the importance of a flexible labour market, both for worker and contractor/ employer.⁶⁴ One reason the UK has a low unemployment rate is because it is relatively easy to start and end employment contracts, and to employ workers on a part time and zero-hour basis. Another factor is light touch business regulation, which has allowed more workers to move into self-employment.⁶⁵

Should radical technologies disrupt industries and hasten the rise of some occupations and the decline of others, flexibility will be necessary to smooth job transitions. However, flexibility can easily be abused, with workers left in precarious positions and unsure of their future. Contract type is a poor indicator of worker experience,⁶⁶ but undoubtedly there will be many on zero-hour contracts, agency work and in self-employment who desire more stability.

So how might flexibility be married with job security? Lessons can be learned from the experience of Denmark. Here, light touch regulation means businesses can take on and let go of workers with ease. But workers also benefit from generous protections that pay as much as 90 percent of their wages while they look for other work, as well as access to training opportunities. This protects individual workers but also creates a more

64. Taylor, M. (2017). Op cit.

65. Dellot, B. and Wallace-Stephens, F. (2017) *The Entrepreneurial Audit: Twenty policy ideas to strengthen self-employment and micro businesses in the UK*. London: RSA.

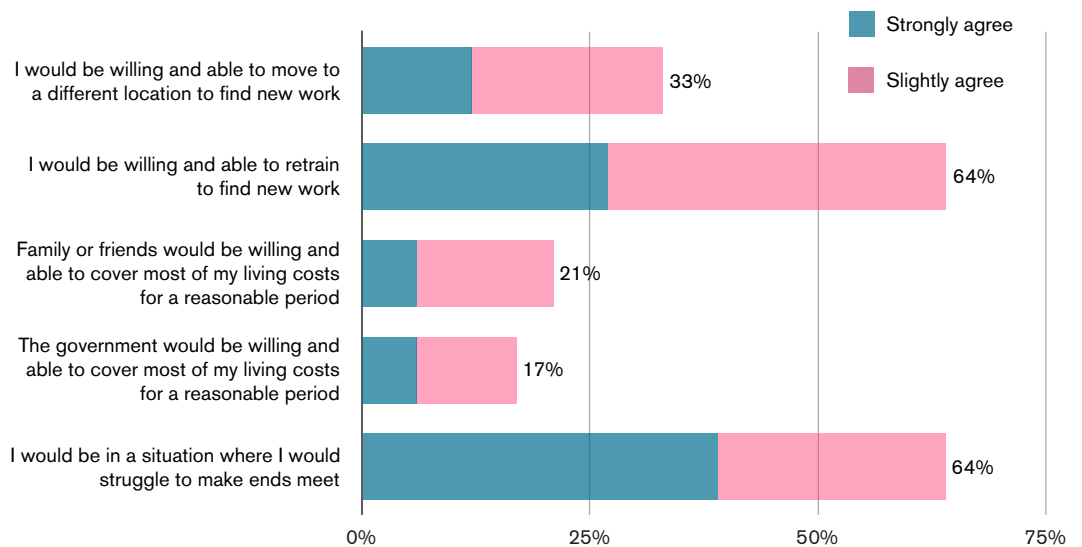
66. Balaram, B. and Wallace-Stephens, F. (2018). Op cit.

efficient labour market, as people move between jobs more often leading to better job matching.

Flexicurity could also be achieved with the support of trade unions. Membership of unions has dwindled over the last 40 years, from 13.2 million in 1978 to 6.2 million in 2016. The union movement has struggled to keep pace with the needs of a changing labour market, not least the growth of atypical work. Yet there are pockets of innovation. IWGB has been successful in winning rights for gig workers in the courts, while Organise has led powerful single-issue campaigns, including most recently to reduce the performance targets set in Amazon fulfilment centres.

Either way, it is clear the government alone is ill equipped to provide workers with an adequate safety net. While it may be an unlikely occurrence for most of the workforce in the near future, our RSA/Populus poll suggests few people would have the wherewithal to bounce back if they lost their job to automation (see Figure 6). Barely a fifth (18 percent) say the government would be able and willing to cover most of their living costs for a reasonable period.

Figure 6: Imagine your employer announced your job would be automated. Do you agree or disagree with each of the following



RSA/Populus survey of 1,114 UK workers (part time and full time). Field work undertaken 27-28 June 2018

A fourth ambition of a renewed social contract could be to foster a **culture of professionalism**. Every study on the future of work invariably calls for greater investment in lifelong learning – a view shared by the RSA.⁶⁷ While automation may be subdued in the near to medium term, the advent of new technologies will open up new and better paid forms of employment, and workers will need support to move into these careers.

Yet not everyone will be able to enter high skilled roles, whether as machine learning specialists or cyber security experts. The UK has 13.9

67. See: www.thersa.org/action-and-research/rsa-projects/creative-learning-and-development-folder/cities-of-learning

million low-skilled workers, including 1.1 million retail assistants, 769,000 care workers, 325,000 teaching assistants, 281,000 waiting staff, and 541,000 cleaners. The number of full time care workers alone will need to increase by 2.6 percent a year until 2035 to meet increased demand.⁶⁸ What tends to be thought of as ‘low-skilled work’ will always be with us.

Policymakers and educators must therefore help people to develop within these roles, not just to rise out of them. This means establishing employment frameworks that recognise everyday skills in different occupations, and creating funding programmes to assist individual learning. The UK could emulate the model of France and Singapore and introduce personal training accounts that give every worker – whether self-employed or employed – a stipend to spend on accredited courses.⁶⁹

More than this, we need a cultural shift so that low-skilled jobs are viewed as professions rather than an unfortunate and temporary stop-gap. While care work may not require the same technical training as architecture or law, there is ample scope to deepen and extend the requirements of this role. By turning low skilled jobs into vocations, workers may be more encouraged to take up training and consumers more willing to pay higher prices for their services.

Finally, a modern social contract may need to put owning on a par with earning. As economists like Thomas Piketty have warned, labour is steadily losing the battle against capital as a source of income in our economy (by capital, we mean economically active wealth such as property, stocks and shares). The OECD estimates that between 1990 and 2009, labour’s share of GDP declined in 26 out of the 30 countries for which data is available.⁷⁰ Recall that Van Reenen and Patterson blame this on the growth of tech-powered superstar firms.

For advocates of good work, this means opening a new flank of policy advocacy. It may no longer be enough to campaign for a living wage or to call for workers on boards. Asset distribution has to factor into more conversations. The Resolution Foundation, for example, recently suggested giving every person at the age of 25 a ‘citizens inheritance’ of £10,000.⁷¹ Another intervention would be to shift the burden of taxation from labour income (eg Income Tax) to capital income (eg Capital Gains).

More ambitious still would be to launch a Sovereign Wealth Fund (SWF). This would be a publicly owned vehicle – or People’s VC – that invests in existing and emerging technology companies, with a view to channelling the proceeds of dividends to every citizen. While an SWF would take years to bear fruit, the underlying principle of giving workers a stake in wealth creating machines is one we should explore further.

68. Department of Health and Social Care (2018) *The adult social care workforce in England*. London: Department of Health and Social Care.

69. For more information see Fitzpayne, A. and Pollack, E. (2018) *Lifelong Learning and Training Accounts: Helping Workers Adapt and Succeed in a Changing Economy*. Washington D.C. The Aspen Institute.

70. International Labour Organisation and Organisation for Economic Co-operation and Development (2015) *The Labour Share in G20 Economies*. [online] Available here: www.oecd.org/g20/topics/employment-and-social-policy/The-Labour-Share-in-G20-Economies.pdf [Accessed 15 August 2018]

71. Resolution Foundation (2018) *A New Generational Contract: The final report of the Intergenerational Commission*. London: Resolution Foundation.

A window of opportunity

This opening essay for the RSA Future Work Centre has challenged the prevailing narrative that deep and enduring automation is on the horizon. Radical technologies should be thought of less as a looming tidal wave that will crash on the shores of our labour market, and more as a rising tide that will gradually seep into every sector and occupation.

But that does not mean we can relax at the prospect of a new machine age. Radical technologies – whether artificial intelligence, smartphones or e-commerce platforms – have been and will continue to shape the lives of workers in significant ways.

Left unchecked, their adoption could depress wages, constrain autonomy, exacerbate discrimination, and – at an aggregate level – sharpen geographic divides and economic inequality. But applied with forethought they could elevate productivity, boost earnings, and remove the dull, dirty and dangerous aspects of our jobs.

The good news is that we have it within our gift to steward these technologies for a benevolent end, so long as we make deliberate and informed choices. More than tweaking our tax, welfare and education systems, this will require a bolder reimagining of our social contract and a new ‘common sense’ regarding how technology should be managed.

Amidst this heated debate, it is easy to lose sight of the fact that technology is ultimately a tremendous force for wealth creation. It is the reason why absolute levels of poverty have fallen worldwide, why child mortality rates have plummeted, why lifespans have extended, why backbreaking work is less common, why we have more leisure time than ever before, and so on.

The purpose of the Future Work Centre is to prevent progress from stalling and ensure that everyone shares in the spoils of radical technologies. We have achieved this in previous waves of innovation during the 19th and 20th centuries, when the early industrial revolutions were taking hold. There is no reason why history should not repeat itself.



About the RSA Future Work Awards

With the support of Barclays, Social Capital Partners and AltNow, the RSA is launching the Future Work Awards to highlight inspiring examples of good work initiatives from around the world.

We are looking for programmes that have a proven track record in improving the wellbeing and economic security of workers using novel methods. Examples include collective sick-pay funds for the self-employed, modern lifelong learning programmes for adults, new forms of trade union for gig workers, and innovative HR practices that give workers maximum autonomy.

The purpose of the Future Work Awards is to reward and recognise the unsung social innovators who are bringing about a better world of work outside of government. By raising their profile, we want to encourage others to consider kick-starting similar schemes in their own communities and sectors.

If you run a good work initiative or know of one that deserves attention, you can submit a nomination through a short online form on our Future Work Awards webpage: www.thersa.org/action-and-research/rsa-projects/economy-enterprise-manufacturing-folder/future-work-awards

Nominations are open until mid-September, after which a panel of global judges will review the entries and announce the winners in November.

The RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) believes that everyone should have the freedom and power to turn their ideas into reality. Through our ideas, research and 29,000-strong Fellowship, we seek to realise a society where creative power is distributed, where concentrations of power are confronted, and where creative values are nurtured.

Recent RSA studies have explored the rise in self-employment, the gig economy and the ethics of artificial intelligence. In each case, we have sought to dig behind the headlines, unpick the nuance of debates, and canvas views from across the political spectrum. Our goal is to explore the big challenges facing society today.

RSA

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