

8. Labour markets and the future of work

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New technologies are causing a restructuring of labour markets in many countries. While much has been written on how these technologies may destroy jobs, this chapter argues that they do not threaten the end of work but they will require extensive worker transitions. While some of the new job tasks that will be created in the digital economy will require skills at an advanced level with a strong scientific base, it is a basic knowledge of these technologies that will be required practically everywhere in the labour market. The chapter discusses the way in which both companies and governments have a role to play in meeting the challenge of achieving these transitions, in face of increasing demand for 'good work'.

I. Introduction

Modern labour markets are in a continuous state of flux. The reasons for change are many, and include new technologies, demographics, supply conditions, and policy. A good labour market accommodates these changes speedily and with minimum disruption. It also gives companies opportunities to adapt to the latest technologies and improve their performance. But very often the institutional structure of a country or its politics inhibit adaptation to new conditions and the country fails to keep up with its competitors.

The future of work is too big a topic to talk about in general terms. Although most economists would agree that certain features of the labour market make change easier to accommodate, in other cases different shocks might require different institutional structures and different responses. This chapter will focus on technology as the cause of change – though the lessons learned will be relevant to accommodate other changes in labour markets.

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Ever since industrialisation we have had ongoing technological change, sometimes great enough to rise to the status of a revolution. Occasionally, an economy might be hit by a one-off shock that will require special measures, such as the transformation of the former planned economies of Eastern Europe, or COVID-19. But in advanced industrial countries, the main reason for change over the longer term is new technology. Technology drives productivity, which is linked to income from work. It also gives opportunities for the creation of better jobs, which can improve human wellbeing independently of income. But to achieve this goal, the labour market needs to be well-regulated and functional, and its participants need to be aware of the challenges.

All of this begs several questions. What makes a labour market 'good' in the face of frequent shocks? How can the labour market best take on the latest technologies and develop new ones? What determines how workers will be affected – and what is the role of policy in influencing this process for the better? Overall, how can we make sure that new technology helps create good jobs?

Typically, when new technology arrives, some labour needs become obsolete. The most common manifestation of this will be 'role turnover': although workers retain their jobs, the things they do with the new technologies change over time. Bank tellers become 'relationship managers', because dealing with simple transactions has been taken over by automated teller machines. Retail shop floor assistants move to back-room selling over the internet, because people no longer buy from stores but shop online.

Yet, some changes in technology are great enough to demand a change of job, or even the closure of companies – even as they create new jobs and new start-ups. Worker transitions take place continually. Most are within the same sector of employment, doing similar things in the new jobs as in the old. But some technologies are more disruptive and require new capital investment and upskilling of the labour force.

Inevitably, the challenges encountered in a forced job change are much bigger than those encountered because of internal role changes. But unless workers are actively engaged in the evolution of new technologies and make the transitions with minimal disruption to their wellbeing, internal role changes can also be disruptive.

Companies can do certain things to achieve smooth transitions and adapt to new technologies. They can, for example, retain and retrain their employees, engaging them in the evolution of the company, motivating them, and all the while attracting more business through improvements in productivity. I shall argue that the best way for companies to achieve this is through the provision of 'good' jobs, which I will define and elaborate on in the course of this chapter.

The state also has an important role to play in the transition to new technologies. This might mean removing obstacles to change, which, although often well-intentioned, can be deleterious. Or it might mean well-designed social and retraining support to help workers, especially those that have lost

their jobs, deal with the transition. Over the long term, governments must maintain a well-functioning infrastructure and provide up-to-date education, training assistance, and incentives for research and development (R&D). A consensus is emerging amongst economists about the best role the state can play in this arena, informed to a large extent by the various international rankings on competitiveness, innovation capabilities, and public sector efficiency.

In this chapter, I start by reviewing the industrial penetration of new technologies, before discussing the implications of that penetration for skills and jobs, and finally examining the role of government in facilitating the adjustment to the new world of work. I will pay particular attention to the impact on jobs and the wellbeing of workers, both in the transition and in the new normal of automation technologies.

II. The background: leading technologies and their industrial penetration

The leading technologies today are based on robotics and artificial intelligence (AI), and their main impact on work is automation. Automation mainly affects tasks traditionally done by workers lower down the skills distribution, which means that, if by introducing the new technologies a company increases profitability, the main beneficiaries are those doing more skilled and managerial work. That said, more recently AI technologies have improved their capabilities and have begun to penetrate activities traditionally associated with more skilled workers.¹

Much has been written about the ability of robots to replace human labour in many occupations, mostly in manufacturing. This literature has converged on a figure for jobs that are at a high risk of obsolescence in the vicinity of 10–15%, although the pandemic may have raised this figure a little.² These jobs are mostly manual and low skilled, such as assembly line jobs, warehouse jobs, certain delivery jobs, and the like. More recently, however, robots capable of service sector tasks have been emerging too.³

Rather than view this as a negative development, I see it as positive, in the sense that the jobs that are lost are routine manual jobs, with low productivity and presumably not very fulfilling for the workers either. It is very difficult to turn these jobs into ones that are more productive and better for the workers. Their removal provides an opportunity for workers to acquire more training and progress to jobs that can be more productive, give more satisfaction, and provide more income. This process fits well with Joseph Schumpeter's claim that societies need to undergo a process of creative destruction of old and established work methods, to be replaced by new job creation.⁴ According to Schumpeter, this is 'the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in'. When the jobs that are being replaced are poor jobs, as in the case of manual labour, creative

destruction can have social benefits too. The role of government is to facilitate this transition, by providing a flexible environment for the company sector to replace the obsolete jobs, and by supporting the workers who lose their jobs to retrain and find better jobs, without falling into poverty.

A caveat is that the job creation that follows Schumpeterian job destruction does not benefit all sectors of the economy, or all workers, equally. Societies need to undergo a structural transformation and, for more inclusive growth, workers need to be prepared for the transitions. The main transformations required fall on low-skilled workers, who lose their jobs and need to learn new skills before they find new jobs. The ease with which the transitions can be made depends on the closeness between the declining and expanding sectors. For example, do manual manufacturing workers need to learn how to work as nurses or as hotel staff, or do they transition to being delivery drivers? Policy support is needed here, both to make the economic transitions easier, but also to support families during the transitions.

Robotics have been disrupting employment since the 1990s, when robots were first introduced on a large scale into manufacturing. This happened once robots became commercially viable as self-controlled mobile devices, sometime in the late 1980s. AI penetration remains low but is growing fast. AI learns from historical data, which means it cannot yet be trusted to produce unbiased results in all situations.⁵ But the widespread use of the internet on mobile devices has been critical in the proliferation of big data sets that have commercial applications – such as training AI.

The current industrial penetration of robots worldwide is available from the database collected by the International Federation of Robotics, which is sourced from suppliers of robots to industrial companies. They define robots as fully autonomous machines that can be programmed to perform several manual tasks without human intervention. These tasks include handling, welding, dispensing, processing, assembling, and dismantling. They are found almost exclusively in the manufacturing industry, but the use of robots with AI is spreading to the service sector as well. Although in terms of growth rates of robot use China stands out, the countries whose industries are most highly robotised are Germany, Japan, and South Korea.⁶ These are also the biggest producers of transport equipment and electronics, in which robot use is at its highest, and among the world's biggest exporters. Robot use improves productivity and competitiveness for its adopter, and so those countries that were first to automate today enjoy exceptionally large markets for their manufacturing goods.⁷

An aspect of robot use that is often ignored in the literature on robot-labour substitutions is that robots are used mainly in the production of tradable goods. Ignoring international trade when evaluating their impact on jobs leads to misleading results.⁸ Across industrial countries, the biggest users of robots are also the ones that lost relatively fewer jobs in manufacturing, because robots made them more competitive, and therefore they exported more. This experience contrasts with that of countries like Britain and France,

which have been much slower to adopt robots and have fallen behind both in export markets and in job creation in manufacturing.

It is much more difficult to collect data on the use of AI in production, but the general view is that it remains very limited. For example, in the financial sector, despite the hype about fintech and its disruptive potential, only a small fraction of activities has been taken over by AI.⁹ AI is based on software that solve problems, so it cannot be counted in the way that self-standing robots can.

However, we can say something about the readiness of countries to adopt AI, based on the 'enablers' that they possess. The main enablers for AI are digital infrastructure, innovation capabilities, well-trained human capital, the country's openness to interaction with other similar countries, and the quality of its labour force institutions, including good social support.¹⁰ The United States and China are the top performers in this respect because of their large internal market and their large digital companies, although they fail on the provision of social support during the transition. Northern European countries, including the United Kingdom, perform well across most criteria, with some differences between them.

The European Union has been compiling statistics on the use of AI in Europe, including comparisons with the US, China, and the UK.¹¹ The US is the leading country in most dimensions, with China close behind. Although the US has more successful start-ups in the AI sector than any other country, the UK has by far the highest 'AI density', defined as companies that use AI, relative to country size. This contrasts with robotics, in which the UK has low density. So, in the future of work, although robotics has not been a major disruptor in British manufacturing, and British productivity has suffered because of it, the expectation is that AI will make a bigger difference to jobs.

III. Implications for skills and jobs

The jobs at risk of obsolescence as robotics and AI develop are those involving tasks that can be programmed, given the available data. When a task done by humans is taken over by machines, workers could learn new skills and move on to another task within their organisation. Sometimes entire companies may shut down or contract, in which case jobs are lost and the workers must move on. Those companies that innovate successfully create jobs complementary to the new technology and grow large, but they drive out of the market others that do not innovate. Although companies like Amazon, Google, and Netflix are new digital companies and have grown large very quickly, they employ fewer people relative to their turnover than the companies that populated their sectors in the past, such as high street retail outlets, newspapers, or cinemas. The big losers when new technologies come to disrupt a sector are the companies that fail to innovate and either shrink or are driven out of the market altogether, bringing down with them the total number of jobs in the sector.

One thing is certain, however: in a free market economy, there will never be a shortage of jobs. Economists as prominent as John Maynard Keynes and Wassili Leontief predicted that eventually there might be a shortage, but they failed to see the potential of the service sector to create jobs without limits.¹² In Keynes's time, service sectors that employed large numbers of workers, such as hospitality, were practically unknown. Later, when Leontief was writing, the gig economy, which is now growing in response to the digitalisation of production and distribution, did not exist. New jobs are created all the time: any person who invents a way of spending their time that is useful to someone else is effectively creating a service sector job. And human ingenuity will always invent new ways of spending time. As society advances and living standards rise, the hours people spend at work will fall, because leisure is a commodity the demand for which increases with income. Currently, the countries with the highest productivity in Europe, such as Germany and the Netherlands, also have the lowest average hours of work, in contrast to countries with low productivity, such as Greece, that have the highest. In several advanced countries, including the UK, Germany, and the US, there is currently a shortage of labour, not a shortage of jobs. Eventually, the four-day week will become the norm, too, but the point to note is that these reductions in work are not driven by obsolescence due to the takeover of work by machinery, but by voluntary additions to leisure activities – which are themselves creating jobs in services.¹³

New technologies will cause a restructuring of employment. An argument may be made, with some justification, that the destruction can be quick, while the creation that follows it is slower. There is an interim period, during which the workers must learn new skills and transition to their new jobs, that is longer than it used to be in the past. It is essential, in these circumstances, that governments provide social support and training assistance to workers, to avoid them falling into long-term unemployment and disenfranchisement. Good social support is one of the enablers used by organisations that calculate the AI readiness of countries, and it is one of the few where the leading countries, the US and China, fall short compared to Europe.

Most of the transitions that will be necessitated by AI are role transitions within a company. Many fewer will demand job change. The roles that will become more in demand in the future are of two types: those that are complementary to the machines and perform tasks that advance the technologies and their use, and those that serve the people when the machines fail to serve them.

In terms of the latter, it is clear by now that most of the new job creation in response to the coming of the robots and AI will be in the service sectors that cannot be automated. These sectors are mainly ones in which there is direct contact with the people who receive the services. Since they are sectors that rely on human interaction, they are characterised by low productivity growth. They mostly supply services that become more in demand as societies become wealthier, so the services they supply are 'luxuries', in the way that

economists use the term, meaning that they consist of goods or services on which expenditure increases faster than income.

Prominent among the sectors that will experience this type of jobs growth are health and care, because of our ageing societies and the 'luxury' element in high-quality, specialised care. As incomes rise, people expect better care for the sick, for their children, and for older people. In societies where incomes are low, care services are often provided by the family. But as incomes and education standards rise, specialist services from outside the home take over. The change from home provision of certain types of services to market provision is known as the 'marketisation' of consumption and it is a major source of job creation as societies grow. This is partly because market demand for services such as care rises, and partly because the family members who used to provide the services at home are now better educated and available to enter the market and seek jobs more suitable to their skills.¹⁴ These factors are behind the observation that, over time, spending on health and care increases by about 1–2% faster than gross domestic product (GDP).

Another sector that can create jobs that cannot be automated is the hospitality and leisure sector, including the creative industries. As living standards rise, people demand better quality services in their leisure activities, such as travel, hotel accommodation, restaurants, and entertainment. In addition, as hours of work fall, especially as full-time workers get more annual leave, the demand for leisure services will increase. Spending on travel to foreign countries has grown much more rapidly than GDP, because of the luxury element of this pursuit and the improvement in safety standards, comfort, and value for money of air travel. It is this kind of job creation that was missed by Keynes – albeit understandably given the structure of employment in his time – when he claimed that there would be a job shortage a hundred years from the date that he was writing. In contrast, William Baumol as early as 1967¹⁵ wrote about the importance of the Arts as employment destinations as technology takes over industrial jobs, because computers will never be able to exhibit the creativity of the human mind in the Arts, even if they can match many aspects of it in simple situations.

The skills required for such jobs are neither new nor different from the ones currently required. The challenge for these jobs is to make them attractive for workers, especially new entrants to the labour market, given that a large number of them will be in the public sector, and many others will be in labour-intensive industries with low productivity growth. The public sector will have to find resources for the funding of health and care services that grow as a fraction of GDP. However, the disparities in spending show clearly in a cross-section of countries.¹⁶ In the US spending on health is as much as 18% of GDP, while in Germany and the UK it is 12.5%, and in China, where care is still largely in the hands of the family, it is a mere 5.1%.

The jobs that are created because of new technologies, which are aimed at developing those technologies and making them commercially useful, are of a different kind and will require new skills. The key to these jobs is technical

training to understand the way that robotics and AI work, and data processing skills to gain information about the market and community. They could be highly specialised jobs in research establishments or jobs in companies or government dealing with the development and implementation of the technologies in practical situations. The greatest number of jobs in this class will be in companies that create 'digital jobs', whose remit will be to use the data generated by new technologies to enhance the company's market performance. By their nature, such jobs will be exclusively in the 'knowledge economy'.

In recent surveys of talent shortage by the Manpower Group, IT skills and data processing feature prominently. For the UK in particular, other technical skills in need are operations and logistics, and engineering.¹⁷ The same is found in surveys of skill shortages by the McKinsey Global Institute, in which digital skills for ICT work is the competence most in demand. 'Soft skills' are also frequently listed as skills in short supply. These include reliability and self-discipline, creativity, critical thinking, leadership, and managing others, as well as advanced communication and negotiation skills. These are all skills with very low automation potential, and they will be a critical component of the work of the future.

An important point to bear in mind when talking about skills is that, although the ones that attract attention are the new skills of data analytics, interacting with computers, and generally skills associated with digital technologies, most of the jobs and roles of the future will involve people interaction. The skills needed in people interaction are different from the skills needed to interact with computers – and even the jobs that primarily involve interaction with computers will also involve some degree of people interaction, because any company will have a management structure and collaborative ways of working. This comes out clearly in a recent study of skills for the economy of 2035, which found that, although the new in-demand skills would be those related to information technology (IT) and data, the six most essential skills would be those needed to communicate with people. Namely, communicating with supervisors, peers, or subordinates; organising, planning, and prioritising work; establishing and maintaining interpersonal relationships; making decisions and solving problems; and customer and personal service.¹⁸

In work done at the Institute for the Future of Work with job vacancies and the skills that they require, we also found that IT and analysis, the two key competencies for the knowledge economy, were the two most rapidly growing skill demands. But the core skills required by most advertised jobs involve competencies like communication, language, and logical thinking.¹⁹

IV. The role of government

Government will inevitably have a greater role to play in the future labour market. This role will involve both broad control and regulation of new technologies, and, more narrowly, preparing the workforce for the needs of the future.

1. Choosing AI trajectories

A feature of AI is that it can do many things and not all are good for humanity. Of course, this is a feature of most of the important discoveries in the history of industrialisation, which are general purpose technologies that relate to our capacity to do things faster and in larger volumes. A key discovery in the first industrial revolution was steam power, which could run factories and move ships and trains more efficiently than in the past. Next came electricity, which was a stronger source of power with many more applications than steam. Digital technologies and AI fall into the same category. They can do more data processing, and solve problems faster, than anything that we had before them.

One difference is that with steam and electricity it was clear what we had to do: replace the current sources of energy with new ones, and transform homes and workplaces to accommodate them. With AI we have much more choice regarding the direction of research and applications. We can, for example, use it for medical research, diagnosis, and treatment – or we can use it for warfare. We can use it to make rich people even richer, by developing it in the way that works best for them – or we can use it to fight poverty and ill health around the world. It is a matter of social choice, and given the way that our societies are organised, along the Smithian principle that pursuing your own objectives will give the best outcomes for society, we are not likely to make the best choices without government intervention.

Because of this feature of AI, governments need to set standards and direct research to causes that are beneficial for humanity. Of course, defining what is and is not beneficial can be controversial. This is a question that has occupied the minds of philosophers and scientists for thousands of years. We need, as a society, to find ways of choosing – and deciding – in which definition and metrics of societal wellbeing to ground that choice. Government needs to take the initiative. And with respect to the theme of the future of work, an obvious starting point is the creation of good jobs. So: what constitutes a good job?²⁰

2. Good jobs

Good jobs are ones that promote worker wellbeing while remaining productive and beneficial to the employer. This may not be easy to achieve, because in practice it is much easier to create jobs that are beneficial to the employer, but which bring unhappiness and frustrations to workers. It is inevitable that subjective happiness measures of people at work cannot be as high as similar measures taken during leisure hours, otherwise people would not need money to work. But for most people, when given a long list of activities to rank, being at work scores very low and is sometimes preferable only to being sick in bed. There is obviously room for improvement in the provision of good jobs. We spend a large part of our lifetime at work, and so if government can incentivise companies to create good jobs then the improvement in social welfare will be large.²¹

Research from diverse organisations, including some by the Institute for the Future of Work, identify several features of good jobs. The most important of these is the engagement of workers by management in the day-to-day operations of the company, giving them more autonomy and allowing them to take initiative in the performance of their duties. For this to succeed workers need to be treated as stakeholders by their employers, engage in a frequent exchange of ideas with both line managers and subordinates, and take the initiative in restructuring their jobs and learning new roles. This is understood by employers, but it is difficult to put into practice, given the history of clearly defined tasks that has characterised, and continues to characterise, most jobs in the pre-digital era.²² It is, however, interesting that the ability to communicate well with line managers and subordinates is considered one of the key skills of the future, as previously mentioned.

Another important feature of good jobs that is frequently mentioned in surveys is time flexibility.²³ An employer that is more open to work interruptions because of family or other personal needs is always preferred to one who is not. The ability to have some choice over the way that the working week is organised is also a sought-after feature. An attraction of this and other related features that enable a more targeted work–life balance is that it benefits demographic groups that currently have lower participation in the labour market, such as women, people with disabilities, and minorities.

Other features of good jobs that improve wellbeing in the workplace are a fair pay structure, diversity of employment, and good public health. Though these features are still not common in British labour markets, they are achievable. For example, human resources departments can be given more incentives to hire a diverse labour force, to enable work from home with the technologies developed during the COVID-19 lockdowns, and to provide an office of Occupational Health at work.

The question of how to improve the autonomy of the workforce and the relations between line managers and subordinates is one that needs to be studied more carefully by both employers and government. Information about best practice is useful. Progress needs collaborative solutions, rather than each company developing its own approach. But it is not certain that progress can be made by relying only on company initiatives. More autonomy at work and good quality jobs contribute to worker wellbeing, better health outcomes, and better mental health. Governments need to take a more active role to promote them. One approach would be to include good work as a company purpose and devise legally enforced standards of company performance towards job quality, along the lines of the ones that protect the shareholders of a company.²⁴

3. Health and care

The education and health sectors, which are largely in the hands of governments, will become more important job destinations than at present. Although they are often treated together, their needs are diverse. Health is the easier one

to monitor, although in practice it is the more difficult one to provide for because of its increasing financing needs. AI has enormous potential in the health sector, mainly in diagnostics, for example, matching patients to donors and suggesting treatments. For this to succeed, government needs to devote greater resources to both R&D and organisational adjustments to increase efficiency. It also needs to decide whether R&D will be focused on elite university hospitals or more dispersed throughout the country. R&D designed for pure research might be more fruitful if it is directed at the main research hospitals, but it is important that the whole country benefits from their discoveries. Applying those new discoveries and technologies across the country would require extensive new capital investment, as well as human capital trained in how to use the new AI-driven equipment.

Care has different needs. As pointed out, the challenge for care will be how to meet the increased demand from an ageing population and a wealthier and better-educated society that will expect more and better-quality service. Training for these skills will not be difficult – the difficulty is how to attract enough highly motivated individuals. Ultimately, the main constraint in state-provided health is the macro one of resources, because of the need to increase the resources devoted to health and care as a fraction of GDP just to maintain service quality as the demands on the system increase.

4. Education

Education will need to prepare workers for entry into occupations that will involve changing roles. Given the need to learn new skills that this entails, a broad education that emphasises language, communication skills, and science subjects would be better than one that specialises in a small number of related subjects from age 16, as it happens in the UK today. An apprentice system that combines regulated work at a company with formal tuition could also provide a better foundation for the skills that some workers will need to develop in the future. Education up to age 18 needs to prepare students with a more varied knowledge base, which they will then develop at a university, in an apprenticeship, or as full-time workers at a company that offers lifelong learning opportunities. In Britain, the present A-level system needs fundamental reform to reduce the specialisation inherent within it, and to increase both the language and technical training that should be mandatory up to and including sixth form.

5. Worker transitions

Given the changing nature of employment, and the increasing complexity of jobs, government has another important role to play, as facilitator of worker transitions. Government needs to provide good social support to workers between jobs, combined with subsidies for approved training that is akin to an apprenticeship system. With increasing specialisation at work, the quality

of the match between worker and job become more important than ever. That is the reason why the best kind of practical training is provided at the company level, and not in educational institutions. This role of government is easier to visualise because it is one that has been operating in Sweden and other countries already for several years. The key to the success of these programmes is trust that the government will provide good support accompanied by a strong incentive structure for the worker to learn new skills and find suitable jobs.

But whereas government's role has mainly to do with education before labour force entry, or with the unemployed who are between jobs, the role of companies in the transition is lifelong. As new technology arrives and disrupts production, workers need to adapt their roles within their organisations. To make a success of this they need incentives. Worker talents are diverse, and workers know best how to exploit their special skills. The challenge for companies is how to find management practices that will incentivise their workers to assume the task of evaluating their roles in the company, looking for ways to improve it, and take control of their own lifelong training.

6. *The gig economy*

Modern technologies based on the internet are making it possible to move many transactions online. While the internet has helped many people work flexible hours and operate with more autonomy than in a factory or office environment, it has also created many 'gig' jobs with zero-hour contracts, and no well-defined location in which an employer can offer the facilities and perks that office or factory workers are used to receiving. Typical examples of gig jobs are warehouse jobs, delivery jobs, or drivers that are booked online through a platform. Should government allow such jobs to grow unregulated, or should it step in and offer protection to workers?

Some countries follow a hands-off policy, for example, in the US, but others have tried to regulate by requiring the platform owners to act as employers.²⁵ There are obvious advantages to the flexibility that gig jobs offer, but on the whole they are dead-end jobs with no prospect of promotion, no sick leave, no pensions, and no paid annual leave. In other words, they are more like casual work, akin to the type that workers used to find in the early years of industrialisation by turning up at the factory gates or the port, and asking if there was work for the day.

Gig work is one of the consequences of the structural transformation that new digital technologies are bringing to the workplace, along with increased inequality and role adjustment. Government could reduce the inequalities between gig work and regular office work, for example, by requiring that the companies regularly using gig workers treat them as regular employees. This appears to be the best solution when it is possible to identify an employer, as, for example, with Uber drivers. Another would be for government to take on

the role of the employer in some key services – for example, in the provision of social benefits, such as sick pay and paid annual leave. But this should be seen as a last resort.

V. Conclusions

This chapter has argued that new technologies may demand worker transitions, but do not threaten the end of work. The challenge we face is how to achieve these transitions, which will require workers to learn new skills and adapt to new types of work.

Both companies and government have a role to play. In the case of the latter, this will range from the provision of digital infrastructure that supports the development of new technologies, to strong social support for the workers undergoing job transitions, as well as training support and preparation of the workforce for the jobs of the future through a reformed education system.

The new job tasks that will be created in the digital economy of the future will be of two kinds. On the one hand, technical jobs will require a strong scientific base, as well as data analytics and IT skills. But only a small fraction of workers will need to learn these skills at an advanced level, because new technologies, especially AI, will advance sufficiently to deal with the needs of technical jobs. A basic knowledge of these technologies will be required practically everywhere in the labour market, alongside a good knowledge of English and maths. A century ago, the basic skill requirements were literacy for everyone – the role of literacy then is now being taken over by basic IT knowledge.

Alongside these basic skills, in the majority of jobs the skills required will be closer to the traditional person-to-person skills that are always in demand in a service economy. Good communication, good customer relationships, ability to think critically and make decisions, and generally skills that might be characterised as ‘empathy’.

With workers equipped with these skills it becomes easier for companies to offer ‘good jobs’. If the jobs are to be good for the workers’ wellbeing, managers need to pay more attention to good communication with their workers, so communication skills from the workers will help. Other characteristics of good jobs are more autonomy, more managerial ability within their company roles, and more time flexibility, features which again are better achieved when the workers have the ability to think critically and make decisions. As society advances, the demand for good work will increase and government plays an important role in ensuring that the features for good work are adhered to.

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Notes

- ¹ See, for example, AI Index Steering Committee (2022).
- ² See Autor and Dorn (2013), Frey and Osborne (2017), Nedelkoska and Quintini (2018) and the McKinsey Global Institute (2017) for estimates in the range 10–20%. Josten and Lordan (2019) use different methodologies and arrive at a much higher figure, 35%, of jobs automated in the next 10 years.
- ³ López and De Prato (2022).
- ⁴ Schumpeter (1942).
- ⁵ AI Index Steering Committee (2022).
- ⁶ China is on the way to matching them, as it currently installs more robots than the rest of the world put together. See International Federation of Robotics (2022).
- ⁷ Graetz and Michaels (2018).
- ⁸ Kapetanious and Pissarides (2025).
- ⁹ Capgemini (2018).
- ¹⁰ McKinsey Global Institute (2018).
- ¹¹ See various publications under the general heading *AI Watch*. A general discussion covering most issues is in the *AI Watch Index 2021*. See López and De Prato (2022).
- ¹² Keynes (1931); Leontief (1983).
- ¹³ Writings on the advantages of the four-day week and the results of some pilot trials are proliferating. See Gomes (2021).
- ¹⁴ See for example Freeman and Schettkat (2005) and Ngai and Pissarides (2008).
- ¹⁵ Baumol (1967).
- ¹⁶ See OECD (2021) and López and De Prato (2022).
- ¹⁷ Manpower Group (2025).
- ¹⁸ Dickerson et al. (2023).
- ¹⁹ IFOW (2025).
- ²⁰ Similar views are expressed by Dani Rodrik in Rodrik (2022). On choosing the direction of technology a good extensive discussion can

be found in the writings of Acemoglu, Johnson, and Robinson, e.g., Acemoglu and Johnson (2023). For a technical review of the literature, see Hémous and Olsen (2021).

²¹ See Layard and De Neve (2023), chapter 12. There are also various surveys of workers online, e.g., see the American Psychological Association surveys, American Psychological Association (2022). For other discussions of good work with emphasis on measurement issues and impact on productivity see De Neve and Ward (2023), IFOW (2021), and RSA (2020).

²² RSA (2020).

²³ American Psychological Association surveys, American Psychological Association (2022).

²⁴ Mayer (2018).

²⁵ The first country to do this explicitly was Spain, after starting a long legal process in 2014. See European Transport Safety Council (2018).

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Response to Christopher Pissarides by Kirsten Sehnbruch

I. A new social contract for labour markets?

The former Washington Consensus is often criticised – among other things – for its neglect of the social and institutional underpinnings that are indispensable for achieving both sustained economic growth and both fair and cohesive societies (as the brief for this project highlighted). Political developments over recent decades in the form of a resurgence of both populism and extremism clearly show that populism has flourished in the geographical areas or subgroups of the population that were left behind by de-industrialisation, deregulation, and globalisation.¹ To prevent an exacerbation of these processes, future political responses should be proactive in responding to the inevitable fallout in the labour market that future technologies will generate for both individual workers and their communities.

Pissarides emphasises that governments will inevitably have a bigger role to play in the future labour market and discusses the many important ways in which they can address the polarisation created by these processes and their resulting socio-economic inequalities. In these brief comments, I will take three of his arguments further by asking, first whether our existing social contracts are prepared for the impact of future technologies or whether the latter will undermine their sustainability. Second, I will argue that the premise of our existing social contract is paradoxically at odds with the regulation that underpins it. Third, I will ask whether our existing institutions are equipped for dealing with the challenges ahead. In making these three points I will refer to the example of labour markets in developing economies, which hold many lessons for advanced economies in terms of what segmented labour markets with a few ‘good’ jobs and many not so good ones look like.

II. Are social contracts based on ‘good jobs’ sustainable?

Pissarides argues that the impact of future technologies on labour markets depends significantly on whether they will impact good and/or bad jobs, as well as on whether governments can help workers transition into better jobs. In this context, a more precise definition of what constitutes a ‘good’ – or its counterpart – a ‘bad job’ would be useful. Defining a good job as one that promotes worker wellbeing, while remaining productive and beneficial to

the employer, which treats workers as stakeholders, and includes a fair pay structure chimes with the growing body of literature on how job quality could be defined,² but it does not constitute a precise definition.

Conversely, measures of 'bad jobs', are also now being discussed and produced.³ These studies emphasise that the conditions of poor-quality employment are likely to *exacerbate* each other: workers with low wages, for example, often also have unstable jobs with other negative employment conditions, such as unpredictable hours or income flows. Examples of such employment conditions are frequently found in those sectors, which are unlikely to be automated (e.g., tourism, healthcare, the care economy, as well as the gig economy). Such jobs often trap workers in situations where they rotate between multiple and sometimes overlapping bad jobs with little prospect of upskilling or developing their capabilities.⁴ In fact, many of these jobs require additional social or fiscal support from governments to be sustained in the economy. For example, the increased proportion of employed people receiving Universal Credit in the UK, the increased expenditure required on the healthcare of workers in poor-quality employment, or the pension subsidies paid to workers unable to save sufficient resources during their working lives illustrate this point.⁵

If social contracts are built on employment relationships that are formal, stable, linked to identifiable employers, contribute to social security systems, and are productive (i.e., with growing wages), it is important to measure how many jobs do not do so. A precise measure of poor-quality employment is therefore essential.⁶

In an ideal world, future technologies would eliminate such jobs and replace them with good ones that can sustain our social contract. However, based on present evidence, this is not the case: the best example of this trend is the gig economy, which in the UK is estimated to have doubled in only five years.⁷ Platform-based jobs (even when they are carried out in addition to other employment) are largely unregulated, draw more workers into self-employment (which contributes less to social protection systems), have unpredictable flows of income, are associated with higher accident risks, and are unlikely to provide basic work–life balance, which is essential to the mental and physical health of workers.⁸ In addition, gig workers are unlikely to be viewed as stakeholders by employers, who so far have attempted to prevent their organisation building (unionisation) that would lead to investment in their skills or the kind of 'exchange of ideas' that Pissarides describes.

As Pissarides suggests, the role of the social security systems and their ability to support workers in their transitions between jobs is therefore essential, a concept that is often referred to as 'flexicurity'. This concept has been extremely influential in shaping labour markets in both advanced and emerging economies in recent years, and is viewed positively in many discussions of the social contract.⁹ However, analysts often fail to recognise the potential paradox inherent to this model: flexible working arrangements that have flourished in deregulated, technology-driven labour markets require

more social and fiscal support from governments, while simultaneously contributing *less* (and less consistently) to the social contract. This prompts the question of whether such a social contract is sustainable in the light of labour market frictions generated by technological progress.

One solution put forward by analysts studying this phenomenon is to decouple the social contract from employment, thus building a welfare state based on taxes and other fiscal revenue rather than social security contributions.¹⁰ However, a transition to such a system in an advanced economy is unlikely to be feasible, neither *politically* nor *fiscally*. A significant amount of debate and effort will therefore have to go into strengthening the existing social contract so that it is prepared for dealing with the impact of future technologies.

The following two sections discuss how regulatory and institutional factors can contribute to this process.

III. Regulating for a sustainable social contract

The existing literature provides us with ample evidence that regulation has a significant impact on the types of jobs that are being created that can have both negative or positive consequences for the sustainability of the social contract in both advanced and emerging economies. The widespread deregulation of labour markets in Southern Europe, for example, led to segmented labour markets with high proportions of workers in short-term contracts, who became 'stuck' in a continuous cycle of precarious employment.¹¹ In Egypt, deregulation of the labour market in 2003 led to a collapse of job quality in the formal sector despite high economic growth rates.¹² Such processes have equally negative implications for both productivity and the sustainability of the social contract.

On the positive side, significant increases of the minimum wage mandated by legislation in Chile, Brazil, and Colombia have decreased the proportion of the working poor.¹³ In the UK, pension reform has led to a significant and rapid expansion of the numbers of workers contributing to pension systems.¹⁴

In a world in which unemployment is no longer the chief concern as even emerging economies battle with skilled labour supply shortages, deregulation and labour market flexibility should no longer be the defining mantra of policymakers. Instead, it is important to recognise that regulation matters and constitutes the foundation of our social contract, as well as of the kind of employment conditions, which attract workers into the labour market. In addition, without regulation, the benefits of economic growth would be spread even more unevenly, especially in a world of stark inequalities in which the proportion of labour income to GDP appears to be in perpetual decline.¹⁵

In advanced economies, therefore, the key challenge lies in finding a balance between the needs of workers and those of employers, while sustaining the social contract. One possibility would be to permit flexibility in the labour market, but charge for its negative externalities (as do carbon taxes).¹⁶

For example, it should never be cheaper to hire a worker on a temporary, outsourced, or zero-hours contract than on a permanent one, as the former is associated with more negative externalities that governments ultimately have to support. A progressive way of approaching this issue would be to factor such costs into the national insurance contributions paid on precarious contracts, which would level the playing field between different types of employment relationships.

In developing countries, the defining issue of improving the functioning of the social contract is to incorporate informal workers into the labour market. Governments can use advanced technology in this process to formalise the informal and gig economy workforce by encouraging the use of automated payment systems, such as M-PESA or PIX. Once these systems have been established, this would also allow governments to track transactions and charge VAT, while also encouraging informal workers to contribute to social security systems, for example, by matching contributions with public funds. In the long run, matching contributions would be cheaper than forgoing both taxes and contributions indefinitely as the informal workforce continues to avoid formalisation.

Levelling the regulatory playing field also means that judicial procedures should not shape fundamental employment rights. In the UK, for example, this has led to the absurd situation that Uber drivers are classified as 'workers', while drivers for other platforms (e.g., Bolt or Ola), Uber Eats, or Deliveroo are *not* classified as such, with all the absence of employment rights that this entails. From the socio-economic perspective of development, regulation relying on unpredictable case law outcomes is unproductive. From the practical policy perspective of sustaining a social contract, they can undermine its very foundation. And from a perspective of social justice, it could be described as unethical.¹⁷

Regulation also plays a significant role when it comes to the distribution of the productivity gains that future technologies could potentially unleash. Profit-driven companies in the private sector may exacerbate inequalities if these gains accrue only to the most qualified workers. This raises the question of how less qualified workers unlikely to benefit from productivity enhancing technologies should be compensated. In this context, it is unlikely that existing minimum wage regulation will sufficiently contain potential inequalities. Moving towards a stakeholder process within companies, as Pissarides suggests, can point to a way forward here. In addition, countries where unions not only represent workers but also participate in the governing boards of firms can serve as an example. In countries where such mechanisms do not exist, this would also require some degree of institutionalisation.

IV. Institution building for sustaining a social contract

One of the key solutions to frictions generated in the labour market by future technologies is the improvement of active labour market policies that help workers transition into new sectors or adapt to changing roles within their companies, as Pissarides emphasises. The risk here is that those sectors in which technological change generates the most friction will again be left behind – as with processes of de-industrialisation – unless such policies are proactive rather than reactive. This is where research analysing and predicting the use and impact of technology, such as The Pissarides Review, can be very helpful.¹⁸

Being proactive requires strengthening the institutional underpinnings of the social contract. Chiefly, this means *integrating* employment legislation and regulation with social and labour policy, as well as with productive development policies, such as those proposed by Rodrik in this volume. Typically, however, such policy areas are housed in different government departments or ministries, which often operate as isolated policy silos.

Ironically, it is the progress made in technology and machine learning that can help with this; it allows governments to link administrative data that can then be used to estimate and predict frictions in the labour market, including at a very granular local level or across subgroups of the population, which cannot be done with the much smaller sample sizes of surveys. The best-known examples that have made progress in this direction are Scandinavian countries, but even emerging economies, such as Chile, are now fast moving towards such a system.

Second, linked administrative databases facilitate interdepartmental collaboration between government services and can enable governments to coordinate policies in something approaching ‘real time’ to respond to the accelerated pace of change that technological advances bring with them. This is particularly necessary in labour markets where workers increasingly juggle multiple jobs, unpredictable hours, and/or income flows. For example, at present, a worker on a zero-hour contract does not receive support funding on time when there is a shortfall of work offered.

Third, lessons from using technology in some public services could also be applied in the areas of labour policy. In the UK, for example, the COVID-19 crisis prompted the government to automate many services provided by the NHS (e.g., reminders for health checks, blood tests, or vaccinations) and established online communication with healthcare providers as a matter of routine. The principle of automated prompts reminding or requiring workers to upgrade their skills over the life cycle is already applied in many sectors where workers need to update their qualifications or licences on a regular basis. This mechanism could be extended to the labour force more broadly, especially to those sectors, professions, or companies that are likely to be affected by technological shifts. This would be a proactive policy that would help workers acquire necessary skills *before* they are affected by technological shifts in their roles or jobs.

Finally, although many experts have discussed the potential advantages and disadvantages of basic income floors or universal basic income as policy tools in responding to labour market frictions, many agree that these would be too costly to implement on a large scale.¹⁹ Instead, the role of work sharing has been researched less in this context. Most studies of shortened working hours relate to company response mechanisms in situations of economic crisis.²⁰ Such mechanisms have been widely applied in Germany since 1957 (*Kurzarbeit*). However, recent studies have also shown that these could constitute more long-term solutions as the non-monetary and wellbeing-related benefits associated with employment already become manifest when workers are employed for relatively few hours per week.²¹

Similarly, recent experiments with the four-day working week, show that this not only increased the wellbeing of workers, but also increased the sales and profits of participating companies as the experiment reduced job rotation (and thus hiring and training costs) and absenteeism, as well as improving productivity overall.²²

Key to these processes and policy options are the institutions that facilitate social dialogue, both within companies and between the social actors, who must engage with the broader agenda of sustaining the social contract rather than advocating for only their own interests. This includes governmental departments, parliamentary groups, and the expert commissions that inform them.

V. Conclusions

To conclude, recent research on the future of work has helped us understand better the impact of technology. However, further research on the issues raised by Pissarides and in the comments above is undoubtedly necessary because technological progress is not the only driver of labour market change. Demographic changes, such as population (and therefore workforce) ageing, as well as migration flows, are likely to interact with technological trends. Early predictions of the loss of a significant quantity of jobs²³ in advanced economies may not play out as expected if technology helps deal with potential labour supply shortages. At the same time, migration pressures may continue to feed labour into poor-quality jobs, potentially exacerbating inequalities.

In many developing and emerging economies, similar demographic shifts are also changing employment patterns. De-industrialisation, deregulation, and new technologies have frequently increased the proportion of poor-quality employment in the formal sector, while informal sectors have not decreased, in part due to significantly increased intraregional migration patterns. This combination of factors is devastating for emerging social protection systems, not least because it depletes fiscal resources.

Notes

- ¹ Baccini and Weymouth (2021); Rodrik and Stantcheva (2021); O'Reilly et al. (2016).
- ² Green (2021); Hovhannisyan et al. (2022).
- ³ Florisson (2022); Sehnbruch et al. (2020).
- ⁴ See Prieto et al. (2022) for a methodology that measures this.
- ⁵ Joseph Rowntree Foundation (2023).
- ⁶ See Sehnbruch et al. (2020) and Florrison (2022) for methodologies that measures this.
- ⁷ Although the gig economy has attracted much academic attention in recent years (e.g., Woodcock and Graham, 2020), other forms of precarious employment such as zero-hour contracts (in the UK) or mini jobs (in Germany) have equally flourished, while contributing less to social security systems.
- ⁸ Woodcock and Graham (2020).
- ⁹ Shafik (2021).
- ¹⁰ See Barr's chapter (11) and Levy's response in this volume.
- ¹¹ Bendapudi et al. (2003); Bellani and Bosio (2019).
- ¹² Sehnbruch et al. (2021).
- ¹³ Apablaza et al. (2024).
- ¹⁴ Cribb and Emmerson (2020).
- ¹⁵ ILO et al. (2015).
- ¹⁶ World Bank (2019).
- ¹⁷ Robeyns (2017).
- ¹⁸ Pissarides (2022).
- ¹⁹ Shafik (2021).
- ²⁰ Casey and Mayhew (2022).
- ²¹ Wang et al. (2022b).
- ²² Wang et al. (2022a; 2022b).
- ²³ Frey and Osborne (2017).

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