Robots, AI and work: comparing the UK and Norway

Caroline Lloyd and Jonathan Payne explore challenges presented by robotics and AI in Norway and the UK

Caroline Lloyd is Professor in the School of Social Sciences, at Cardiff University.

Jonathan Payne is Professor of Work, Employment and Skills, and Director of the People, Organisations and Work Institute, at De Montfort University

The last few years have seen a number of gloomy publications predicting that robotics and artificial intelligence (AI) will destroy vast numbers of jobs, with dire economic and social consequences. These warnings have been heard before – most recently in the 1990s when microcomputers were accompanied by prophesies of a 'jobless future'. However, although some jobs were lost at the time, many more new ones were created. Is it different today and where is the evidence?

Much of the research in this field either involves abstract assessment of technological capabilities and the potential to replace humans, or focuses on engineering or computing challenges and possibilities. There is very little research that examines the *societal context* and how these technologies are actually impacting on jobs. Investment can be costly and risky for employers, with no guarantee technology will be taken-up. There are decisions over when and where to invest, and whether jobs will be replaced or changed. The same applies to how jobs are 'redesigned' around technology and its impact on skills.

Comparing countries offers the opportunity to examine the societal context and address the role of institutions, interests and power. The power of social actors, such as employers and trade unions, and the roles they play are different across developed countries. Institutions that shape decisions within the workplace also vary, including industrial relations systems, labour market regulations, mechanisms for worker voice, welfare states, education and training, and corporate governance arrangements. These may have an important bearing on the development of robotics and AI, take-up and work outcomes. Comparative research can help shed light on the role of institutions, interests and power in shaping technological change, and open up the challenges and possibilities that different countries face.

Our research focuses on Norway and the UK, two countries which contrast markedly in their institutions and in the power of employers and unions in influencing decisions. Here, we discuss two aspects from our current work. First, we draw on a project that involved interviews with robotics/AI scientists, developers and funders, along with representatives from employer associations and trade unions, and examine their views on the pace of technological change and the impact of robotics/AI on jobs. Second, we provide some examples of the introduction of robotics at the workplace in hospitals and the food and drink processing sector, research funded by a British Academy/ Leverhulme Small Research Grant.

Tech capabilities and the jobless future?

Talking with robot researchers and developers can be rather sobering in terms of what these technologies *cannot* do, and the timescale over which current limitations might be overcome. Computers can now outperform humans at certain rule-bound problems and the rapid processing of information; they can beat a world chess champion or master the game 'Go'. But when it comes to replicating human behaviour, using contextual knowledge, intuition and language capability, AI still has a very long way to go. As one Norwegian researcher put it, 'there's a lot of artificial, and very little intelligence.'

Similarly, physical robots struggle to match human flexibility and dexterity. A robot can pick up bottles and place them in a box, but grasping wet fish of varied size and shape, or arranging a piece of lettuce for a sandwich, present major challenges. Robotic vacuums can clean large empty spaces, but a hospital ward is a different proposition. Some commentators argue these 'limitations' will soon be overcome. Our interviews with robotic developers suggest this is likely to be a gradual and lengthy process. In addition, the creation of a technological solution does not mean it will be developed and manufactured on a scale that is cost effective for organisations. As a UK technology implementer put it, we are probably looking at 'evolution', not 'revolution where suddenly everything changes'. Across the interviews, predictions of mass technological employment met widespread scepticism.

We did, however, find noticeable country differences in relation to perceptions about the pace at which robots/AI are being introduced into the workplace. It was argued that there is a greater incentive for organisations to invest in technology in Norway. High labour costs and generous unemployment benefits encourage the use of automation to boost productivity, as well as providing a strong safety net for those who lose their jobs. In the UK, there is less incentive to invest in robotics/AI, due to significantly lower labour costs. Shareholder 'short-termism' also remains a problem for capital investment, with interviewees describing many companies as 'risk averse' or requiring investments to be paid back in two or three years. A representative from a robotics association insisted many organisations in the UK 'haven't done industry 3 yet', with a 'long-tail' of low productivity firms and 'backward SMEs'.

To find out how organisations are making decisions about robotics and AI and their impact on jobs and skills, we are undertaking research in a small number of workplaces. The technologies observed include the use of automated guided vehicles (AGVs) in hospitals, and robotic palletisers, wrappers, feeders and pickers in food and drink processing plants.

Robots in hospitals

AGVs are robotic platforms used to transport food, waste, linen and medical supplies, tasks usually undertaken by workers, such as porters, which involve pushing and lifting heaving loads. Replacing human labour brings occupational health benefits, including reduced injuries to backs and upper limbs. Most workers were redeployed, with only a few leaving voluntarily (e.g. early retirement). Some transferred to moving patients. Others were retrained for new roles, such as service workers in logistics or monitoring the AGVs. These new positions required additional knowledge of logistics and basic skills in computing.

The way in which AGVs are introduced into the workplace makes a substantial difference to how workers respond and their subsequent use. In one Scottish hospital, unions were consulted from the start. Despite workers' initial fears that they could lose their jobs, union involvement helped allay such concerns and made the introduction of AGVs run smoother. Contrast this with an English hospital, where there were no guarantees of redeployment. Unions were not involved and therefore opposed the use of AGVs, and management failed to take the time to engage with the workforce over their introduction. The result was an environment of non-cooperation and reports of workers deliberately sabotaging the robots by blocking their paths or covering their sensors. Three years on, their use is still far more limited in this hospital than others in our study.

Although there are labour savings as well as occupational health benefits, only seven hospitals have deployed AGVs across the UK and Norway. Why so few? Quite simply, they require purposefully built layouts with set pathways, making them extremely difficult and costly to introduce into older hospitals. Even in new hospitals, the process of implementation is far from straightforward. There are many technological issues related to alignment of sensors and the ability of the software systems, including those in doors and lifts, to 'talk to each other'. It also requires a reorganisation of logistics and standardisation of processes, involving both the hospital and external suppliers. AGVs are slow and expensive to implement, as well as costly to maintain. When we asked managers if they saved money, the answer was invariably 'we're not sure'.

An automated guided vehicle (AGV) transporting a piece of equipment in a Norwegian hospital. Photos: Caroline Lloyd.

Robots in food and drink processing

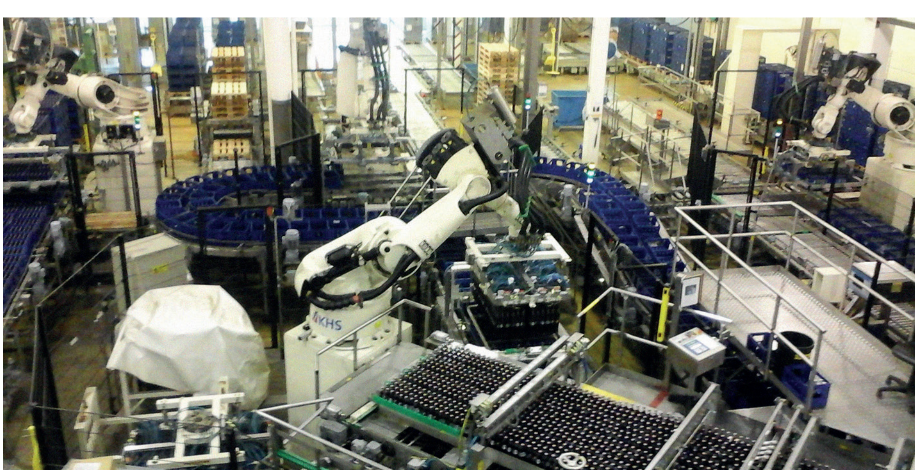
In the food and drink processing sector, automation has been taking place for decades, although at an uneven pace. Robots are a further step in this direction, being used primarily in those areas that have been difficult to automate with traditional technology, such as palletising and picking/placing. Selecting and installing a robot is not straightforward as it requires bespoke adaptation to the workplace and training for workers. The expectation is of the gradual replacement of some workers, with a greater potential future impact on labour-intensive activities like sandwich making, although these are areas where workable solutions still evade robot developers.

In Norway, high labour costs are seen to provide an important push towards automation and the greater use of robotics. In the three Norwegian companies in our study, wage costs for an operative are between two to three times that of UK workers. There is also close co-operation between pro-technology unions and local management focused on productivity enhancement. Some workers have been upskilled to operate the new computer systems, with workers gaining formal certification, skilled worker status and higher pay through the industry-level collective agreements. One Norwegian company stands out for worker engagement in technological change. 'Project groups' are set up, involving a manager, technician, engineer, union rep, safety rep and operative, which visit robotic manufacturers and choose and assist with implementation. In two Norwegian cases, some workers had been replaced by automation, including robots. Nevertheless, unions and workers see automation as necessary for the survival of plants, given the high labour costs.

In the two UK companies, the driver for investment is more varied. One company is using robots to increase output and reduce bottlenecks caused by manual processes, such as feeding machines and packing. The use of robots and computer-controlled machinery has removed some jobs, but employment is still increasing as the company is growing. There are changes to the work of line operatives and craft engineers, with jobs requiring less mechanical and more computing skills. Workers are also trained and supported to achieve accredited qualifications.

The other company cited recruitment challenges as a key driver for investing in robots. Wages are close to the statutory minimum, and a more buoyant local labour market has made it difficult to recruit and retain staff. This factory uses a highly manual process across much of the plant, partly due to technological constraints involved in roboticising sandwich production. Robots are gradually being introduced to displace workers in areas like packing, but, in a context of low pay, the process is constrained by the relative cost of capital investment compared to any potential labour savings. Under current plans, it is anticipated only a handful of jobs will be lost each year.

In both UK companies, there are no unions and little evidence of workers being involved in decisions around introducing technology or exploring ways of improving production efficiency. Technology is seen as the remit of engineers and managers.



A robot used in drink processing in Norway.

Final thoughts

This research identifies key issues around what robotics and AI can and cannot do, barriers to diffusion, the pace of change, implementation challenges, and whether mass technological unemployment beckons. It highlights important country differences. Norwegian trade unions are powerful and influential policy actors, and have been central to shaping and maintaining an institutional context which provides high wages and relatively generous social protection. This 'social pact' helps support union-management co-operation at the workplace around productivity-enhancing automation. In the UK, relatively cheap flexible labour, along with short-term shareholder pressures, disincentivises capital investment, with damaging implications for productivity. Social partnership at the workplace has weak institutional support, and workers who lose their jobs have less protection in terms of unemployment benefits and retraining opportunities. In this context, any productivity gains are less likely to be shared with workers who are also more exposed to the risks associated with technological change.

Important questions are raised for further research. To what extent and at what pace will technological constraints be overcome? Can robotics and AI solve the UK's productivity problem without addressing institutional barriers to diffusion? How extensive is union-management co-operation around technology in Norway, and are there examples in the UK of proactive unions shaping technology at work?

International comparative research is critical in showing us that place continues to matter, and that there is the potential for different outcomes. This provides an important corrective to accounts which see technology as the prime determinant, and instead focuses attention on the role of institutions, social actors and power. While countries have different starting points, a central question is what can be done to shape the process of technological change to support decent work and protect displaced workers.