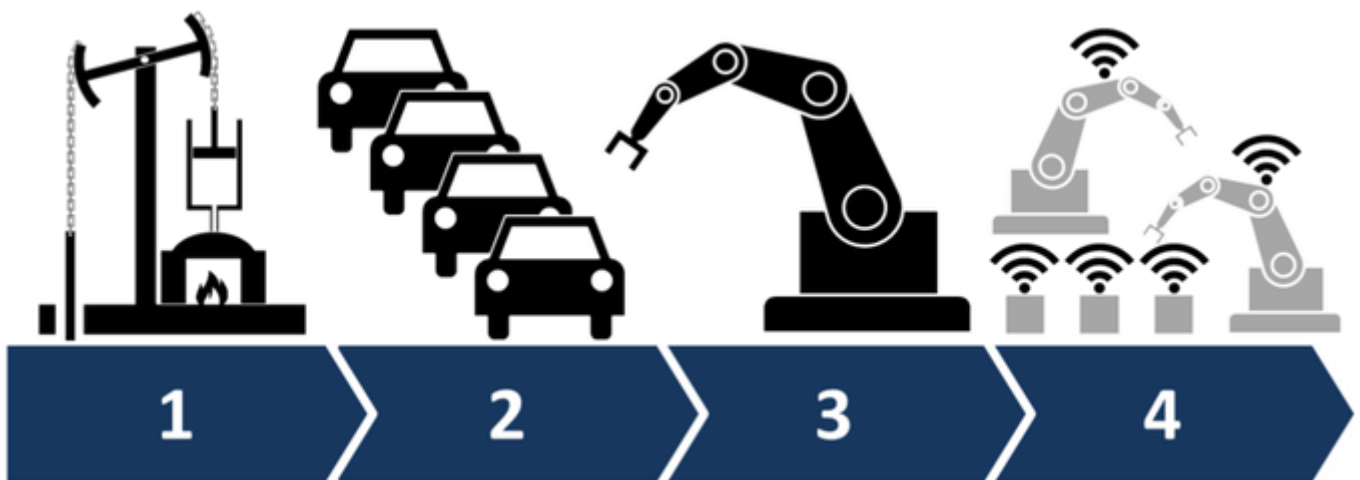


March of the robots? The Fourth Industrial Revolution and the potential challenges and opportunities for Wales

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The world is potentially on the brink of a Fourth Industrial Revolution (4IR) of technological advances that may bring science fiction to reality over the coming decades. On [5 April](#) the Assembly will be debating the challenges and opportunities that Wales might face as a result of the 4IR, and how Wales should respond to these.



What is the Fourth Industrial Revolution?

Klaus Schwab, founder and Executive Chairman of the World Economic Forum, [argues that](#) the world is on the brink of the 4IR, a range of new technologies that bring together the physical, digital and biological spheres. [Examples of these](#) are advances emerging from artificial intelligence, autonomous vehicles, energy storage and the Internet of Things (the interconnection of computing devices from everyday objects via the internet). [Schwab states that](#) the speed, scope and impact on systems across nations, industries and society of these changes mean that this represents a distinct 4IR rather than an extension of the Third Industrial Revolution although some, including the economist and social theorist Jeremy Rifkin, [disagree](#).



The Institute for Public Policy and Research (IPPR) [believes that](#) by 2030 the UK will have seen advances in four key areas – automation and manufacturing, information technologies, resource technologies, and health technologies.

Are the robots going to take our jobs?

There are a wide range of estimates of the impact of automation on jobs. Andy Haldane, Chief Economist at the Bank of England [has said that](#) up to 15 million jobs in the UK could be at risk of automation over the coming decades, prompting a number of newspaper headlines about robots stealing UK jobs. Those most at risk from automation tend to have the lowest wages, for example elementary and sales and customer service occupations, along with better-paying skilled trades occupations.

This is based on [work by Frey and Osborne](#), two academics at Oxford University, who concluded that 35% of UK jobs are at a high risk from automation in the next 10 to 20 years and that jobs paying less than £30,000 per year are estimated to be almost 5 times as likely as those paying over £100,000 to be lost to automation.

[However, the OECD have suggested that](#) the methodology used by Frey and Osborne led to overestimates of the number of jobs affected as they view whole occupations rather than tasks as being threatened by automation. Instead, they suggest that 10% of jobs in the UK have a high risk of automation. [Deloitte have highlighted](#) that while around 800,000 jobs were lost due to technological change between 2001 and 2015, 3.5 million new jobs were created over this period which paid an average of £10,000 more than the jobs lost. They also note that tasks are more likely to be impacted on by automation than whole occupations, and that technology can also change the nature of an occupation instead of replacing it. Deloitte found that humans and technology have worked together based on their relative strengths, and that this can lead to better productivity.

What will be the impact of the Fourth Industrial Revolution on business, and how are they preparing for it?

Schwab [considers that](#) many industries are seeing the introduction of new technologies that create new ways of serving existing needs, with new competitors who are able to replace well-established competitors by providing better quality, speed or price. As a result of the 4IR, businesses are shifting from simple digitisation to innovation based on a combination of technologies. He suggests there are four main



effects on business from the 4IR – increased customer expectations, product enhancement through better digital capabilities, collaborative innovation, and organisational forms.

EEF, the organisation that represents UK manufacturers, [has published research](#) into how prepared the UK is for the 4IR. It has found that while 42% of UK manufacturers have a good understanding of the concept, only 11% say that the UK is ready for the 4IR. They consider that support is needed through the UK Government's [industrial strategy](#).

How can governments respond to the challenges and opportunities resulting from the Fourth Industrial Revolution?

Commentators have suggested a number of responses to the Fourth Industrial Revolution, including support to maximise the potential benefits of the 4IR and addressing some of the challenges to the workforce. [EEF have suggested](#) that increased government spending on innovation is needed to help maximise potential benefits from the 4IR, along with investment in digital infrastructure and working with industry to develop cluster networks of early adopters by easing the uptake of digital technologies across industrial supply chains.

The innovation foundation Nesta is currently undertaking work to inform innovation policy in Wales through the [Arloesiadur](#) project. This will create a data engine to automatically access, combine and analyse data. It has undertaken projects to map research networks in Wales and to generate predictions about the future specialisations of local economies based on their current profiles.

The [World Economic Forum considers that](#) reskilling and retraining will be a priority and that governments should incentivise this through lifelong learning. Other priorities include reshaping education curriculums to meet future needs and collaboration between business and government to meet skills and employment needs, such as through upskilling to fill high priority employment gaps.

The IPPR [believes that](#) the speed and impact of automation are a political choice, and the UK response will need to consider new models of ownership, higher wage floors to incentivise automation, an education system that promotes creativity and skills to complement machines, a shorter working week to fairly share productivity gains and



potentially the introduction of a universal basic income. The Trades Union Congress (TUC) [states that](#) commitment from government to an economy based on full employment and good jobs should be at the heart of economic policy. They also advocate the ‘just transition’ to a digital economy advocated by Brian Koehler of the IndustriALL trade union, including sustainable industrial policy, social protection for those affected by the transition and creative labour adjustments.

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