



THE DITCHLEY FOUNDATION

21st-century manufacturing: the jobs, workers and technology for a new era *In partnership with the Canadian Ditchley Foundation*

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As the century advances, excitement about the transforming power of new technologies is matched by concerns about the sources of future jobs for many people, particularly in developed economies. Increasing automation and robotisation of processes, combined with extraordinary advances in artificial intelligence (the new machine age), are changing the nature of advanced manufacturing and competitiveness. At the same time, fears have sharpened that opportunities even for middle-skilled workers may be reducing overall, despite current skill shortages in some areas and aging demographics. The proportion of people in jobs in OECD countries has returned to its 2008 peak level, but is the quality of many jobs declining?

The scale, scope and pace of change are astonishing. The merger of digital technologies, big data and artificial intelligence (AI) is giving rise to smart machines where algorithms are the powertrains and data are the fuel. In the new auto sector of today, for example, the value added is in electronics and sensors not metal, as autonomous vehicles and hybrid engines move from imagination to mass production. Additive manufacturing (3-D printing) is another notable and rapidly evolving feature of the scene. The future trend is towards smaller scale, highly flexible manufacturing facilities, with multiple products possible from easily reprogrammable machines; and towards more local, customised and personalised production, ordered electronically and delivered rapidly.

There should also be a move towards more sustainable forms of manufacturing, such as closed cycle solutions, where companies take back their old products and recycle the materials. Biotechnology and the use of new materials will continue to increase in importance. The shift to companies making their income less from their manufactured products than from the imbedded and accompanying services will also gather speed.

Trends in advanced economies may be different from those in the emerging economies, with companies in the former seeking to move ever higher up the value chain, in order to retain some niche manufacturing. However, we also need to factor in so-called reshoring to developed economies such as the US, Canada and the UK, where easier availability of new technology, skilled workforces, shorter lines of communication, converging labour costs, better social and legal institutions etc. can increase the attraction of advanced economy manufacturing, and change again the shape of global supply chains.

Governments all over the world need in any case to ensure that they are providing the right conditions to encourage manufacturing investment, and technology clusters, including the appropriate skills, R & D resources, availability of risk capital and talent. Individuals and educational institutions need to rethink what kind of skills are going to be most useful and lasting, such as IT literacy and analytics ability.

Overall, how can the obvious advantages of extra growth and productivity coming from the new trends be balanced against the possible downsides for current workforces and present economies? What should governments, companies and individuals be doing to prepare themselves and to ensure that they increase their competitiveness in this new world? Are the current projections about the impact on workers unduly negative, with new opportunities coming up to replace the old ones, as we have always seen in previous industrial revolutions, or will this time be different?

This conference will aim to bring together politicians, industrialists, financiers, officials and outside experts to take an in-depth look at the likely consequences of the developments already happening or on the horizon for advanced manufacturing, and work out ways in which the opportunities can be maximised and the worst of the disadvantages avoided or contained.