

Small is beautiful for factories in brave new world of manufacturing

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Tesla may seem the very model of a modern manufacturer, right down to the enthusiasm of its Technoking Elon Musk for zany job titles and cryptocurrencies. Yet in one sense it may be behind the curve.

Tesla makes its electric cars and their batteries in plants so vast that they have been dubbed “gigafactories”. In contrast, Arrival, the British-based electric van and bus start-up, plans to use “microfactories” one hundredth of the size. In this respect, Arrival rather than Tesla may represent the future of manufacturing.

For years, pundits have been predicting a shift towards smaller-scale, decentralised manufacturing. New technologies such as 3D printing would make it economic to switch from huge factories in China to smaller and more flexible plants close to the end customer. In a rather overexcited column in these pages nearly a decade ago, I predicted that it could lead to a renaissance in British manufacturing. 3D printing could be one of the most disruptive technologies of the next couple of decades, I wrote.

Well, as you may have noticed, the revolution hasn’t materialised, but it may merely have been delayed. Indeed, some experts say that the combination of the pandemic, maturing new technologies and the pressure to reduce carbon emissions means that it is imminent. According to Jaideep Prabhu, a professor at the Judge Business School of the University of Cambridge, this will be the year that small-scale, distributed manufacturing “takes off in a big way”.

One reason why the prediction is more convincing this time can be found on an industrial estate in Oxfordshire. Arrival will start producing electric vans at its first small plant outside Bicester soon in what the company believes will be a turning point for global manufacturing. Avinash Rugoobur, the former General Motors executive who is Arrival’s chief strategy officer, says that not only the motor industry will be watching closely. “Many other industries will say: ‘If Arrival can do it in automotive, why can’t we do it in our sector?’ ”

Valued at about \$10 billion after its recent flotation on Nasdaq, Arrival has been working for five years on the necessary technology. Denis Sverdlov, its founder, a Russian telecoms tycoon and former government minister, believes that using highly automated small plants can be dramatically cheaper than traditional large factories. A decentralised model also should reduce carbon emissions and deliver big economic benefits to the microfactories’ communities thanks to localised supply chains.

To apply this approach to vehicles has required a fundamental redesign of the products. Arrival makes its bodies from coloured composite materials, doing away with the metal-pressing and painting that take up much of a traditional car plant. Although Arrival makes some use of 3D printing, Rugoobur says that “3D printing can be an enabler of decentralised manufacturing, but is not the only way of getting there”.

During the pandemic, many of these techniques were used by British companies to produce personal protection equipment and medical components when supplies from China were interrupted. In addition to fears about the resilience of supplies, companies have been worried about rising wages in China and the rising costs of transport. The Suez Canal snarl-up has heightened concerns. At the same time, many western governments have said that they want to build up domestic manufacturing in critical industries, a resolve only strengthened by the vaccine wars.

As far as companies are concerned, some observers are more sceptical about the effect short-term disruption caused by Covid will have on supply chain plans. While surveys carried out in the early months of the pandemic showed that a high proportion of companies were considering “reshoring” some of their production, more recent polls have revealed a big fall in such intentions.

Janet Godsell, a professor of supply chain strategy at the University of Warwick, says that the cost advantages of manufacturing in China are still so compelling that concerns about supply chains will be mostly shrugged off. The main reason she agrees that there will be a shift to distributed manufacturing onshore is climate change. In recent years, government efforts to reduce greenhouse gases generated in the UK have accelerated the offshoring of manufacturing and the related emissions. If importers of goods into Britain start to recognise the true cost of carbon (either voluntarily or because of the imposition of carbon border taxes), domestic manufacturing may become relatively much more attractive.

There will be losers, of course. More localised manufacturing will hurt those developing countries whose growth is heavily dependent on low-cost manufacturing exports.

What the regional impact in the UK might be is less clear. Spreading manufacturing more evenly around the country may not be quite the levelling up that the government is hoping for. Traditional large factories can be attracted to old manufacturing areas, enticed by plentiful cheap land, good supplies of experienced industrial labour and the odd subsidy — but these new small plants need much less space and a different kind of workforce. It is no coincidence that Arrival’s first UK factory is in affluent Oxfordshire. All those increasingly redundant retail sheds in the southeast could easily be repurposed. Or even town centre sites left empty by working from home.

So to ensure that decentralised manufacturing does not worsen regional inequalities, some government intervention may be called for. Perhaps this is an issue that the government should start thinking about as part of its industrial strategy. If it still has one.

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