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There is no question that manufacturing matters and continues to matter. Nevertheless, it is important to appreciate that manufacturing is, for the majority of countries, no longer simply a national concern. Rather, manufacturing has become part of complex global value chains or production networks. Many journalists and politicians too often fetishise manufacturing by considering it as the most important part of a national economy. On 24 July 2018, for example, Jeremy Corbyn, Leader of the Labour Party, gave a speech to the EEF technology hub to launch the party's new 'Built it in Britain' campaign. He argued that:

> It must be our job in government to reprogramme our economy so that it stops working for the few and begins working for the many. That is why we will build things here again that for too long have been built abroad because we have failed to invest (Corbyn, 2018).

This new campaign slogan, an echo of Donald Trump's 'Make America Great Again' strategy, appears to be a paean to reviving manufacturing labour. It also resonates with the speech given by David Cameron, then Prime Minister of the UK, to the World Economic Forum in Davos in January 2014. In this speech, Cameron noted that:

> In recent years there has been a practice of offshoring where companies move production facilities to low cost countries. We've all seen it. We all know it's true. And it will continue. But there is now an opportunity for the reverse: there is now an opportunity for some of those jobs to come back. A recent survey of small and medium sized businesses found that more than 1 in 10 has brought back to Britain some production in the past year. More than double the proportion sending production in the opposite direction. From food processing to fashion, from cars to computer-makers. It's not just one sector; it's across all sectors of the economy (Cameron, 2014).

This raises an interesting question: is the apparent reshoring (or repatriation) of manufacturing jobs to countries like the UK and the United States the start of a process of economic 'reprogramming' (Vanchan, *et al*., 2018)? This is the key issue explored in this chapter, which focuses both on identifying the drivers behind this process, and the implications for industrial strategy.

Reprogramming national economies

Both Corbyn and Trump place considerable emphasis on reprogramming national economies towards manufacturing work. The ambition to nurture manufacturing reflects a strategy that is based on reverse engineering national and global economies. This process of reverse engineering would alter trade flows and challenge the ongoing development of a global division of labour that lies behind the operation and development of global value chains. There are three points to consider here.

First, the deindustrialisation of developed market economies reflects a longer-term process of comparative advantage. This process has been facilitated by innovations in logistics, predominantly containerisation. It has led to an increasingly interconnected global economy in which labour, raw materials, components and service inputs – the factors of production, produced in many different places – are combined together as part of co-ordinated value chains.

Second, the ongoing shift towards service employment is seen by some to be problematic and something that should be resisted. This is a fallacy. Manufacturing goes hand-in-hand with the production of services. The reorientation of manufacturing towards advanced or hi-tech industries involves a redefinition of the role of services within production (Daniels and Bryson, 2002), and manufacturing in countries like the UK and United States has in practice become a process involving a complex blend of manufacturing and service tasks (Bryson *et al*., 2013).

Third, in 1967, in his economic theory of services, William Baumol distinguished between progressive and non-progressive services. Progressive services are similar to manufacturing work in that the application of technology can lead to an improvement in the rate of output per capita. No such substitution of technology for labour is possible for non-progressive services. Ongoing productivity improvements in manufacturing have continued to reduce employment, often defined as deindustrialisation, but at the same time have led to an increase in output (Bryson *et al*., 2013). For Baumol, within a national economy there will be a steady transfer of employment from the progressive to the non-progressive parts, which reflects differential productivity (Bauman, 1967; Baumol, 2001; Baumol *et al*., 1989).

The implication of Baumol's thesis for manufacturing reshoring is that the UK only deindustrialised in relation to employment, rather than in terms of manufacturing output. This is a key point. In political terms, the debate over reshoring is all about bringing jobs back, but in many cases these jobs have already been lost as they have been automated and replaced by technological innovation. For manufacturing in developed market economies what matters is output rather than jobs. In any case, developments in artificial intelligence and robotics will continue to increase manufacturing productivity and to transform manufacturing labour.

The drivers of reshoring

Detailed research on the reshoring process is still on-going, but eight drivers behind this process can be identified (see Bryson et al., 2013; Mulhall and Bryson, 2013; 2014; Vanchan *et al*., 2018):

1. Firms are reshoring production because cost savings were not as great as anticipated, and many of the labour cost saving are now being eroded by escalating shipping costs, combined with the substitution of labour by technology. Labour increasingly accounts for a small proportion of a product's manufacturing costs.
2. Speed and closeness to market are becoming significant drivers of firm success. The implication is that offshore manufacturing will be undertaken closer to market or that firms will have production capabilities in lower-cost locations combined with production capability closer to market (Bryson and Ronayne, 2014).
3. Concerns with the quality of products supplied by producers located in low-cost locations are influencing the location of production.
4. Concerns related to the theft of intellectual property (Bryson and Rusten, 2011), including product and process innovations, are also influencing these decisions.
5. The economic downturn that commenced in 2008 reduced the order sizes for some components. Firms began to seek alternative local suppliers willing to supply smaller batches.
6. Companies are beginning to appreciate the benefits of co-locating design and development with production managers and assembly workers. This enables a close dialogue to occur between design, development and manufacturing (Bryson and Rusten, 2011).
7. During the twentieth century, labour differentials between national and regional labour markets played an important role in the evolving global geography of manufacturing. Energy differentials will play a much more important role during the

current century, and may displace labour costs as an important local/national driver behind the evolving global geography of manufacturing (Mulhall and Bryson, 2013; 2014).
8. Alterations in trade policy, and particularly American imposed tariffs, for example on imports of steel, are having an impact too.

Policy implications

Many labour-intensive products will continue to be manufactured in low labour cost locations. Developments in machine tools may reduce the labour content required to produce some labour-intensive products, opening the possibility of the return of more manufacturing to high labour cost locations. Some high-value products that are inexpensive to ship, for example mobile phones, laptops and tablet computers, may continue to be produced abroad. But ongoing innovations in manufacturing processes and technologies will always provide an opportunity to return manufacturing to developed market economies. The recent development in the onshoring of manufacturing highlights that it is possible to compete on quality, delivery speed, customisation and even price with producers located in lower-cost locations.

In policy terms, there are eight important implications for the development of an industrial strategy:

1. A focus on the availability and cost of energy. The key issue is availability combined with cost, as advanced manufacturing is more energy-intensive. These specific factors are partly behind the reshoring of manufacturing to the United States.
2. A focus on the availability of highly skilled manufacturing workers including highly trained engineers and computer programmers.
3. The development of a national and regional tax system that is supportive of manufacturing.
4. A spatial planning system that is responsive to the needs of manufacturing firms in a locality.
5. Manufacturing requires access to raw materials and to markets. This means that connectivity, based on access to an appropriate blend of national and international infrastructure (road, rail, air, ports, etc.), is critical.
6. A focus on developing a national innovation ecosystem intended to support innovations in production, including product and process innovations.
7. An industrial policy must simultaneously be a service strategy; manufacturing goes hand-in-hand with inputs provided by business and financial services. Siloed policies must be avoided.
8. The importance of investing in new technology, including artificial intelligence and robotics. This investment will enhance productivity but will also create employment opportunities elsewhere in the economy.

Any attempt to reprogramme an economy towards manufacturing employment is based on a set of flawed premises. The key issue for any industrial strategy is that it must be based on understanding the complex plexus that supports national economic activity. It is important to differentiate between policy that creates a long-term supportive set of wider framework conditions that encourages entrepreneurship and economic activity, and policy that is intended to address an immediate political objective or problem. There are three critical elements of these wider framework conditions: the availability of skilled labour, appropriate levels of connectivity (including digital), and a relatively stable policy environment. These three types of policy interventions must be developed and applied both regionally and nationally.

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