



Changing geography of manufacturing: new patterns of competitiveness

Key messages

- a. Big shifts in **economic activity in the next 10 years will be disruptive** and potentially destructive of the patterns and geography of traditional manufacturing.
- b. There will be **new links between producers and consumers**, with the relationship faster paced and more closely knit. Producers will need to understand consumers better due to their increased desire for variety and personalisation of products, which could lead to greater regionalisation of supply chains for different products. Fast moving consumer goods in particular, could be subject to such a change. Equally, outward investment may become more important for UK firms in order to understand and tap into local preferences in growing markets.
- c. **The difference between manufacturing and services continues to blur**. Technological developments mean service inputs are an increasingly important part of the production process. Consumers could even become producers if 3D printing becomes a household phenomenon under 'perfect customisation', which in the extreme, could mean manufacturing is really a service industry.
- d. If technological adaptation and changes in production, rather than traditional industry, is the key – we may need a **production as well as an industrial policy**.
- e. Emerging economies, particularly China, will increasingly **compete higher up value chains** and therefore with traditionally more advanced economies, which will increase pressure to specialise further in areas of competitive advantage. Emerging economies will also become more important as markets – and increasingly sources of final demand – than stages in the production process.
- f. This will create opportunities for **developing economies** towards the bottom of the value chain and labour intensive manufacturing will still remain important for many regions, particularly in parts of Asia and sub-Saharan Africa. Such economies will need to remain focussed on improving competitiveness to attract manufacturing away from China.
- g. Skilled labour will become increasingly important in comparison to low cost labour in manufacturing globally. **Education policy** therefore becomes even more important, and the UK will need to produce a labour force that is able to compete in different, more service orientated roles. Science, technology, engineering, and maths will become a focus in the global race for jobs.
- h. Manufacturing shifts will alter **trade and investment patterns**, particularly related to supply chains and those related to China, which is likely to affect global imbalances. New trade deals, such as the TPP and TTIP could also reinforce competitiveness changes, with greater trade and investment between the associated countries.
- i. Supply chain regionalisation and the need for proximity to consumers is likely to **increase the importance of the single market in the EU**, and the UK's place within it.

History and current trends

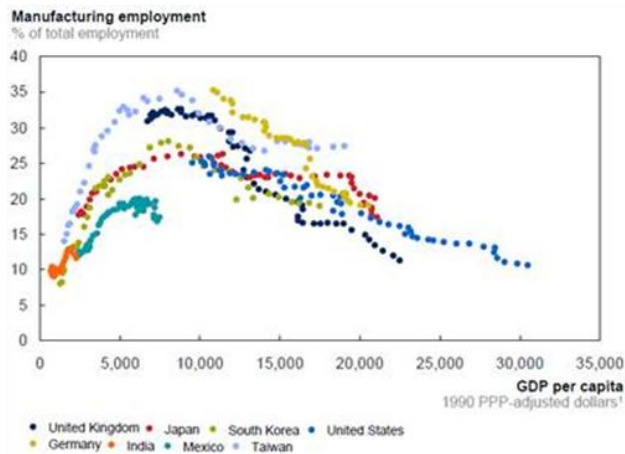
1. **Globalisation has increased the movement of certain industries and supply chains around the world.**

The manufacturing sector is most flexible in shifting locations, while agriculture, services and non-manufacturing industry tend to be more fixed, given geographical, resource or trade (in the case of some services) limitations. Historically, as domestic incomes increase towards PPP\$10,000, manufacturing as a share of employment peaks (figure 1). This is partly due to rising wages and declining competitiveness – when manufacturing industry often moves elsewhere in search of cheaper labour.

2. **Labour costs vary across emerging economies and have increased at different speeds in the last decade (figure 2).**

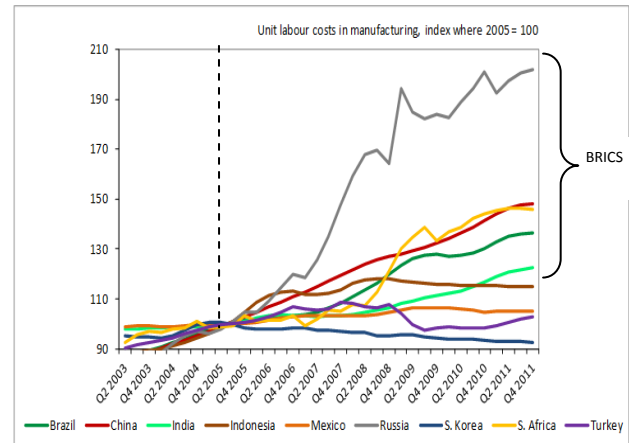
This offers challenges for some economies, and opportunities for others. China is likely to be the most affected given the speed of income rises and sheer quantity of jobs based on low wages, although internal differences are also likely to be important. Other members of the BRICS group have also had large wage increases relative to productivity growth, and are also likely to be affected, although to a lesser degree. Some, including South Korea, Mexico and Turkey have seen more stable wages, but from a higher base.

Figure 1: Manufacturing's share of total employment as income levels change



Source: McKinsey

Figure 2: Emerging powers unit labour costs in manufacturing



Source: EIU

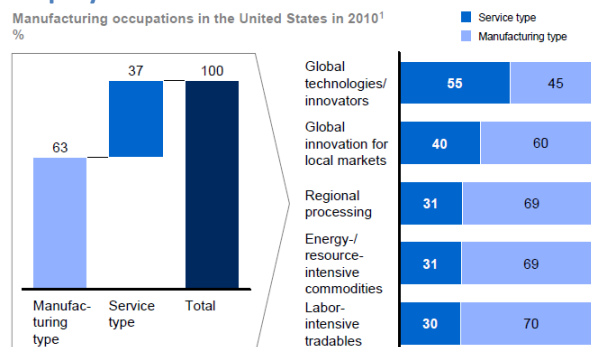
3. **Technological change is also having a major impact on the geography of manufacturing and its production – dubbed the 3rd industrial revolution.**

In particular, the emergence of 3D printing and other advanced techniques such as carbon fibre components, nanotechnology and robotics is altering production patterns. 3D printing could in theory remove the need for many subcomponents in supply chains and increase the need for elements such as design, software, materials; the result could alter the geography of production significantly. Some companies are trying to engineer the labour out of production, and Nike is using 3D printing technology to produce elements in their new trainers. Such technology is increasing the need for skilled labour and reducing the traditionally labour intensive nature of some manufacturing industries and therefore the impact of labour costs increases.

4. **The relationship between producers and consumers will also change as customisation becomes a commercial reality.** There will be an increasing requirement to understand changing preferences and therefore locate near consumers. Consumer led innovation will also increase in importance. The interaction between design and production will also increase in importance, and production policies which develop new systems for production which adapt to technological developments, rather than traditional industrial policies, may become more relevant for governments.

5. **In part as a result of technological changes, services and manufacturing are blurring.** There are evermore service jobs and service inputs in manufacturing, such as R+D, marketing, sales as well as logistics, banking and IT service inputs. Figure 3 highlights that service type activities already make up between 30% and 55% of manufacturing employment in the US and some estimates suggest nearly one quarter of US manufacturing output comes from service inputs (15% in China). Intermediate inputs of services through global supply chains now also need to be taken into account, and engineering and design, transportation and business services are all becoming more important components of manufacturing, altering the trade picture considerably. Service industries as well as manufacturing are now sources of export growth and innovation, which is reflected in the OECD's recent work on trade in value added. As a result the manufacturing/services divide is increasingly obsolete in some types of manufacturing.

Figure 3: Service activity in manufacturing employment



¹ Manufacturing-type occupations refer to early-stage manufacturing and final assembly. Service occupations include R&D, procurement, distribution, sales and marketing, post-sales service, back-office support, and management. SOURCE: US Bureau of Labor Statistics (BLS); McKinsey Global Institute analysis

Source: McKinsey

Who might be the winners and losers?

China is key...

6. **China is heading towards having a labour shortage, and the economy faces a challenge to rebalance.** The number of working-age adults fell by 3.45m in China last year, and estimates suggest this trend will continue due to aging and low fertility. As a result, the current Chinese growth model of increasing the number of workers in production (factor input accumulation) is unsustainable, and resources will need to be used more efficiently and rebalance away from investment and towards domestic consumption. The reduction in labour surplus is, in part, leading to higher wages (figure 2).

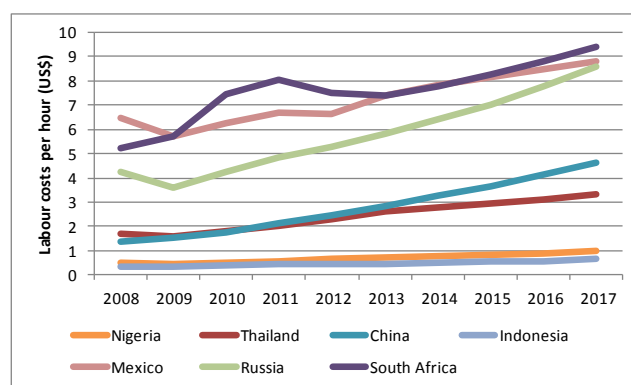
7. **Income levels and the scale of manufacturing in the Chinese economy suggest the sector should have peaked.** China's income per capita is forecast to move above the PPP\$10,000 level (the turning point shown in figure 1) in 2013 (IMF) and labour costs have been increasing rapidly. Equally, empirical evidence suggests the contribution of manufacturing to an economy peaks at around 20-35% of GDP - China's share is currently around 40%. This suggests that production will need to be rebalanced, with Chinese firms competing higher up the value chain. Some manufacturing will therefore begin to shift away from China, as it realigns its economy accordingly. There are already signs of this, for instance, there is evidence that some textiles companies have moved to Ethiopia and Cambodia and some Japanese investment shifted to Vietnam.

8. **Competitiveness in China is falling beyond just wages, which may further increase shifts in manufacturing, although China is likely to remain a major player nonetheless.** For instance, energy – electricity in China has increased by 15% since 2010 (BCG); land – coastal industrial land is more expensive in China than in the US according to BCG, and although inland is cheaper, transport costs increase; transpacific transport costs have increased as a result of high oil prices; there is pressure to reduce government subsidies to industry; and the Renminbi has appreciated against the dollar, making exports relatively more expensive. However, strong supply chains and infrastructure, as well as existing investment or sunk costs for business might offset some of these competitiveness changes. Shifts in production within China are also underway, and with domestic demand increasingly significant (particularly from coastal regions), China is likely to remain a key player in manufacturing regardless of these changes. It will however, need to move towards different types of manufacturing, higher up the value chain and less labour intensive.

Developing economies could start to compete...

9. **Lower income countries outside of the emerging markets could exploit changes in Chinese competitiveness.** For industries that continue to rely on cheap labour, opportunities are likely to increase in other low income countries, with figure 4 highlighting opportunities for countries such as Indonesia. Mexico, with slightly higher wages, also has proximity to the US (and related shale gas advantage) and NAFTA, which is increasing its competitiveness. Other countries in sub-Saharan Africa, South Asia and ASEAN also have an opportunity to exploit shifts in economic conditions, although skills, productivity, infrastructure, incentives and supply chain limitations all remain inferior to China's. Lower income countries will therefore need to distinguish between different types of manufacturing to gauge where their competitive advantage is relative to others, most notably China.

Figure 4: Manufacturing labour costs per hour



Source: EIU

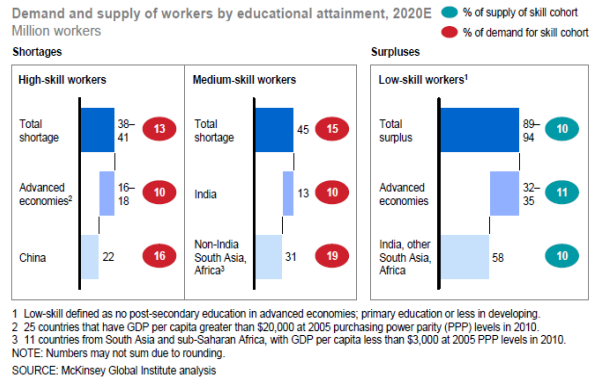
Technology is helping advanced economies...

10. **“Re-shoring” towards the US and other advanced economies might take place as relative competitiveness begins to shift.** While real wages in Asia increased by 7-8% a year between 2000 and 2008 (ILO), in advanced countries, they rose by less than 1% a year – or even reduced in real terms during the financial crisis. Competitiveness is also changing in relation to the shale gas revolution, making production in certain industries cheaper in the US (and perhaps Mexico) than in Asia; very loose monetary policy and quantitative easing, which have kept the dollar in particular low, as well as currencies in some other advanced economies; and 3D printing and advanced production which is set to increase competitiveness of advanced economies. In effect, firms in the developed world are increasingly likely to compete on total cost (not just labour), with greater quality and customisation. A survey of UK manufacturers in 2009 suggested 14% had brought production back to the UK from abroad

in the previous 2 years (EEF/BDO), highlighting the start of a possible transformation of the geography of global manufacturing.

11. Both advanced and developing countries could exploit changes in China, but in different types of manufacturing, and will require different types of labour. Global technologies and innovation is where advanced economies hold advantages, while labour intensive manufacturing and processing are important for developing countries. This is logical, and relates in part to labour capabilities. Figure 5 indicates that there is a shortage of skilled workers in advanced economies, and a surplus (and hence lower wages) of low skilled workers in lower income countries.

Figure 5: Shortage of high skilled workers; surplus of low skilled



Sources: McKinsey