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Manufacturing: statistics and policy

By Chris Rhodes

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Summary

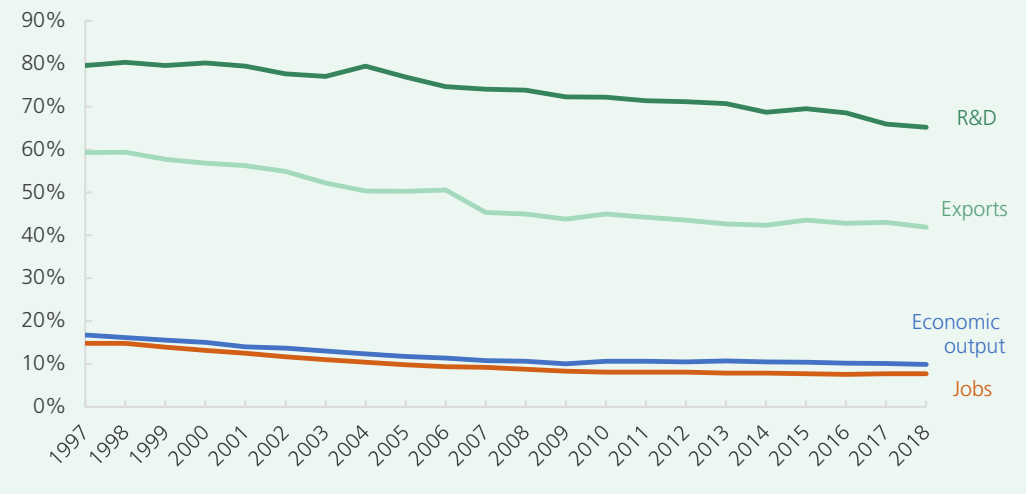
This note provides data on the manufacturing sector, analysis of recent trends and pressures facing the sector, a summary of government policy and a discussion of the potential impact of the UK's decision to leave the European Union.

Statistics

In 2018 manufacturing in the UK accounted for:

- 8% of jobs, 2.7 million in total
- £191 billion of economic output, or 10% of the UK total
- 42% of UK exports, worth £275 billion
- 65% (£16 billion) of UK research and development spending.

Manufacturing as a % of UK total: Output, jobs, R&D and exports



Trends

Over the past 30 years, the value of manufacturing output has remained largely the same, but the number of people employed in the industry has fallen significantly.

These trends partly explain why productivity in manufacturing has (until recently) grown more quickly than productivity in the whole economy.

Since the late-1990s, imports of manufactured goods have grown more quickly than exports. This means that the manufacturing trade deficit has widened over this period.

The impact of Brexit

The UK's decision to leave the EU has already had an impact on the manufacturing industry, and the nature of the new trade deal between the UK and the EU will also impact manufacturing firms. Manufacturing trade associations have welcomed the Withdrawal Agreement that was agreed in October 2019, with some notes of caution.

Some manufacturers are concerned about issues such as future investment, the operation of cross border supply chains and access to skilled labour after Brexit.

Policy

The government's industrial strategy was published in November 2017 and includes a number of policies designed to help manufacturing, including a number of sector deals and Grand Challenges for industry.

1. Contribution to UK economy

Manufacturing's share of UK economic output (in terms of Gross Value Added, GVA[1]) has been in steady decline for many decades, from 27% in 1970[2] to 10% in 2018.

Manufacturing's declining share of the economy in the last 30 years is the result of growth in other industries, particularly the services sector, rather than falls in manufacturing output. Manufacturing output in 2018 is actually 7% higher in real terms compared with 1990. But service sector output has risen by 106% over the same period.

The service sector accounted for 80% of the economy in 2018, up from 69% in 1990.[3]

Manufacturing output
Gross Value Added (GVA), £ billion

	Current prices (£ billions)	2016 prices (£ billions)	Real % change on previous year	% of total economy
1990	106.1	175.3	-	17.3%
1991	108.9	166.6	-4.9%	16.9%
1992	110.5	166.5	-0.1%	16.6%
1993	113.6	169.0	1.5%	16.2%
1994	123.7	177.0	4.7%	16.8%
1995	132.1	179.8	1.6%	17.1%
1996	139.1	181.3	0.8%	16.9%
1997	144.3	184.3	1.7%	16.8%
1998	145.3	184.8	0.2%	16.2%
1999	145.2	185.4	0.3%	15.6%
2000	147.8	188.7	1.8%	15.0%
2001	143.7	186.0	-1.4%	14.0%
2002	146.9	181.5	-2.4%	13.7%
2003	147.5	180.7	-0.4%	13.0%
2004	146.5	184.1	1.8%	12.3%
2005	148.2	184.3	0.1%	11.8%
2006	151.3	188.7	2.4%	11.4%
2007	150.8	189.7	0.5%	10.8%
2008	153.0	184.3	-2.8%	10.6%
2009	141.6	168.5	-8.6%	10.1%
2010	153.0	176.2	4.6%	10.6%
2011	157.1	180.3	2.3%	10.6%
2012	160.4	178.2	-1.1%	10.5%
2013	170.8	176.2	-1.1%	10.7%
2014	174.6	181.3	2.9%	10.5%
2015	178.3	181.2	-0.1%	10.4%
2016	181.5	181.5	0.2%	10.2%
2017	186.1	185.6	2.2%	10.1%
2018	190.5	187.2	0.9%	9.9%

Source: ONS, *Low level aggregates tables*, Series KKE3 (current prices), KL8V (real prices), KKP5 (total economy)

Manufacturing accounted for 17% of the UK economy in 1990, compared with 10% in 2018.

1 Gross Value Added (GVA) is a measure of the contribution to the economy of the production of goods and services. GVA plus taxes on products (mostly VAT), less subsidies, is equivalent to Gross Domestic Product (GDP).
Manufacturing is defined as Standard Industrial Classification code Section C: the transformation of materials or components into new products.

2 United Nations Conference on Trade and Development (UNCTAD) data, accessed November 2017

3 Underlying data available in: ONS, UK GDP low level aggregates

The decline of manufacturing relative the rest of the UK economy is mainly because UK manufactured goods have become less attractive to industries and consumers for several reasons including:

- Relatively high production costs in the UK;
- Other manufacturing centres are closer to raw materials;
- Consumer markets far from the UK have been the fastest growing in recent decades (notably China and India).
- Other countries where these factors are not present have absorbed most of the global growth in demand for manufacturing.

1.1 Impact of the 2008-09 recession

The 2008/09 recession hit manufacturing especially hard. Manufacturing output fell by 13% in real terms between Q1 2008 and Q3 2009, compared to a 6% fall for the whole economy.

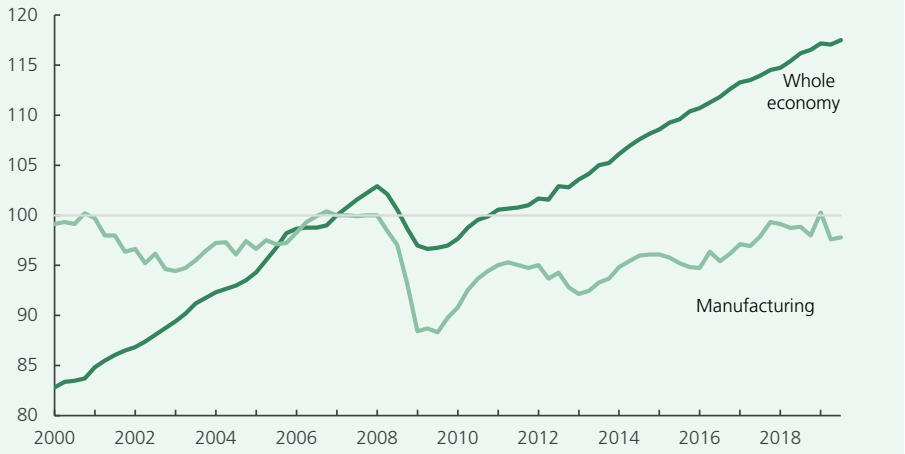
Unlike the rest of the economy, output from the manufacturing sector has not recovered to the pre-crisis level. The initial recovery in manufacturing output stalled in early 2011 and declined for the following two years.

In early 2013 a more sustained recovery began and between Q1 2013 and Q4 2017 manufacturing output grew by 8%.

In Q1 2019, for just one quarter, manufacturing output reached its pre-recession level. This was due to production boost caused by stockpiling drives ahead of the initial Brexit deadline of 29th March 2019

Manufacturing output then fell sharply in Q2 2019. In Q3 2019, output was 2% below the Q1 2007 level.

Economic output (Gross Value Added), *Chained volume, Indexed, Q1 2007=100*



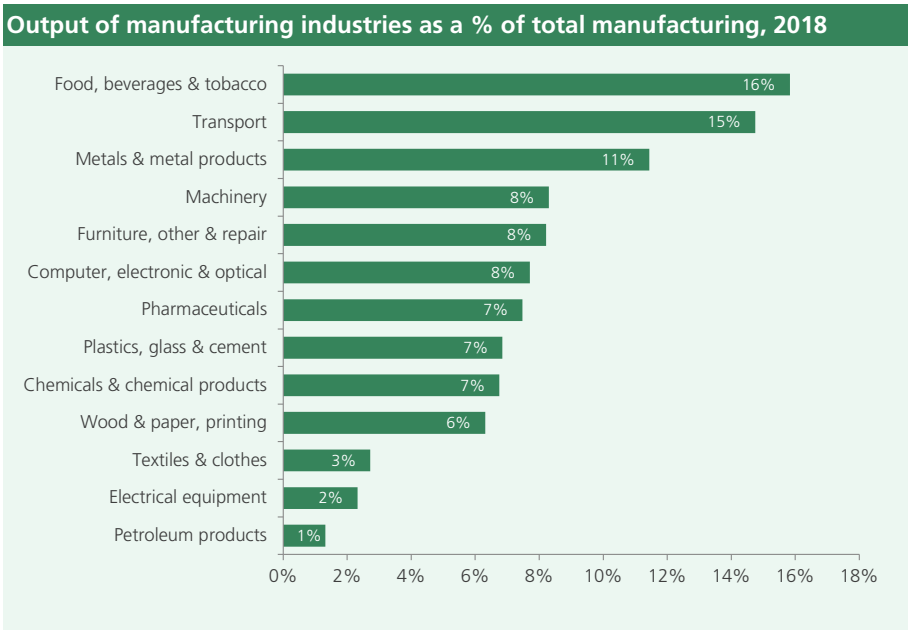
Source: ONS, *Low level aggregates tables*, Series L2KK (whole economy), L2KX (manuf.)

Manufacturing output in Q3 2019 is 2% **below** the pre-recession peak.

Output from the whole economy is 18% **above** the pre-recession level.

1.2 Manufacturing industries

Various industries make up the manufacturing sector. The chart below shows the major manufacturing sub-sector as a share of total manufacturing output.



Source: ONS, *Low level aggregates tables*

Food manufacturing and transport manufacturing (mainly car manufacturing) are the largest sub-sectors, accounting for 16% and 15% of total manufacturing output. The manufacture of metals and metal products accounted for 11% of manufacturing output.[4]

The other manufacturing sub-sectors each contributed less than 10% of total manufacturing output.

[4] ONS, *Quarterly National Accounts,* Low Level Aggregates

1.3 Manufacturing: international comparisons

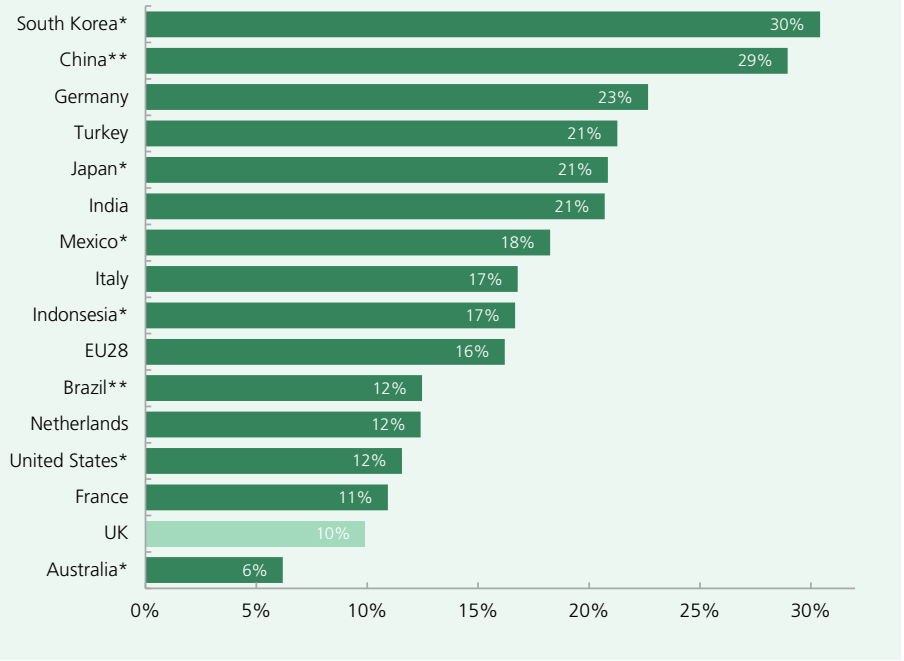
UK manufacturing was the equivalent of 10% of GDP in 2018, a smaller proportion than in most other major economies.[5]

In Germany, manufacturing accounts for the equivalent of 23% of GDP, which is unusually high among major Western economies. In France it is 11%, USA 12% and Italy 17%.

China and South Korea have significantly larger manufacturing industries – the equivalent of 30% and 29% of those countries GDP.

Further analysis of manufacturing in different countries can be found in the Library briefing paper, *Manufacturing: international comparisons*.

Manufacturing as a % of GDP
2018, Major OECD countries



Source: OECD, *Value Added by Activity*, Accessed January 2020

* = 2017 data; ** = 2016 data

[5] OECD, *Value Added by Activity*, Accessed January 2020

2. Employment

The manufacturing workforce has fallen sharply over the last few decades. The table below shows that in UK, the manufacturing workforce more than halved between 1981 and 2018, with three million fewer jobs.

Manufacturing jobs, UK

	Jobs 000s	Annual % change	Manufacturing as % all jobs
1981	5,713	0%	21.8%
1991	4,434	-9%	15.7%
2002	3,583	-5%	11.7%
2003	3,403	-5%	11.0%
2004	3,237	-5%	10.4%
2005	3,097	-4%	9.8%
2006	3,016	-3%	9.4%
2007	2,972	-1%	9.2%
2008	2,847	-4%	8.8%
2009	2,638	-7%	8.3%
2010	2,563	-3%	8.1%
2011	2,565	0%	8.1%
2012	2,586	1%	8.1%
2013	2,574	0%	7.9%
2014	2,639	3%	7.9%
2015	2,620	-1%	7.7%
2016	2,625	0%	7.6%
2017	2,691	3%	7.7%
2018	2,695	0%	7.7%
2019	2,717	1%	7.6%

Source: ONS, Workforce jobs via NOMIS database

The number of manufacturing jobs has fallen by three million or 53% since 1981.

Manufacturing accounted for 8% of the workforce in 2018, compared with 21% in 1982.

The decline in the workforce is the result of the strong growth of manufacturing productivity, combined with relatively small growth in manufacturing output in real terms over this period.

Productivity is the amount produced by each worker. So, productivity growth means that *fewer* workers are required to produce the same amount.[6] In other words, for the number of manufacturing jobs to remain constant, then manufacturing output would need to grow at the same rate as productivity.

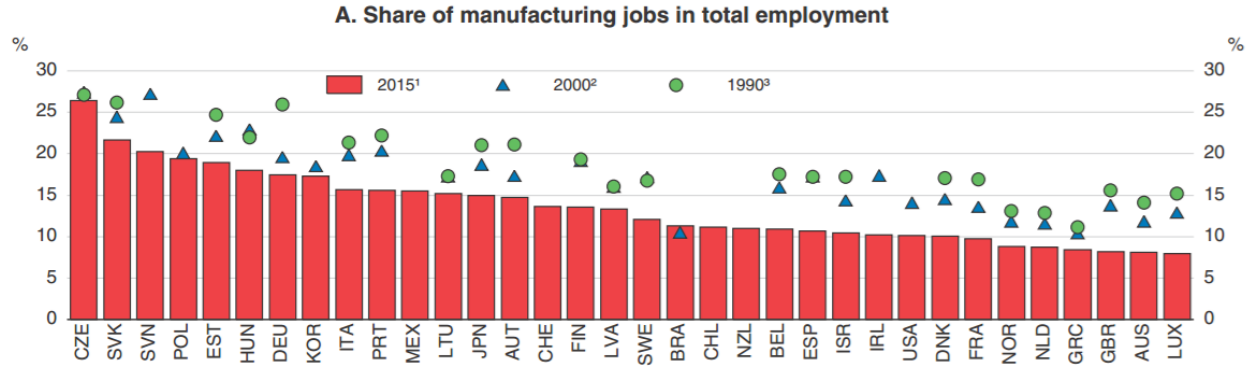
One explanation for this trend in the UK is that as consumers get richer, they tend to spend more of their income on services than on manufactured goods. This reduces the need for manufacturing jobs and increases the need for jobs in services.[7]

The trend of falling manufacturing employment has been apparent in nearly all developed countries over the past 30 years. Among the countries shown in the chart below, only Brazil saw a very slight

6 See for example: Michael Kitson and Jonathan Michie, Centre for Business Research, University of Cambridge, *Working Paper No. 14: Britain's Industrial Performance since 1960: Underinvestment & Relative Decline*, 1995.

7 OECD, Economic Outlook, Volume 2017 Issue 1, Chapter 2, 'How to make trade work for all', p. 69

increase in the manufacturing share of its workforce between 1990 and 2015. The chart below comes from an OECD report that looked at the impact of global trade on jobs.[8]



Source: OECD, Economic Outlook 2017, 'How to make trade work for all', figure 2.2

Further information on productivity in manufacturing can be found in Section 3 of this briefing.

2.1 Future prospects for employment

The Centre for Business Research, University of Cambridge, modelled the future of the manufacturing workforce under various scenarios. Their 2013 paper concluded that the manufacturing workforce is unlikely to grow, even if output from the sector does increase:

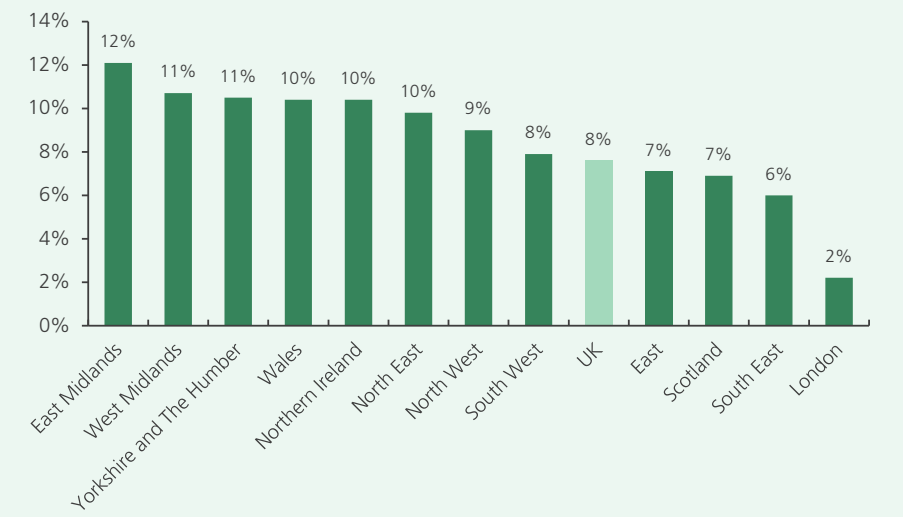
> A stronger manufacturing sector would grow faster and generate more net exports. However, the share of manufacturing in employment or value-added would be unlikely to increase. Rapid labour-saving productivity growth in the manufacturing sector would limit the growth of employment in this sector despite rising output. It would also drive down the relative price of manufactured goods, thereby holding down the share of the fast growing manufacturing sector in value-added.[9]

8 OECD, Economic Outlook 2017, 'How to make trade work for all', figure 2.2
9 Robert Rowthorn & Kenneth Coutts, Centre for Business Research, University Of Cambridge, *Working Paper No. 454: Re-industrialisation – a commentary*, 2013, p. 2

2.2 Regional variations

There is considerable regional variation in manufacturing employment. As a proportion of all jobs, manufacturing is highest in the East Midland, where it accounts for 12% of manufacturing jobs. By contrast, only 2% of jobs in London are in manufacturing.[10]

Manufacturing as a % of all jobs
Sept 2019, seasonally adjusted



Source: ONS, Workforce jobs via NOMIS database

The table below shows the number of manufacturing jobs by region. The region with the most manufacturing jobs is the North West, with 345,000 manufacturing jobs in the third quarter of 2019.

Manufacturing jobs by region, September 2019

	Jobs 000s	% change on year	Manufacturing as % all jobs
North East	120	-2%	10%
North West	345	0%	9%
Yorkshire and The Humber	290	-3%	11%
East Midlands	297	3%	12%
West Midlands	317	-3%	11%
East	231	0%	7%
London	132	1%	2%
South East	299	4%	6%
South West	243	4%	8%
Wales	155	3%	10%
Scotland	191	2%	7%
Northern Ireland	96	0%	10%
UK	2,717	1%	8%

Source: ONS, Workforce jobs via NOMIS database

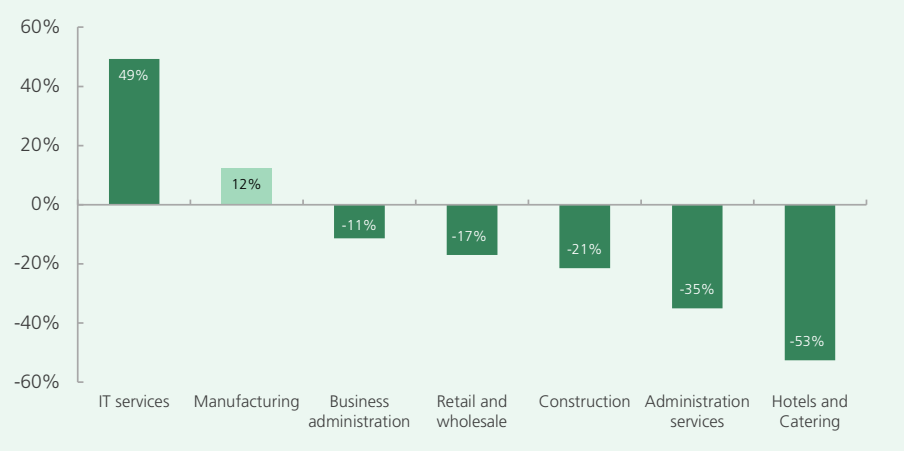
[10] ONS, *Workforce Jobs by Industry*, Q3 2019, via NOMIS database

3. Productivity

Productivity in the manufacturing sector has historically been higher than in most other sectors of the economy due to the sector's reliance on machinery and equipment. This means that for every hour worked in the manufacturing sector, more is produced compared with many other sectors.

Productivity: % difference from UK average

Selected sectors, Q3 2019, Output per hours worked, CVM



Source: ONS, *Labour productivity in the UK (quarterly)*. Dataset: *Breakdown of contributions: whole economy and sectors*

Manufacturing productivity is 12% higher than average UK productivity.

In Q3 2019, manufacturing productivity was 12% higher than the UK average. Productivity in the IT services sector was 49% higher than the UK average.[11]

The higher levels of productivity in the manufacturing sector are explained by two main features of manufacturing:

1 It is easier to substitute human labour for a machine in manufacturing than in many other industries

2 Processes can be more easily outsourced to low cost alternatives

In recent decades these factors have influenced the services sectors as well. For example, the rise of IT has seen some human labour in businesses substituted for computers, and telecommunications have enabled some business support services to be outsourced to cheaper call centres.

But there are parts of the services sector that are less affected by these factors. For example, some parts of the creative, catering and beauty industries operate on the basis of person to person contact which cannot be replaced by machines or outsourced (or at least not to the extent that is possible in manufacturing industries).[12]

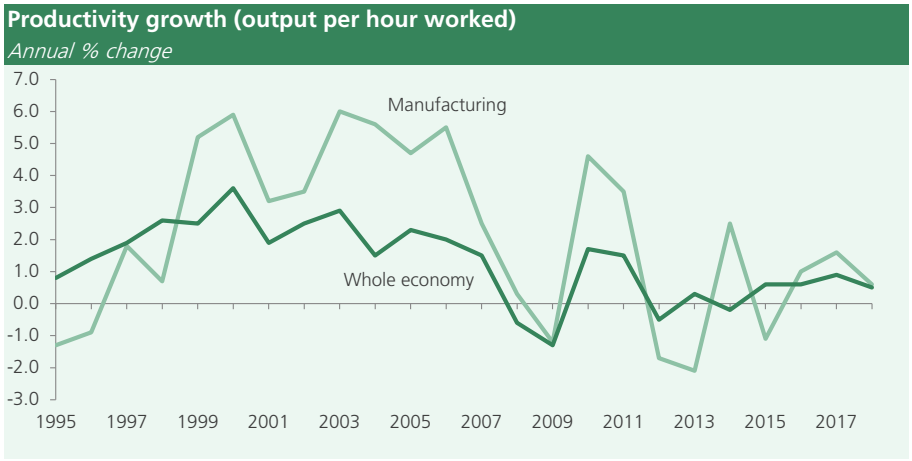
11 ONS, Labour productivity data, *Breakdown of contributions, whole economy and sectors,* October 2018

12 Strategic labour market intelligence report, *The future of productivity in manufacturing*, February 2016, p5

3.1 Future prospects for manufacturing productivity

Historically, productivity has grown more quickly in the manufacturing sector than in other sectors because manufacturing has been able to capitalise on advances in technology in a way that other sectors have not.

The following chart shows the percentage change in productivity compared to the previous year in manufacturing and the whole economy



Source: ONS series DJK8 and LZVD

Between the late 1990s and the financial crisis of 2008, productivity in the manufacturing sector grew more quickly than productivity in the whole economy. In 2009 and 2010 following the financial crisis, productivity in manufacturing and the whole economy fell.

Since then, manufacturing productivity growth has not been consistently higher than productivity growth in the whole economy. Various explanations have been suggested for this.

No more automation can be achieved

One theory is that manufacturing has reached the threshold of how much can be automated (automation in manufacturing is discussed in more detail in the box later in this paper). This theory suggests all the productivity advantages that can be gained from automating processes in manufacturing have already been achieved. Many manufacturing processes now rely on low skilled workers whose role is to maintain complex machinery.

As the University of Sheffield Political Economy Research Institute states:[13]

> …growth in the strongest performing [manufacturing] industry, transport equipment, is arguably due to the partial transformation of UK car manufacturing into a lower-skilled industry increasingly populated by assembly plants...

[13] University of Sheffield Political Economy Research Institute, *Brief number 25 – UK manufacturing decline since the crisis in historical perspective*, October 2016, p4

Investment is historically low

Investment in machinery and equipment means that businesses remain efficient because they can use the most up to date equipment. For example, investing in new software generally means that companies require less IT maintenance, can take advantage of advances in software operations, and can more readily adapt to other new updates and developments.

The University of Warwick points out that of the manufacturing sub-sectors, 'medium value manufacturing' is the only manufacturing sub-sector to have seen investment levels close to the historic average, and this is the only sub-sector to have seen consistently strong productivity growth since the financial crisis.[14]

Investment data are discussed more in Section 4.

R&D spending is down

Research and Development is a key driver of productivity growth. R&D investment enables companies to convert research into practical innovations. This ensures that companies can continue make use of the latest advancements in technology and benefit from the ensuing productivity gains.[15]

Although the manufacturing industry accounts for the majority of R&D expenditure in the UK (65% in 2018), this is down from 84% in 1985.

Counteracting the effects of this trend has been one of the main focuses of UK industrial policy in recent years. For example, successive governments have supported the development of the Catapult Centre Programme. These organisations and campuses seek to connect businesses, academics and industrial research so that technological advances can be more easily converted into commercial products or processes.

Company and management best practice

Company and management "best practice" refers to processes that manufacturing firms adopt which ensure that their products are of high quality and that the businesses operate effectively. These include adopting statistical quality control, supply chain 'agility', clustering with other similar companies, 'lean' business processes, and 'continuous improvement'. Perhaps most importantly, this also refers to a management structure and leadership culture which can adapt to changing priorities or challenges.[16]

Businesses that frequently improve their business practices and have effective management structures in place tend to be more productive.

It has been argued that UK manufacturing firms (with the exception of very large manufacturing firms and manufacturing firms with overseas offices) are not good at adopting best practices and do not have strong

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14 University of Warwick, *The future of productivity in manufacturing*, February 2016, p38
15 *Ibid*, p39
16 *Ibid*, p41

and effective leadership, and that this has could hamper their productivity growth.[17]

Skills

More skilled employees are generally more productive, and firms that improve the skills of their employees tend to be more productive.

The manufacturing sector has a higher proportion of vacancies caused by skills shortages than other sectors (29% in 2017) compared to the national average of 6%, suggesting an issue with the supply of skilled employees and a potential barrier to productivity growth. [18]

Manufacturing firms are less likely to have a dedicated training budget, compared to all firms (30% compared with 37%), a reversal of the historic trend.[19]

Box 1: Robots and automation in manufacturing

Manufacturing has benefitted from automation for centuries, with machines such as the spinning jenny and hydraulic metal presses driving the industrial revolution in the 18th and 19th Centuries. In the 20th Century, the proliferation of electrical power, and the development of mass production led to huge gains in productivity. Post-Second World War advances in computing provoked a third wave of advances in manufacturing, and the industry is currently at the forefront of developments to do with connected, learning machines and additive technology which are sometimes characterised as the Fourth Industrial Revolution.

With each wave of innovation, the manufacturing industry has increased its reliance on machines which can operate independently of humans, often referred to as robotic technology.

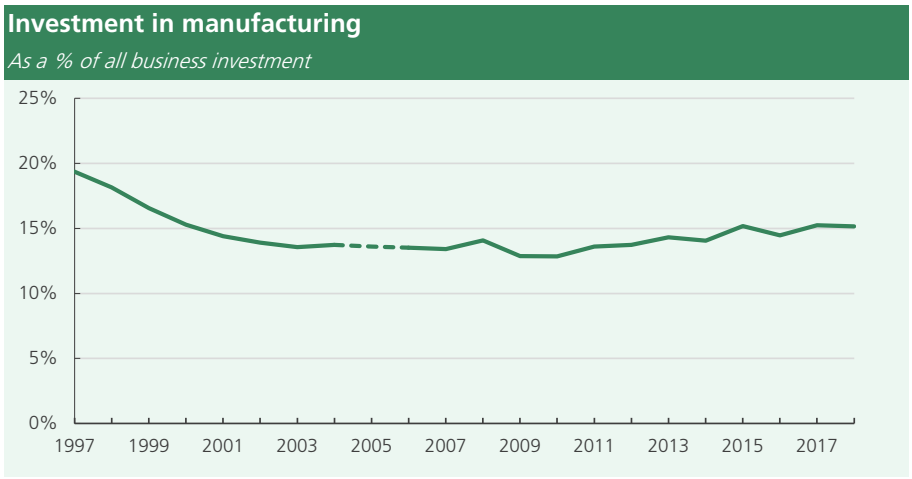
Compared with other developed economies, the UK has been a slow adopter of robotics in manufacturing. In 2015, UK manufacturing used 71 robots per 10,000 employees, compared with 176 in the US, 301 in Germany and 531 in South Korea, according to the International Federation of Robotics.

This low level of 'robot penetration' in the UK has been blamed on the structure of the manufacturing sector in this country. The UK manufacturing sector is reliant on food manufacturing which is typically labour intensive and has not been through the advances in automation that other sectors have seen.

17 University of Warwick, *The future of productivity in manufacturing*, February 2016, p40 and 42
18 Department for Education, *Employer skills survey 2017*, 2018, p41
19 Ibid, p211

4. Business investment

Business investment in UK manufacturing has fallen as a proportion of all investment over the last decade.



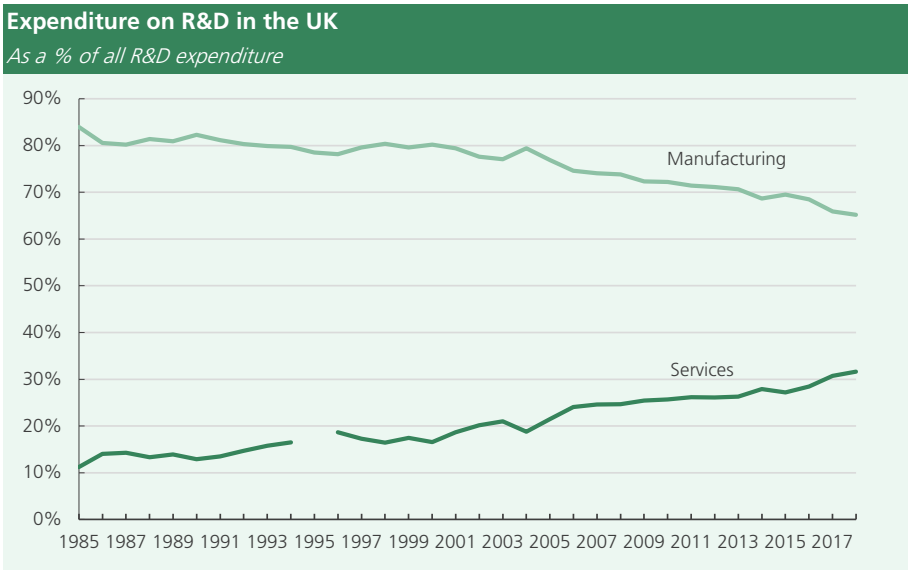
Source: ONS series DS15 and NPEK.
Note: One-off nuclear decommissioning investment in 2005 has been excluded

In 1997, investment in manufacturing was worth £26.1 billion, 19% of total investment by businesses. In 2009, it had fallen to £16.9 billion, 13% of the total. It has since risen and was worth £31.0 billion in 2018, 15% of the total. (These data are in current prices).

For further information on the potential impact of Brexit on investment in manufacturing, see Section 7.3 below.

5. Research & Development

Manufacturing dominates UK R&D spending. In 2018, R&D spending in manufacturing totalled £16.3 billion, 65% of the total. The combined R&D spending of all the services sectors totalled £7.9 billion or 32% of the total, despite the service sectors accounting for 80% of UK economic output.



Source: ONS series DLBX; DLDF; DLDM

The proportion of R&D accounted for by manufacturing has declined in recent years. In 1985, manufacturing R&D investment was 84% of total R&D, compared to the current total of 69%. The proportion of R&D spending accounted for by the service industries has seen a corresponding rise over the same period, from 11% to 32%.

The interaction between science and technology has historically been closer than in manufacturing than in the service industries. This has resulted in more R&D investment by manufacturing firms, and readiness to adopt new technology, resulting in greater productivity gains.

In recent years, service industries (particularly IT services, but also financial services and management services), have invested more heavily in R&D.

6. Exports and trade

Manufactured goods account for a large share of total exports. In 2018, 42% of the value of all exports were manufactured goods, worth £275 billion. Manufactured goods are the majority of imports – 53% in 2018, worth £367 billion.

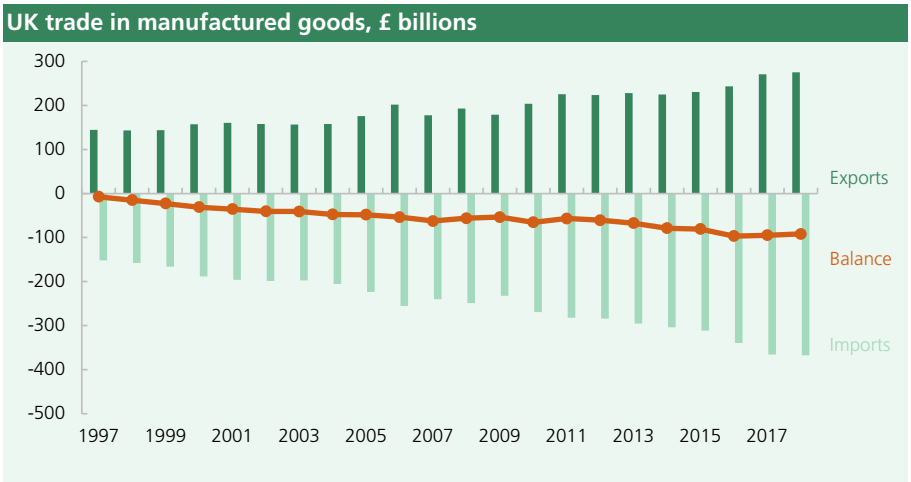
Trade in manufactured goods, UK

Balance of payments basis, current prices

	Value £ billion		% of total	
	Exports	Imports	Exports	Imports
1997	144.2	151.7	59%	64%
1998	142.9	157.9	59%	64%
1999	143.5	166.2	58%	63%
2000	156.8	188.0	57%	64%
2001	160.3	196.0	56%	63%
2002	157.6	198.3	55%	62%
2003	156.6	197.4	52%	60%
2004	157.6	205.2	50%	59%
2005	175.3	223.5	50%	58%
2006	202.0	255.5	51%	59%
2007	177.3	239.8	45%	57%
2008	192.8	249.0	45%	54%
2009	178.5	232.1	44%	54%
2010	203.6	268.9	45%	55%
2011	225.4	282.2	44%	54%
2012	223.6	284.1	44%	53%
2013	227.7	295.0	43%	53%
2014	224.6	303.5	42%	55%
2015	230.6	311.3	44%	56%
2016	243.0	339.6	43%	57%
2017	270.4	365.3	43%	56%
2018	275.0	367.0	42%	53%

Source: ONS, Trade in Goods, series BPAN, BQBD, IKBH, IKBI

The UK has a negative balance of trade in manufactured goods meaning the UK imports more than it exports. The trade deficit in manufactured goods has widened over the past 20 years: in 1997, it was worth £7.5 billion; in 2018 it was worth £92.0 billion.

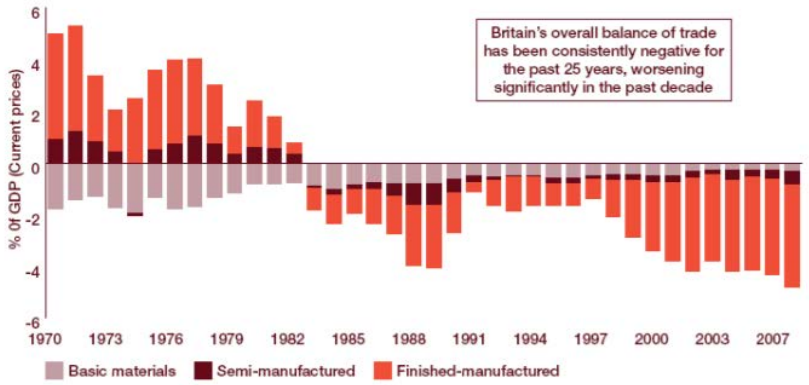


Source: ONS, Trade in Goods, series BPAN, BQBD, IKBH, IKBI

This widening in the trade deficit represents a decline in the demand for UK manufactured goods both in the UK (so more goods manufactured elsewhere are imported) and abroad (so UK exports have increased more slowly than in the past).

The trade balance in manufacturing can also be analysed in terms of the type of manufactured good being traded. The following chart from the University of Cambridge Centre for Business Research shows that there has been a trade deficit in finished goods, semi-manufactured goods and basic materials since the early 1980s. But for most of the decade prior to this, the UK ran a surplus in finished and semi-manufactured goods.[20]

Fig 6. UK manufacturing balance of trade by product type as a % of GDP, 1970-2007



[20] Centre for Business Research, University of Cambridge, *The deindustrial revolution: the rise and fall of UK manufacturing, 1870-2010*, June 2014, p26

6.1 Exchange rates and trade

Fluctuations in the value of the pound can have a significant impact on exports, and by extension manufacturing, which accounts for almost half of the UK's exports.

When the value of the pound rises compared to other currencies, it becomes more expensive for foreign customers to buy UK products. This may lead to declining foreign demand for UK exports. Conversely, when the value of the pound falls compared with other currencies, the cheaper price may encourage demand for UK exports.

UK manufacturing is reliant on extensive supply chains meaning that the components of many manufactured goods are imported. When the value of the pound falls, imports from abroad become more expensive, so producing goods may become more expensive.

Exchange rate movements alone do not explain changes in manufacturing output. Other factors, notably domestic demand, play a significant role. The sharp decline in manufacturing production during the 2008-09 recession occurred even though the value of the pound had been falling since summer 2007. Any potential boost from export markets due to the weaker pound was outweighed by lower demand.

The impact of the fall in the value of the pound since the EU membership referendum on 23 June 2016 is discussed in more detail in Section 7 of this briefing paper.

7. Brexit and manufacturing

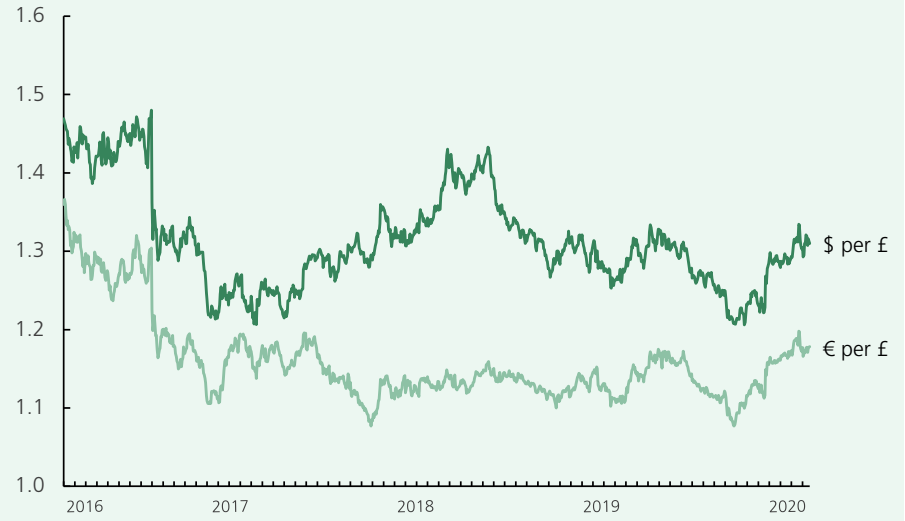
The UK is due to leave the UK on the 31st January 2020. Some of the impacts of the UK's decision to leave the EU in 2016 already experienced by the manufacturing sector are discussed below. There is also a summary of what some key manufacturing trade associations have said about the UK's future relationship with the rest of the EU.

7.1 Exchange rates

Between the referendum (23 June 2016) and the end of October 2016, the pound lost 18% of its value against the dollar and 15% of its value against the euro.

Since mid-2019, the value of the pound against both currencies has risen, but at the beginning of 2020, the pound was still down 11% against the dollar and 10% against the euro.

Exchange rates, daily closing price



Source: Bank Of England, *Exchange rates: daily closing price*

It is often assumed that a weaker pound means that UK goods sold abroad are cheaper, and so UK manufactured goods should be more attractive to foreign buyers.

However, manufactured goods depend on extensive supply chains that often involve goods or materials imported from abroad. A weak pound means that imported goods are more expensive for manufacturers. So a weak pound could increase costs for manufacturers, meaning that they may increase prices.[21]

Nissan estimate the impact of the fall in the value of the pound as "slightly worse" than no change.

In evidence to the International Trade Select Committee, the Senior Vice President for Manufacturing, Supply Chain Management and

[21] The Conversation, *Hard evidence: does a weak pound boost manufacturing*, March 2017

Purchasing at Nissan stated that the fall in the pound after the referendum was[22]

> …good for cars produced in the UK and sold outside the UK, bad for Nissan because we import cars. Net/net it was slightly worse.

7.2 Supply chains

Supply chains are the businesses which provide the materials, expertise and parts that go into manufactured goods. Smoothly functioning supply chains often depend on companies being able to transport goods across international borders without lengthy customs procedures.

If Brexit results in more complex or time consuming customs checks for imports, this could mean that supply chains are disrupted. For example, Nissan have stated that its Sunderland plant only holds half a day's stock and uses five million parts a day, 60% of which are imported. They have said that any disruption to their supply chains would be "a disaster".[23]

However, the think tank Breugel studied the engagement of UK sectors with European supply chains and drew a more nuanced conclusion:[24]

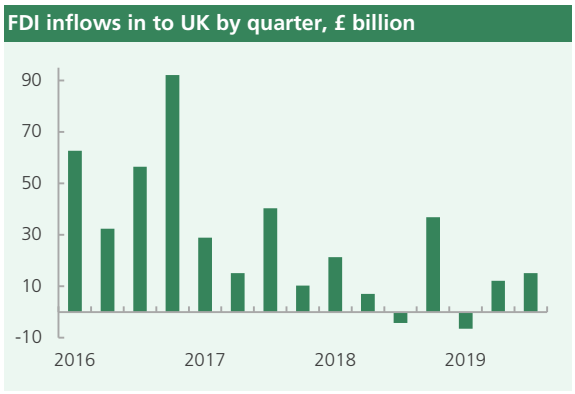
> …UK's automobile sector and related services, especially transport and storage, could be severely affected [by supply chain disruption]. However, another important sector – pharmaceuticals – should suffer less, because the expected increase in tariffs outside a trade agreement with EU would be negligible.

22 International Trade Select Committee, *UK trade options beyond 2019: oral evidence*, HC 817-iv, Q706
23 *Ibid*, Q730
24 Breugel, *Is the UK's role in the European supply chain at risk?*

7.3 Investment

During the referendum, those campaigning to remain in the EU argued that a fall in international investment into UK companies was one of the potential dangers of voting to leave the EU. For example, the Treasury argued that:[25]

> …foreign investors in the UK would be uncertain over their access to the European market, a significant driver of foreign investment in the UK, leading them to delay, relocate or cancel investment that otherwise would have come to the UK.



Since the referendum, the data has shown a mixed picture.[26]

All quarters of 2016 saw relatively large flows of Foreign Direct Investment (FDI) into the UK, including in the last two quarters of the year (which were wholly after the referendum).

In 2017 and 2018, FDI has been much lower than it was in 2016: the first three quarters have seen net inward FDI of £32 billion, compared with £115 billion in the last two quarters of 2016 alone.

In the first three quarters of 2019, net inward FDI has totalled £21 billion.

7.4 Skills/labour force

There are 300,000 non-UK EU nationals employed in the manufacturing industry in the UK, 13% of all manufacturing employees. In the whole UK economy, non-UK EU nationals make up 7% of the workforce.[27]

Make UK (formerly EEF, the manufacturer's trade associations have argued that the UK manufacturing currently sector has a "chronic skills gap", and that new barriers to the immigration of skilled manufacturing workers from the EU to the UK could impair manufacturing firms from trading competitively.[28]

However, Make UK also notes that increased STEM education in the UK, immigration from non-EU countries and more competitive salaries in manufacturing could also help to resolve the recruitment issues in the sector.

Other commentators have noted that if Brexit has the result of reducing low skilled immigration, this might have the effect of encouraging

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25 HM Treasury, *Intermediate economic impact of leaving the European Union,* May 2016

26 ONS, Total inward FDI, Series N2SA FDI (National Economic Accounts data)

27 Data are from ONS, Labour Force Survey micro data, 2016 Q1 to Q4 average. Further information on the employment of non-UK EU nationals in the UK can be found in the Library briefing paper, *Employment of other EU nationals in the UK*

28 Make UK, *Brexit briefing: a new model for immigration,* 2017

automation in some typically labour intensive manufacturing sectors such as the food manufacturing industry.[29] This could help the whole manufacturing sector and the economy more widely to become more productive. Currently 33% of the food manufacturing workforce is non-UK EU nationals, one of the highest proportion in any industry.

7.5 Trade Association views on Brexit

The following quotes are from the major manufacturing trade associations and cover their views on the Withdrawal Agreement agreed in 2019. This is Agreement is implemented and ratified by the *EU (Withdrawal Agreement) Bill*, which received its Third Reading on 09 January 2020. It looks likely that this Bill will complete the other legislative stages and receive Royal Assent before the end of January 2020 meaning that the UK will leave the EU on 31st January 2020 on the terms of this Agreement. Further information on this matter can be found in the Library Insight: *Brexit what happens next*.

Make UK

Make UK is the main trade association for manufacturing firms in the UK. Make UK maintain a suite of briefings on various Brexit related topics relevant to manufacturers.

In October 2019, after the Withdrawal Agreement had been negotiated, Make UK published a summary of their views on its impact: Brexit: *Make UK recognises the importance of an agreement but points to challenges*. The key points are:[30]

- Make UK welcome the Agreement because it "values trade, creates a plan for our departure and, vitally, prioritises the avoidance of a hard border between Ireland and Northern Ireland."
- Make UK have long argued that a No Deal Brexit would be "disastrous" for UK manufacturers. They "applaud" the government for bringing an alternative to no deal into "plain sight".
- However, Make UK highlights four areas where questions remain for manufacturers about the future relationship between the UK and the EU:
  - There is now only a short time to negotiate a trade agreement with the EU, which, Make UK suggests, "risks [the UK] moving onto WTO trading terms in just 14 months, bringing crippling tariffs, complex customs procedures and friction at the border."
  - The short period to negotiate a trade deal leads Make UK to conclude that lots of incremental changes will be made over a longer period of time, which could add "greatly to the red-tape burden."

29 LSE, *Brexit and the UK labour market*, Autumn 2016
30 Make UK, *Brexit: Make UK recognises the importance of an agreement but points to challenges*, 18 October 2019

- Make UK are concerned that "commitments to the closest possible trading relationship in goods" are not part of the Withdrawal Agreement. They argue that differences between EU and UK regulation will add to "cost and bureaucracy" for manufacturers.
- Make UK are concerned that future immigration rules might make it more difficult to recruit skilled employees to manufacturing firms.

Society of Motor Manufacturers and Traders (SMMT)

Following the 2019 election, SMMT released a statement which congratulated the new government and said that SMMT "look forward to working with the new government at this critical time for the automotive industry and the country.". The statement went on:[31]

> The priority must now be to restore business and economic confidence and re-establish the UK's reputation as a great place to invest. The agenda remains much the same, which means working to secure a future relationship with the European Union that helps UK Automotive maintain its globally competitive position. When automotive succeeds so does Britain.
>
> We remain optimistic about the future of this sector as the fundamentals are strong; our expertise in building high-tech, premium products, the sophisticated supply network and our strength in developing the latest powertrains and autonomous technologies demonstrate that we have the foundations to build a new British success story.
>
> We want to be leaders in the technological revolution that is reshaping our industry, producing ever cleaner, cutting-edge vehicles that are driven throughout the world and which are the embodiment of the quality, ingenuity and innovation that sits at the heart of UK automotive manufacturing.

Confederation of British Industry (CBI)

The CBI welcomed the October 2019 withdrawal Agreement:[32]

> If agreed by parliament, this deal unlocks a transition period, guarantees rights of the 4 million citizens living abroad in the UK and EU, and opens a pathway to a new EU/UK partnership. It would keep trade flowing freely across the island of Ireland and, most importantly, avoid a damaging no deal scenario.

However, the CBI notes that "big questions remain about the feasibility of negotiating a new trade agreement deep enough before the end of 2020". This risks the "free and frictionless trade with the UK's largest market" that many firms rely on.

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31 SMMT, *Time for long-term strategy to meet industry ambitions*, 13 December 2019
32 CBI, *Our response to the new UK-EU treaty*, 17 October 2019

8. Government policy to support manufacturing

8.1 Future of Manufacturing report

In October 2013, a major government project researching the long term future of the manufacturing sector was published: the Foresight Project into The future of manufacturing.[33]

In addition to the main Project report, the report also featured over 30 Supporting evidence reports including one which examined the impact of government policy on manufacturing since 1945.

This report argued that 'macro' and non-sector specific policies often had as great an impact on the manufacturing sector as those policies specifically aimed at manufacturing. For example, policies which had a big impact include increased funding for further and higher education, changes to corporation tax and increased integration with European markets.

The findings of this report have informed many of the policy developments since then, including the Industrial Strategy.

8.2 The industrial strategy

The government's industrial strategy, *Building a Britain fit for the future*, was published on 27 November 2017. The policy has been developed since then, and documents on all aspects of it are available on the Government's Industrial Strategy web pages.

The industrial strategy is analysed in detail in the House of Common Library note, *Industrial Strategy.*

In brief, the industrial strategy is composed of three components.

The first aspect is a series of policies that have an impact on all sectors of the economy: the 'Five Foundations':

- Ideas (R&D, innovation)
- People (skills and education)
- Infrastructure (broadband, energy, transport)
- Business environment (support for specific sectors and SMEs)
- Places (Local Industrial Strategies)

[33] BIS and Government Office for Science, *Foresight report: Future of manufacturing*, October 2013

The second aspect of the strategy is a series of bespoke partnerships with individual sectors and government: the 'sector deals'. The sector deals announced so far are:

1. Aerospace
2. Artificial Intelligence
3. Automotive
4. Construction
5. Creative industries
6. Life sciences
7. Nuclear
8. Offshore wind
9. Rail
10. Tourism

The third aspect of the strategy is a series of challenges facing the economy. The mission of solving these challenges will help the whole economy to strengthen and develop. The 'Grand Challenges' are:

- AI and the data revolution (how to embed and maximise the advantages of AI and data)
- Clean growth (low carbon technologies across the economy)
- Mobility (low carbon transport, automation, infrastructure)
- Aging society (healthcare and labour market challenges)

The Government has created an independent **Industrial Strategy Council** chaired by Andy Haldane, deputy guvnor of the Bank of England to assess progress and make recommendations to the government.

Industrial Strategy Challenge Fund

This is a competitive fund from which awards will be made to companies that are seeking to address the specific problems related to the 'grand challenges' outlined in the industrial strategy (AI and data, mobility, clean growth, the aging society). The specific problems that the Fund will make awards to solve are:

- Audience of the future
- Faraday battery challenge
- From data to early diagnosis and precision medicine
- Healthy ageing
- Leading-edge healthcare
- Next-generation services
- Prospering from the energy revolution
- Quantum technologies
- Robots for a safer world
- Transforming construction
- Transforming food production
- Creative industries clusters

- Driverless cars
- Manufacturing and future materials
- National Satellite Test Facility

Although these challenges and the Fund are designed to be non-sector specific, manufacturing companies will have a clear role to play in all of these areas and could benefit significantly from the Fund.

The Fund will particular seek to support companies which are trying to bring together research and innovation with marketable products.

More information about the application process is available from UK Research and Innovation, the body responsible for government investment in R&D.

T-Levels and the National Retraining Scheme

The T-Levels (new technical qualifications) and the National Retraining Scheme were re-announced in the Industrial Strategy, having formed part of the government's Skills Plan. Both policies could help manufacturing firms and employees.

The T-Level are intended to ensure that those parts of the economy that need more STEM (science, technology, engineering and maths)-qualified people can get them, countering historic under-supply in this part of the economy. The manufacturing sector is particularly prone to this skills shortage.

The National Retraining Scheme gives people the opportunity to change career and move into a sector or role for which they not yet acquired skills. This could provide a route for further recruitment into manufacturing.

Further information on these areas can be found in the Library briefing paper, *Reforms to Technical Education.*

8.3 High Value Manufacturing Catapult Centre

Catapult Centres are designed to enable companies to access equipment, expertise and information needed to develop and commercialise ideas and innovations.

The High Value Manufacturing Catapult (HVMC) is based at the seven research centres listed below. Each centre has a specific focus on an area of manufacturing:

- Advanced Forming Research Centre (AFRC) in Glasgow,
- Advanced Manufacturing Research Centre (AMRC) in Sheffield,
- Centre for Process Innovation (CPI) in Sedgefield,
- Manufacturing Technology Centre (MTC) in Coventry,
- National Composite Centre (NCC) in Bristol,
- Nuclear Advanced Manufacturing Research Centre (NAMRC) in Sheffield
- Warwick Manufacturing Group (WMG) in Coventry.

These centres are available to businesses which can demonstrate that they have a product or idea, and require the expertise or equipment that the Centres can provide. The overarching aim of the HVMC is to double manufacturing's contribution to GDP.

The HVMC has invested or generated investment equivalent £504 million. This investment has involved 4,650 projects, of which 40% are small or medium sized companies (with fewer than 250 employees). It is estimated that the Catapult will generate Gross Value Added (economic activity) of around £16 billion over the next 10 years.[34]

[34] High Value Manufacturing Catapult, *Annual review 2019*, 2019

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