HOUSE OF COMMONS LIBRARY

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Manufacturing: statistics and policy

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Summary

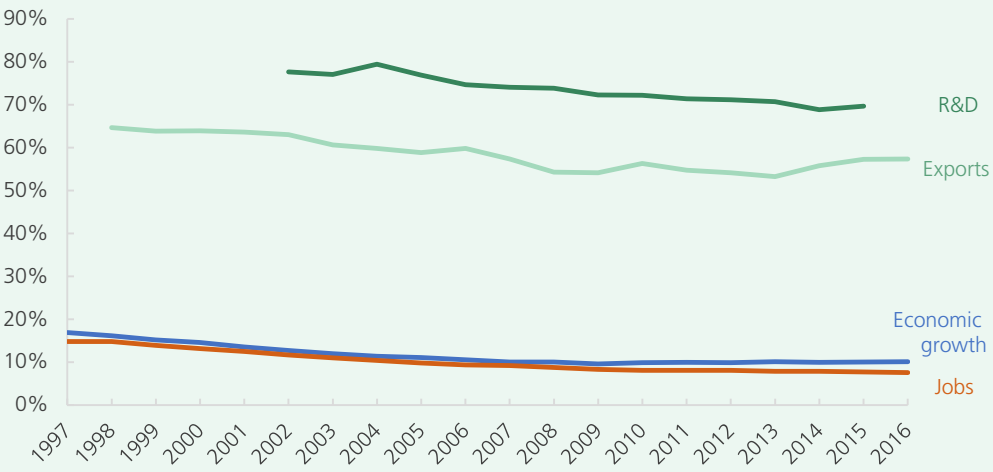
This note provides data on the manufacturing sector, analysis of recent trends and pressures facing the sector, a summary of government policy and a discussion of the potential impact of the UK's decision to leave the European Union.

Statistics

In 2016 manufacturing in the UK accounted for:

- 8% of jobs, 2.7 million in total
- £177 billion of economic output, or 10% of the UK total
- 57% of imports, worth £243 billion
- 70% (£15 billion) of UK research and development spending (2015 figures).

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 could have a major impact on the manufacturing industry. For example, changes in the trading relationship between the EU and UK could increase the complexity of trading with European countries, but the ability of the UK to negotiate trade deals with third countries could help open markets that are currently unavailable to UK manufacturers.

Issues such as investment, supply chains and access to skilled labour after Brexit will also have an impact on manufacturing.

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 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 2017.

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 2017 is actually 6% higher in real terms compared with 1990. But service sector output has risen by 97% over the same period.

The service sector accounted for 79% of the economy in 2017, up from 69% in 1990.[3]

Manufacturing output
Gross Value Added (GVA), £ billion

	Current prices (£ billions)	2015 prices (£ billions)	Real % change on previous year	% of total economy
1990	106.8	165.0	-	17.4%
1991	109.5	156.7	-5.0%	17.1%
1992	111.0	156.6	-0.1%	16.7%
1993	113.9	158.8	+1.4%	16.3%
1994	124.1	166.3	+4.7%	16.9%
1995	132.4	168.9	+1.6%	17.3%
1996	139.2	170.1	+0.8%	17.0%
1997	144.8	173.2	+1.8%	16.9%
1998	143.8	173.8	+0.4%	16.1%
1999	139.9	174.7	+0.5%	15.1%
2000	142.2	178.7	+2.3%	14.6%
2001	137.1	176.0	-1.5%	13.5%
2002	135.1	172.1	-2.2%	12.7%
2003	134.3	171.2	-0.5%	11.9%
2004	133.7	174.3	+1.8%	11.3%
2005	138.2	174.3	+0.0%	11.1%
2006	139.4	178.1	+2.2%	10.6%
2007	139.2	179.2	+0.6%	10.1%
2008	142.9	174.2	-2.8%	10.0%
2009	133.4	157.8	-9.4%	9.6%
2010	141.1	165.0	+4.5%	9.9%
2011	145.8	168.7	+2.2%	10.0%
2012	148.4	166.2	-1.4%	9.9%
2013	158.6	164.6	-1.0%	10.1%
2014	162.7	169.4	+2.9%	9.9%
2015	169.4	169.4	-0.0%	10.1%
2016	176.7	170.9	+0.9%	10.1%
2017	188.1	175.2	+2.5%	10.3%

Source: ONS series: KKE3 (current prices), KL8V (real prices), KKP5 (total economy)

Manufacturing accounted for 17% of the UK economy in 1990, compared with 10% in 2017.

This is mainly because UK manufactured goods have become less attractive to industries and consumers for the following reasons

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).
2 United Nations Conference on Trade and Development (UNCTAD) data, accessed November 2017
3 Underlying data available in: ONS, UK GDP low level aggregates

including relatively high production costs in the UK; other manufacturing centres are closer to raw materials; and 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.

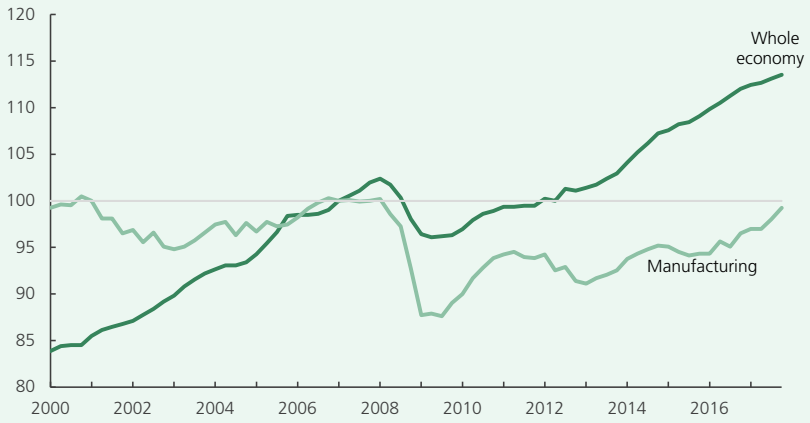
1.1 Impact of the 2008-09 recession

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%. However, manufacturing output is still 1% below its recent peak in Q1 2008.

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



Source: ONS series L2KK, L2KX

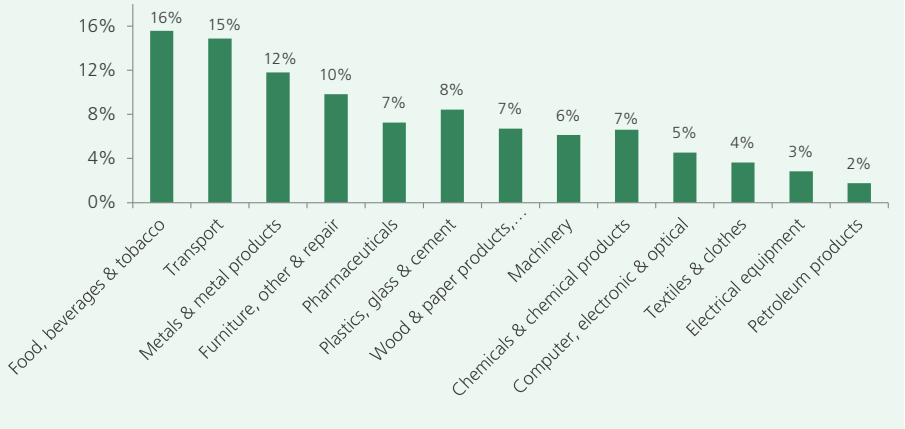
Manufacturing output in Q4 2017 is 1% **below** the pre-recession peak.

Output from the whole economy is 11% **above** the pre-recession level.

1.2 Manufacturing industries

Various industries make up the manufacturing sector. The chart below shows these industries' share of total manufacturing output.

Output of manufacturing industries as a % of total manufacturing, 2016



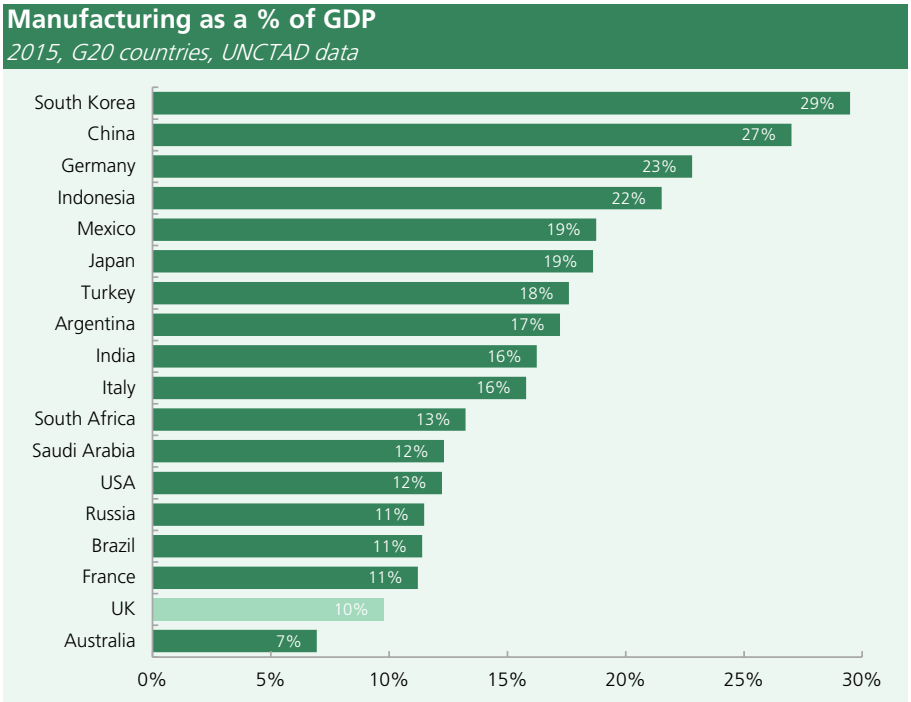
Food manufacturing accounted for 16% of the manufacturing industry in 2016. The manufacture of transport equipment (which includes the automotive industry) accounted for 15%, and the manufacture of metals and metal products accounted for 12%.[4]

1.3 Manufacturing: international comparisons

UK manufacturing accounts for 10% of GDP, a smaller proportion than in most other major economies.

Over 20% of Germany's GDP is from manufacturing, which is unusual among major Western economies. In France it is 11%, USA 12% and Italy 16%.

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



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

2. Employment

The manufacturing workforce has fallen sharply over the last few decades. The table below shows that for the UK as a whole, the manufacturing workforce more than halved between 1981 and 2017, with three million fewer jobs.

Manufacturing jobs, UK

	Jobs 000s	Annual % change	Manufacturing as % all jobs
1981	5,713	-	22%
1991	4,434	-9%	16%
2001	3,775	-5%	13%
2002	3,582	-5%	12%
2003	3,403	-5%	11%
2004	3,237	-5%	10%
2005	3,097	-4%	10%
2006	3,016	-3%	9%
2007	2,972	-1%	9%
2008	2,847	-4%	9%
2009	2,638	-7%	8%
2010	2,563	-3%	8%
2011	2,565	0%	8%
2012	2,586	1%	8%
2013	2,574	0%	8%
2014	2,639	3%	8%
2015	2,620	-1%	8%
2016	2,636	1%	8%
2017	2,685	2%	8%

Notes: Data from September each year, seasonally adjusted
Workforce jobs is a sum of employee jobs and self-employment jobs

Source: ONS workforce jobs by industry

Manufacturing accounted for 8% of the workforce in 2017, compared with 22% in 1981.

The decline in the workforce is the result of the growth of manufacturing productivity, and the small growth in manufacturing output in real terms (up 4% since 1990).

Productivity growth means that each individual worker produces more output than before. If total output is not increasing, then productivity growth means that *fewer* workers are required to produce the same amount.[5] 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. This has not happened in the UK over the last 30 years.

One explanation for this 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.[6]

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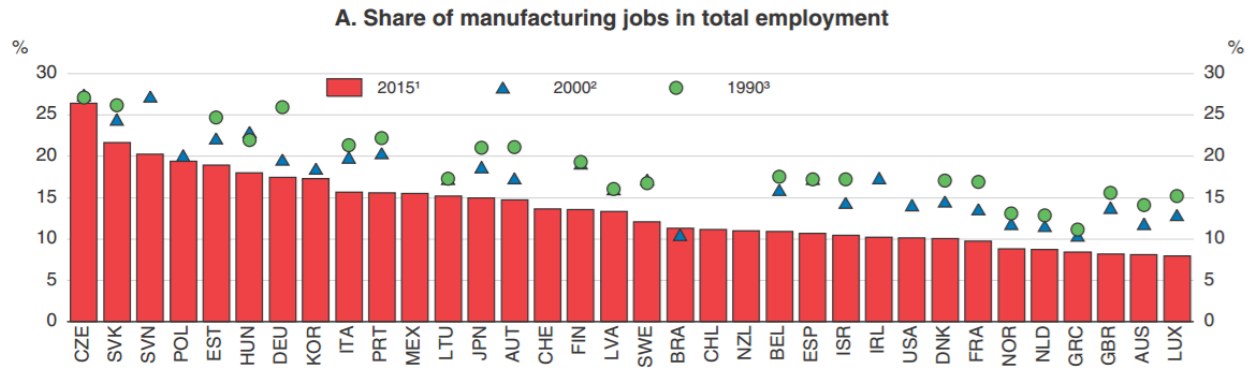
5 See for example: Michael Kitson and Jonathan Michie, Centre for Business Research, University of Cambridge, *Working Paper No. 14: Britain's Industrial Performance since 1960: Underinvestment & Relative Decline*, 1995.

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

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 increase in the manufacturing share of its workforce between 1990 and 2015.[7]



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:

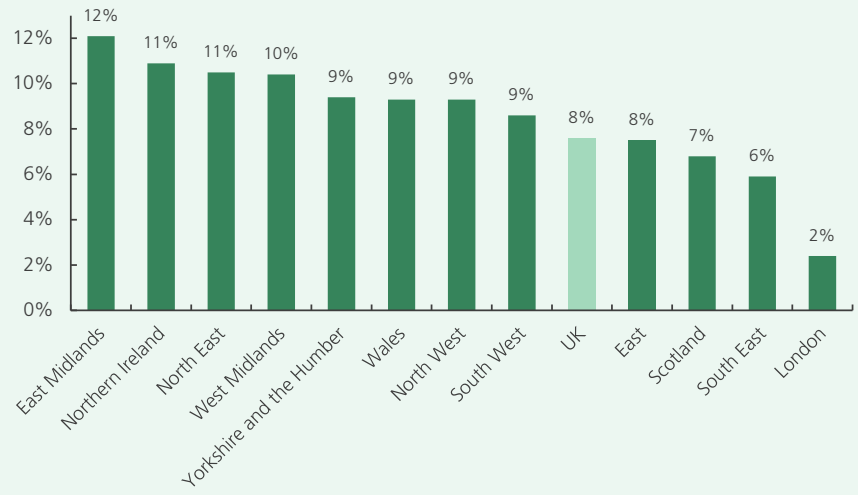
> A stronger manufacturing sector would grow faster and generate more net exports. However, the share of manufacturing in employment or value-added would be unlikely to increase. Rapid labour-saving productivity growth in the manufacturing sector would limit the growth of employment in this sector despite 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.[8]

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%. By contrast, only 2% of jobs in London are related to manufacturing.[9]

7 OECD, Economic Outlook 2017, 'How to make trade work for all', figure 2.2
8 Robert Rowthorn & Kenneth Coutts, Centre for Business Research, University Of Cambridge, *Working Paper No. 454: Re-industrialisation – a commentary*, 2013, p. 2
9 ONS, *Workforce Jobs by Industry*, Q3 2017

Manufacturing as a % of all jobs
September 2017, seasonally adjusted



The table below shows the number of manufacturing jobs by region. The region with the most manufacturing jobs is the North West, with an estimated 341,000 as of September 2017.

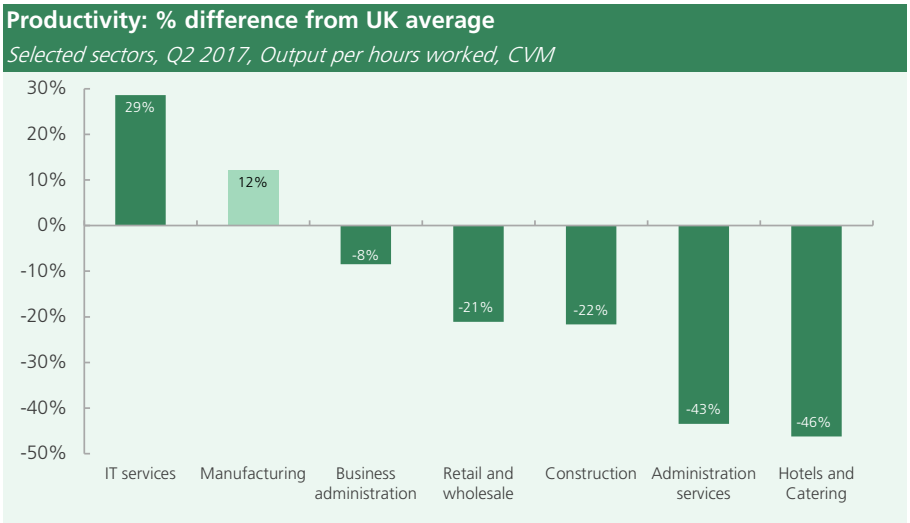
Manufacturing jobs by region, September 2017

	Jobs 000s	% change on March 2016	Manufacturing as % all jobs
North West	341	0%	9%
West Midlands	314	0%	10%
South East	299	5%	6%
East Midlands	294	6%	12%
South West	253	2%	9%
Yorkshire and the Humber	250	0%	9%
Scotland	192	2%	7%
Wales	142	-7%	9%
London	140	4%	2%
North East	126	7%	11%
Northern Ireland	95	8%	11%
UK	2,685	2%	8%

Notes: Data is seasonally adjusted
Workforce jobs is a sum of employee jobs and self-employment jobs
Source: ONS workforce jobs by industry

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 other sectors.



In Q2 2017, manufacturing productivity was 12% higher than the UK average. Productivity in the IT services sector was 29% higher than the UK average.[10]

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 or 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).[11]

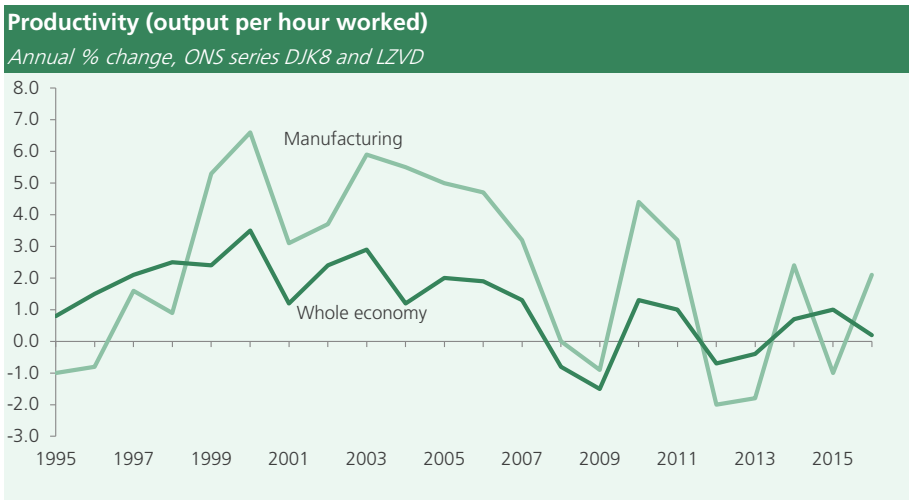
10 ONS, Labour productivity data, *Breakdown of contributions, whole economy and sectors,* October 2017

11 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 of 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



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 the 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 below). 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:[12]

> …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...

[12] 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.[13]

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.[14]

Although the manufacturing industry accounts for the majority of R&D expenditure in the UK (70% in 2015), this is down from 78% in 2002.

Counteracting the effects of this trend has been one of the main focuses of UK industrial policy in recent years. Successive governments have supported the development of the Catapult Centre Programme. These organisations and campuses seeks 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.[15]

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

and effective leadership, and that this has could hamper their productivity growth.[16]

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 (around 30% in 2013), suggesting an issue with the supply of skilled employees and a potential barrier to productivity growth.[17]

The UK Commission for Skills reports that 18% of manufacturing employers had skills gaps in their workforce (their employees did not possess all the skills required), compared to 15% of all employers in 2013.

Manufacturing firms were also less likely to have a dedicated training budget, compared to all firms (23% compared with 31%), a reversal of the historic trend.

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.

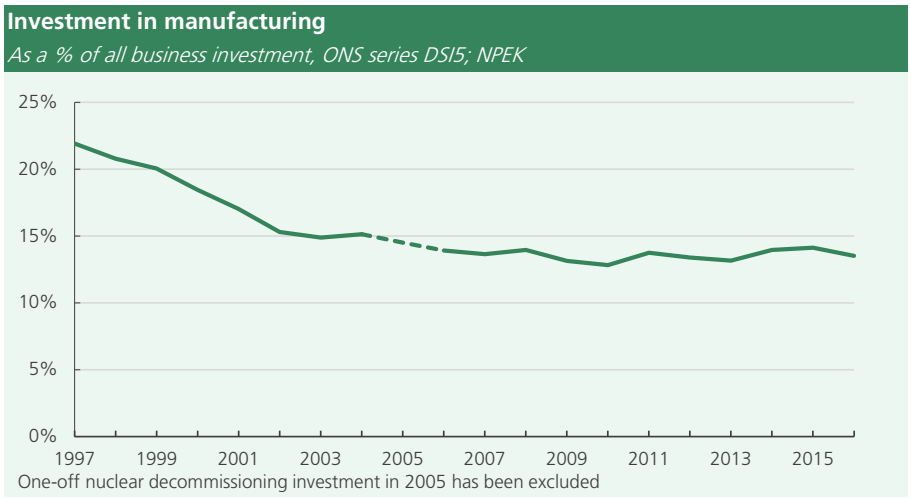
This low level of 'robot penetration' in the UK has been blamed on the structure of the manufacturing sector in this country. The UK manufacturing sector is reliant on food manufacturing which is typically labour intensive and has not been through the advances in automation that other sectors have seen.

16 University of Warwick, *The future of productivity in manufacturing*, February 2016, p40 and 42

17 Quoted in *Ibid*, pp45-51

4. Business investment

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

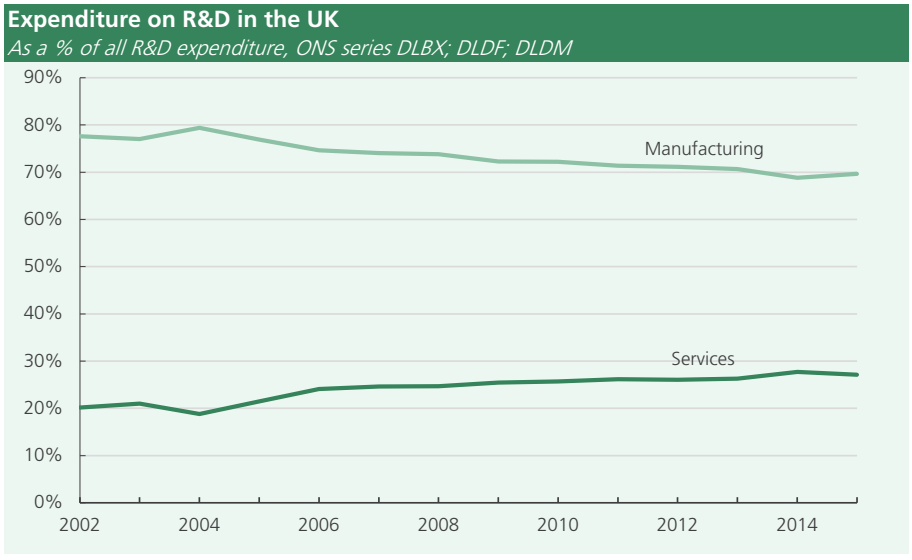


In 1997, investment in manufacturing was worth £25.2 billion, 22% of total investment by businesses. In 2009, it had fallen to £16.7 billion, 13% of the total. It has since risen and was worth £24.6 billion in 2016, 14% of the total. (These data are in current prices).

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 2015, R&D spending in manufacturing totalled £14.6 billion, 70% of the total. The combined R&D spending of all the services sectors totalled £5.7 billion or 27% of the total, despite the service sectors accounting for 80% of UK economic output.



The proportion of R&D accounted for by manufacturing has declined in recent years, from 78% in 2002 to the 2015 total of 70%. The

proportion of R&D spending accounted for by the service industries has seen a corresponding rise over the same period, from 20% to 27%.

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.

6. Exports and trade

Manufactured goods account for a large share of total exports. In 2016, 44% of the value of all exports were manufactured goods, worth £242.5 billion. Manufactured good represented a larger share of imports – 58% in 2016, worth £341.2 billion.

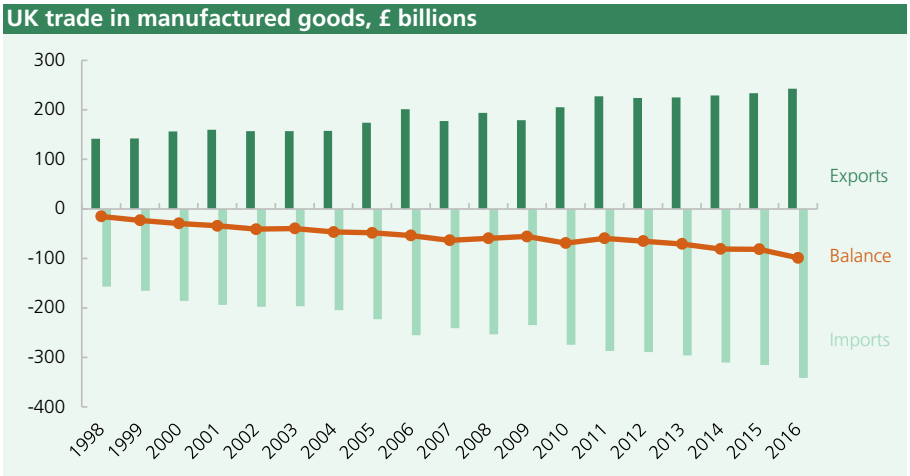
Trade in manufactured goods, UK

Balance of payments basis, current prices

	Value £ billion		% of total	
	Exports	Imports	Exports	Imports
1998	141.8	156.9	60%	65%
1999	142.3	165.4	59%	64%
2000	156.3	185.7	58%	64%
2001	159.6	193.9	57%	64%
2002	156.7	197.5	56%	63%
2003	156.8	196.5	53%	61%
2004	157.7	204.3	51%	60%
2005	174.2	222.4	51%	59%
2006	201.0	254.8	51%	60%
2007	177.5	241.0	46%	57%
2008	193.9	253.3	46%	54%
2009	178.9	234.6	45%	54%
2010	205.3	274.3	46%	56%
2011	227.2	286.8	46%	55%
2012	223.9	289.2	45%	54%
2013	225.0	295.8	43%	53%
2014	228.7	309.8	44%	56%
2015	233.3	314.9	45%	57%
2016	242.5	341.3	44%	57%

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

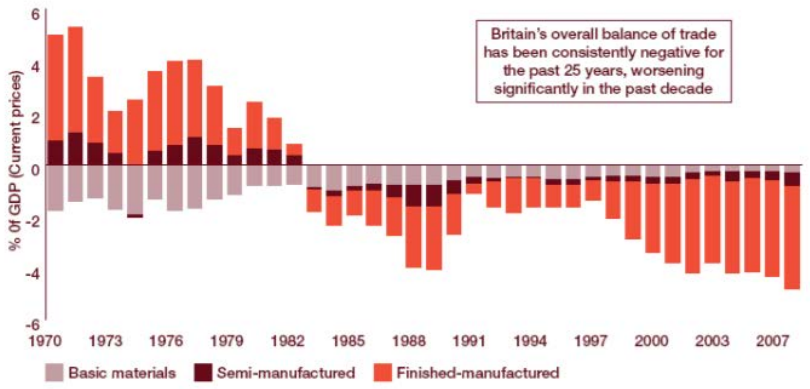
The UK has a negative balance of trade in manufactured goods meaning the UK imports more than it exports. The trade deficit in manufactured goods has widened over the past 20 years: in 1998, it was worth £15.2 billion; in 2016 it was worth £98.7 billion.



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.[18]

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



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

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

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.

Note that 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.

6.2 Trade and Brexit

The UK exported goods worth £134 billion to the EU in 2015, 47% of all exports.[19] Changes to the way in which goods are traded stemming from Brexit could have a significant impact on the manufacturing industries involved with producing these goods.

For further information see the following Library briefings:

- *Importance of EU trade for UK industries;*

- *Brexit: trade aspects*

Currently, the UK is a member of the EU single market and customs union the key features of which are that:

1 There are no tariffs on goods traded between member states.

2 There are no quotas or limits on the quantity of goods that can be traded between member states.

3 Non-tariff barriers to trade have been eliminated, which means that there are common technical specifications and labelling requirements throughout the EU.

4 All member states set the same tariffs for goods imported into the EU from non-EU countries.

These measures almost completely remove the need for customs checks when goods are traded between the UK and another EU member state.

However, it is very difficult for EU member states to negotiate free trade agreements with non-EU member states. These are negotiated by the EU Commission and agreed by all EU member states. Critics of the customs union say that this restricts the UK's potential to develop trade links with non-EU member states and that leaving the customs union

[19] ONS, *Pink Book 2016*, Table 9.4. These data are for the EU 28, refer to 2015 and are not directly comparable with the data used elsewhere in this briefing paper

would enable the UK to create trade deals which could benefit the manufacturing sector.[20]

UK Government's trade priorities post-Brexit

The Government's negotiating objectives for the trade aspects of Brexit were set out in a White Paper published in February 2017[21] and in a speech Prime Minister gave in Florence on 22 September 2017.[22]The main points are:

- The UK will leave the single market and the customs union.
- The UK wants the freest and most frictionless trade possible in goods and services between the UK and the EU.
- The UK does not wish to adopt an existing model of relations with the EU. Both the EEA option and a model based on the EU's recent trade agreement with Canada are rejected
- An "implementation" period (or transitional period) of around two years.

EEF, the manufacturers' trade association, found that its members largely approved of these priorities for the post-Brexit trading relationship. They also emphasised the importance of outlining the 'shape' of a trading relationship "sooner rather than later", and argued that the manufacturing sector would suffer if the UK did not become a "fully-fledged World Trade Organisation member in its own right as a first priority."[23]

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20 Patrick Minford in the Financial Times, *Brexit will make manufacturing more profitable*, 16 March 2017

21 HM Government, The United Kingdom's exit from and new partnership with the European Union, Cm 9417, February 2017

22 A new era of co-operation and partnership between the UK and the EU, Prime Minister's speech, Florence, 22 September 2017

23 EEF, *Brexit briefing: UK trade with the EU*, March 2017

7. Brexit and manufacturing

Some of the early effects on the manufacturing sector of the UK's decision in June 2016 to leave the European Union are discussed below.

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.

Exchange rates, daily closing price

Since then the pound has gradually recovered some its value against the dollar (at the end of 2017 it was 9% below the pre-referendum level), but against the euro, the pound's recovery has not been strong – at the end of 2017 it was 14% below the pre-referendum level).

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.[24]

In evidence to the International Trade Select Committee, the Senior Vice President for Manufacturing, Supply Chain Management and Purchasing at Nissan stated that the fall in the pound after the referendum was[25]

> …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.

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

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

[25] International Trade Select Committee, *UK trade options beyond 2019: oral evidence*, HC 817-iv, Q706

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".[26]

However, the think tank Breugel studied the engagement of UK sectors with European supply chains and drew a more nuanced conclusion:[27]

> …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.

Further information on how Brexit might affect trade in manufactured goods is discussed in Section 6.2 of this paper.

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:[28]

> …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.

However, since the referendum, the data has shown a mixed picture.[29]

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

FDI inflows in to UK by quarter, £ billion

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

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26 *Ibid*, Q730
27 Breugel, *Is the UK's role in the European supply chain at risk?*
28 HM Treasury, *Intermediate economic impact of leaving the European Union,* May 2016
29 ONS, Total inward FDI, Series N2SA

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.[30]

EEF 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.[31]

However, EEF 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 automation in some typically labour intensive manufacturing sectors such as the food manufacturing industry.[32] 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.

30 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*

31 EEF, *Brexit briefing: a new model for immigration*, 2017

32 LSE, *Brexit and the UK labour market*, Autumn 2016

8. Government policy to support manufacturing

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.

8.1 The industrial strategy

The government's industrial strategy, *Building a Britain fit for the future*, was published on 27 November 2017. The industrial strategy is analysed in detail in the House of Common Library note, *Industrial Strategy.*

In brief, the industrial strategy is a "blended" approach: it involves Horizontal policies (as described in the Foundations), Sectoral/Selective policies (through the Sector Deals), and also Mission-based policies (through the Grand Challenges).

Below are some of the key manufacturing related policies announced in the industrial strategy.

Sector deals

Sector deals are councils set up to encourage collaboration between industries (including trade associations, unions and major company leaders) and government ministers in order to resolve major issues facing the industry. One of the most well-known examples of an industry council is the Automotive Council which was established in 2009 to combat the threat posed by the global financial crisis to automotive manufacturing. It has continued to operate since then and is seen as a model for the relationship between government and industry.

In the industrial strategy, the government announced sector deals in life sciences, construction, AI and automotive. EEF have published a list of sectors that are in discussions about creating sector deals.

Industrial Strategy Challenge Fund

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

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

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.

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*

8.2 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 HVMC has received over £200 million of Government investment since 2011. The overarching aim of the Catapult is to double manufacturing's contribution to GDP.[34]

[34] HVMC, *Our Mission*, accessed January 2014

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