Industrial Strategy and UK Manufacturing

A white paper by Cranfield University



23 May 2018

National Manufacturing Debate

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Overview

This white paper provides the following information:

- Evaluation of the key components and critical success factors of UK manufacturing growth.
- Assessment of the compatibility between UK industrial strategy and the manufacturing sector.
- An updated “well-being profile” of UK manufacturing in 2018, and comparison with US manufacturing.

Contents

Part 1: Information sources and research methodology

Before describing how the research was conducted, here is a list of key words and phrases and their definitions, as used in the study:

Manufacturing Sector: Includes the manufacture of food, beverages and tobacco, textiles and leather products, wood, paper and printing, coke and petroleum, chemical and pharmaceutical products, metal products, computer, electronic and optical, electrical and transport equipment, machinery and equipment, other manufacturing and repair.

(Source: Statistical Industry Classification 2007)

Industrial Strategy: the UK government's Industrial Strategy, announced in 2017 in *Building a Britain fit for the future*, published 27 November 2017. It seeks to co-ordinate a wide range of economic policies to achieve particular objectives, which need not be purely economic in and of themselves.

(Source: Industrial Strategy Briefing Paper 2017)

The literature reviewed included the following sources:

- **509** Newspaper Articles: Factiva database.
- **40** Journal and Academic Papers: Google Scholar.
- **57** Online Articles and Studies: Specialised Websites.

The data review was based on the following sources:

- Office for National Statistics (ONS).
- Organisation for Economic Co-operation and Development (OECD).
- The World Bank.
- U.S. Bureau of Labour Statistics (BLS).
- Companies House in the UK.
- World Trade Organisation.
- Health and Safety Executive (HSE).

A structured approach and methodology was created in order to facilitate the successful completion of our research, as follows:

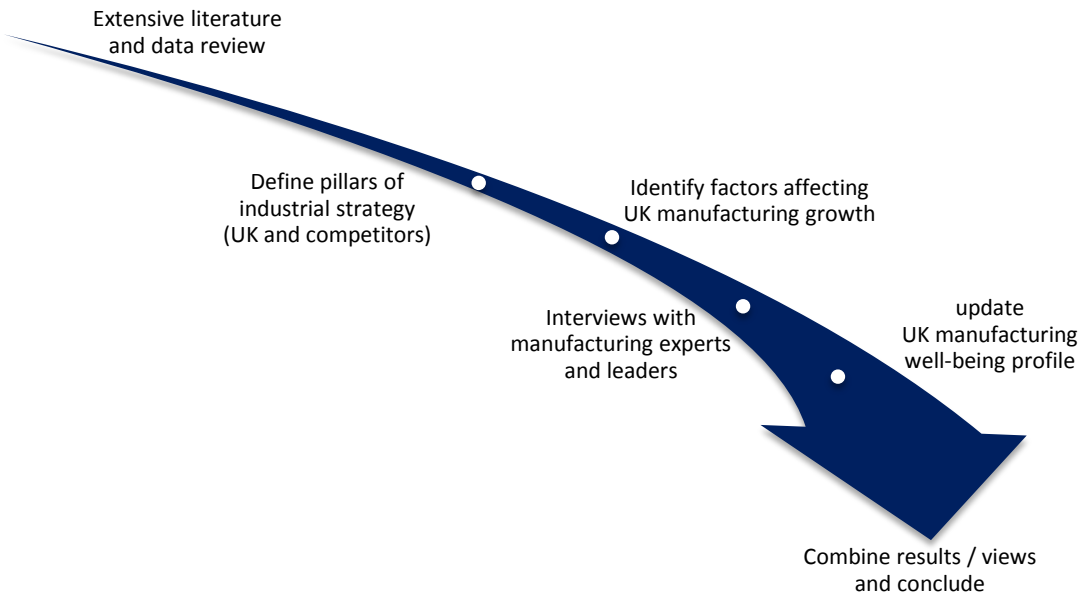

Figure 1: Methodology framework

The study compares the UK industrial strategy with the following **seven main manufacturing competitor countries**, based on the 2020 projection of the Global Manufacturing Competitiveness Index:

- United States.
- China.
- Germany.
- Japan.
- India.
- Poland.
- France.

Part 2: Review of UK industrial strategy and the UK's main competitors' strategies

Before defining its industrial strategy, it is essential to understand the UK's role in the international arena. In order to do so, we have analysed key indicators – productivity per person per hour (pp/hr) – of the UK economy and its seven main manufacturing competitor countries.

In USD	2006	2016	Variation in 10 years	Rank
United States	$ 25,8	$ 32,3	25%	6
Germany	$ 25,6	$ 30,9	21%	8
France	$ 24,6	$ 25,0	2%	12
United Kingdom	$ 26,5	$ 24,1	-9%	16
Japan	$ 19,9	$ 22,7	14%	17
Poland	$ 4,6	$ 6,4	41%	28
China	$ 1,0	$ 3,8	301%	36
India	$ 0,4	$ 0,8	116%	50

Table 1: Productivity per person per hour

It was found that the **UK's productivity has decreased by 9%** over the past ten years, while all its competitors have increased their productivity scores. Germany, for example, raised its productivity rate pp/hr by 21% over ten years. On this measure alone, the UK is ranked 16th out of the world's leading economies.

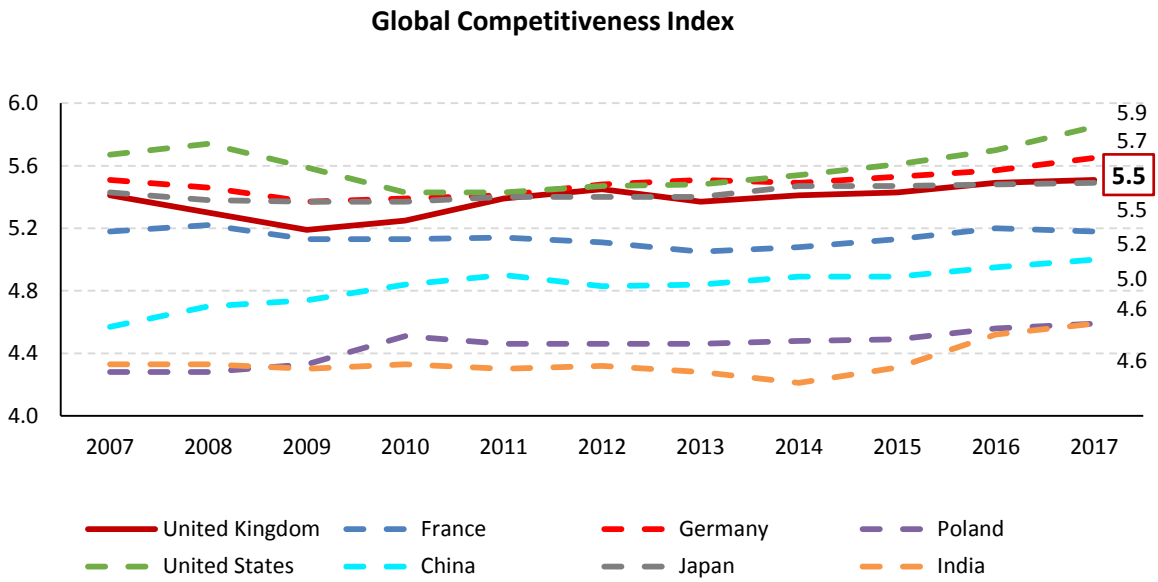

Figure 2: Global Competitiveness Index

However, despite low productivity, the **UK remains a leader in terms of competitiveness** according to the Global Competitiveness Index. It takes into consideration quality of infrastructure, health and education institutions, macroeconomic framework, efficiency enhancers and the sophistication and development of innovation enablers.

The UK economy struggles with low productivity, compared to its competitors. The UK government wants to tackle this problem and to prove that it has the vision to enhance Britain's industrial productivity. It also wants to address the long-term challenges to the UK economy, particularly in the context of Brexit uncertainty. The short-term consequences of Brexit have been a drop in the international value of the pound, a reduction in economic growth, and rising inflation. All of these have emphasised long standing productivity problems such as wage stagnation.

In order to address this issue, the government launched a consultation on the industrial strategy with the publication on 23 January 2017 of a Green Paper entitled *Building our Industrial Strategy*. It sets out the government's approach and outlines some actions it has committed to take. More than **2,000 companies from industry and businesses sectors replied to those propositions**. The results of the consultation process were published on 27th November 2017 in a White Paper named: *Building a Britain fit for the future*.

The Industrial Strategy lays out a long-term plan to boost the UK economy, to improve productivity and to capture more value in technology and innovation. The government aims to help businesses to create wealth more efficiently, to solve the problem of skills shortages, improve living standards and ultimately to boost economic growth across the whole country.

The government has identified five foundations as essential attributes of a successful economy.

Figure 3: Five Foundations of UK industrial strategy

Investing in these foundations will help the country to successfully achieve the four grand challenges the White Paper set as the goals for the strategy.

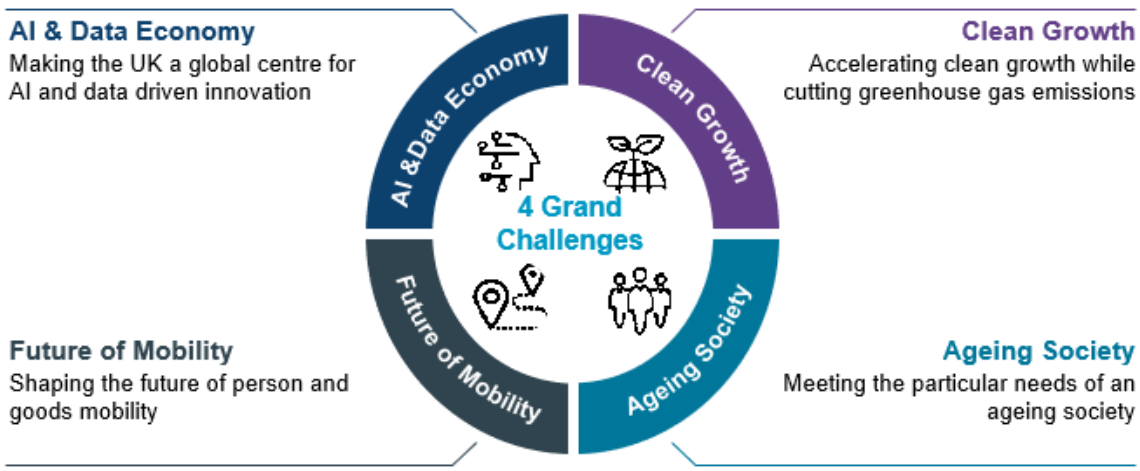

Figure 4: Grand challenges of UK industrial strategy

These grand challenges will combine the efforts of industry, business and universities to better address the UK strategy to become an industrial world leader again. The government has announced investments in specific sectors and the allocation of funds to specially-created programmes and plans in order to make the strategy succeed.

The industrial strategies of other countries were also analysed, specifically (in alphabetical order):

- China - *Made in China 2025.*
- France - *New Face of Industry in France.*
- Germany - *Sustainable Development Strategy.*
- India - *Industrial Policy of* India, Discussion Paper.
- Japan - *Future Vision towards 2030s.*
- Poland - *Strategy for Responsible Development.*
- United States - *Manufacturing USA.*

By considering these strategies, it was possible to determine how much the UK differs from these countries in terms of manufacturing activities. It also provided a way to understand why the UK ranks where it does in global league tables. Attempts were also made to determine whether a change of approach or adoption of some other solutions would improve the situation of UK industry.

According to the literature reviewed, each country wants to deliver innovation, bold leadership, produce ideas, build wealth and just be a better producer, or to become the best. Each UK competitor is addressing aims and objectives in different ways:

Figure 5: Pillars of competitor countries' strategies

Part 3: Review of factors affecting manufacturing growth

In order to ensure understanding of the UK's manufacturing background, we read more than one thousand articles and journal papers published over the past 25 years.

We identified and focused on 509 articles determined to be relevant and categorised them in five-year periods (four years, in the case of the most recent block). The analysis was conducted by NVivo 11 word frequency software.

The number of occurrences of various words and phrases enabled us to identify 25 drivers that impacted UK manufacturing growth during the period studied.

The following enablers and inhibitors were identified from newspaper articles:

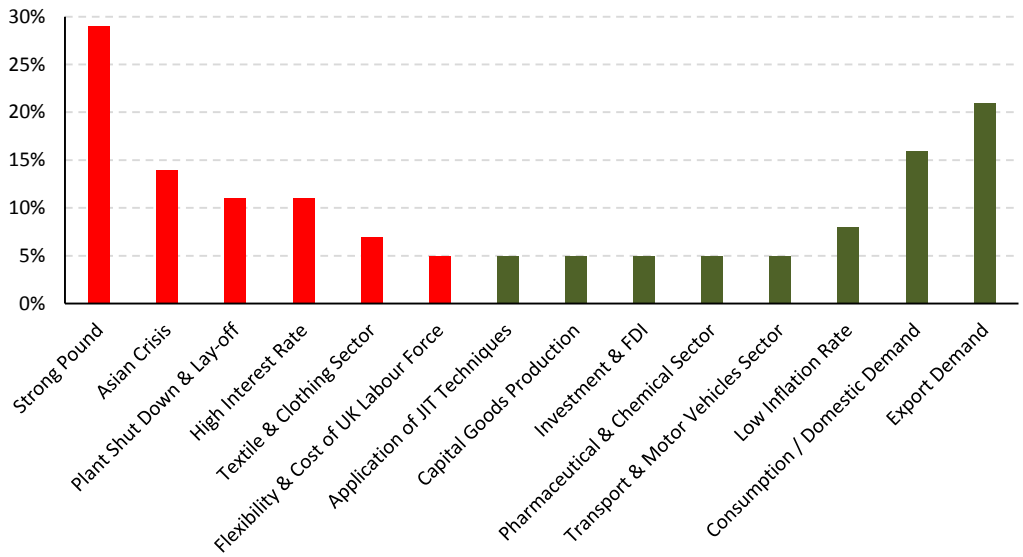

Figure 6: Inhibitors and enablers 1993 to 1998

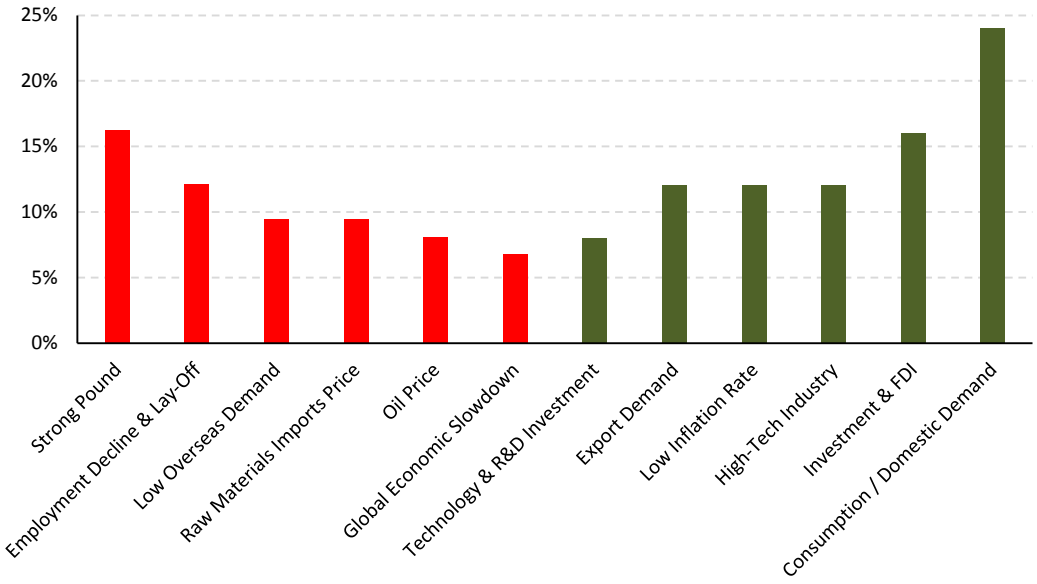

Figure 7: Inhibitors and enablers 1999-2003

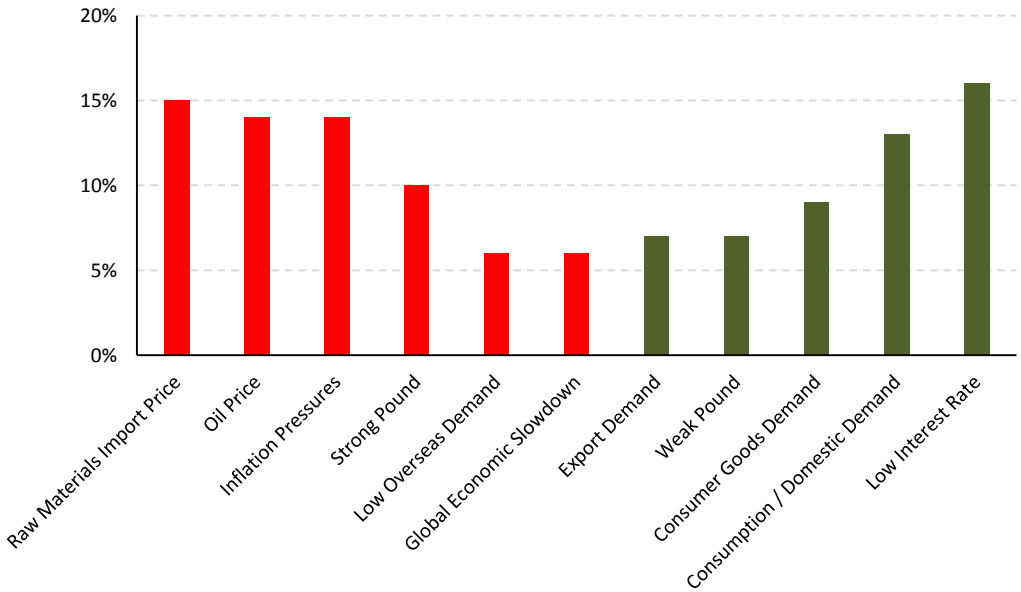

Figure 8: Inhibitors and enablers 2004-2008

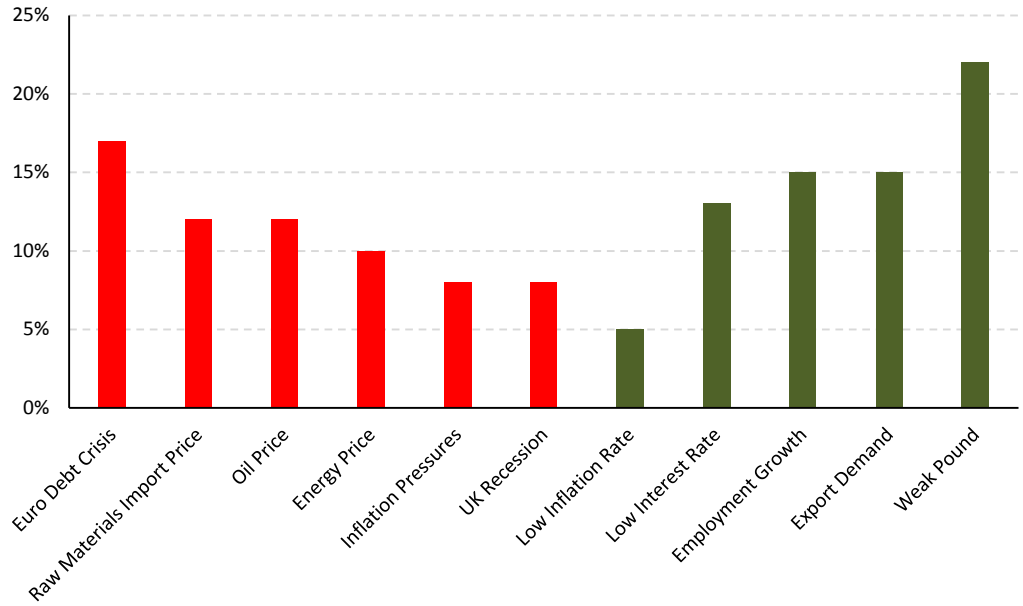

Figure 9: Inhibitors and enablers 2009-2013

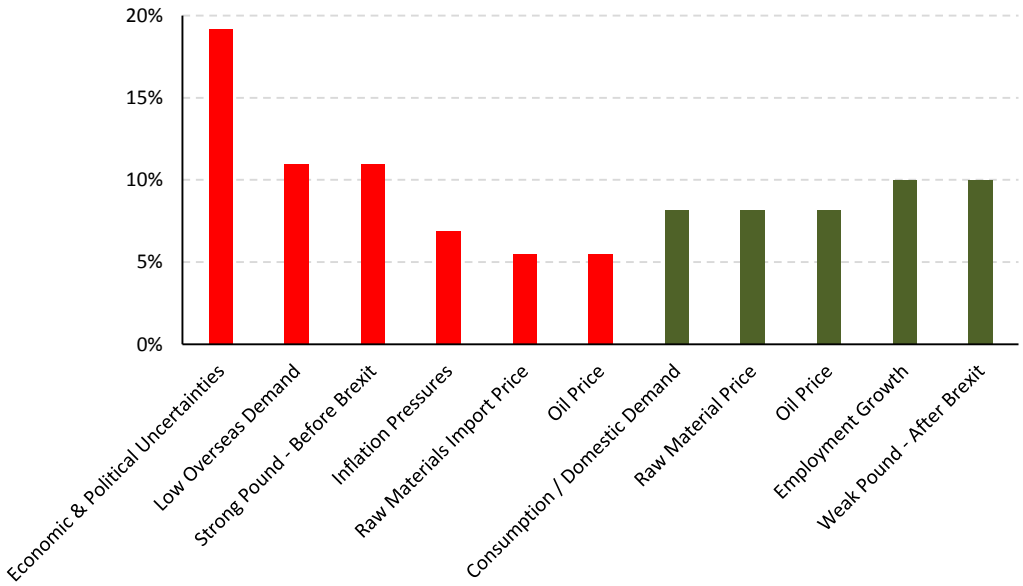

Figure 10: Inhibitors and enablers 2014-2018

History analysis

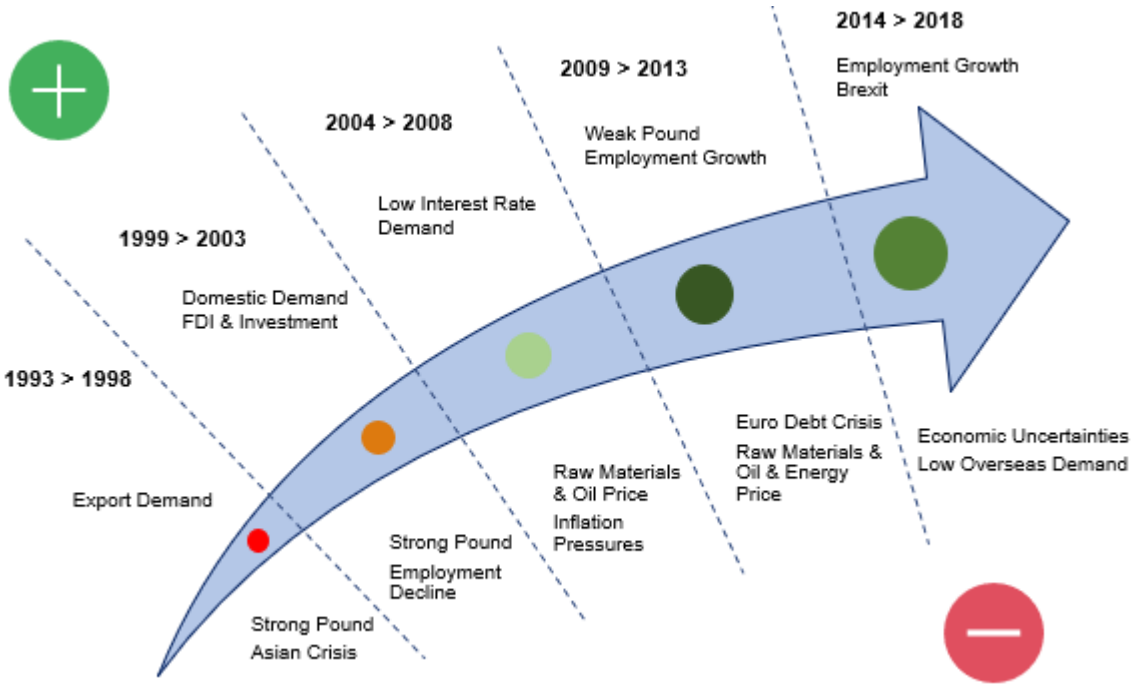

Figure 11: Historical analysis

The figure demonstrates two key periods for the manufacturing sector:

- From the 1990s into the beginning of the century, UK manufacturing faced many difficulties due to three main influencers: The **high value of the pound, the 1997 Asian crisis, the decline in employment** and the shutdown of many plants, alongside the fast growth of the services sector.

- UK manufacturing started to recover at the beginning of the 2010s. It seems to have benefitted from the effects of the subprime mortgage and subsequent global banking crisis from 2007-10. The value of the **pound on international exchanges dropped sharply and interest rates also fell to historic lows. These trends encouraged investment in the manufacturing sector** and enabled growth in employment.

- Uncertainty following the 2016 Brexit vote has slowed growth slightly, but UK manufacturing remains competitive.

To look further and to assess the relevance of the drivers detected in the newspaper articles, the same analysis was applied to journal / academic papers as well as online articles and studies made on the drivers impacting UK manufacturing growth over the past 25 years.

The following table relates the results of the word frequency analysis conducted through NVivo 11 software.

Rank	509 Newspaper Articles	40 Journal Papers	57 Online Articles
1	Pound Value	Innovation	Government Policy
2	Global Economy	R&D	Skills Shortage
3	Demand	FDI	R&D
4	Government Policy	Pound Value	Global Economy
5	Inflation Rate	Skills Shortage	Innovation
6	Trade Policy	Technology Development	Technology Development
7	Geopolitical Events	Demand	Demand
8	Interest Rate	Tax Corporate Rate	Geopolitical Events
9	Employment Growth	Employment Growth	Trade Policy
10	Oil Price	Geopolitical Events	Overseas Competition

Unique Driver Driver in Common

Table 2: Top ten drivers affecting UK manufacturing growth per source

The previous table demonstrates or indicates how the media is handling stories about UK manufacturing:

- **Newspaper articles** mainly focus on pound value and exchange rate as it has been shown previously, as well as effects of the global economy. This can be explained in that newspapers report actuality, macroeconomic facts and short-term events and try to affect people opinions by using more daily concerns.

- **Journal and academic papers** are more specialised publications and base their work on a long-term vision of UK manufacturing. To reflect this, research and development as well as innovation are the key drivers they report to develop the manufacturing sector in UK. This source also identifies FDI, foreign direct investment, more than newspapers.

- **Online articles and studies** the main agenda of online articles and studies is skills shortage, government policies and R&D. This can be explained due to skill shortage in the UK manufacturing growth. Furthermore, another feature which is presented in online articles and studies is overseas competition as it influences global communications; thus resulting in international growth.

Part 4: Analysis of feedback from interviews

To complement the media analysis, **16 interviews** with professionals – academics, CEOs, managers and journalists were conducted.

During the interviews efforts were made to find out what are the strengths and weaknesses of the published UK Industrial Strategy. The most frequent answers included opinions such as it is a real advantage to have a **formalised strategy. The strategy is a first step of the Government's commitment** to the process of changing and modernising the industry. Engaging stakeholders, collective thinking, creating the Industrial Strategy Challenge Fund as well sector deals were also considered to be main strengths of the strategy.

On the other hand, the weaknesses of the strategy mainly include the **lack of KPIs to measure follow-up performance**, the lack of specific development guidelines and directions for small companies and too few new investments plans.

Based on the interviews, we created a rating of factors influencing manufacturing growth. The following factors most affected manufacturing performance:

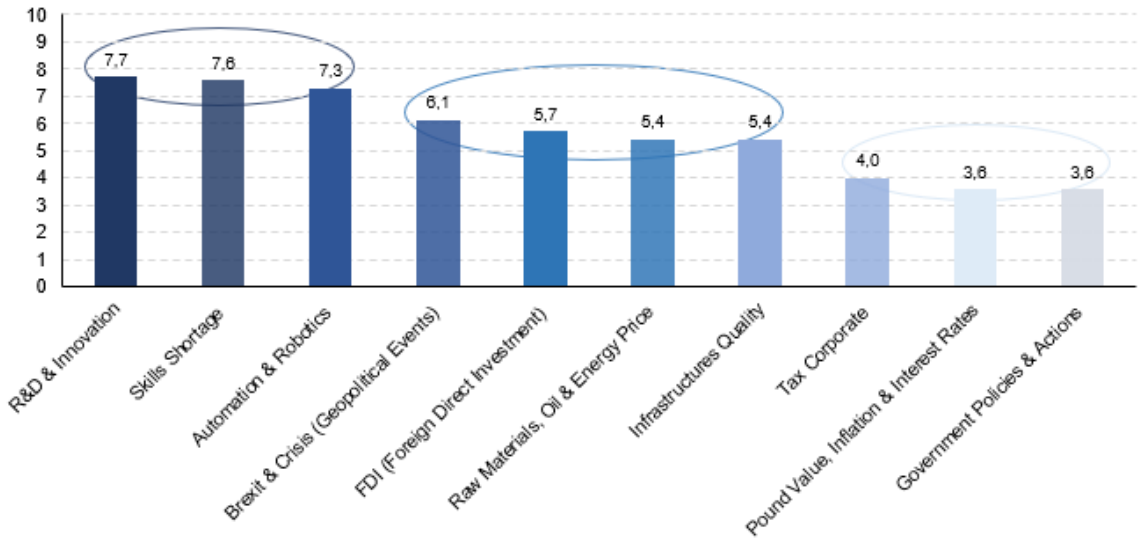

Figure 12: Drivers affecting manufacturing growth – interviews average rate

In addition, suggestions for how to improve the strategy were gathered – considering regional disparities and local needs, auditing and reporting to follow the results of the actions taken and matching policies to help SMEs.

Additional feedbacks included comments that this strategy is more helpful for large companies or those from innovative sectors and it would be more profitable to sign cross-sector deals. Also, the support from government to manufacturing was rated as 3.3 out of 5 = *good, but not enough*.

To validate the observations made through the interviews, the previous rating of drivers has been crossed with the results obtained in the literature review in order to have a general ranking with all the information sources:

Rank	Drivers Affecting UK Manufacturing Growth
🥇	R&D & Innovation
🥈	Skills Shortage
🥉	Pound Value
4	Automation & Robotics
5	Government Policy
6	Demand
7	Global Economy
8	Geopolitical Events
9	FDI
10	Inflation Rate

Driver which will be **impacted** by UK Industrial Strategy

Table 3: Top ten drivers affecting UK manufacturing growth per source

What is interesting to notice is that **out of the top five drivers of manufacturing growth, four of them will be affected by the Industrial Strategy**. This outlines that the government has targeted key drivers to reinforce the sector and a positive perspective in the next years for manufacturing in UK.

Part 5: Updated well-being profile for 2018

The growth of a manufacturing sector does not only impact the economic development of a country, but also the well-being of people, including the effects on people's health, safety, relationships, education and employment.

Both the ONS and OECD indicators were referenced in order to complete the well-being profile of the manufacturing sector. Well-being of manufacturing in the UK and the US were compared. The simplified framework used to establish the well-being profile is shown below:

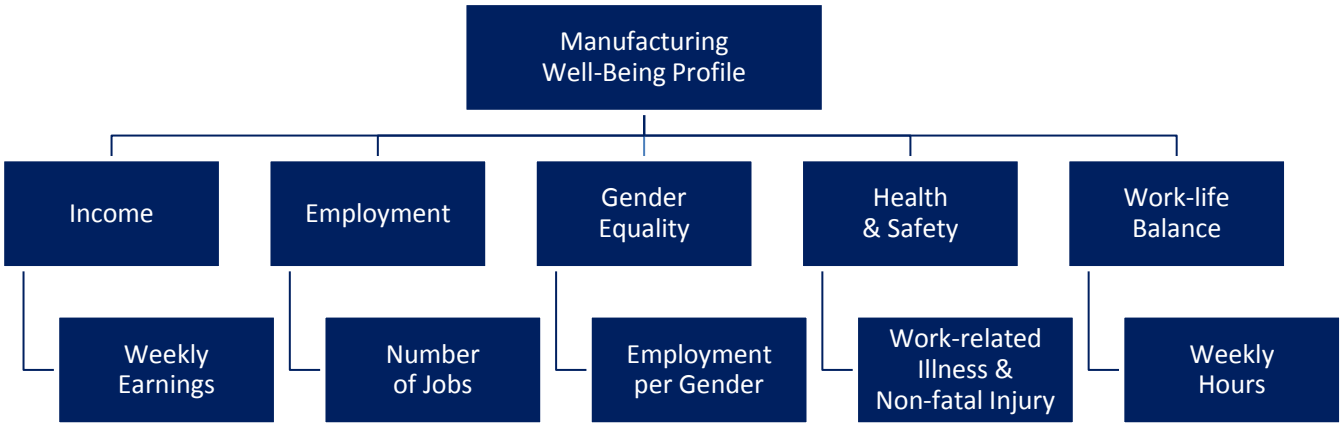

Figure 13: Manufacturing well-being profile framework

The data of the indicators mentioned were collected from the following sources:

- UK Manufacturing
  - Office for National Statistics (ONS)
  - Health and Safety Executive (HSE)

- US Manufacturing
  - Bureau of Labour Statistics (BLS)

Normalisation

Indicators for the well-being profile are represented in different units such as hours, pounds, etc. To estimate the values of manufacturing compared to other sectors in the UK economy, using the following formula (indicators were normalised to remove every unit:

$$Normalised\ Value\ for\ Manufacturing = \frac{V_{manufacturing} - V_{min}}{V_{max} - V_{min}} \times 100$$

Weekly working hours in the UK per sector are shown in the chart below:

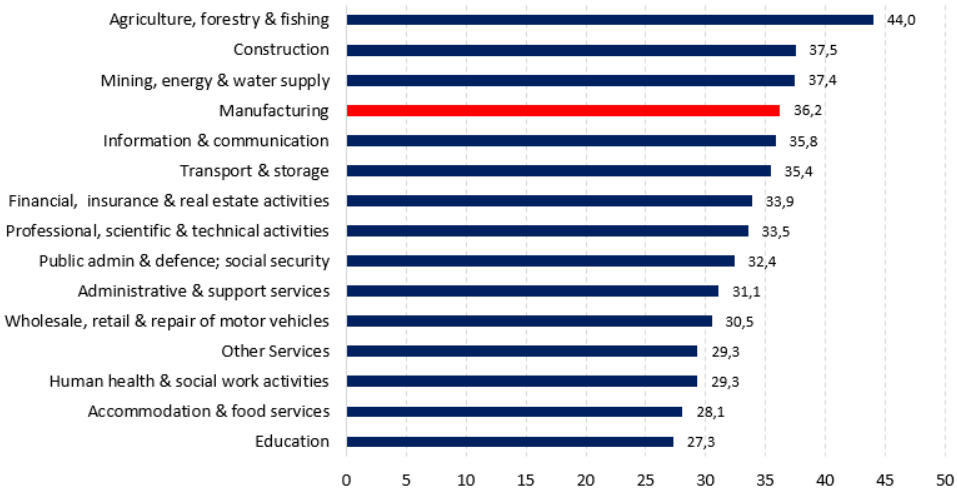

Figure 14: Weekly working hours in UK by sector, 2017

By applying the formula of normalisation, the following chart was obtained:

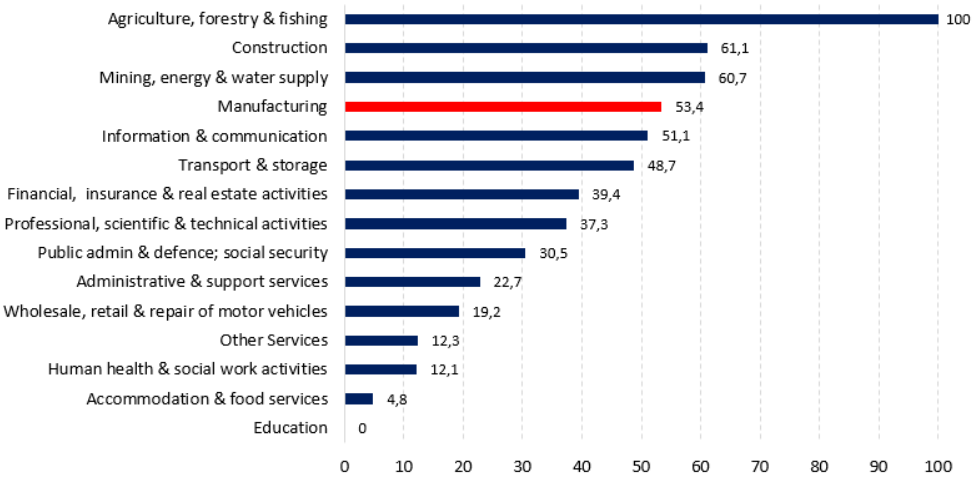

Figure 15: Normalised weekly working hours UK 2017

The score is calculated based on relative weighting across sectors. So if the healthcare sector has employed more people (indicating more growth) than manufacturing, then relatively the manufacturing score goes down.

Each of following indicators has been normalised in order to assess the well-being profile of manufacturing in 2018:

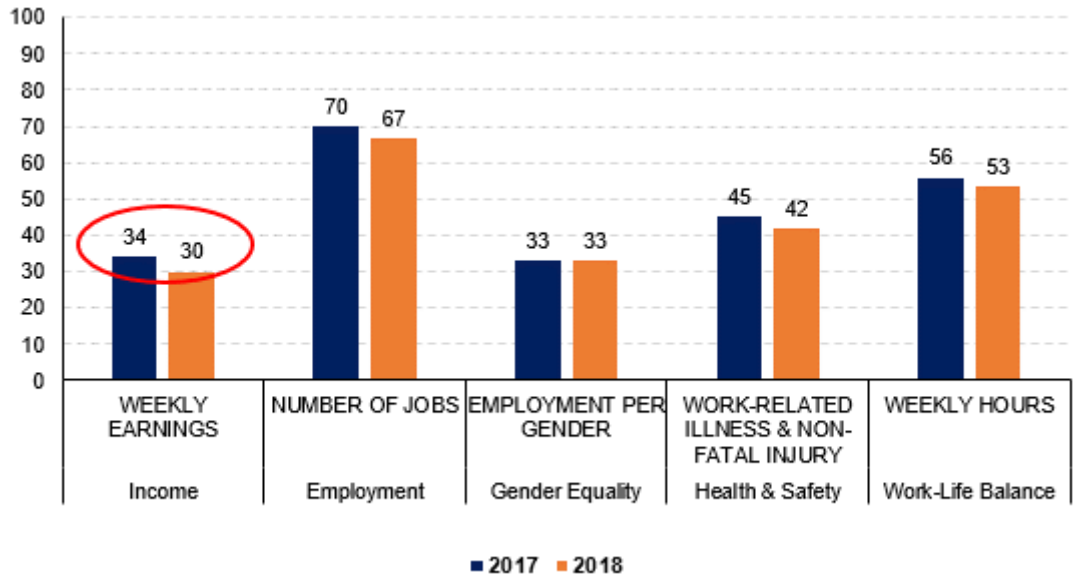

Figure 16: UK Manufacturing well-being profile 2018 vs 2017

In the UK, manufacturing growth creates jobs and provides more career opportunities, therefore improving the overall rate of employment within the sector. This is further supported by figure 16. Figure 16 shows the slight decrease in employment compare to 2017. Compared to other industry sectors in the UK, manufacturing is performing well in terms of the total number of jobs as the rate is largely above the average. Although the number of jobs in manufacturing is stable, we observe a 3-points decrease due to growth of this indicator in the healthcare sector, currently a leading sector among other industry activities.

On the other hand, the **weekly earnings** of manufacturing employees represent the weakest factor. Like the employment indicator, the 4-points fall is mainly due to an increase in financial services and insurance incomes. This KPI demonstrates that UK manufacturing may not be perceived as attractive as other business sectors. **Gender equality** is also a major issue of manufacturing as we can see in the graph.

After establishing the UK manufacturing well-being profile, a comparison of the data with the US profile was made to see what the ranking of manufacturing in the industry landscape, UK vs US, is:

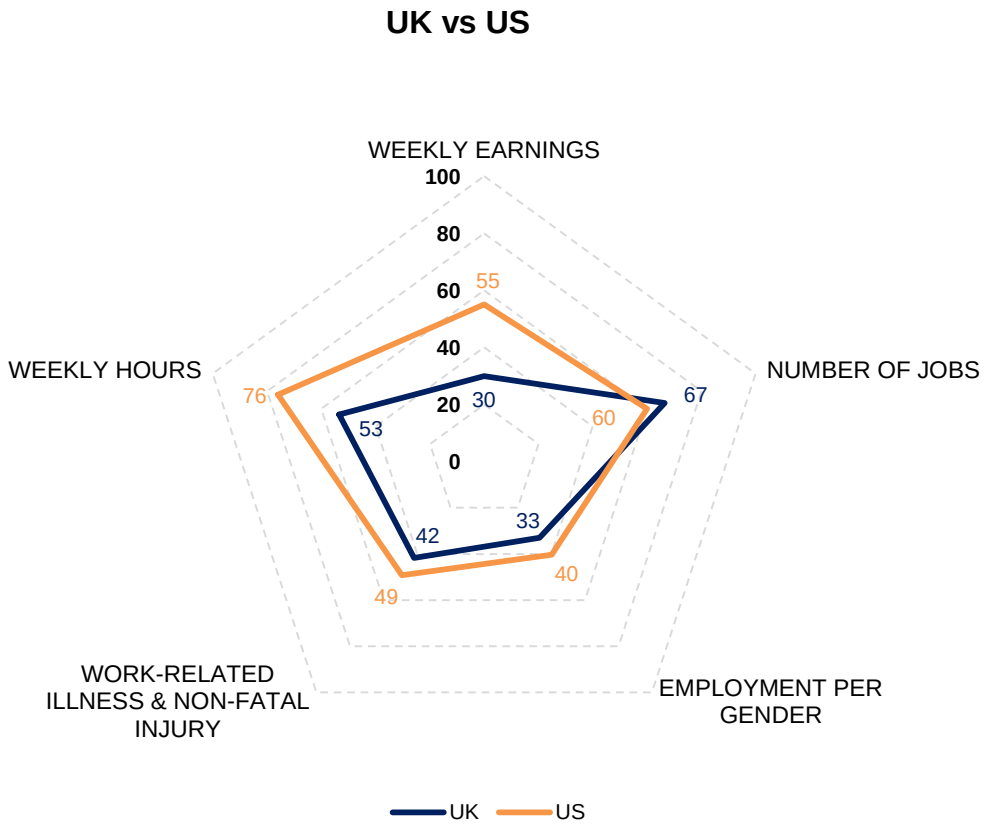

Figure 17: Manufacturing well-being profile 2018 UK vs US

The graph demonstrates that US manufacturing has higher ratings for four out of five indicators. Two indicators have a strong difference: **Weekly hours and weekly earnings**. This observation confirms that the US is much more productive and attractive than the UK when compare to the other industrial sectors.

However, UK is still leading in the **number of jobs** (adjusted for population) in manufacturing by a slight margin, which shows that manufacturing remains a strong asset for the countries' economies.

Part 6: Conclusions and recommendations

Conclusions

- The Industrial strategy aims to tackle low productivity through innovation (£725 million invested in the Industrial Strategy Challenge Fund to support innovative projects) and skills support (£400 million invested to support a modified educational system with more emphasis on STEM).
- Despite low productivity, UK manufacturing remains competitive.
- The Government wants to reinforce strong sectors compared to the UK's competitors with "sector deals".
- Two key periods over the past 25 years for UK manufacturing: firstly in the 1990s difficulties and then since the financial crisis a recovery thanks to a weaker pound and low interest rates that has allowed investment in manufacturing.
- The top five drivers affecting UK manufacturing growth are: R&D and innovation, skills shortages, pound value, automation and robotics, government policy.
- Four out of the top five drivers of UK manufacturing growth are impacted by the UK industrial strategy: R&D and innovation, skills shortage, automation and robotics, government policy.
- Well-being KPIs show a slight decrease in 2018. Manufacturing figures remain stable despite other sectors' growth in employment and earnings.
- Comparison with US figures demonstrate difficulties in UK manufacturing productivity, as well as earnings and hours.

Recommendations

- Regional disparities in economic output should be considered in order to adapt the strategy to the local needs and requirements of manufacturing.
- Universities and industries should raise more awareness of manufacturing growth and its contribution to the economy.
- Auditing: Introduce KPIs in order to audit and report on the performance of the actions taken.
- Matching policies more to the needs of SMEs.
- Signing cross-sector deals could give more benefits to the UK economy.
- Greater focus on and help for entrepreneurs in industry.



National Manufacturing Debate

Vincent Building, Cranfield University, 23 May 2018

Theme: Will the published industrial strategy help rebuild manufacturing?

Now in its ninth successful year, the National Manufacturing Debate hosted by Cranfield University brings together manufacturing professionals from a range of sectors to discuss and debate current challenges in the industry. The event is designed to encourage networking and collaboration across the sector to enable continued and long-term growth.

This white paper and collected data are available in the following link:

www.national-manufacturing-debate.org.uk

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