



**MANUFACTURING
RENAISSANCE IN
INDUSTRIAL
REGIONS?**



ADVANCED MANUFACTURING AND LOCAL INDUSTRIAL STRATEGIES



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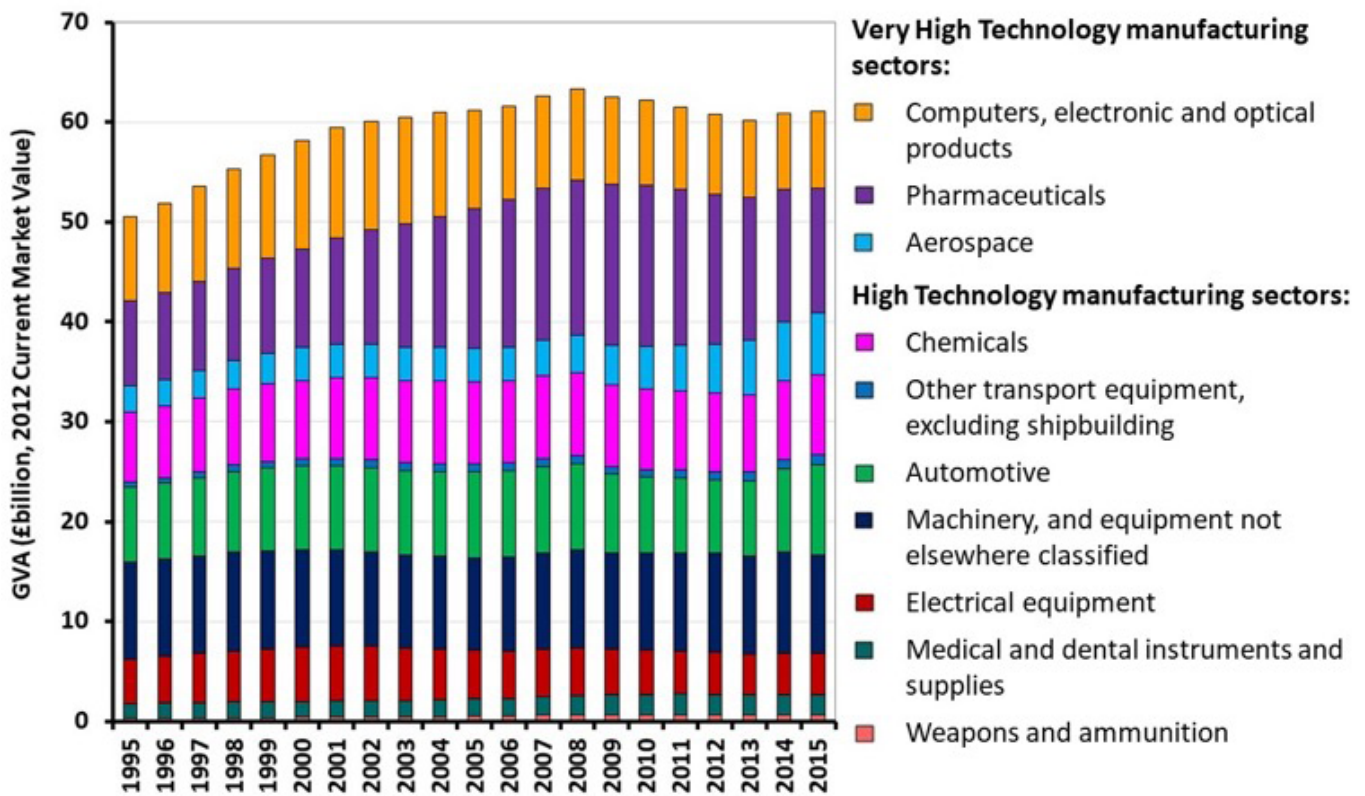
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1. WHAT IS ADVANCED MANUFACTURING?

Advanced manufacturing is defined as production activities that use a high level of technology and are relatively knowledge intensive. These activities require a workforce with higher level and more specialist skills, and often incorporate elements of service provision¹. Figure 1 shows the development of advanced manufacturing sector output between 1995 and 2015 in Britain.

Figure 1: Development of advanced manufacturing sectors, 1995-2015²



¹ BIS (2010) Growth Review Framework for Advanced Manufacturing, BIS: London https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/31755/10-1297-growth-review-framework-for-advanced-manufacturing.pdf

² Based on Eurostat-classification: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:High-tech_classification_of_manufacturing_industries

2. WHY IS ADVANCED MANUFACTURING IMPORTANT FOR LOCAL ECONOMIES AND LOCAL INDUSTRIAL STRATEGIES?

Many local economies across the UK have experienced a reduction in total and relative output and employment in manufacturing caused by de-industrialisation and the shift towards a more service-based economy. Local economies have had to adapt to the transition out of lower value, lower productivity and lower wage manufacturing and into higher value, higher productivity and higher wage manufacturing. This shift towards more advanced manufacturing raises the challenge of adaptation.

National policy is seeking to rebalance the economy sectorally and spatially. Advanced manufacturing is central to the UK Industrial Strategy, and its key role in driving growth across the country will now have to be worked out in Local Industrial Strategies.

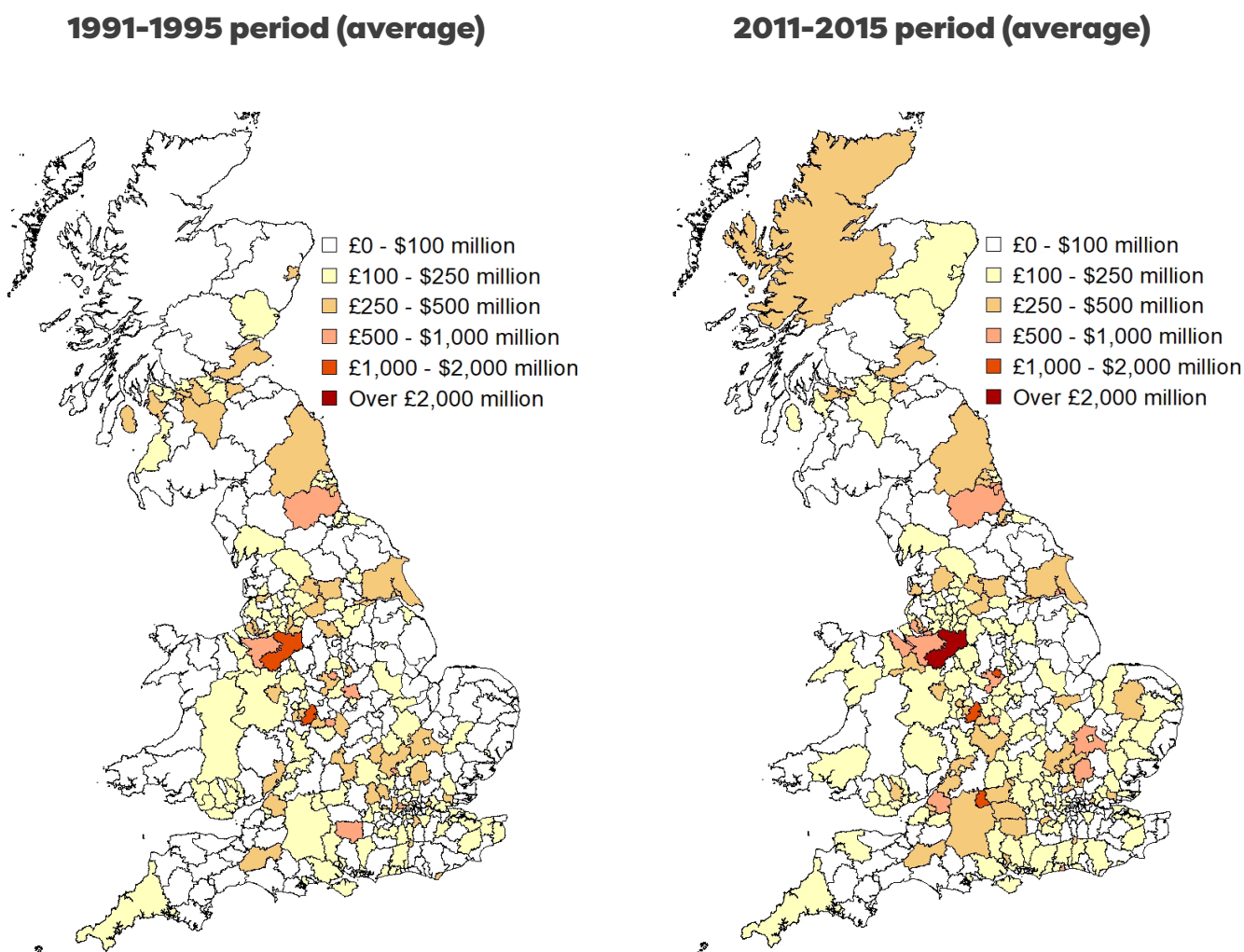
Undermining arguments against considering manufacturing as a 'smokestack' industry with limited future potential, advanced manufacturing is central to this ongoing economic transition and opportunities for economic renewal and 'rebalancing' due to several characteristics:

- Higher value and higher productivity economic activities based upon knowledge- and capital-intensive manufacturing capable of driving local and extra-local linkages through demands for cutting-edge and innovative materials and scientific advances
- Tradeable activities and exports generating earnings from overseas sales, contributing positively to the national balance of payments, helping to manage inflation through reducing reliance upon imports and sustaining exchange rate values
- Driving innovation and knowledge creation, especially through the development and application of advanced information and communication technologies and artificial intelligence – described as 'Industry 4.0' or the '4th Industrial Revolution'
- Higher quality, more productive and better paid jobs and training and skills development opportunities.
- Upgrading potential for products and processes towards higher value-added content through the incorporation of tangibles such as technology and integration with intangible services such as branding, product support, after-care and disposal – described as 'manu-services' or 'servitisation'

These attributes of advanced manufacturing make it a potentially vital part of local industrial strategies and a stimulus for upgrading within and beyond local economies.

Centrally important is a better understanding of the changing geography of advanced manufacturing because notable shifts have taken place in the location of advanced manufacturing across Britain since the 1990s (Figure 2).

Figure 2: Development of the spatial distribution of output in all advanced manufacturing sectors across Local Authority Districts in Britain³



Different advanced manufacturing sectors differ in their growth prospects and locational requirements. Different trends can be seen for different types of activities (Table 1), and these underline the need to better understand advanced manufacturing locally and contribute to formulating a place-based policy mix addressing an area's particular strengths and bottlenecks.

³ Output is in Gross Value Added (GVA), in 2012 Current Market Value.

Table 1: Trends in the geography of advanced manufacturing in Britain

| | Growth sectors, expanding into new regions | Slower growth sectors, flourishing in select regions |
|--|--|--|
| Emphasis on efficient assembly and engineering-based know-how | <ul style="list-style-type: none"> → Aerospace → Automotive → Other transport equipment (excl. shipbuilding) → Medical and dental instruments and supplies | <ul style="list-style-type: none"> → Machinery and equipment → Electrical equipment → Chemicals |
| Emphasis on research & development activities and science-based innovations | <ul style="list-style-type: none"> → Pharmaceuticals → Weapons and ammunition | <ul style="list-style-type: none"> → Computers, Electronics and Optics |

3. UNDERSTANDING ADVANCED MANUFACTURING LOCALLY

The central task is assembling the evidence base on advanced manufacturing in the local economy. This involves gathering the quantitative and qualitative data to describe what is present locally.

The first step includes identifying and mapping the sectoral structure, employment (e.g. number of jobs, occupations), geography (e.g. spatially clustered or dispersed) and performance (e.g. output, productivity, innovations). Then examining the dynamics and trends over time on these indicators to detect patterns of growth, stagnation and decline across different sectors in the area.

The second step requires moving from description to analysis and undertaking more detailed examination of the constituent elements of advanced manufacturing and their inter-relations. Key issues to address here include intra- and extra-local linkages and supply chains within and beyond the local economy and identifying sectoral needs, future potential and risks and vulnerabilities. Examples of questions include: what are particular strengths in the area? Which sectors and places are appropriate comparators against which to assess local performance and future aims? What bottlenecks and constraints are different sections of advanced manufacturing in the region facing? Which sectors and jobs are liable to disruption and vulnerable to automation and digitalisation?

The final step is then using this strategic assessment of local advanced manufacturing to decide upon the focal points and priorities for policy. These will then have to be developed into a mix of specific policy interventions matching local potential and opportunities.

4. WHAT SORT OF POLICY INTERVENTIONS FOR WHAT KIND OF ADVANCED MANUFACTURING?

Place-based local policy for advanced manufacturing involves designing a mix of policies tailored to local economic circumstances and potential. This mix of policies needs to be supported by the kinds of evidence and analysis described in Section 3. Key is to avoid generic or ‘one-size-fits-all’ approaches and policies that may not be well matched with the particular kinds of advanced manufacturing present locally. Ideally, the proposed interventions will be directly underpinned by the analysis of evidence.

The key questions to address for local advanced manufacturing policy include:

- What are the rationales for the interventions? What market or (eco)system failures are they addressing? What social and/or spatial equity rationale is being addressed?
- What is being targeted by the interventions? Is the dominant approach horizontal and industry-wide or more vertical and sectoral? Or is the focus mission-oriented towards a particular technology (e.g. Artificial Intelligence) or societal challenge (e.g. climate change)? What segments of the ‘ecosystem’ around local advanced manufacturing firms are to be enhanced to facilitate growth, innovation and entrepreneurship?
- What are the aims and purposes of the policies? What are the policies expected to do? What are the linkages in the ‘causal chain’ between the planned policies and expected inputs, activities, outputs, outcomes and impacts? What are the policy options and their comparative benefits and costs?
- Are the policies aligned and complementary to other local economic interventions? How will they be co-ordinated at the local level and in relation to national level policies? Is there an appropriate balance of policies at the local level? How are the risks of focusing available resources into relatively small, albeit potentially advanced and highly productive, manufacturing niches being assessed and mitigated?

International analysis provides many ideas for local industrial strategies and policies⁴. Examples of types of interventions and policies include consolidating and focusing support through advanced manufacturing centres or hubs, targeting specific advanced manufacturing activities through focused sector development strategies, working with local further education colleges and using apprenticeships to ensure a consistent pipeline of skilled labour for a specific sector and linking with a local university for advanced manufacturing management training and skills upgrading to enhance productivity.

⁴ See, for example, Bartik, T. J. (2018) Helping Manufacturing Intensive Communities: What Works?, Policy Futures, Center on Budget and Policy Priorities, <https://research.upjohn.org/reports/232/> and What Works Centre for Local Economic Growth (2018) Developing Effective Local Industrial Strategies, https://whatworksgrowth.org/public/files/18-06-21_Designing_Effective_Local_Industrial_Strategies.pdf

ABOUT THE RESEARCH

The project is examining the geographical, organisational and economic dynamics of advanced manufacturing across the UK, focusing on four sectors in particular: computing, electronic and optical products; aerospace; pharmaceuticals; and automotive.

The research is funded by the Economic and Social Research Council. The research team is led by Peter Sunley (Southampton University) and includes Emil Evenhuis (Southampton University), Richard Harris (Durham University), Ron Martin (Cambridge University), John Moffat (Durham University) and Andy Pike (Newcastle University).

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For more information, see:
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