Department for Education

Skills England: Sector skills needs assessments

Advanced Manufacturing

June 2025

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Summary

Manufacturing spreads opportunity across the country and plays an important role in our future economic resilience, acting as a significant dependency for many of our services sectors and as a driver of innovation.[1]

Advanced Manufacturing (AM) is an industry within manufacturing and is defined as a production process that integrates advanced science and technology, including digital and automation, into manufacturing. The Advanced Manufacturing Industrial Strategy Sector Plan will use an "analytical proxy" definition for the sector. However, these rely on and operate within a wider manufacturing ecosystem so for this and reasons of published data availability this briefing will focus on the broader manufacturing sector.

At the time of writing, definitions of the eight Industrial Strategy growth-driving sectors are still in development. Our analysis uses the best available definitions and evidence, setting out what we already know and where further work is needed to understand the skills landscape within these sectors. The forthcoming Industrial Strategy Sector Plans will set out analysis of the highest growth potential subsectors.

Priority jobs and skills

Manufacturing employed 2.6m people (7% of total employment) in 2024 and accounts for £220 billion of gross value added (around 9% of the economy).[2,3,4,5] There are a range of different roles in the manufacturing sector across skill levels[6], including:

- **Lower-skilled roles:** assemblers, basic production workers.
- **Mid-skilled roles:** technicians, welders.
- **Higher-skilled roles:** engineers, researchers, scientists.

Our sector engagement [7] highlighted that a lack of women, ethnic minorities and young people applying is a huge factor exacerbating recruitment difficulties; 74% of the manufacturing workforce are male, 88% are white and 36% are over 50.[8,9,10]

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[1] Invest 2025: the UK's modern industrial strategy, DBT (2024)
[2] Workforce jobs by industry, ONS (2024)
[3] Self-employment jobs by industry, ONS (2024)
[4] Employee jobs by industry, ONS (2024)
[5] GDP output approach – low-level aggregates, ONS (2024)
[6] SOC 2020 Volume 1: structure and descriptions of unit groups, ONS
[7] During this engagement process and the drafting of this publication, Skills England was set up in shadow form within the Department for Education (DfE). Skills England - GOV.UK
[8] Employees and self-employed by industry, ONS (2024)
[9] Employment by industry, ONS (2024)
[10] Annual Population Survey Jan 2024-Dec 2024, ONS (2024)

More than 70% (27 of 38 areas) of Local Skills Improvement Plans (LSIPs) highlighted Manufacturing and Engineering and related industries as a priority in their reports and 18 areas are taking part in a sector based working group for designated Employer Representative Bodies (ERBs).[11]

In December 2023, 82% of payrolled employments in manufacturing were UK nationals, 12% were EU nationals and 6% were non-EU nationals.[12] The end of free movement following EU Exit has led to an estimated shortfall of 47,000 workers, representing 2% of employment.[13] From January 2022 to June 2023, 13% of visa applications for SOL (Shortage Occupation List) eligible jobs were in manufacturing, the second highest of any sector.[14] The median salary in manufacturing in 2024 was £35,518, below the new skilled worker visa salary threshold of £38,700.[15]

There are 49,000 current vacancies in manufacturing and the sector has the third-highest skill-shortage vacancy (SSV) density, with 42% of all manufacturing vacancies being classed as SSVs in 2022. In 2017, SSV density was at 29%, implying a sharp recent increase in skill shortages. Existing job occupations with some of the highest SSV densities across the sector include[16]:

- Metal machining setters and setter operators;
- Electricians and electrical fitters;
- Design and development engineers;
- Engineering professionals n.e.c. (not elsewhere classified);
- Carpenters and joiners

Focus on industries

Space

A recent survey of the space industry found that 52% of organisations reported skills gaps in their current workforce, with notable skills gaps in space manufacturing including electronics design (43%), systems engineering (39%) and maintenance manufacturing & materials (24%).

[11] AI analysis of local skills improvement plans, DfE (2023)

[12] UK payrolled employments by nationality, region, industry, age and sex, from July 2014 to December 2023, HMT (2024)

[13] Early Impacts of post-Brexit immigration system on the UK labour market, Centre for European Reform (2023)

[14] Review of the Shortage Occupation List, Migration Advisor Committee (2023)

[15] Earnings and hours worked, by industry and occupation 2023, Office for National Statistics (2024)

[16] Vacancies by industry, ONS (2025)

Half (50%) of organisations expect that their space skills needs will be different in three years' time, with organisations particularly expecting to need skillsets in software & data (81%), electronics design (70%) and systems engineering (59%).

The survey also found that 58% of large companies and 56% of medium organisations tried to hire from outside of the UK in 2023, compared with 38% of small companies and 16% of micro businesses. Among organisations who tried to recruit from abroad, 83% faced difficulties, including high costs and the complexity of the visa process, and 21% were not successful.[17]

Aerospace

Our engagement with the aerospace industry indicated that a lack of skilled composite engineers is constraining industry growth. Separate engagement carried out by the Government / Industry sector council Aerospace Growth Partnership (AGP) has indicated that the UK is facing a talent crisis as the industry continues to grow at unprecedented production rates while also transitioning to a net zero future through technology transformation.

This crisis is compounded as older, experienced workers retire and the demand for skills continues to grow. The deficit is causing a critical shortage of mechanics, technicians, material specialists (including composite engineers), and manufacturing engineers amongst others, resulting in production delays and increased costs.

The AGP engagement also highlighted the industry's concern about sourcing sufficient highly skilled individuals with qualifications of Level 5 or above, noting that skilled workers are essential for the delivery of future aerospace programmes and capabilities in the UK.[18]

Future skills demand is driven by three core trends:

- Automation: 59% of manufacturers cite automation as a trend that is changing jobs and skills needs for their business, with manufacturing predicted to have the highest number of net job losses out of any industry.[19,20] In addition, 46% of manufacturers say a lack of technical skills creates challenges for adopting automation technologies.[21]
- Digitalisation: 50% of manufacturers cite digitalisation as a trend that is changing jobs and skills need for their business.[22] The digital transformation of manufacturing is

[17] Space Sector Skill Survey 2023, Space Skills Alliance (2023) Figure 2 and Figure 14
[18] The Aerospace Growth Partnership 2024 future skills workshops – due for publication in Summer 2025
[19] 2030 Skills: Closing the Gap, Make UK (2022)
[20] The Potential Impact of Artificial Intelligence on UK Employment and the Demand for Skills, PWC (2021)
[21] Manufacturing and Automation, Make UK (2023)
[22] 2030 Skills: Closing the Gap, Make UK (2022)

enabling better and more efficient design and production, but the technological change creates a greater demand for digital skills.[23]

- Environmental Sustainability: 37% of manufacturers cited environmental sustainability or “greenification” as a factor in changing skills needs. Key skills include resource efficiency as well as design and innovation to develop sustainable products and electric vehicles.[24]

Training routes into the sector

Engineering and Manufacturing Technologies apprenticeship starts in England dropped from 49,060 in 2021/22 to 45,800 in 2023/24.[25] For the academic year 2020/21, only 7% of total science graduates entered the manufacturing workforce.[26]

According to Skills England engagement, meeting the skills demands of AM is challenging due to the need to reskill existing staff. Only 54% of manufacturing employers provided any training in 2022.[27] Manufacturing employees on average receive 2.5 days of total training per employee, amongst the lowest of all UK sectors. Without investing in their development, businesses risk losing experienced employees and missing opportunities to cultivate mentors for incoming talent, hindering growth and innovation.

AM employers also highlighted that perceptions of manufacturing as an undervalued profession is the main challenge in attracting new talent. This was linked to schools not advocating for the sector, coupled with misconceptions around wage. Employers spoke of a lack of collaboration between industry, education, and government which limits outreach, perpetuates outdated perceptions of manufacturing and apprenticeships, and restricts access to young talent. It was suggested that increased investment in education providers would improve the ability to enhance industry perception among potential future employees and foster stronger links between industry and schools, including work experience opportunities.

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[23] How technology developments in manufacturing demand a new approach to leadership and skills, Made Smarter (2024)

[24] How technology developments in manufacturing demand a new approach to leadership and skills, Made Smarter (2024)

[25] Apprenticeships: Starts by Subject, DfE (2024)

[26] Standard industrial classification of graduates entering work in the UK by subject area of degree - Figure 11, HESA (May 2023)

[27] Employer Skill Survey 2022, DfE (2023)

Securing the future workforce

Feedback from the sector indicated that the skills shortages are well understood, and apprenticeships are highly regarded. Therefore, the consensus was to refine the existing skills offer rather than a proposing a complete overhaul of the system.

Key gaps in provision

- Accessing talent at Levels 4 and 5 was repeatedly highlighted as a challenge. Limited industry-education collaboration, regional coordination, and lack of flexible delivery models also hinder the accessibility and quality of training for shift workers and SMEs.
- Providers reported lacking the necessary funding for training, materials, and premises, adversely affecting their capacity to deliver the more complex skills needs such as AI and automation skills, or more niche skills which, due to the small scale, are financially unviable. The lack of inflation proofing apprenticeship standards has also impacted this. Without inflation-proofing standards providers struggle to deliver, especially lower-level apprenticeships, as current bands were considered inappropriately set making them financially undeliverable. It was felt that inflation-busting increases to these funding bands would help ensure the sector's growth and stability.
- Some standards were considered to have failed to adapt to evolving industry needs, impacting the ability to upskill the current workforce and attract a new generation of talent in AI and Automation. The introduction of a modular approach to apprenticeships with core and optional elements would assist with this.
- Engagement also highlighted the need for investment in education providers for adequate equipment, technology, infrastructure and tools to support training around advanced technologies, such as targeted training on AI and digital technologies. This would support workforce readiness for the transition, with a focus on reskilling, attracting new talent, and adapting standards to meet evolving industry needs.
- It was suggested that short courses funded through the growth and skills offer could support underrepresented groups through pathways like Foundation Apprenticeships. This could strengthen collaboration between industry, education, and government to improve outreach, reshape perceptions of manufacturing and apprenticeships, and increase access to young talent. The flexibility of a more modular approach to upskilling offers would allow for skills gaps to be addressed much more effectively, with increased uptake due to the greater work life balance and reduced burden on the business compared with committing to a full apprenticeship.

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