Skills England

Sector Skills Needs Assessment
Advanced Manufacturing

1 June 2026

Contents

1. Handling Notes

The SNAs use occupations, as defined by Standard Occupation Classification (SOC) codes, to provide an indication of the skills needs for the sectors. These allow for a consistent approach and cross-sector comparison. However, they are an approximation and do not work for all types of employment, particularly in highly specialised and emerging roles. In addition, we have expanded our methods to use the newly developed UK Standard Skills Classification to identify the skill areas relevant for priority occupations.

This is the first step for assessing the future demand for skills across key sectors in terms of both occupations and specific skills areas. All estimates of future employment and skills are highly uncertain and their inclusion here is not for making precise forecasts of employment levels. Rather, the aim is to provide information about the general nature of changing employment patterns and their implications for skill requirements. The projections should be regarded as indicative of general trends and orders of magnitude, given the assumptions set out in section 5 below.

In line with the Advanced Manufacturing Industrial Strategy sector plan, this report uses the proxy definition for the sector which covers high and medium-high technology manufacturing sectors. This corresponded to the following UK's Standard Industrial Classification (SIC) Codes:

- 20 Chemicals
- 26 Computer, electronic and optical products
- 27 Electrical equipment
- 28 Machinery
- 29 Motor vehicles
- 30 Other transport equipment

The data and methodology used to create the Skills Needs Assessments are set out in the accompanying tables and technical annex published alongside this report.

2. Executive summary

According to analysis by Skills England and the Department for Business and Trade, employment demand in Advanced Manufacturing is set to rise, with priority occupations within the Advanced Manufacturing sector projected to grow by 47,000 (13%) between 2025 and 2035. This is in addition to the estimated 101,000 workers expected to leave these priority occupations over that period that need to be replaced, bringing total demand to around 148,000 workers.

There are 25 priority occupations identified for this sector. These are mostly formed of: engineers, skilled metal and electrical workers, technicians, programmers, and process operatives.

The majority (84%) of projected additional employment in priority occupations requires workers with qualifications at level 4 and above. These roles typically require skills in numeracy, digital literacy, and problem solving and decision making. Most of these occupations (19 out of 25) face demand from other priority sectors, particularly for digital and engineering roles, intensifying the difficulty to attract and retain people in these occupations. There is some uncertainty about how AI adoption will influence the demand for roles in the future.

These occupations are already showing signs of high demand across the UK labour market, with almost 3 quarters (71%) of the occupations in critical or elevated demand across the whole economy. Over a quarter (29%) of these occupations are in critical demand, indicating that the demand pressures are already acute.

Generative AI is altering sections of the Advanced Manufacturing Industries sector, as roles become more hybrid and shift away from manual tasks to oversight and orchestration.

Historically, the education pathways most important to the priority occupations are varied and are split across apprenticeships in Manufacturing and degrees in Computing and Engineering. The apprenticeship for Transportation Operations and Maintenance is also an important pathway, due to the high volumes of apprenticeships used in the automotive subsector. The historic data does not capture all training routes, and there are now over 110 apprenticeships standards aligned to a priority occupation and skills bootcamps that also support these occupations.

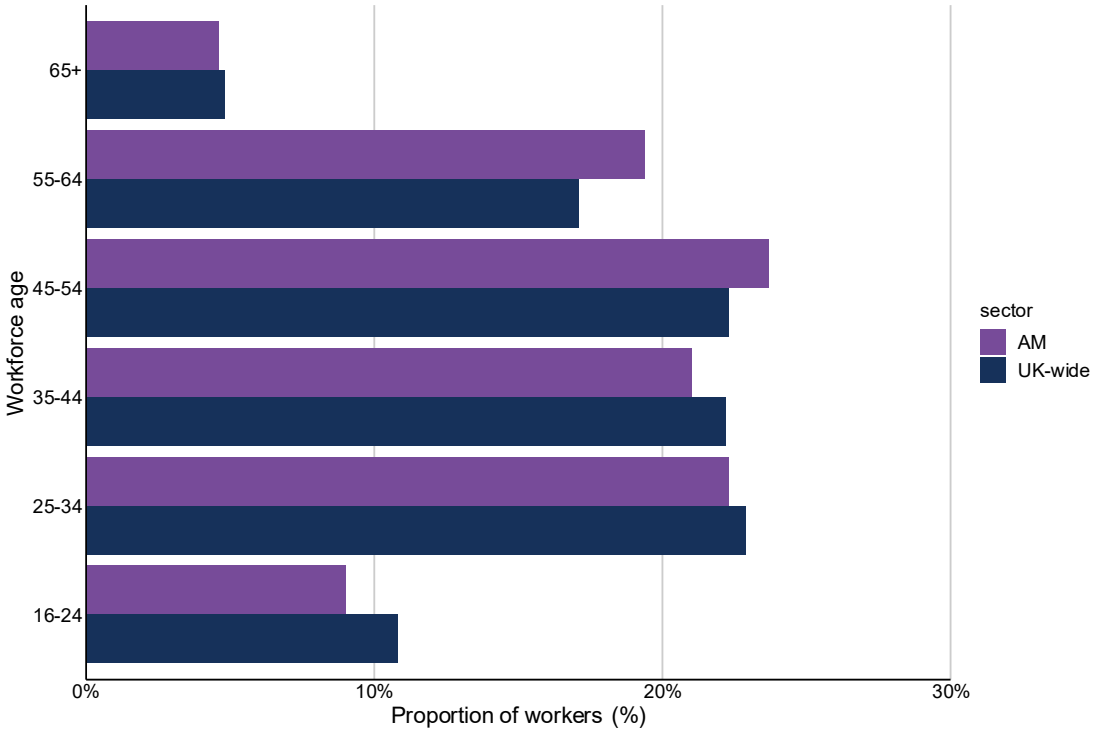
The growth in training is most heavily concentrated in Computing and Transportation Operations, which have seen growth in course completions between 2021 to 2022 and 2023 to 2024 of around 40%. Engineering has also seen growth in training, whereas there has been a substantial reduction for apprenticeships in Manufacturing.

3. Workforce overview and demographics

Advanced Manufacturing (AM) is an industry within manufacturing, defined as a production process that integrates advanced science and technology, including digital and automation, into manufacturing. It is key to the UK's ambitions to decarbonise, digitise and build a more resilient economy. In 2025, it was estimated that Advanced Manufacturing employed 770,000 people across the UK (Employee jobs by industry and Self-employment jobs by industry, ONS, 2026). The Advanced Manufacturing Industrial Strategy Sector Plan outlines 6 priority sub-sectors: automotive, batteries, aerospace, advanced materials, and agri-tech. It uses a proxy definition for the sector covering high and medium-high technology manufacturing sectors, which is aligned with the UK's Standard Industrial Classification Codes. We use the same definition in this report.

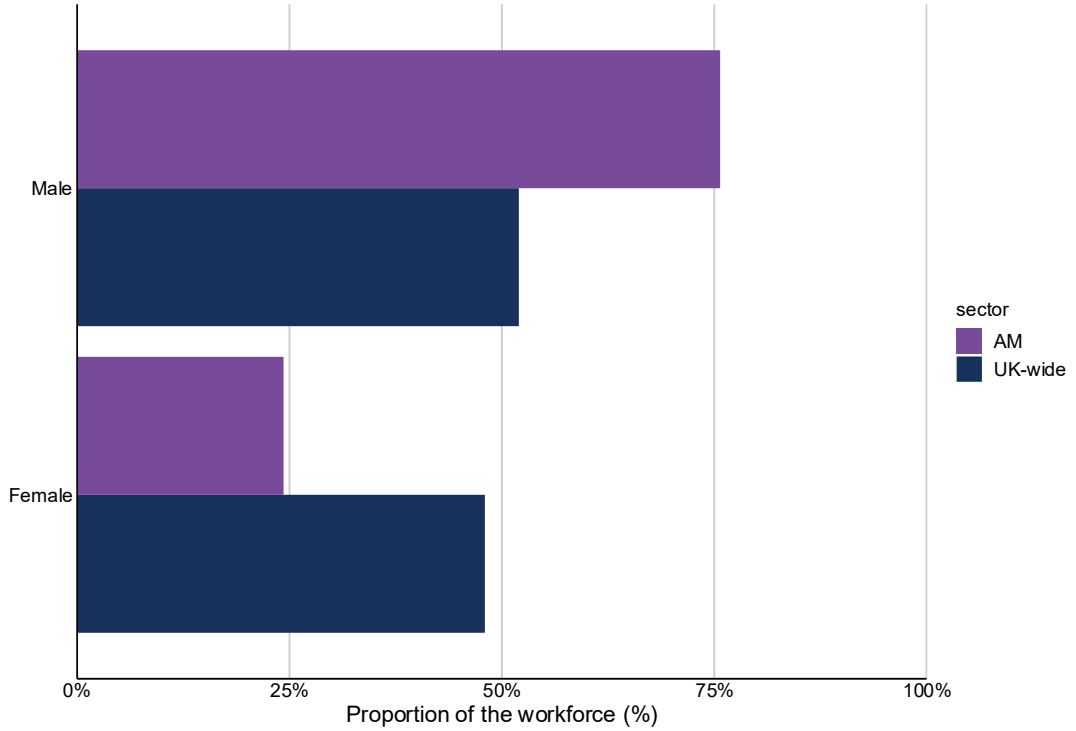
The workforce in Advanced Manufacturing has an age profile that appears relatively older than that of the UK-wide workforce. As seen in Figure 1, the largest age group in Advanced Manufacturing is 45 to 54 (23.7%), which is 1.4 percentage points higher than the UK average (22.3%). The workforce is also male dominated, as shown in Figure 2: 76% of the workforce is male, compared with 52% across all UK industries. This may put pressure on the workforce. Improving women's access to the sector and increasing its attractiveness to women would widen the talent pool available to manufacturing businesses.

Figure 1: Age distribution in the Advanced Manufacturing (AM) workforce compared to UK-wide employment in 2025



Source: Annual Population Survey, ONS, 2025 data

Figure 2: Sex distribution in the Advanced Manufacturing (AM) workforce compared to UK-wide employment in 2025



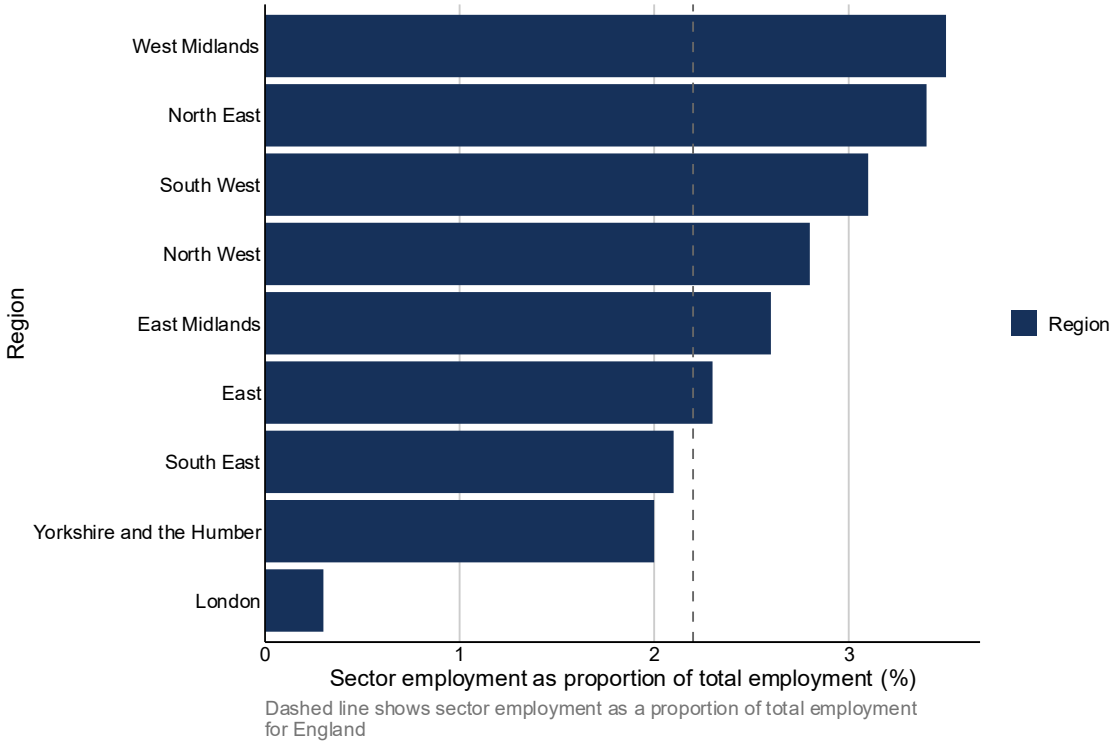
Source: Annual Population Survey, ONS, 2025 data

Regionally, based on employment estimates from the Business Register and Employment Survey (BRES) 2024, the West Midlands, North East, and South West record the highest shares of Advanced Manufacturing employment, each exceeding 3% of their total regional workforce. This is shown in **Error! Reference source not found.** below. In comparison, regions such as the East, South East, and Yorkshire and the Humber sit below the England average of around 2%, and London's concentration is much lower at 0.3%.

As shown in Figure 4, within the West Midlands region, the Warwickshire LSIP geography (4.7%) and Worcestershire LSIP geography (4.2%) stand out as hotspots for their shares of Advanced Manufacturing employment. Neighbouring geographies show levels of employment in Advanced Manufacturing that are in line with national patterns. BRES analyses comparisons are made using LSIP geographies as defined by the designated Employer Representative Body boundaries set out by Skills England, ensuring consistency with the official LSIP framework.

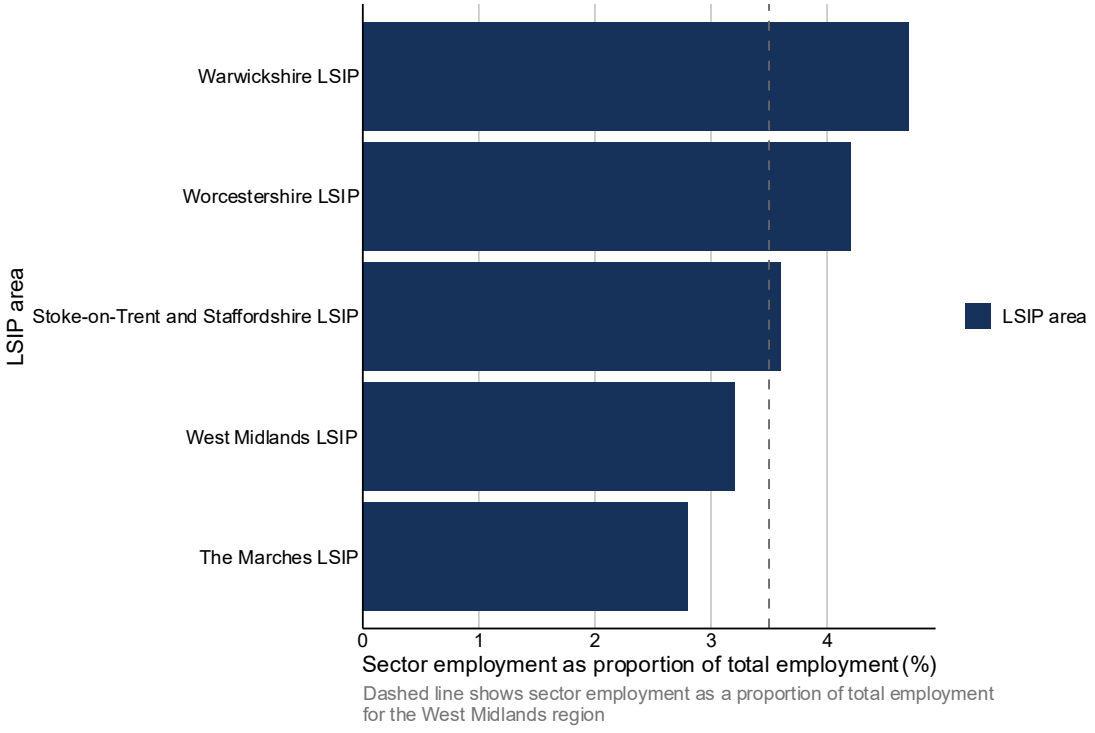
Note: BRES primarily captures VAT- and PAYE-registered businesses and may therefore under-represent sectors with high numbers of freelancers or micro-businesses. As a result, apparent regional concentrations may reflect the location of larger employers rather than the full distribution of sectoral employment.

Figure 3: Proportion of jobs in Advanced Manufacturing, relative to total employment, for English regions in 2024



Source: Business Register and Employment Survey (BRES) 2024

Figure 4: Proportion of jobs in Advanced Manufacturing, relative to total employment, for the West Midlands region in 2024



Source: Business Register and Employment Survey (BRES) 2024

4. Priority Occupations and Current Demand

4.1 Priority Occupations

Skills England has been working with the Department for Business and Trade (DBT) to identify important occupations in Advanced Manufacturing. These priority occupations have been chosen by identifying which jobs are concentrated in Advanced Manufacturing sectors, with a focus on higher-skill professions. Skills England's demand assessments were also considered alongside qualitative evidence from sector teams.

There are 25 priority occupations for Advanced Manufacturing and 19 of these occupations overlap with at least one other sector. The sectors that overlap the most with Advanced Manufacturing in terms of priority occupations are Clean Energy, Defence, and Digital and Technologies.

There are 6 Advanced Manufacturing priority occupations which do not overlap with the priority occupations selected for any other priority sectors, including: Sheet metal workers, Precision instrument makers and repairers, and Vehicle technicians, mechanics and electricians.

Table 1: Advanced Manufacturing priority occupations appearing in at least 2 other sectors

Occupation	Number of sectors including Advanced Manufacturing
Programmers and software development professionals	7
IT business analysts, architects and systems designers	6
Engineering professionals n.e.c.	5
Electrical engineers	4
Electronics engineers	4
Production and process engineers	4
Engineering technicians	4
Production managers and directors in manufacturing	3

Mechanical engineers	3
Engineering project managers and project engineers	3
Quality assurance technicians	3
Welding trades	3
Metal working production and maintenance fitters	3

Of the priority occupations in Advanced Manufacturing, 29% are in critical demand (substantially higher demand than usual) and 71% are in either critical or elevated demand (above average). This is based on Skills England's Occupations in demand analysis, published in 2025. This illustrates a high level of current demand for the priority occupations identified by the sector.

4.2 Demand for Skills

The UK's first Standard Skills Classification (SSC) provides a mapping of relevant skill areas to occupations. Using an initial prototype of the SSC, experimental analysis was conducted to identify the skill areas which are relevant to priority occupations. Across the priority occupations in the Advanced Manufacturing sector, the top 3 technical skill areas are:

- Inspecting and testing structures and equipment
- Determining project requirements and plans
- Designing technical solutions and prototypes

4.2.1 Core Skills

The SSC also sets out 13 'Core Skills', which are fundamental abilities that contribute to the capability to carry out the tasks associated with a specific job, such as numeracy, reading, and writing. They are often transferable, meaning they can be applied across different sectors of activity and roles. The SSC provides proficiency scores for core skills by occupation, on a 1 to 5 scale from minimal proficiency to expert proficiency.

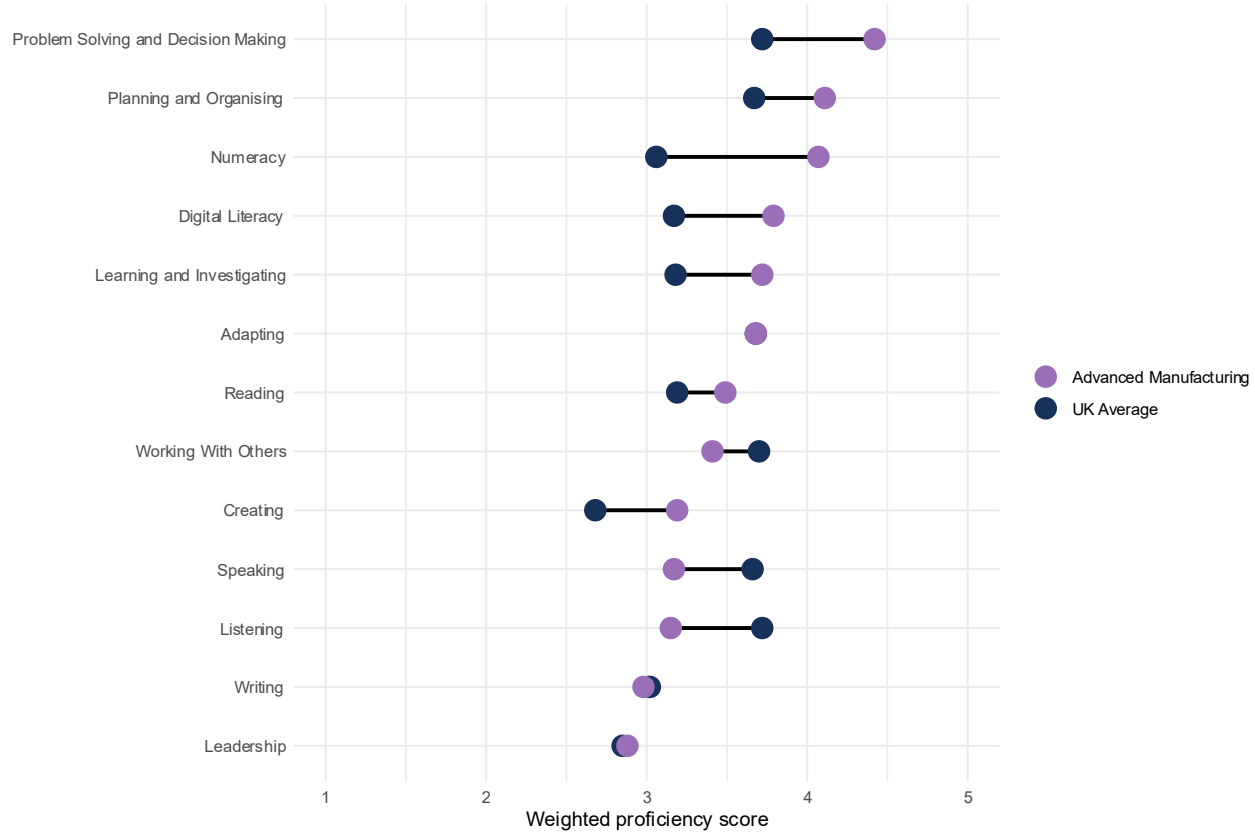
The 13 Core Skills defined in the UK Standard Skills Classification (SSC) are listed below. These are foundational, transferable abilities required across occupations, and they are listed explicitly in the SSC Core Skills Explorer.

- **Planning and Organising** – Setting goals, prioritising tasks, structuring approaches.
- **Adapting** – Adjusting strategies or behaviour to new or changing situations.
- **Working With Others** – Collaborating effectively with teams or groups.
- **Listening** – Understanding spoken communication, including non-verbal cues.
- **Speaking** – Communicating clearly and confidently through speech.
- **Leadership** – Motivating, guiding, and inspiring others.
- **Learning and Investigating** – Searching for, gathering, and understanding new information.
- **Creating** – Developing original ideas, innovations, or solutions.
- **Problem Solving and Decision Making** – Identifying issues, analysing information, selecting solutions.
- **Numeracy** – Applying mathematical techniques and interpreting numerical data.
- **Digital Literacy** – Using digital tools and technologies effectively (including AI).
- **Reading** – Interpreting written information accurately.
- **Writing** – Communicating ideas clearly and persuasively in written form

The required proficiency in core skills for the priority occupations has been compared to the UK average. Where core skills have a higher required proficiency in priority occupations, this suggests that these skills are particularly important for these occupations. The graph below shows which core skills are important for the Advanced Manufacturing sector compared with the wider UK.

Advanced Manufacturing requires notably higher proficiency in the core skills: Numeracy (4.1 versus 3.1); Problem Solving and Decision Making (4.4 versus 3.7); Digital Literacy (3.8 versus 3.2).

Figure 5: Core skills proficiency for the Advanced Manufacturing sector compared to the UK average



Source: Internal analysis using the UK Standard Skills Classification

5. Future Demand for Priority Occupations

Employment demand is set to rise for priority occupations within the Advanced Manufacturing sector. They are projected to grow by 47,000 (13%) between 2025 and 2035.

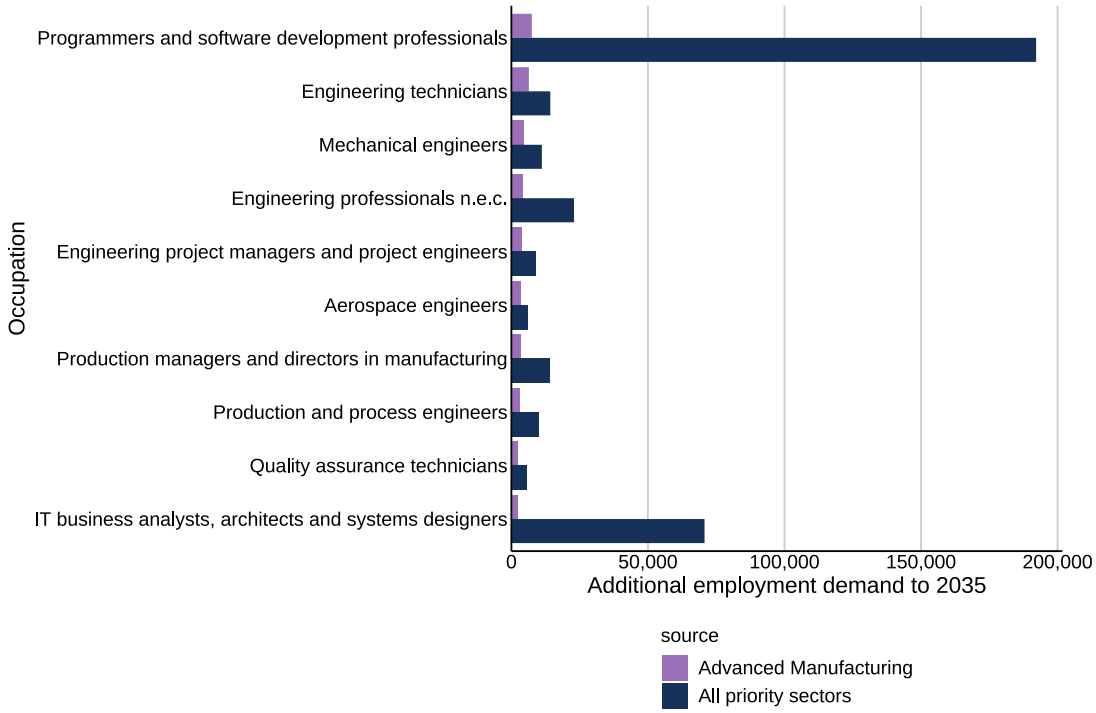
To estimate future demand projections for priority occupations, DBT used growth rates from The Skills Imperative economy-wide projections 'technological opportunities' scenario and applied these to actual employment estimates for priority occupations from the 2024 Annual Population Survey.

As the Industrial Strategy plan for Advanced Manufacturing notes, this sector is focusing on achieving economic growth through a boost in productivity. In the sector, this is mostly delivered through capital investments and technological developments rather than through increasing the size of the workforce, hence the relatively low levels of employment growth over the next ten years when compared with other sectors.

5.1 Top Occupations by Employment Growth to 2035

As seen in Figure 6, the occupation with the highest projected employment demand is Programmers and software development professionals, with 7,500 additional workers needed in Advanced Manufacturing between 2025 and 2035. This occupation also faces demand from other priority sectors. The total projected employment demand for Programmers and software development professionals across all priority sectors, including Advanced Manufacturing, is 192,200 workers.

Figure 6: Top 10 priority occupations in the Advanced Manufacturing sector by additional employment to 2035



Source: Demand projections provided by Department of Business and Trade

5.2 Expected Qualification Levels

The majority (84%) of projected additional employment in Advanced Manufacturing priority occupations requires workers with qualifications at level 4 and above. This is notably higher than the proportion across all priority occupations.

Table 2: Expected qualification level of workers needed to meet demand to 2035 in priority occupations in the Advanced Manufacturing Sector

Priority Occupations	Level 2 or 3	Level 4 or above
Advanced Manufacturing priority occupations	16%	84%
All priority occupations	38%	62%

Source: Skills England planning scenarios based on sector-level projections

5.3 Alternative Scenarios

Any future projection of how the economy will evolve is inherently uncertain. This uncertainty increases the further forward the projection extends. To improve the understanding of the uncertainty in the skills assessment projections, Skills England asked the sponsoring department to provide an alternative scenario. The total job growth in the alternative scenario is shown in Table 3 below.

To estimate demand projections for the alternative scenario, DBT used growth rates from The Skills Imperative economy-wide projections 'baseline' scenario and applied these to actual employment estimates for priority occupations from the 2024 Annual Population Survey. This approach differs to the main scenario, presented in Figure 6, which used the 'technological opportunities' scenario from The Skills Imperative economy-wide projections. Further information on the scenarios can be found here: The Skills Imperative 2035: Occupational Outlook – Long-run employment prospects for the UK, Alternative Scenarios Working Paper 2b (p12).

In the Alternative scenario, growth in priority occupations is lower by 22,900 workers (23,900) compared to the main scenario (46,800). The growth rate in the Alternative scenario is 6%, which is 7 percentage points lower than the main scenario (13%).

Table 3: Main and Alternative Demand *scenarios for Advanced Manufacturing*

Scenario	Increase in employment demand from 2025 to 2035	Percentage change in employment demand from 2025 to 2035
Main	46,800	13%
Alternative	23,900	6%

Numbers rounded to nearest 100

Source: Projections provided by Department of Business and Trade

The uncertainty in many of the projections is far greater currently due to the accelerated adoption of AI technology. Such technology will increase the productivity of many jobs and possible reduce the demand for new workers in affected occupations. The speed of such changes will be uneven across the economy and very uncertain.

The uncertainty caused by AI has been a particular issue for the assessment of the Advanced Manufacturing sector, not least as digital occupations have seen some of the highest projected growth rates and these occupations are seeing some of the greatest AI-related changes. For the purposes of this assessment, we have not adjusted the projections provided by sector experts to take account of AI adoption as the evidence for changes is not currently strong. Furthermore, the growth in digital occupations is as much to do with the broad digitalisation of many sectors which is well established, as opposed to just a narrow growth in demand. However, it needs to be recognised that there is a heightened risk that projections of AI-exposed occupations including digital occupations

are too high. Skills England intends to conduct some further work over the next year to understand the risks more fully.

5.4 Replacement Demand

In addition to expansion demand, where we consider the additional workers needed due to expected future sector growth, there is also demand for workers required to replace existing workers in the labour market. This is known as replacement demand. This is a broad estimate which is based on applying rates from economy wide projections onto employment estimates of priority occupations within the sector. To note that the replacement demand rates used are at the SOC 2 digit “sub-major group” level rather than at the more specific 4 digit occupation level.

Our analysis focusses on expansion demand and assumes current supply is sufficient to maintain the existing size of the workforce. In practice, this will not be the case for some occupations.

Each year we estimate an average of 10,100 workers needing to be replaced within priority occupations in Advanced Manufacturing. Over the 10-year period of 2026 to 2035, the total estimated replacement demand is 101,000 workers.

This increases the total demand for workers. When combining this with total additional employment demand to 2035 (47,000), the total demand for workers in priority occupations in Advanced Manufacturing is 148,000. DBT engagement with the sector finds that replacement demand is a key concern, and some professions indicate that replacement demand could be higher than suggested here.

6. Influence of AI on the Advanced Manufacturing Sector

AI adoption in UK Advanced Manufacturing is expanding beyond pilots in quality control and maintenance to enterprise deployment in planning, supply chain and documentation. Adoption remains uneven: large firms are progressing faster than SMEs due to funding/resource challenges, data maturity and governance capacity. In addition, scarce roles in data/knowledge stewards, and business analysts constrain scaling (Upcoming publication: What Works for AI Upskilling in the UK, and deep-dive workshops with sector leads).

A recent survey by MakeUK reveals that while two-thirds of UK manufacturers are embracing AI, only 36% have integrated it into their operational processes (Robotics & Automation, 2024; and Make UK, 2024). PwC's 2025 Global AI Jobs Barometer shows a steady increase in manufacturing roles requiring AI expertise, increasing from ~ 0.3% of postings in 2012 to over 2% in 2024. Adoption rates also highlight a clear divide: 71% of large manufacturers are leveraging AI, compared to just 28% of SMEs, creating an uneven workforce demand.

Skills England commissioned Dr Nisreen Ameen to develop an AI Skills tools package. As part of this, evidence from deep-dive workshops with sector leads and Skills England's research and analysis report on AI skills for the UK workforce shows that there are several areas of skills demand that are particularly impacted by AI:

- There is a shift from manual tasks to oversight and orchestration: Front-line and back-office roles supervise AI-enabled vision systems, digital twins and predictive maintenance, with human sign-off on safety-critical decisions.
- Change is happening from pilots to system integration: co-pilots for documentation/analysis in back-office functions; factory use cases include condition monitoring, scheduling and line balancing.
- There is role evolution, not wholesale displacement: entry-level "pure manual" roles may shrink while some hybrid roles (operator-technician, data/quality analyst) grow.

Dr Ameen's deep-dive workshops with sector leads and our research and analysis report on AI skills for the UK workforce shows that AI skills in demand can be mapped to three broad domains:

Technical skills:

- Data/metadata literacy; developing and operating AI-enabled vision and robotics; digital twins & simulation; predictive maintenance; low/no-code automation; basic machine learning assurance; and prompting and retrieval-augmented use of approved enterprise copilots.

Non-technical skills:

- Problem framing, effective communication of AI outputs, cross-functional communication (ops–IT–quality–finance), change management and supplier/tool evaluation.

Responsible and ethical skills:

- Governance, audit trails and documentation; human-in-the-loop checkpoints; confidentiality/IP protection (e.g., recipes/formulations); cybersecurity and EU-AI-Act readiness.

7. Education Supply

As part of this assessment, we have considered the supply of workers in priority occupations relevant to the Advanced Manufacturing sector. Employment in the sector is influenced by a range of joiners (inflows) and leavers (outflows), as illustrated in Figure 7. This analysis focuses on one component of supply: inflows from education.

Education inflows capture individuals who move from education into employment in priority occupations. This group is predominantly made up of career starters, while also including a smaller number of job switchers and individuals returning to work. Taken together, these flows provide a robust and consistent indicator of the pipeline of new talent entering priority occupations and form a reliable basis for understanding the contribution of the education system to workforce supply.

Figure 7: Stock and flow of joiners and leavers into Advanced Manufacturing

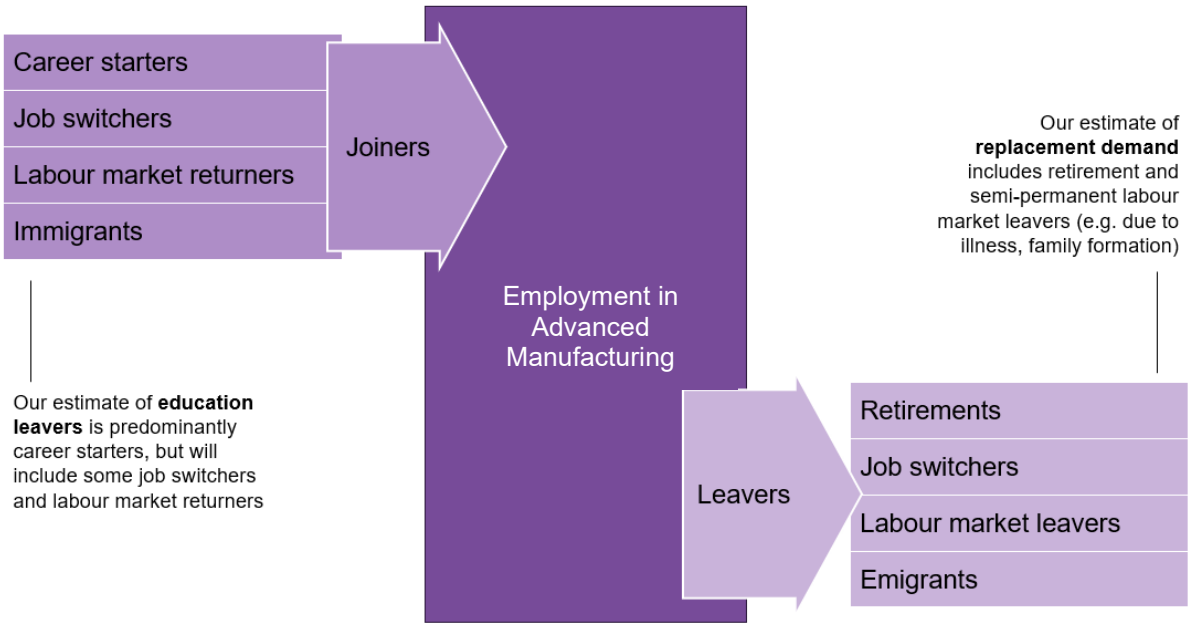


Figure 7 is a stock and flow diagram showing how people join the Advanced Manufacturing sector, listed as career starters, job switchers, returners, immigrants. It then shows what makes them leave: retirements, job switchers, labour market leavers, emigrants. For joiners, the diagram states that Skills England's estimate of education leavers is predominantly career starters, but will include some job switchers and labour market returners. For leavers, the diagram outlines that Skills England's estimate of replacement demand includes retirement and semi-permanent labour market leavers (for example, due to illness, family formation).

7.1 Important training routes

There are multiple routes by which people enter employment in a given occupation. Using information on historic pathways into these occupations and the Skills England Occupational Maps, we have identified the most prominent routes that provide direct supply into priority occupations identified for the Advanced Manufacturing sector. The routes relate to entry into the occupation but cover all industries and are not specific to

employment in the Advanced Manufacturing sector. These routes are summarised in Table 4.

Training routes are listed below by the proportion of education leavers in employment that enter a priority occupation listed by DBT. The volume of education leavers is also listed for a particular route.

Key training routes broadly split into 3 types of courses:

- Well-aligned routes, often technical in nature, where a high proportion of leavers progress into priority occupations, but sometimes with small cohorts.
- Balanced routes, where a reasonable proportion of leavers progress into priority occupations from a larger cohort.
- High volume routes, where a smaller proportion of leavers progress to priority occupations but contribute a large share of employment.

Not all 3 course types are present in all sectors. For well-aligned routes, increasing the supply into priority occupations will likely require an increase in enrolments. Whereas for other routes that are less well-aligned, increasing the progression rates to priority occupations may be more effective.

Table 4: Key routes related to priority occupations *relevant to Advanced Manufacturing*

Pathway	Subject area	Level group	Number of education leavers entering priority occupations	Percentage of employed education leavers entering priority occupations
Apprenticeship	Manufacturing Technologies	Level 2/3	2,410	43%
Apprenticeship	Transportation Operations and Maintenance	Level 2/3	1,500	37%
Higher Education	Engineering	Level 6+	4,950	37%
Higher Education	Computing	Level 6+	5,130	41%
Apprenticeship	Engineering	Level 2/3	1,660	21%

Source: Skills England estimates based on employment in 2022 to 2023 tax year

Note: The routes relate to entry into the priority occupations identified by DBT but, as these occupations can span multiple sectors beyond Advanced Manufacturing, this analysis is not strictly specific to employment in the Advanced Manufacturing sector.

The 5 routes in Table 4 account for 53% of education leavers entering the priority occupations identified for Advanced Manufacturing. This suggests that level 6+ higher education and apprenticeships are key pathways for Advanced Manufacturing's priority occupations. There are a range of levels and subject areas, and all have similarly high rates of education leavers entering priority occupations, except for Engineering apprenticeships at level 2/3. Apprenticeships identified as key pathways are lower in volume and level of education but have very similar rates into priority occupations as the level 6+ higher education provision – except for Engineering apprenticeships at level 2/3. In addition to engineering apprenticeships cover manufacturing and transport subject areas. The latter is due to the high volumes of apprenticeships in the automotive subsector.

Some newer training routes are not included in the historic data, including newer apprenticeship standards and Skills Bootcamps. Overall, based on the Skills England Occupational Maps, there are 110 apprenticeship standards linked to priority occupations in the sector. There have been 4 newly introduced apprenticeship standards since August 2022 including Machining technician, Cold forming setter technician and Process industry manufacturing technician, all at level 3. In the 2024 to 2025 data, the majority of apprenticeship achievements are at level 3 or above (84%), with 16% at level 6 or above.

7.2 Trends in training routes

We can get a sense of how supply into priority occupations is changing by looking at the number of learners successfully completing a course (defined as 'achievements') that is aligned with these occupations. Where courses have grown in achievement numbers, this could suggest that these courses will continue to be key pathways into priority occupations in the sector. **Error! Reference source not found.** gives an overview of the change in achievement figures for the key routes over the 2 years between 2021 to 2022 and 2023 to 2024.

Table 5: Growth in achievements for key routes related to priority occupations

Pathway	Subject area	Level group	Achievements in 2023 to 2024	Growth in achievements since 2021 to 2022
Higher Education	Computing	Level 6+	50,280	+40%

Apprenticeship	Transportation Operations and Maintenance	Level 2/3	7,440	+39%
Apprenticeship	Engineering	Level 2/3	12,900	+29%
Higher Education	Engineering	Level 6+	43,080	+7%
Apprenticeship	Manufacturing Technologies	Level 2/3	2,880	-53%

Source: Figures provided by the Department for Education

There were also 5,160 learners that achieved Engineering and Manufacturing skills bootcamps in 2023 to 2024, an increase from 820 in 2022 to 2023.

Apprenticeships in Engineering and Transportation Operations and Maintenance have high growth (29% and 39%, respectively), as does level 6+ higher education computing (at 40% growth) which supplies important digital skills to the sector. There is also steady growth in level 6+ higher education Engineering courses. Manufacturing Technologies level 2/3 apprenticeships have declined, which most commonly support roles as metal working and welding trades, alongside electricians and other technician roles.