ROYAL ACADEMY OF **ENGINEERING**

Engineering workforce

Summary

The availability of skilled people is a major factor for influencing business investment in R&D: being able to hire the right people with the right skills at the right time is vital for successful R&D.

The UK engineering skills base is of good quality and supports existing R&D investment.

But, quantity is a limiting factor: more engineers are needed in the UK, particularly in emerging fields such as artificial intelligence (AI) and software engineering[1].

Engineering R&D in the UK is undertaken by an international workforce: maintaining this after the UK's departure from the EU will be fundamental to increase business investment in R&D.

Engineers are inherently innovative and play a central role in business R&D and innovation. Sectors with a high concentration of graduate engineers report higher than average levels of innovation[2].

The **quality** of engineering and R&D skills in the UK is considered good when compared with competitor countries, especially where wages are lower.

But, the **quantity** of engineers in the UK is a challenge. The interviews reflected the broader engineering skills gap in the UK, with forecasts of an annual shortfall of up to 59,000 engineering graduates and technicians by 2024[3].

One in three interviewees find recruitment challenging due to a lack of skilled applicants.

Availability of skilled staff varies by sector:

Digital skills and software engineering ▼

The skills gap in this area is well-recognised, because of the rapidly developing nature of the field, and its increasing importance across all business sectors. A 2016 government report found that 72% of large companies already have tech skills gaps[4]. The interviews revealed that some countries, such as Singapore, have access to a better pool of digital talent than the UK. This may drive companies to relocate R&D, particularly since digital R&D is more mobile than capital intensive work.

Motorsport ▲

The UK has a significant heritage in motorsport, with seven out of ten of the current Formula 1 teams having UK bases. This has created a cluster of R&D activity and a strong skills base.

Medtech ▼

The large majority of companies in this sector are SMEs, with 49% employing fewer than five people[5]. Small companies can find it difficult to access the range of skills they need. This includes engineers, as well as people with an understanding of production, standards and regulatory pathways.

Small companies

Attracting R&D staff is particularly difficult for small companies who compete with large companies offering greater salaries, benefits and security.

Initiatives to encourage more graduates to consider careers in small companies could be explored. These could include greater support for SMEs to create student placements and internships, increasing CASE studentships in SMEs, or increasing the visibility of SMEs at graduate careers events.

An international workforce

Companies interviewed actively seek engineers and R&D staff from across the world, not only to provide the skills needed but also to realise the benefits of diversity in their teams.

This diversity provides multicultural understanding, language skills, and a broad range of ideas, facilitating the development of goods for a global market. Additionally, if international staff return to their home country, it can help companies develop international research networks.

The vibrant nature of the UK's cities, particularly London, helps to attract and maintain this international R&D workforce. For some companies, this is an important factor for locating R&D in the UK. There are significant concerns that if attracting international staff becomes more difficult after Brexit, it may be harder to retain R&D activities.

"If we were unable to maintain an internationally diverse team in the UK, it would be a challenge to maintain the level of R&D work here."

Jeni Mundy, formerly Product Director, Vodafone Group

The UK engineering workforce is international. **Over 15% of staff** working in professional, scientific and technical activities in the UK **are born outside the UK**[6]. For many of the companies interviewed, it was much higher, with one product development team made up of 75% non-UK nationals.

To increase business R&D investment:

→ Build the UK's engineering skills base, increasing the number of engineers, particularly for emerging sectors.

→ Government should continue to work with industry to develop the UK digital skills base, including implementing the commitments outlined in the AI sector deal and *Made Smarter Review*.

→ Recruitment of skilled people from around the world and transfer of R&D staff into the UK must not become harder after Brexit. Any new immigration system should be streamlined to be more efficient, fast, fair, and transparent, and make the UK more competitive in the global market for talent.

This explainer is part of a series based on interviews with individuals responsible for making decisions on R&D across a wide range of engineering companies.

→ See *Introduction* explainer to find out more.

1   *Growing the Artificial Intelligence industry in the UK,* Professor Dame Wendy Hall and Jerome Pesenti, 2017.
2   *Assessing the economic returns of engineering research and postgraduate training in the UK.* Technopolis, 2015.
3   *The state of engineering,* Engineering UK, 2018.
4   *Digital skills for the UK economy.* Department for Business Innovation and Skills and Department for Culture Media and Sport, 2016.
5   *Strength and opportunity 2016: The landscape of the medical technology and biopharmaceutical industries in the UK,* Office for Life Sciences and Department for International Trade, 2017.
6   *Number and proportion of people in employment: by country of birth, nationality, occupation and industry, ages 16 and over, April 2015 to March 2016 (user requested data),* Office for National Statistics, 14 July 2016.