

IET Skills and Demand in Industry 2019 Survey



Executive Summary

The UK engineering sector is at the heart of UK industry. Engineering organisations generate more than £420 billion of UK Gross Value Added, and engineers make up 19% of the UK workforce.¹ These professionals have the skills, insights and ingenuity to help propel business forward.

Yet engineering in the UK is in a precarious position. There is an estimated annual shortfall of 59,000 new engineering graduates and technicians, a deficit which only continues to get worse. Our in-depth research and strong connections with industry confirm the challenge, but also shed light on ways that we can all work together to avert the looming engineering crisis.

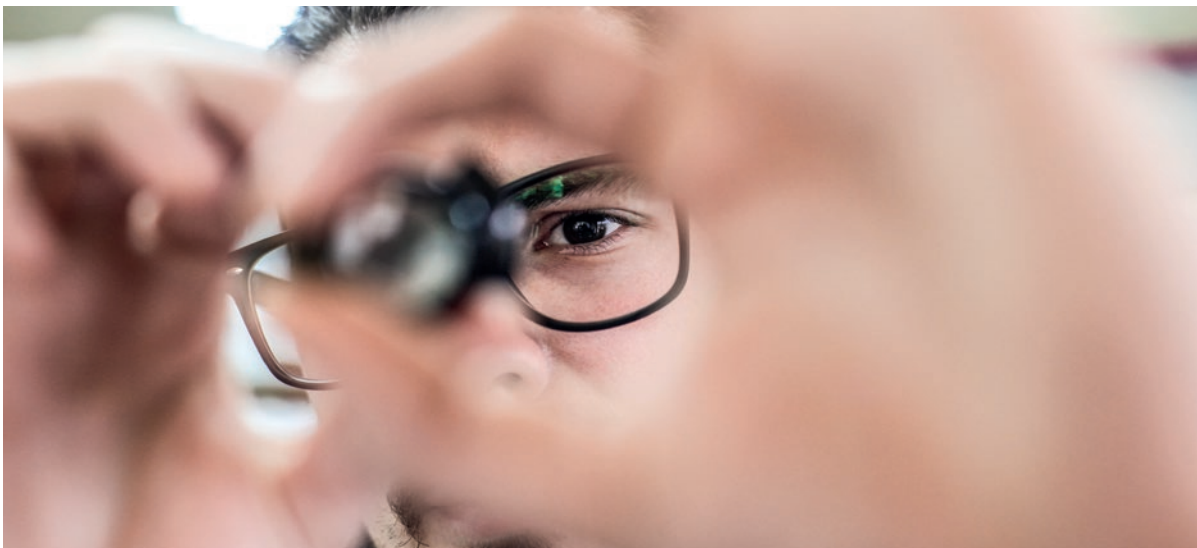
The government is introducing T Levels in 2020, a technical alternative to A levels. These will include a 45-day industry placement, providing students with an opportunity to develop their technical skills in a role directly relevant to their vocational course. T Levels may alleviate some of the downward pressure, though industry and government alike must be far better prepared and informed, as explored within this report.

As one of the world's largest professional engineering bodies, we want to continue to use our position to raise awareness of the many issues faced by the engineering industry. We want to inspire the next generation of engineers and encourage diversity, ensuring that engineering is regarded as an exciting, meaningful and viable career path for everyone.

The survey covers:

- Current and planned levels of engineering recruitment
- Skills shortages when recruiting engineers
- Skills gaps in existing workforces
- The level of diversity within engineering
- Employer perceptions of T Levels
- Apprenticeships and the effect of the Apprenticeship Levy
- Employer approaches to training, upskilling and reskilling
- Employer engagement in the education system

This report is based on research we commissioned, conducted by market research agency BMG Research. The last skills survey with comparative data was carried out in 2017. For further details please refer to the introduction section of this report.



¹ State of Engineering 2018, Engineering UK, 2018.



The main findings presented in this report are:

The skills challenge

- Employment within engineering and technology is growing, with almost one in three employers (31%) saying they have expanded their engineering and technology workforce over the last three years. However, recruiting engineering and technical staff with the right skills is the largest anticipated obstacle that businesses face in achieving objectives over the next three years (60%). This is a serious and ongoing issue that has featured strongly in previous surveys.
- Nearly half of the companies surveyed (48%) report difficulties in respect of the skills available in the external labour market when trying to recruit, up from two years ago (46%). The supply or quality of young people entering the industry is also a key concern, as is their lack of workplace skills.
- Larger companies are more likely to have problems recruiting professional level staff, whereas smaller companies report shortages at a technician or skilled craft level.
- Marginally fewer companies now have internal skills gaps or limitations in their workforce when compared with two years ago. However, those companies with internal skills gaps have seen them widen across the board, from apprentices and trainees through to fully-qualified professionals.
- Companies have made some effort to broaden diversity, but more still needs to be done. The proportion of women within the engineering and technical workforce hasn't changed since our 2017 survey, remaining at 11%. Just over one in 10 businesses (12%) are taking or have taken any action to increase the diversity of their engineering, IT and technical workforces in terms of ethnicity, LGBT+ status and disability.

Technical and vocational skills challenges

- Only 28% of employers are aware that the new T Level qualifications require students to undertake work experience. 59% of employers state that they have the capacity to offer work experience as part of T Levels, but only 43% say they intend to offer it. However, the intention to offer an industrial placement could potentially be lower if employers were clear about the 45-day placement requirement.
- 32% of companies have engineering or technical apprentices in place, with an average of between two and three apprentices at every participating company.
- 46% of companies that didn't have engineering or technical apprentices in place said they were unlikely to create an apprenticeship or hire an apprentice.
- Two in three (66%) of companies that didn't employ engineering or technical apprentices said having the capacity within the firm would encourage them to create an engineering or technical apprenticeship. 63% believed that having more motivated or better qualified young people applying for apprenticeships would encourage them to create an engineering or technical apprenticeship.



The Apprenticeship Levy

- The majority of companies that are liable to pay the Apprenticeship Levy reported that they are using it (71%).
- In 2017, 27% of companies said that the introduction of a levy would result in them employing more apprentices. This year's findings show that since its introduction, almost one in four companies (23%) that pay the Apprenticeship Levy have increased the number of engineering or technical apprenticeships offered.



Employer approaches to training, upskilling and reskilling

- 68% have arranged or funded technical or job-specific training for their engineering or technical staff in the 12 months prior to our survey, comparing favourably with 59% in 2017.
- There has been a general increase in companies providing training for operative-level employees (75%, up from 64% in 2017). Companies are almost as likely to provide training for employees at technician level or for skilled engineering craft persons (73%). However, there has been a significant decrease in training for professional-level engineering or technical staff (58%, down from 74%).
- More than half the companies with 250 or more employees have linked up with universities to deliver training (53%), compared with just 14% of companies with less than 25 employees.²
- More than half (57%) of companies provide work experience opportunities to young people at school, up from 49% in 2017. Almost half offer work experience to young people in Further Education (FE) (48%), with only 40% providing work experience to young people doing university courses.
- Only one in four companies (26%) have partnerships with FE colleges or universities to help them develop courses matched to their needs. This is similar to the proportion of companies that go into schools or attend careers events to help young people understand and value engineering careers (23%) or encourage employees to register as a STEM Ambassador or to take time off to participate in STEM Ambassador activities (23%).

² Among those that have arranged or funded any technical or job-specific training for their engineering or technical staff in the last 12 months

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Recommendations

To meet the UK's increasing engineering and technology skills needs, and to counter skills shortages and gaps, education, industry and government need joined up approaches at strategic, tactical and local levels.

The skills challenge: *our recommendations*

Work readiness and employability:

To improve potential recruits' workplace readiness and employability, more employers should commit to delivering high quality apprenticeship schemes, T Level work placements and other work experience opportunities. Systemic liaison with education partners is essential to ensure fitness for purpose and benefits for all parties.

Diversity:

To raise awareness of the range of engineering and technology opportunities and to improve the supply of more diverse recruits, education, industry and Professional Engineering Institutions (PEIs) should strategically work together and do more to engage with under-represented groups.

Industry and PEIs must embrace multiple diversity strands and demonstrate their commitment to this important topic. Developing an equality, diversity and inclusion (EDI) strategy and gaining top-level support in embedding it throughout an organisation is key to addressing the skills shortage and promoting equal opportunity for all.

T Levels: *our recommendations*

Raising awareness:

The Government should do more to raise awareness and take-up of T Levels as a valued, attractive qualification, equivalent to A Levels, that offers wide-ranging vocational and higher-level study opportunities. Engagement with students at an early age is an essential element, together with targeted approaches to parents, teachers and businesses.

Delivery:

The Government should commit to ensuring the ongoing financial and staffing capability of the education sector to deliver T Levels effectively and keep pace with technological advances.

Apprenticeship Levy: *our recommendation*

The Government should give employers greater flexibility on spending for skills development, relaxing apprenticeship levy restrictions and supporting alternative, high-quality training options.



Employer approaches to training: *our recommendations*

Working with educators:

Employers should proactively link up with academic institutions to develop a greater range and network of flexible, individually tailored and innovative approaches at different levels. This is a beneficial means of upskilling and reskilling technical staff to meet industry needs and keep abreast of emerging technology. This is particularly useful for small and medium-sized enterprises (SMEs) where resourcing pressures, capabilities, size or location may preclude traditional training routes.

Workforce development:

All employers should formally adopt ongoing workforce development and upskilling initiatives as a means of enhancing competitive advantage and commercial success.

Improving technical education: *our recommendation*

The Department for Education, the Institute for Apprenticeships and Technical Education, PEIs and engineering employers must continue their commitment to technical education in the long-term, including T Levels and apprenticeships, to ensure these pathways receive the same respect and prestige as academic routes.

Introduction and methodology

The 2019 IET Skills and Demand Survey is the 13th in an ongoing series since 2006 that has assessed the evolving state of skills in UK engineering and technology sectors, and the challenges faced by employers.

This report is based on quantitative research commissioned by us and conducted by the market research agency BMG Research. Historically, the IET skills survey has been undertaken annually. The survey is now biennial; the last skills survey with comparative data was carried out in 2017.

The insight for this report was gathered from telephone interviews with 701 employers of engineering and technology staff, drawn from across the UK in April, May and June 2019. The telephone interviews included businesses with at least one engineering or technical employee, ranging in size from five employees to major employers with many hundreds of staff. Businesses were identified using standard industrial classifications (see appendix for the Standard Industrial Classification (SIC) definitions used).

Data was gathered at site level, relating to the establishment rather than the enterprise as a whole. In addition to the main survey, a shorter follow up survey focusing on apprenticeships was completed by 137 respondents who had already completed the skills main survey (responses to this were a mixture of online survey responses and telephone interviews).

The research is supplemented by two additional in-depth interviews with individual organisations of different sizes undertaken in October 2019 (both of these organisations took part in the Skills Survey).





What employers are reporting

Facts and figures about engineering employers in the UK


Skills supply and skills shortages

60% 

report the **recruitment of engineering and technical staff with the right skills** is the **biggest anticipated barrier** to achieving business objectives over the next three years

48% 

report difficulties in respect of the **skills available in the external labour market** when trying to recruit


Only **20%** 

expect the **supply of engineering and technical skills** into industry to **improve** over the next **3-5 years**


81% 

agree that **businesses have a responsibility** to support the transition from **education and training** into the workplace, to get people with the **right skills**

Growth of workforce

53% 

are concerned that a **shortage of engineers in the UK** is a threat to their business, yet **46% anticipate growth** in their engineering and technology workforce over the next three years


31% 

of engineering and technology companies reported an **increase in their workforce** over the last three years, but the **rate of growth has slowed** compared to previous years

Upskilling existing workforce

73% 

offer arrangements for older workers which help them to stay with the company

68% 

of organisations have **arranged or funded any technical or job specific training** for engineering or technical staff at any level over the 12 months prior to the survey

Recruitment and quality of skills

48%  report **gaps in the skills of their apprentices** or other young trainees. This is **up from 30%** in 2017³

73%  have had **problems** with candidates who have **academic knowledge**, but **not the required workplace skills**⁴

57% report **technical skills gaps at a professional level**, including people with HND, degrees or higher qualifications. This is **up from 46%** in 2017³ 

Technical qualifications

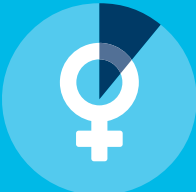
Only **28%** of companies are aware that **T Levels** require students to have an **industrial placement** 

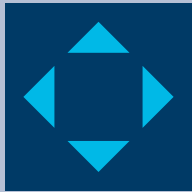
59% of companies report they have the **capacity to offer work experience placements as part of T Levels**. This is mainly larger companies of **100+ employees** 

Once made aware of the **requirement** **43%** intend to offer **industrial placements**. 

Diversity in the workplace

Only **12%** of firms are **taking, or have taken any action** to **increase the diversity** of their engineering, IT and technical workforce in terms of the **ethnicity, LGBT+ status** and **disability** of the workforce 

11% of the **UK engineering and technical workforce is female** 

42% agree that their **organisation could do more** to recruit people from **diverse backgrounds** 

³ Among those with skills gaps or limitations in their workforce.

⁴ Among those that have difficulties finding the right skills in the external labour market when trying to recruit.

Section 1 – The skills challenge

In this section we explore:

- How the engineering needs of UK employers compare with the available skills of engineering workforces and the wider labour market.
- What UK employers are doing to upskill current workforces and to ensure an adequate future supply of work-ready engineers.

1.1 Skills: the biggest barrier

For engineering and technology companies, the biggest anticipated barrier that they might face in achieving objectives over the next three years is the recruitment of engineering and technical staff with the right skills (60%). It's more challenging than market competition, late payment and industry regulations.

When looking beyond engineering and technology companies, at UK businesses across all sectors, recruiting staff with the right skills is less of a priority. It drops to fourth position, behind market competition, industry regulations and taxation. This highlights the great importance of skills within the engineering and technology sector, more than in other sectors, and its impact on the health of engineering in the UK.

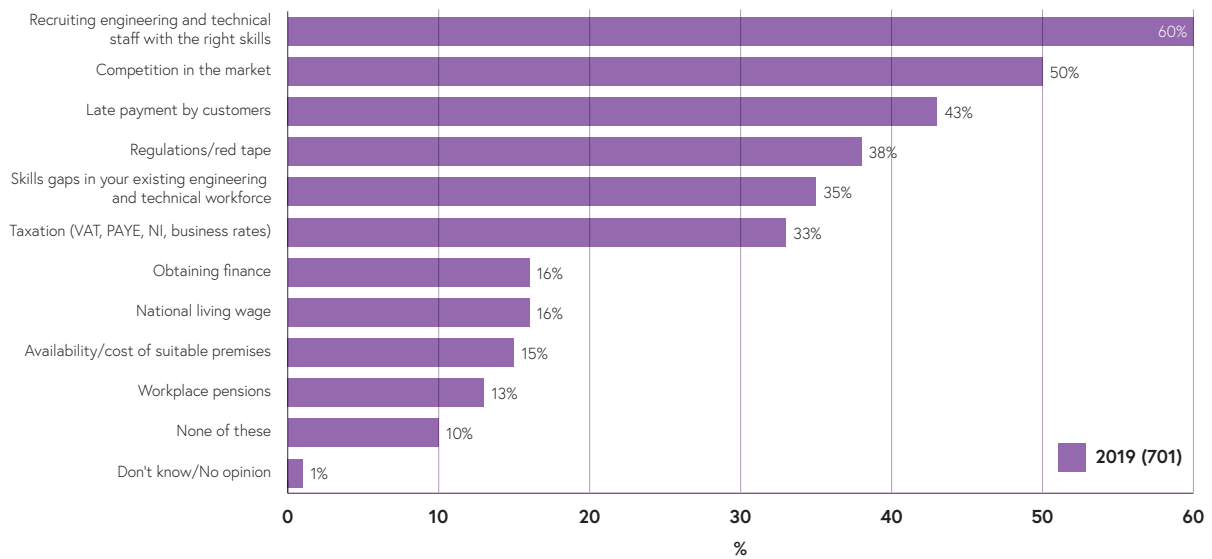
Figure 1: Ranking of various barriers to future business performance by engineering/technological businesses and by businesses in all sectors.

	Engineering/technology businesses (IET Skills Survey 2019) ⁵	All businesses (BEIS) Longitudinal Small Business Survey Year 4 2018
Recruiting the right skills	1	4
Competition in the market	2	1
Late payment	3	5
Regulations/red tape	4	2
Skill gaps in existing workforce	5	-
Taxation	6	3
Obtaining finance	9	10
National living wage	10	8
Availability/suitability of premises	11	7
Workplace pensions	12	9

Note: the rankings are based on the proportions of businesses in each survey which identified each factor as a barrier to future performance. The two surveys are not directly comparable – the BEIS survey interviewed businesses with between 1 and 249 employees (compared with 5 employees and upwards in the IET skills survey) and the two surveys were not undertaken at the same time.

⁵ The barrier ranked 7th related to 'access to the supply chain due to the UK's exit from the EU'; the barrier ranked 8th related to 'changes to immigration rules arising from the UK's exit from the EU'.

Figure 2: Obstacles or difficulties that businesses might face in achieving their business objectives over the next three years.



Q: Thinking about obstacles or difficulties that your business might face in achieving your business objectives over the next 3 years, which of the following would you say are obstacles to the success of your business? Un-weighted base in parentheses. Prompted, multiple response (All establishments).



1.2 Talent pool: more engineers, but skills a concern

Almost one in three employers say they have expanded their engineering and technology workforce over the last three years (31%). This is more than twice as many as those who report a reduction (13%). Although the rate of growth has slowed since our 2017 survey, when 39% of employers reported a workforce expansion, the future continues to show promise.

Around half of the employers surveyed (46%) expect to grow their engineering and technology workforce in the next three years. That's compared with just 3% who anticipate a decrease.

Figure 3: Proportion of establishments reporting an increase or decrease in their engineering and technical workforce over the last 3 years and the net increase (% increase minus % decrease), by sector.

	Un-weighted bases	2019		Net increase: % increase minus % decrease	2017 Net increase: % increase minus % decrease
		Increased %	Decreased %		
All establishments	701	31%	13%	+18%	+28%
Other engineering related	64	43%	8%	+35%	+47%
Electrical/electronic	99	36%	9%	+27%	+32%
Built environment	107	34%	14%	+20%	+18%
Non-metals manufacturing	86	29%	12%	+17%	+30%
All manufacturing	246	31%	15%	+16%	+29%
Metals manufacturing	160	31%	17%	+16%	+27%
IT and communications	92	30%	15%	+15%	+43%
Transport	51	23%	10%	+13%	+17%
Aerospace/defence*	18	20%	11%	+9%	+38%
Energy*	24	13%	30%	-17%	-30%

Q: Over the last 3 years, has the engineering and technology workforce at your establishment...?
 Figures in bold are statistically significantly higher than average based on a 95% confidence level.
 *Caution low base.



Figure 4: Proportion of establishments expecting an increase or decrease in their engineering and technical workforce over the next 3 years and the net increase (% increase minus % decrease), by sector.

	Un-weighted bases	2019		Net increase: % increase minus % decrease	2017 Net increase: % increase minus % decrease
		Increase %	Decrease %		
All establishments	701	46%	3%	+43%	+47%
Metals manufacturing	160	55%	2%	+53%	+57%
All manufacturing	246	50%	2%	+48%	+48%
Built environment	107	50%	3%	+47%	+33%
Non-metals manufacturing	86	45%	1%	+44%	+38%
IT and communications	92	48%	5%	+43%	+76%
Electrical/electronic	99	47%	4%	+43%	+51%
Energy*	24	35%	0%	+35%	+58%
Aerospace/defence*	18	34%	0%	+34%	+42%
Other engineering related	64	38%	5%	+33%	+33%
Transport	51	22%	5%	+17%	+39%

Q: Over the next 3 years, do you expect the engineering and technology workforce at your establishment to...?
 Figures in bold are statistically significantly higher than average based on a 95% confidence level.
 *Caution low base.

1.3 Recruitment: an ongoing skills shortage

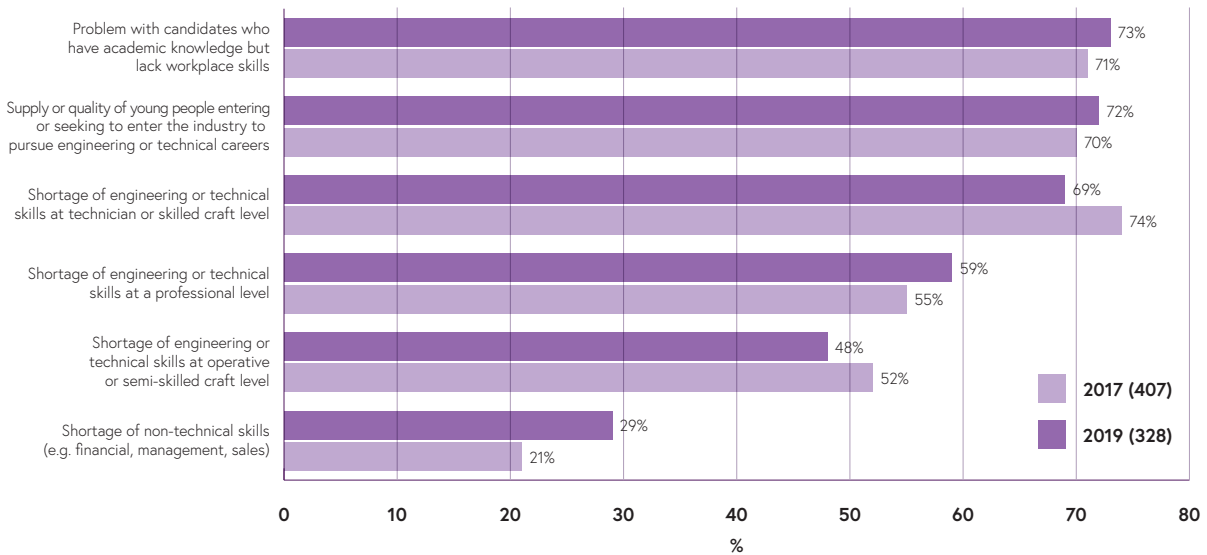
The skills supply remains a fundamental concern for employers. Some 48% of companies report difficulties in respect of the skills available to them in the external labour market when trying to recruit, up from 46% in 2017.

Companies reported two key challenges when recruiting. The biggest problem raised by 73% of companies is having candidates with academic knowledge but inadequate workplace skills.⁶ This was closely followed by the supply or quality of young people entering or seeking to enter the industry to pursue engineering or technical careers (72%).⁶

The nature of supply and quality issues are clearly different and we will explore this further to understand the issues in more detail. A shortage of engineering or technical skills at technician level was the main challenge in 2017, though this has dropped to third position (69%).⁶

A shortage of engineering or technical skills at a professional level was of less concern, at 59%, though it has increased four percentage points from 2017. In contrast, less than half of companies (48%) now report a shortage of engineering or technical skills at operative or semi-skilled level, dropping from 52% previously.⁶

Figure 5: Areas in which there are external skills shortages - prompted, multiple responses (where companies had experienced a lack of skills in the external market).



Q: Does a shortage of skills in the external labour market concern your firm particularly in respect of...?
Un-weighted bases in parentheses



⁶ Among those that have difficulties finding the right skills in the external labour market when trying to recruit.

Figure 6: Proportion of establishments reporting current skills shortages in the external labour market by size of establishment and sector (All establishments).

	2019 <i>Un-weighted bases</i>	Skills available to the business in the external labour market	
		2019	2017
All establishments	701	48%	46%
Size			
5-9 employees	172	49%	39%
10-24 employees	240	50%	51%
25-99 employees	188	40%	51%
100-249 employees	65	57%	58%
250+ employees	36	51%	64%
Sector			
Metals manufacturing	160	56%	63%
Electrical/electronic	99	40%	53%
All manufacturing	246	49%	53%
Energy*	24	40%	52%
Aerospace/defence*	18	16%	51%
Built environment	107	42%	45%
Non-metals manufacturing	86	43%	43%
Transport	51	62%	40%
IT and communications	92	50%	33%
Other engineering related	64	46%	30%

Q: *Could I check? Do you have any difficulties in respect of...?*

Figures in bold are statistically significantly higher than average based on a 95% confidence level.

**Caution low base.*

Recruitment: challenges based on company size

Larger companies are more likely to have problems recruiting professional level staff, with difficulties reported by 76% of those with 100 or more

employees. In smaller companies (with between five and nine employees), recruitment is more of an issue at technician or skilled craft level.

Figure 7: Areas in which there are external skills shortages, by size – prompted, multiple response (where experienced lack of skills in the external market).

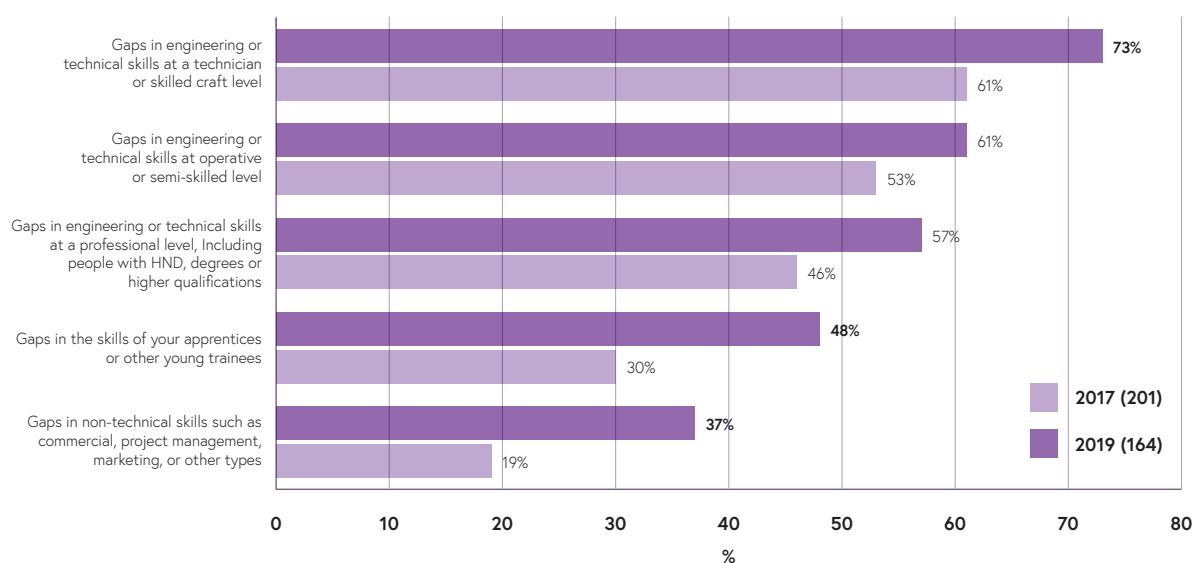
	All establishments	5-9 employees	10-24 employees	25-99 employees	100-249 employees	250+ employees
Shortage of engineering or technical skills at a professional level	59%	61%	55%	56%	77%	72%
Shortage of engineering or technical skills at a technician or skilled craft level	69%	75%	67%	61%	59%	64%
Shortage of engineering or technical skills at operative or semi-skilled level	48%	50%	44%	50%	49%	59%
The supply or quality of young people entering or seeking to enter the industry to pursue engineering or technical careers	72%	77%	66%	66%	73%	75%
A problem with candidates for jobs who have academic knowledge but not the skills which are needed in the workplace	73%	79%	67%	74%	54%	77%
Summary: Any engineering or technical skills shortage	86%	89%	85%	78%	92%	87%
Shortage of non-technical skills such as commercial, project management, or other types	29%	20%	35%	37%	45%	46%
Un-weighted bases	328	83	111	77	37	20*

Q: Does a shortage of skills in the external labour market concern your firm particularly in respect of...?
 Figures in bold are statistically significantly higher than average based on a 95% confidence level.
 *Caution low base.

1.4 Workforce: skills gaps in a wider range of areas

In contrast to the external skills shortage, the proportion of those companies with skills gaps or limitations within their current workforce is at 22%, down from 25% in 2017. Skills gaps in the workforce increase as company size increases, in line with our 2017 findings. The proportion of companies reporting skills gaps was largest in transport, metals manufacturing, aerospace/defence and energy sectors.

Companies that report internal skills gaps have seen widening disparities across all levels, from apprentices and trainees through to fully-qualified professionals. In particular, there has been a significant increase at the technician or skilled craft level, increasing from 61% to 73%. Even more pronounced is the skills gap for apprentices or young trainees, up to 48%; a rise of 60% in two years (up from 30%), albeit from a lower base.

Figure 8: Areas of skill gaps within existing workforces – prompted, multiple response (where there are skill gaps).

Q: Do gaps in skills within your existing workforce concern...? Un-weighted bases in parentheses. Figures in bold are statistically significantly higher than average based on a 95% confidence level.

Figure 9: Types of skill or groups of potential workers subject to skill gaps within existing workforces by size – prompted, multiple response (where they have skill gaps).

	All establishments	5-9 employees	10-24 employees	25-99 employees	100-249 employees	250+ employees	<25 employees	25+ employees
Gaps in engineering or technical skills at a professional level	57%	55%	55%	59%	56%	66%	55%	59%
Gaps in engineering or technical skills at a technician or skilled craft level	73%	73%	84%	68%	62%	53%	77%	66%
Gaps in engineering or technical skills at operative or semi-skilled level	61%	62%	73%	51%	40%	61%	66%	50%
Gaps in the skills of apprentices or other young trainees	48%	49%	60%	38%	32%	38%	53%	37%
Summary: Engineering or technical skills gap	93%	94%	96%	90%	90%	87%	34%	44%
Gaps in non-technical skills (financial, management, sales etc.)	37%	34%	36%	48%	26%	47%	4%	8%
Un-weighted bases	164	36	38	52	24*	14*	74	90

Q: Do gaps in skills within your existing workforce concern...? Figures in bold are statistically significantly higher than average based on a 95% confidence level. *Caution low base.

Figure 10: Proportion of establishments reporting current skills gaps in their internal workforces, by size of establishment and sector. (All establishments).

	2019 <i>Un-weighted bases</i>	Skill gaps or limitations within the internal workforce	
		2019	2017
All establishments	701	22%	25%
Size			
5-9 employees	172	22%	26%
10-24 employees	240	17%	23%
25-99 employees	188	28%	23%
100-249 employees	65	33%	29%
250+ employees	36	40%	57%
Sector			
Metals manufacturing	160	33%	22%
Electrical/electronic	99	10%	22%
All manufacturing	246	28%	23%
Energy*	24	31%	35%
Aerospace/defence*	18	32%	25%
Built environment	107	14%	30%
Non-metals manufacturing	86	22%	24%
Transport	51	35%	20%
IT and communications	92	17%	27%
Other engineering related	64	16%	21%

Q: Could I check? Do you have any difficulties in respect of...?

Figures in bold are statistically significantly higher than average based on a 95% confidence level.

*Caution low base.

1.5 Diversity: a lack of progress

The proportion of women within the engineering and technical workforce hasn't changed since our 2017 survey, remaining at 11%.

Figure 11: Average proportion of women in the engineering and technical workforce, by size and sector (where provided a response).

	2019 Un-weighted bases (no. of eng/tech staff)	2019	2017
All establishments	13,708	11%	11%
Size			
5-9 employees	723	7%	13%
10-24 employees	2,061	10%	9%
25-99 employees	3,543	11%	9%
100-249 employees	2,392	16%	12%
250+ employees	4,989	12%	10%
Sector			
Energy	394	7%	14%
IT and communications	1,405	11%	14%
Transport	1,560	6%	4%
Built environment	1,606	14%	20%
Electrical/electronic	2,123	12%	10%
Aerospace/defence	416	9%	6%
Non-metals manufacturing	1,449	8%	12%
Metals manufacturing	3,238	11%	6%
Other engineering related	1,517	20%	7%

*Q: So overall, what percentage of your total engineering and technical staff, at any grade, is female?
Figures in bold are statistically significantly higher than average based on a 95% confidence level.*

Engineering in the UK suffers from a huge image problem. Our research backs up fears that gender stereotyping within STEM careers is alive and well, potentially damaging the diversity of talent coming into the industry. This, coupled with the fact that there is an estimated annual shortfall of 59,000 engineers and technicians to fill engineering roles, clearly demonstrates a need for action. As one of the world's largest professional engineering bodies we want to continue to utilise our position to raise awareness of this issue.

We want to inspire the next generation of engineers. With just 11% of the UK engineering and technical workforce being female, we know that more needs to be done to show just how diverse and inclusive engineering really is and to ensure that STEM is being promoted as a viable career path for everyone.

We continually recognise and celebrate female engineering talent, through our Young Woman Engineer of the Year Awards and our campaigns, such as #SmashStereotypesToBits, to seek out role models and help address the UK science and engineering skills crisis by promoting engineering careers to more girls and women.

One in five companies (19%) make particular efforts to attract and retain women in engineering and technical roles beyond observing statutory equality requirements (up from 15% in 2017). This includes measures like implementing transparent policies, having a positive attitude to flexible/part-time working, providing structured career paths with breaks and offering back-to-work advice and coaching.

As noted in 2017, even if the proportion of female appointments should increase dramatically, given that the bulk of the workforce is already in place, the overall percentage increase will change only very slowly and slightly. However, with the figures not improving in two years, it is now more important than ever that engineering and technology organisations and PEIs do more to engage with under-represented groups in a bid to address the UK engineering skills shortage. To make the engineering workforce more diverse and inclusive, they must embrace multiple diversity strands and demonstrate their commitment to this important topic. Developing an EDI strategy and gaining top-level support in embedding it throughout an organisation is key to addressing the skills shortage and promoting equal opportunity for all.

In a recent survey we undertook to review children's and parents' perceptions of engineering and technology – 'Inspiring the next generation of engineers' - it was highlighted that 'overall perceptions of engineering and technology among BAME (Black, Asian, and Minority Ethnic) parents are very good. Technology is the industry they feel their children would be most interested in, and they are more likely than other parents to rate engineering as a potential career.'

This positive perception shows that there is an opportunity for a much wider pool of talent in the future, and organisations can capitalise on this through their EDI endeavours.

Just over one in 10 businesses (12%) are taking, or have taken, any action to increase the diversity of their engineering, IT and technical workforces in terms of the ethnicity, LGBT+ status and disability of the workforce. This reflects a 33% increase over our 2017 report in which only 9% of businesses had taken such actions. It is heartening to see that there have been improvements to companies' efforts to broaden diversity, but more still needs to be done.

1.6 In summary

- Recruiting engineering and technical staff with the right skills is vital to the health of engineering in the UK. It is also the largest anticipated obstacle or difficulty that businesses may face in achieving objectives over the next three years. This is the continuation of a chronic issue that has featured strongly in previous surveys.
- Almost one in three employers (31%) say they have expanded their engineering and technology workforce over the last three years.
- Of particular concern to employers is a lack of workplace skills and a shortage of young people choosing to pursue engineering or technical careers.
- A shortage of engineering or technical skills at a professional level is a continuing problem for larger companies, whereas smaller companies report shortages of technician and craft level skills.
- Fewer companies now have internal skills gaps when compared with two years ago. However, those companies with internal skills gaps have seen them widen across the board, from apprentices and trainees through to fully-qualified professionals.
- Employers have clearly made efforts to broaden diversity, but more still needs to be done to achieve a balanced workforce.

1.7 Recommendations

- To improve potential recruits' workplace readiness and employability, more employers should commit to delivering high quality apprenticeship schemes, T Level work placements and other work experience opportunities. Systemic liaison with education partners is essential to ensure fitness for purpose and benefits for all parties.
- To raise awareness of the range of engineering and technology opportunities and to improve the supply of more diverse recruits, education, industry and PEIs should strategically work together and do more to engage with under-represented groups.
- PEIs must embrace multiple diversity strands and demonstrate their commitment to this important topic. Developing an EDI strategy and gaining top-level support in embedding it throughout an organisation is key to addressing the skills shortage and promoting equal opportunity for all.

Section 2 – Technical and vocational skills challenges

In this section we explore:

- The awareness of T Levels within industry and the capacity for rollout
- How the Apprenticeship Levy is influencing the uptake of apprentices
- Why companies do or don't take on apprentices and how successful the outcomes have been

2.1 T Levels: low industry awareness

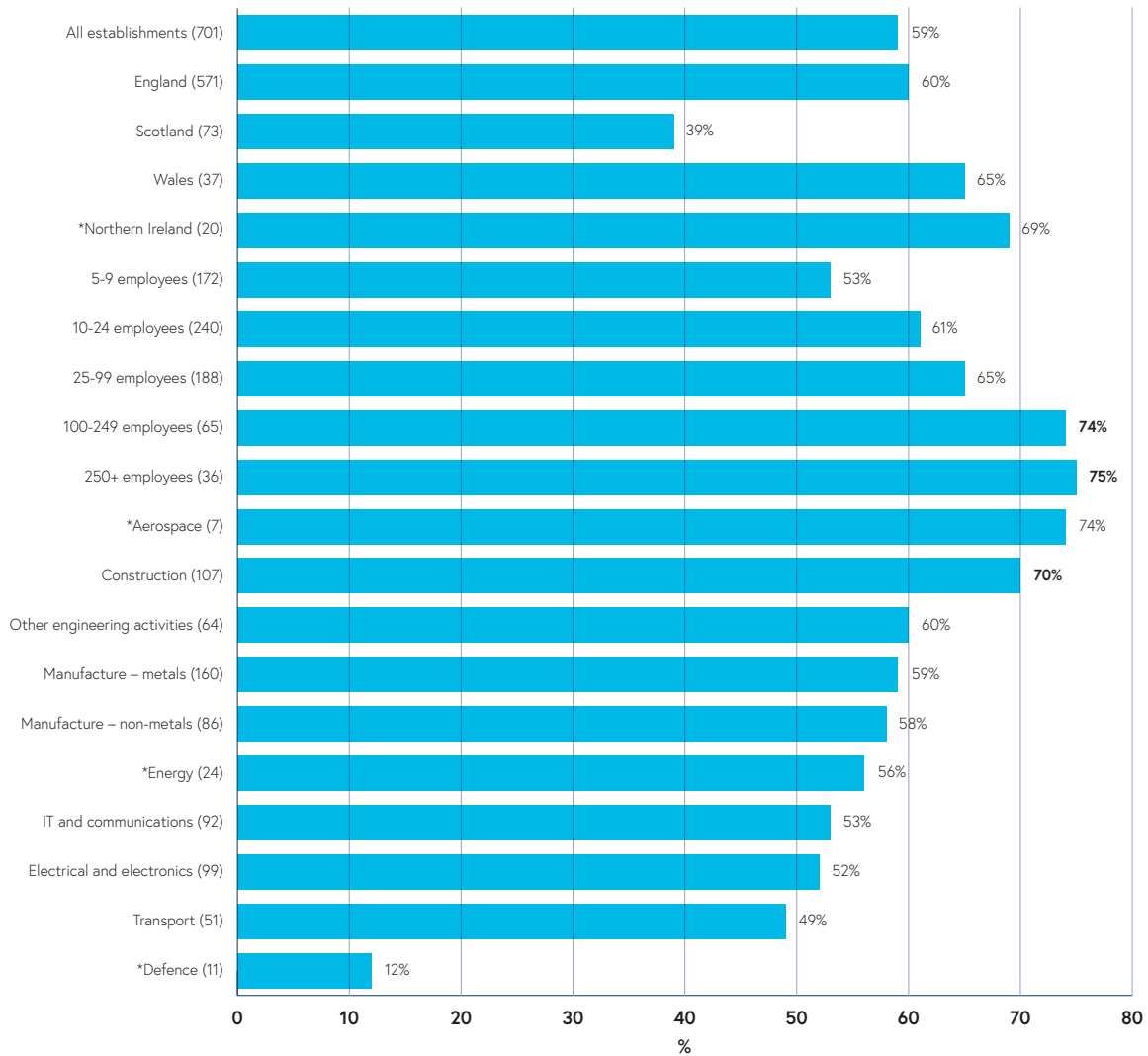
T Levels are new qualifications that will be taught from 2020. A vocational alternative to studying three A Levels, they will offer students a combination of classroom learning and on-the-job experience, with a compulsory 45 days work placement in industry. T Levels have been designed to equip students with the knowledge and experience needed to progress into skilled employment and therefore improve the quality of the workforce at entry level.

Less than one in three companies (28%) realise that T Levels require students to have a work experience placement, highlighting the need for more communication and increased awareness of the initiative. Companies that currently employ apprentices are slightly more likely to be aware (35%), as are those that have arranged technical or job specific-training in the last 12 months (31%). As company size increases, awareness also rises, to more than half (57%) of companies with 250+ employees.

On being told that T Levels will require students to undertake work experience, less than two in three companies (59%) said they have the capacity to offer placements, dropping to 39% in Scotland. However, around three quarters of companies with 100 or more employees (74%) said they have capacity.



Figure 12: Proportion of establishments that have the capacity to offer work experience as part of T-levels, by nation, size and sector (All establishments).

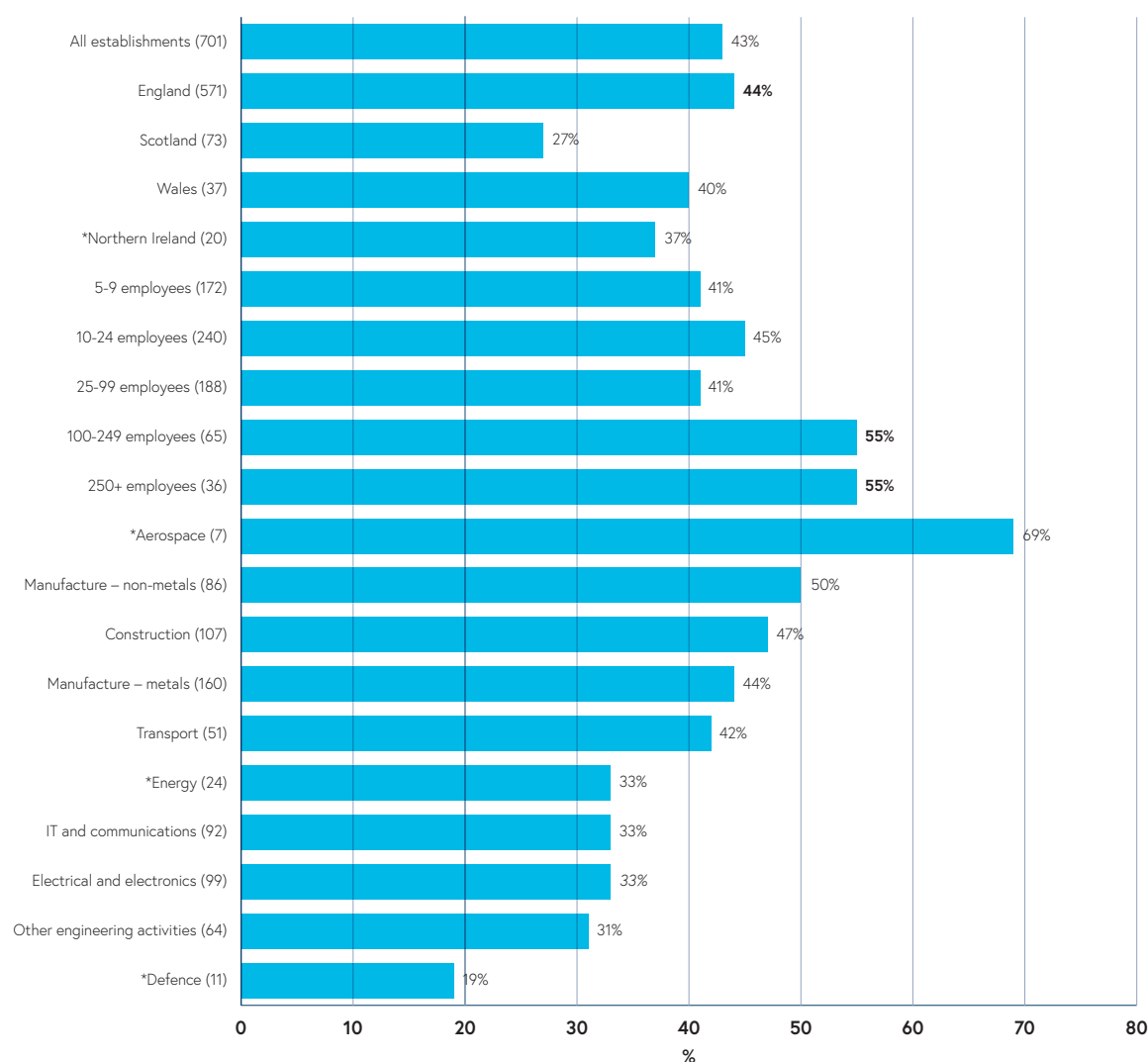


Q: Does your firm have the capacity to offer work experience as part of T Levels?
*Un-weighted bases in parentheses. Figures in bold are statistically significantly higher than average while figures in italics are statistically significantly lower than average, based on a 95% confidence level. *Caution low base.*

43% of companies say they intend to offer work experience as part of T Levels. However, there is a concern that they may not understand the full obligation of 45 days which is a substantial increase

on normal work experience duration of around a week. The ability of employers to offer this must be addressed if T Levels are to succeed.

Figure 13: Proportion of establishments that intend to offer work experience as part of T Levels, by nation, size and sector (All establishments).



Q: Does your firm intend to offer work experience as part of T Levels?
*Un-weighted bases in parentheses. Figures in bold are statistically significantly higher than average while figures in italics are statistically significantly lower than average, based on a 95% confidence level. *Caution low base.*

Poor industry awareness of the work experience requirement (28%), combined with limited capacity for work experience (59%), and little intention to get

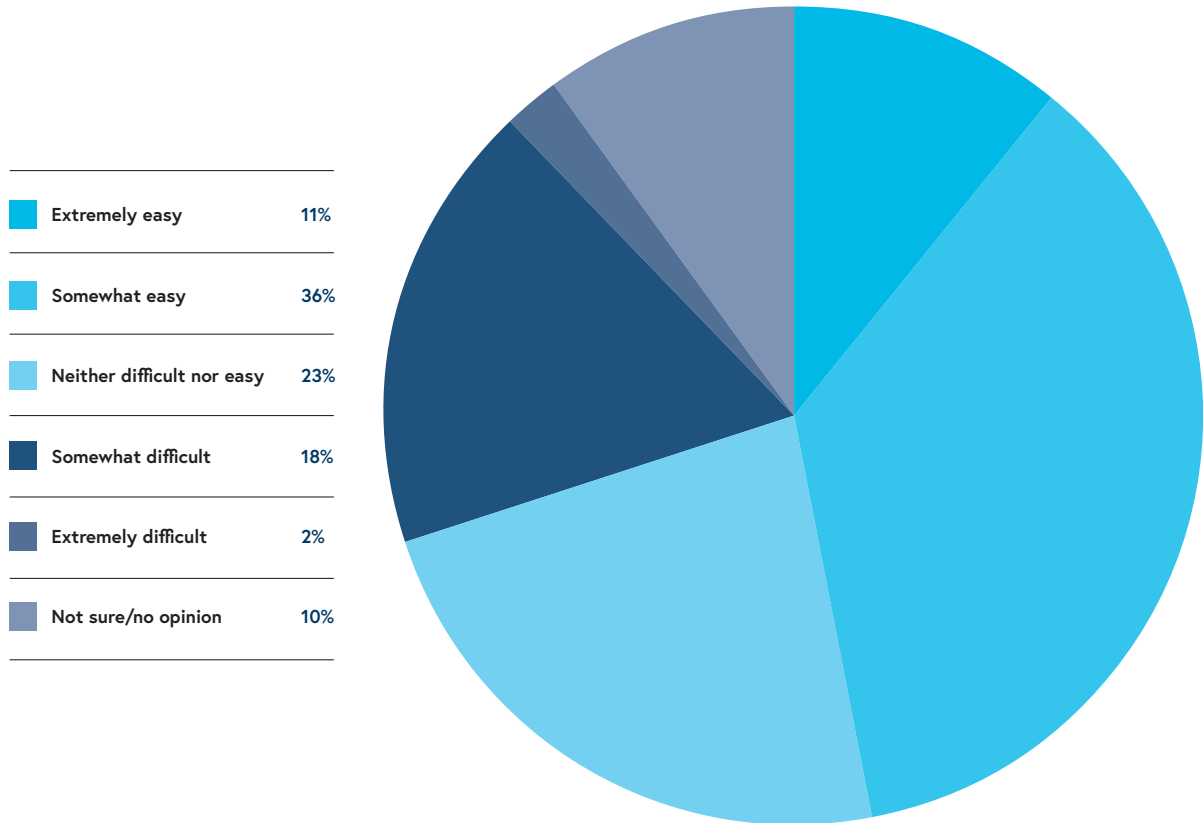
involved (43%), is indicative of future problems for the success of this new qualification.

2.2 The Apprenticeship Levy

The Apprenticeship Levy was introduced in England to fund the development and delivery of apprenticeships. It came into effect on 6 April 2017 and is a compulsory tax on companies with a pay bill of more than £3 million.

The majority of companies that are liable to pay the levy have reported that they are using it, with nearly half of these reporting that it is easy to use (48%).

Figure 14: Extent to which establishments found it easy or difficult to use the Apprenticeship Levy (where used).



Q: How easy or difficult does your firm find using the apprenticeship levy?
Un-weighted base = 89.

Since its introduction, almost one in four companies (23%) that pay the levy have increased the number of engineering and technical apprenticeships offered. Most of the others reported no change (70%) with just 3% reporting a decrease in the number of apprenticeships

offered since April 2017. Companies in the North of England (34%) and those with 100 or more employees (34%) were significantly more likely to have offered more apprenticeships since the introduction of the levy.

2.3 Apprenticeships: company capacity and candidate quality

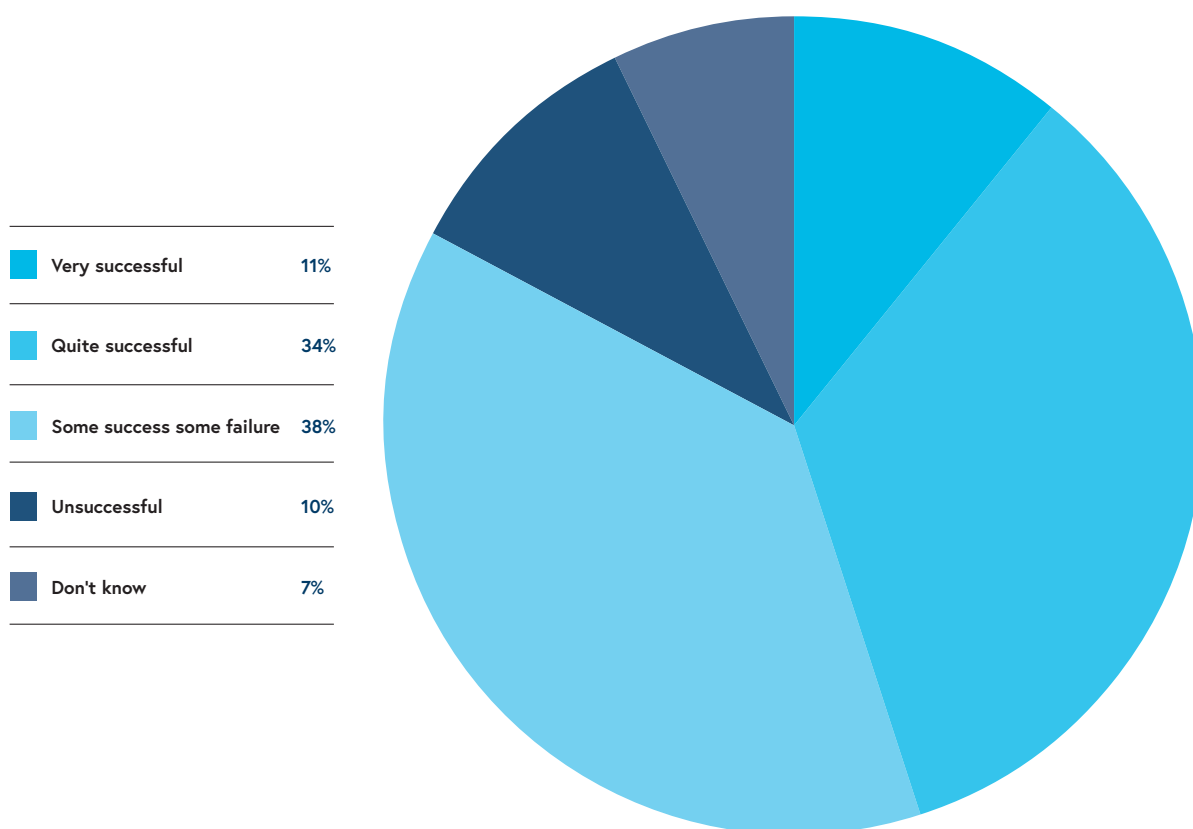
Providing apprenticeships allows companies more opportunities to meet their skills needs. Since 2013, apprenticeships have undergone significant reform, with the implementation of new employer-led standards, a move to end-point assessment rather than continuous assessment, and the introduction of the Apprenticeship Levy.

At the time of our survey, 32% of companies employed engineering or technical apprentices, with an average of between two and three apprentices at every participating company. As previously illustrated in Figure 8, large gaps in the skills of apprentices or other young trainees were reported (48%) but, they are not as severe as at a professional level (57%) or technician or skilled craft level (73%). Skills gaps at all levels have widened significantly since 2017 (30%, 46%, and 61% respectively).

In our follow-up survey,⁷ companies that employ apprentices were asked what initially triggered them to take on apprentices. Teaching skills to people was the most common reason (34%), followed by the need to address skill shortages (27%). Other reasons included addressing skills gaps resulting from an ageing workforce, and building a workforce with the necessary skills and ways of working that are specific to the organisation.

When companies in our follow-up survey were asked to rate their experience of employing engineering or technical apprentices, nearly half (45%) of those that have employed apprentices, reported it as having been successful, while an additional 38% reported mixed success.

Figure 15: Rating of firm's experience of employing engineering or technical apprentices (where they have employed apprentices).



Follow-up survey

Q: Overall, how would you rate your firm's experience of employing engineering or technical apprentices?
Un-weighted base = 74. From follow-up survey.

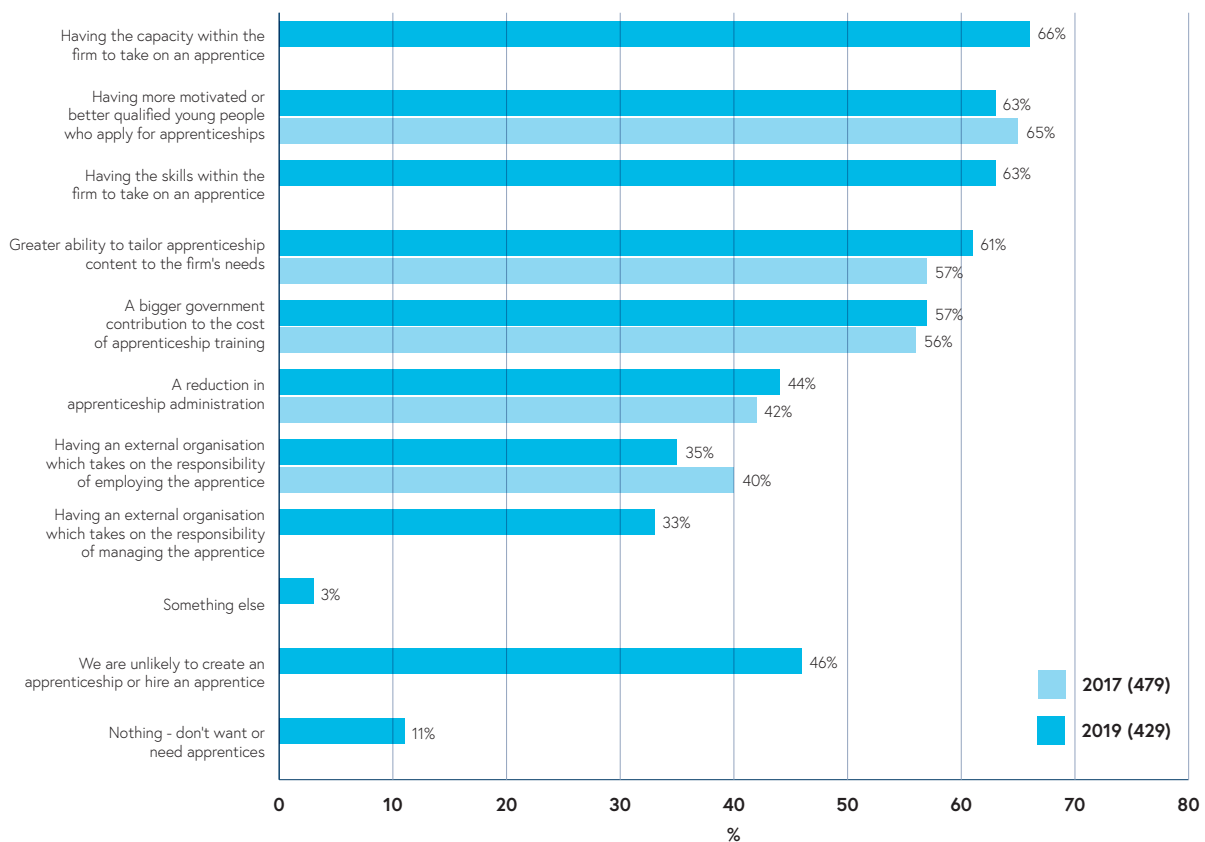
⁷ See introduction and methodology for detail

Companies that didn't have apprentices in place at the time of our survey were asked what would encourage them to hire. 46% said they were unlikely to create an apprenticeship or hire an apprentice. 11% said they didn't want or need apprentices. Two thirds (66%) said having the capacity within the firm to take on an apprentice was a factor. Having the skills within the company to take on an apprentice, as well as having more motivated or better qualified young people who apply for apprenticeships were both key factors (63%

in each case). 61% also wanted greater control over the content of apprenticeships, to make them more relevant to their business.

Two of the top three ways in which companies could be encouraged to take on apprentices relate to their internal capacity and resources, while a lack of good quality apprentices is the third. A bigger government contribution to the cost of apprenticeship training was less important (57%), but still of relevance.

Figure 16: Actions or support that would encourage establishments to create an engineering or technical Apprenticeship or hire an apprentice – prompted, multiple response (where establishments do not currently employ apprentices).



Q: Which of the following would encourage you to create an engineering or technical apprenticeship or hire an apprentice? Un-weighted bases in parentheses. Where data is missing for 2017, the question wasn't included in the previous survey.

In our follow-up survey, there was an indication that a successful apprenticeship experience is largely due to the relationship between the company and the training provider. This is mainly in terms of finding the right people, with some respondents reporting that they have worked with colleges or other training providers for years and, as a result, they know what to look for in candidates. Half of all companies in the follow-up survey had sought external information or advice on apprenticeship provision, with multi-site businesses

more likely to have done so (64% compared with 42% of single site establishments).

Nearly half of all companies, asked in the follow-up survey (47%) felt there is sufficient support and guidance available to firms interested in offering apprenticeships. Those who feel support and guidance is lacking, would like more information about who to get in touch with, more information and advice tailored to their needs, and guidance on how to manage apprentices within the business.



2.4 In summary

- Only 28% of employers are aware that the new T Level qualifications require students to have a 45-day industrial placement. Only 59% state that they have the capacity to offer work experience as part of T Levels. A low intent from companies to get involved and offer an industrial placement (43%), may make it difficult to deliver T Levels successfully. This figure is potentially overinflated due to a misunderstanding of what it entails. The intention to offer an industrial placement could be significantly lower if employers were clear about the 45-day placement requirement.
- The majority of companies that are liable to pay the Apprenticeship Levy reported that they are using it to some degree (71%).
- Since its introduction, almost one in four companies (23%) that pay the Apprenticeship Levy have increased the number of engineering or technical apprenticeships offered.
- As reported within the follow-up survey a successful apprenticeship experience is largely due to the relationship between the company and the training provider.
- 32% of companies surveyed employed engineering or technical apprentices, with an average of between two and three apprentices at every participating company.
- Companies that didn't have apprentices in place were asked what would encourage them to hire. 46% said they were unlikely to create an apprenticeship or hire an apprentice. 11% said they didn't want or need apprentices.
- Two thirds (66%) said that having more capacity within the firm would encourage them to create an engineering or technical apprenticeship or hire an apprentice. 63% said they would be encouraged by having more motivated or better qualified young people who apply for apprenticeships.

2.5 Recommendations

T Levels

The Government should do more to raise awareness and take-up of T Levels as a valued, attractive qualification, equivalent to A Levels, that offers wide-ranging vocational and higher-level study opportunities. Engagement with students at an early age is an essential element, together with targeted approaches to parents, teachers and businesses.

The Government should commit to ensuring the ongoing financial and staffing capability of the education sector to deliver T Levels effectively and keep pace with technological advances.

Apprenticeship Levy

The Government should give employers greater flexibility on spending for skills development, relaxing apprenticeship levy restrictions and supporting alternative, high-quality training options.

Section 3 – Employer response - approaches to training, upskilling and reskilling

In this section we explore:

- How much training is being given to existing employees at different levels
- The ways that training is being delivered
- How companies are engaging with the education system to improve the influx of young people into engineering

3.1 Training the existing workforce

As the cost of FE continues to rise and the digital revolution expands and disrupts at an exponential rate, companies are increasingly seeing a need to upskill and reskill their workforce. Training both new and existing staff is a tangible and direct way for them to tackle internal skill gaps.

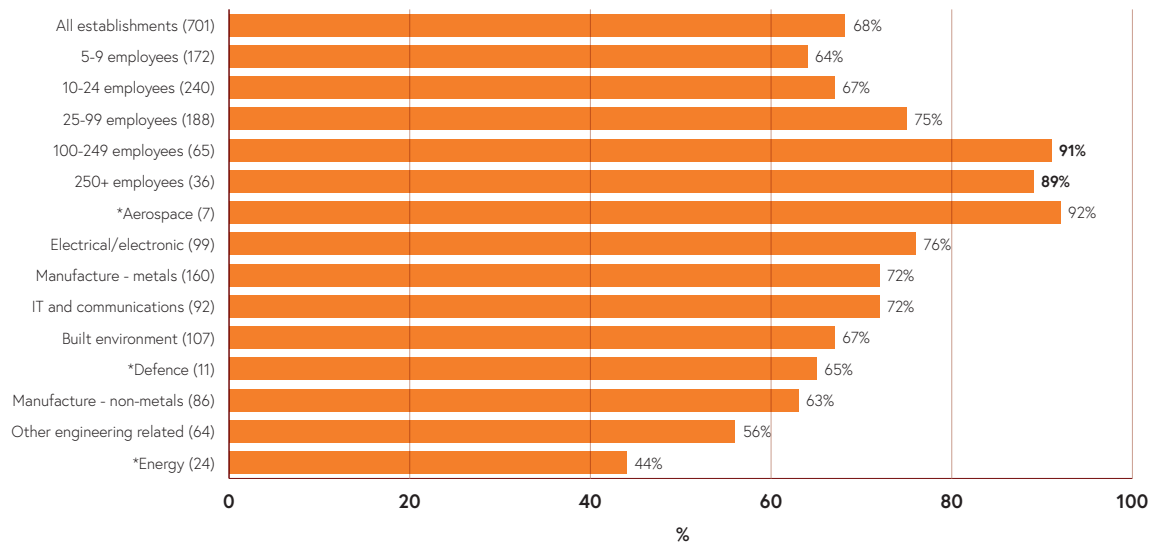
68% arranged or funded technical or job-specific training for their engineering or technical staff in the 12 months prior to our survey. This compares favourably with 59% in 2017. The likelihood is greater for

companies that have experienced engineering and technical skill shortages (increasing to 75%) and skill gaps within their existing workforce (increasing to 80%).

Company size has a marked effect on training provision, increasing from 65% for companies with fewer than 25 employees, to 75% for between 25 and 99 employees, and rising to 91% for companies of 100 employees or more.



Figure 17: Proportion of businesses that supplied technical training to their engineering and technical staff in the last 12 months, by size and sector (All establishments).

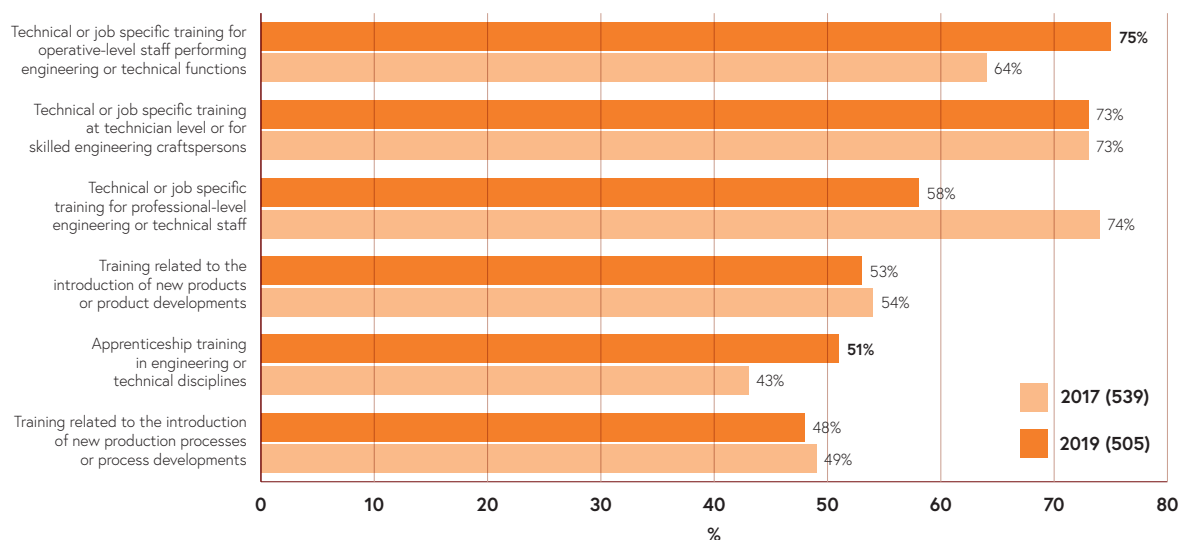


Q: Over the last 12 months, has your establishment arranged or funded any technical or job specific training for engineering or technical staff at any level? Un-weighted bases in parentheses. Figures in bold are statistically significantly higher than average based on a 95% confidence level. *Caution low base.

There has been a general increase in companies providing training for operative-level employees (75%, up from 64% in 2017), making it the single most common level of training. Companies are almost as likely to provide training for employees at technician level or for skilled engineering

craft persons (73%). Moving against this trend, there has been a significant decrease in companies providing training for engineering or technical employees at professional level. At 74%, this employee group was the primary focus for training in 2017; in 2019 it has dropped to 58%.

Figure 18: Types of training supplied to engineering and technical staff – prompted, multiple response (where funded/arranged training).



Q: Has any of this training arranged or funded in the last 12 months been any of the following types? Figures in bold are statistically significantly higher than average while figures in italics are statistically significantly lower than average, based on a 95% confidence level.

3.2 Training delivery

Companies that have arranged or funded training over the last 12 months most commonly used external training organisations (81%) and their own training departments or other employees with specialist knowledge (69%). More than one in three companies used FE colleges to deliver training (37%), while universities were used by just 17% of companies.

As company size increases, the use of any source of training is more likely. More than half the companies with 250 or more employees have linked up with universities (53%), compared with just 14% of companies with less than 25 employees. These larger companies were highly likely to use their own training departments or other employees with specialist knowledge (95%), as well as external training organisations (91%).

Figure 19: Modes of delivery of training for existing engineering or technical staff over the last 12 months, by size – prompted, multiple response (where arranged/funded training).

	All establishments	5-9 employees	10-24 employees	25-99 employees	100-249 employees	250+ employees
Your own training staff or other internal staff with specialist knowledge	69%	64%	68%	74%	87%	95%
Training organisations external to the business	81%	77%	79%	88%	93%	91%
Universities	17%	9%	20%	18%	42%	53%
Further Education colleges	37%	32%	31%	47%	61%	76%
Other	1%	0%	1%	2%	4%	2%
Un-weighted bases	505	113	159	142	59	32

Q: Which of the following have delivered training for your existing engineering or technical staff over the last 12 months? Un-weighted bases in parentheses. Figures in bold are statistically significantly higher than average based on a 95% confidence level.

3.3 Employer engagement in the education system

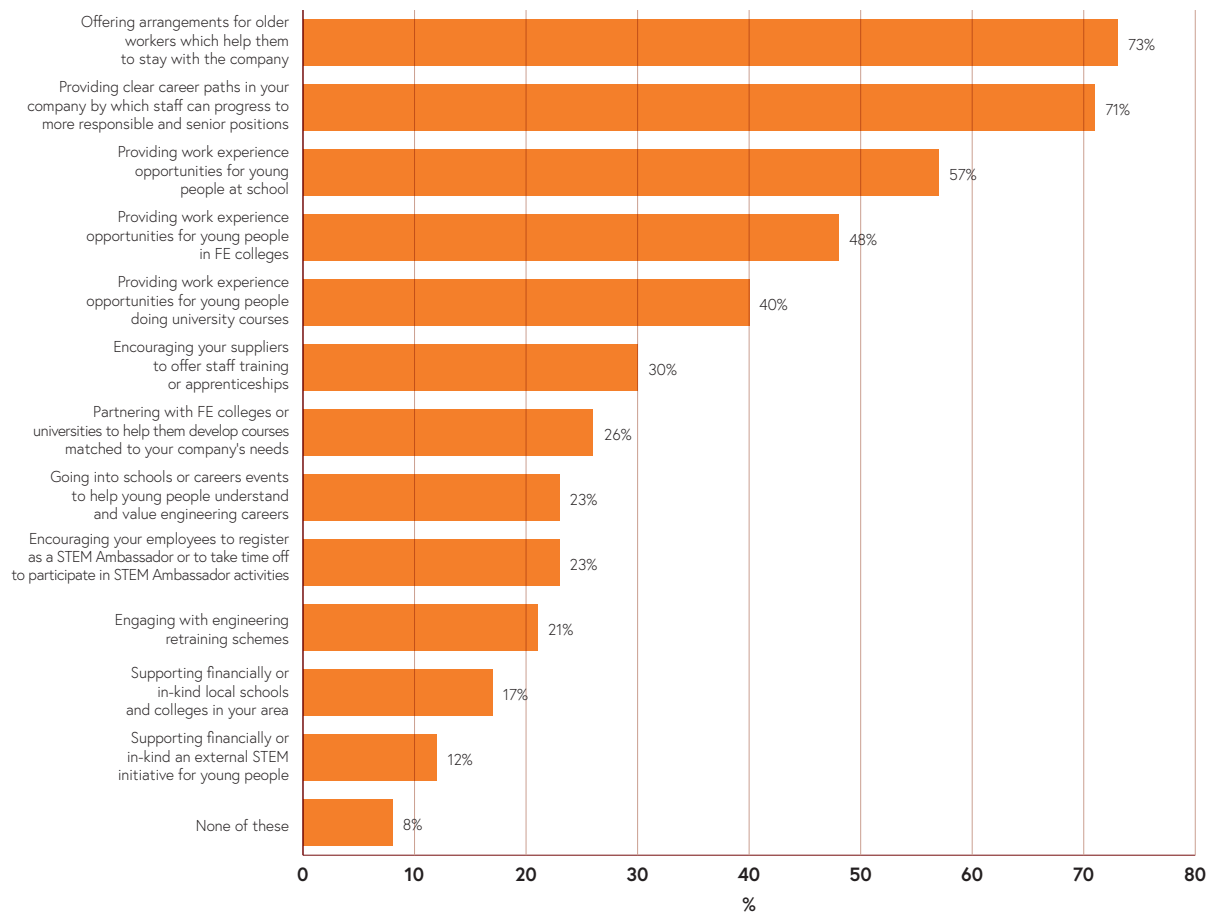
As well as contributing towards the development of people already working within industry, companies can also positively influence skills by using initiatives designed to encourage young people to pursue engineering careers. Although these methods are less direct and have a longer incubation period when compared with training employees, they can have a sustained impact. Examples include the provision of work experience opportunities for school, Further or Higher Education students, attendance at careers events and supporting STEM (science, technology, engineering and mathematics) initiatives.

Not surprisingly, companies are most likely to focus on offering arrangements for older workers which help them to stay with the company (73%) and support the career development of employees (71%). However, more than half (57%) also provide work experience

opportunities to young people at school, up from 49% in 2017. Almost half the companies offer work experience to young people in FE (48%), with only 40% providing work experience to young people doing university courses.

For industry to help shape the education agenda and make a larger impact upon skills, a deeper connection with the education system is needed. Only one in four companies (26%) achieve this by partnering with FE colleges or universities to help them develop courses matched to their company's needs. A similar number go into schools or attend careers events to help young people understand and value engineering careers (23%, up from 17% in 2017) and encourage employees to register as a STEM ambassador or to participate in STEM Ambassador activities (23%).

Figure 20: Activities that establishments have been involved in that can contribute towards increasing the skills supply within the firm or into the industry as a whole – prompted, multiple response (All establishments).



Q: *There are a number of other ways in which firms can increase skills supply either within the firm or into the industry as a whole. If I read out a list, could you say which of them your establishment is involved in? Un-weighted base = 701.*

Our survey showed that there is considerable overlap across the different initiatives and activities, with those companies involved in one activity significantly more likely to be involved in another. Companies employing

apprentices are also more likely to be involved with any education outreach activity, as are establishments with 100 or more employees at their site.



3.4 In summary

- 68% arranged or funded technical or job-specific training for their engineering or technical staff in the 12 months prior to our survey, comparing favourably with 59% in 2017.
- Company size has a marked effect on training provision, increasing from 65% for companies with fewer than 25 employees, to 91% for companies of 100 employees or more (those that have arranged or funded any technical or job-specific training for their engineering or technical staff in the 12 months prior to our survey).
- There has been a general increase in companies providing training for operative-level employees (75%, up from 64% in 2017), making it the single most common level of training. Companies are almost as likely to provide training for employees at technician level or for skilled engineering craft persons (73%).
- There has been a significant decrease in companies providing training at professional level (58%, down from 74%).
- Companies that arranged or funded any technical or job specific training for engineering or technical staff over the last 12 months primarily used external training organisations (81%) and their own training departments or other employees with specialist knowledge (69%).
- More than half the companies with 250 or more employees have linked up with universities for training (53%), compared with just 14% of companies with less than 25 employees.
- More than half (57%) of companies provide work experience opportunities to young people at school, up from 49% in 2017. Almost half offer work experience to young people in FE (48%), with only 40% providing work experience to young people doing university courses.
- Only one in four companies have partnerships with FE colleges or universities to help them develop courses matched to their company's needs. A similar number go into schools or attend careers events to help young people understand and value engineering careers.

3.5 Recommendations

- Employers should proactively link up with academic institutions to develop a greater range and network of flexible, individually tailored and innovative approaches at different levels. This is a beneficial means of upskilling and reskilling technical staff to meet industry needs, and keep abreast of emerging technology. This is particularly useful for small and medium-sized enterprises (SMEs) where resourcing pressures, capabilities, size or location may preclude traditional training routes.
- All employers should formally adopt ongoing workforce development and upskilling initiatives as a means of enhancing competitive advantage and commercial success.
- The Department for Education, the Institute for Apprenticeships and Technical Education, PEIs and engineering employers must continue their commitment to technical education in the long-term, including T Levels and apprenticeships, to ensure these pathways receive the same respect and prestige as academic routes.

Conclusion

The 2019 Skills Survey presents a mixed picture of the talent supply to our profession

The results show continued growth in the engineering and technical workforce in UK industry. Companies are largely aware of chronic skills shortages and skill gaps, and are impacted by them to a greater extent than UK employers operating in non-engineering-based sectors of the economy. This reflects the high skills requirements of engineering compared with many other sectors. Indeed, the recruitment of engineering and technical staff with the right skills remains the biggest anticipated barrier to engineering businesses achieving their objectives over the next three years.

Companies are taking action to reduce skills shortages and skill gaps. They are training and up-skilling existing workers (though less so at a professional level), attracting new employees through apprenticeships, providing some work experience and building partnerships with the education sector.

However, there is a lot more to be done. In many key areas the results are worse than they were at the time of our last survey, in 2017. More companies report difficulties finding the skills they need in the external labour market when trying to recruit. The shortage of engineering or technical skills at a professional level is a mounting problem and there has also been a significant decrease in companies providing training at a professional level.

From a positive perspective, fewer companies now have internal skills gaps, down 12% when compared with two years ago. Yet those companies with internal skills gaps have seen them widen across the board, from apprentices and trainees through to fully-qualified professionals. The proportion of companies reporting skills gaps was largest in transport, metals manufacturing, aerospace/defence and energy sectors.

There has been no progress in improving gender diversity in the engineering and technical workforce since 2017. Attracting under-represented groups will widen the pool of trained engineers and reduce skills shortages and gaps.

Only one in three businesses employed an apprentice at the time of our survey. The upcoming T Levels will offer young people an alternative to academic study, but without the wide support of industry they may not be a significant and important addition to young people's options. A severe lack of industry awareness, combined with limited capacity for industrial experience is indicative of future problems.



The Apprenticeship Levy has started to take effect, with almost one in four companies that pay the levy increasing the number of engineering or technical apprentices they employ.

More than half of companies surveyed now provide work experience opportunities to young people in schools, and almost half offer work experience to young people in FE. What is worrying is the lack of companies that help to promote science and engineering in schools. Schools and industry need to work more closely together to encourage young people to consider engineering and technical careers and to provide more opportunities to confidently move in this direction. A closer relationship will also ensure companies can map out the breadth of career paths to parents and young people, making them more aware of the options.

All these problems and opportunities drive our recommendations for this year, focusing on the actions we believe employers, educators and government must take in order to respond to the challenges.

Case study 1

Gall Thomson
proven technology

Apprenticeships: getting it right in oil and gas

When the right skills are hard to find, close ties with colleges and a personal approach are helping Gall Thomson stand tall in its field. Lance Chapman, Group Manager for this leading authority on the application, design and supply of marine breakaway couplings takes us through the detail.



Two years ago, it was relatively easy to recruit people with the right skills. Now we're finding that engineers are in much greater demand. We're also going up against wind and recyclable energy sectors, where high levels of rewards are being offered. It can be challenging.



"There used to be a wealth of skills in the industry, but the downturn in oil and gas drove out some of the requirement. People with the right skills moved into different industries. Now our industry needs them back, but their focus is elsewhere. I've also found that people who used to be technicians have shifted to other vocations beyond engineering. Some are even driving taxis and have absolutely no interest in coming back.

"The majority of people employed in our workshops have undertaken an apprenticeship. This has worked well for us and we've taken on apprentices again this year. The standard was high and we secured the people that we wanted, although I'm not convinced it will be the same next year.



"Using the government scheme has been our route for some years now and it works for us. However, we work closely with the college and vet people with a week's placement. We get to know them and we can work out who has potential. They also get to know us. It's all about finding that mutual fit. They have to be interested and engaged. The quality of young people's skills and their attitudes to work vary dramatically, so it's important we get it right.

"I think a lot of the success is down to the great relationship we have with our local college. We can take them on their recommendations. The college understands our business and how we operate. Without that connection, it would be a different story.

"In terms of training our existing employees, we make it a priority. We have an internal skills matrix, we run a lot of in-house courses and we use external training providers. It does work, but we need something more as well. Looking at the demographics of the workforce, when we have people who are reaching natural retirement age, we might make use of their skills by moving them to another area of the business if that interests them. We're then able to realign our recruitment drive to fill the company's skills gaps rather than a role requirement.

"To get the right people, I don't think we do things all that much differently to other companies. Generally, it seems like the industry as a whole is going through tricky times, particularly when you want to recruit highly-skilled engineers."

Case study 2



Building a company on training and support

To attract the best people, you need to be serious about apprenticeships and serious about training. For Base Quantum, that can also mean selling training as a service. Duncan Hughes-Phillips, CEO at this chartered quantity surveyor consultancy operating in the construction sector, talks about skills and passion.



The strategy of our business is to build the company around the team. We only sell the products that are within the skills of our people. As the skills of the team develop then the services we offer develop as well.



"The hard part is identifying those skills that we don't currently have, but want to acquire. For that, training is vital. 90% of our people are going through some element of training at any one time, whether it's technical, degree, MBA or diploma. We also have a detailed ongoing programme which aligns people's aspirations with the aspirations of the business.

"We know only too well that there is a skills shortage out there. The key shortages for us are in the 25 to 35 year old bracket and also in discovering high quality young people. For the former, the only way we can attract the best is by offering them training towards becoming chartered.

"We're finding a real lack of young talent in the pipeline. We've tried government backed apprentice schemes, but they seem to force people through whether they like it or not. Most of them come here because they have to be here, and it shows. What we're looking for, first and foremost, is people who want to be engineering quantity surveyors and secondly, those who want to do it through us. We get the best results when we focus on the people who come to us and apply direct. Those people have put the homework in to get here and have identified this as the vocation that they want to pursue.

"If every company could take on one apprentice and fully commit to them that would be fine. However, many companies want to take on 20 and pay them very little, but make a lot of money. We don't see apprenticeships as a quick moneymaking scheme, it's a long-term plan, not only to improve the business, but also the industry as a whole.

"Engagement from the government needs to be a lot better at the grass roots, communicating with companies like ours. Small business has an important part to play in providing skills for the future, skills that prepare the workforce for emerging business needs. We don't know what the future brings. In 20 or 30 years it's likely that quantity surveying and engineering will look far different to today. We have to equip people with the skills they need to be successful now, but also skills that allow them to adapt to the future, when technology and industry changes. The government needs to be a lot more engaged. It's not about pushing people through the system and filling quotas."

Appendix

Standard Industrial Classification (SIC 2007) codes used to define engineering enterprises.

Specific sectors for this research include:

1 Energy

- **06100** Extraction of crude petroleum
- **06200** Extraction of natural gas
- **09100** Support activities for petroleum and natural gas mining
- **05101** Deep coal mines
- **05102** Open cast coal working
- **35110** Production of electricity
- **35120** Transmission of electricity
- **35130** Distribution of electricity
- **35210** Manufacture of gas
- **35220** Distribution of gaseous fuels through mains
- **35300** Steam and air conditioning supply

2 IT and Communications

- **18201** Reproduction of sound recording
- **18202** Reproduction of video recording
- **18203** Reproduction of computer media
- **58210** Publishing of computer games
- **58290** Other software publishing
- **59111** Motion picture production activities
- **59112** Video production activities
- **59113** Television programme production activities
- **59120** Motion picture, video and television programme post-production activities
- **59200** Sound recording and music publishing activities
- **61100** Wired telecommunications activities
- **61200** Wireless telecommunications activities
- **61300** Satellite telecommunications activities
- **61900** Other telecommunications activities
- **62011** Ready-made interactive leisure and entertainment software development
- **62012** Business and domestic software development
- **62020** Computer consultancy activities
- **62030** Computer facilities management activities
- **62090** Other information technology and computer service activities
- **63110** Data processing, hosting and related activities
- **63120** Web portals
- **95110** Repair of computers and peripheral equipment
- **95120** Repair of communication equipment

3 Transport

- **28301** Manufacture of agricultural tractors
- **29100** Manufacture of motor vehicles
- **29201** Manufacture of bodies (coachwork) for motor vehicles (except caravans)
- **29202** Manufacture of trailers and semi-trailers
- **29203** Manufacture of caravans
- **29310** Manufacture of electrical and electronic equipment for motor vehicles
- **29320** Manufacture of other parts and accessories for motor vehicles and their engines
- **30110** Building of ships and floating structures
- **30120** Building of pleasure and sporting boats
- **30200** Manufacture of railway locomotives and rolling stock
- **30910** Manufacture of motorcycles
- **30920** Manufacture of bicycles and invalid carriages

- **30990** Manufacture of other transport equipment n.e.c.
- **51220** Space transport
- **33150** Repair and maintenance of ships and boats
- **33170** Repair and maintenance of other transport equipment n.e.c.
- **45200** Maintenance and repair of motor vehicles

4 Built environment

- **41201** Construction of commercial buildings
- **41202** Construction of domestic buildings
- **42110** Construction of roads and motorways
- **42120** Construction of railways and underground railways
- **42130** Construction of bridges and tunnels
- **42210** Construction of utility projects for fluids
- **42220** Construction of utility projects for electricity and telecommunications
- **42910** Construction of water projects
- **42990** Construction of other civil engineering projects n.e.c.
- **43110** Demolition
- **43120** Site preparation
- **43130** Test drilling and boring
- **43220** Plumbing, heat and air-conditioning installation
- **43290** Other construction installation
- **43999** Other specialised construction activities n.e.c.
- **71111** Architectural activities
- **71112** Urban planning and landscape architectural activities
- **74901** Environmental consulting activities
- **74902** Quantity surveying activities

5 Electrical and electronics

- **26110** Manufacture of electronic components
- **26120** Manufacture of loaded electronic boards
- **26200** Manufacture of computers and peripheral equipment
- **26301** Manufacture of telegraph and telephone apparatus and equipment
- **26309** Manufacture of communication equipment other than telegraph, and telephone apparatus and equipment
- **26400** Manufacture of consumer electronics
- **26511** Manufacture of electronic instruments and appliances for measuring, checking, testing, navigation and other purposes, except industrial process control equipment
- **26512** Manufacture of electronic industrial process control equipment
- **26513** Manufacture of non-electronic instruments and appliances for measuring, checking, testing, navigation and other purposes, except process control equipment
- **26514** Manufacture of non-electronic industrial process control equipment
- **26520** Manufacture of watches and clocks
- **26600** Manufacture of irradiation, electromedical and electrotherapeutic equipment
- **26701** Manufacture of optical precision instruments
- **26702** Manufacture of photographic and cinematographic equipment
- **26800** Manufacture of magnetic and optical media
- **27110** Manufacture of electric motors, generators and transformers
- **27120** Manufacture of electricity distribution and control apparatus
- **27200** Manufacture of batteries and accumulators
- **27310** Manufacture of fibre optic cables
- **27320** Manufacture of other electronic and electric wires and cables
- **27330** Manufacture of wiring devices
- **27400** Manufacture of electric lighting equipment
- **27510** Manufacture of electric domestic appliances
- **27520** Manufacture of non-electric domestic appliances
- **27900** Manufacture of other electrical equipment
- **33130** Repair of electronic and optical equipment
- **33140** Repair of electrical equipment
- **43210** Electrical installation
- **95210** Repair of consumer electronics

6 Aerospace

- **30300** Manufacture of air and spacecraft and related machinery
- **33160** Repair and maintenance of aircraft and spacecraft

7 Defence

- **84220** Defence activities
- **30400** Manufacture of military fighting vehicles
- **25400** Manufacture of weapons and ammunition

8 Manufacturing

- **10130** Production of meat and poultry meat products
- **10200** Processing and preserving of fish, crustaceans and molluscs
- **10310** Processing and preserving of potatoes
- **10320** Manufacture of fruit and vegetable juice
- **10390** Other processing and preserving of fruit and vegetables
- **10410** Manufacture of oils and fats
- **10420** Manufacture of margarine and similar edible fats
- **10511** Liquid milk and cream production
- **10512** Butter and cheese production
- **10519** Manufacture of other milk products
- **10520** Manufacture of ice cream
- **10611** Grain milling
- **10612** Manufacture of breakfast cereals and cereals-based food
- **10620** Manufacture of starches and starch products
- **10710** Manufacture of bread; manufacture of fresh pastry goods and cakes
- **10720** Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes
- **10730** Manufacture of macaroni, noodles, couscous and similar farinaceous products
- **10810** Manufacture of sugar
- **10821** Manufacture of cocoa and chocolate confectionery
- **10822** Manufacture of sugar confectionery
- **10831** Tea processing
- **10832** Production of coffee and coffee substitutes
- **10840** Manufacture of condiments and seasonings
- **10850** Manufacture of prepared meals and dishes
- **10860** Manufacture of homogenized food preparations and dietetic food
- **10890** Manufacture of other food products n.e.c.
- **10910** Manufacture of prepared feeds for farm animals
- **10920** Manufacture of prepared pet foods
- **11010** Distilling, rectifying and blending of spirits
- **11020** Manufacture of wine from grape
- **11030** Manufacture of cider and other fruit wines
- **11040** Manufacture of other non-distilled fermented beverages
- **11050** Manufacture of beer
- **11060** Manufacture of malt
- **11070** Manufacture of soft drinks; production of mineral waters and other bottled waters
- **12000** Manufacture of tobacco products
- **13100** Preparation and spinning of textile fibres
- **13200** Weaving of textiles
- **13300** Finishing of textiles
- **13910** Manufacture of knitted and crocheted fabrics
- **13921** Manufacture of soft furnishings
- **13922** Manufacture of canvas goods, sacks, etc.
- **13923** Manufacture of household textiles
- **13931** Manufacture of woven or tufted carpets and rugs
- **13939** Manufacture of other carpets and rugs
- **13940** Manufacture of cordage, rope, twine and netting
- **13950** Manufacture of non-wovens and articles made from non-wovens, except apparel
- **13960** Manufacture of other technical and industrial textiles
- **13990** Manufacture of other textiles n.e.c.
- **14110** Manufacture of leather clothes
- **14120** Manufacture of workwear
- **14131** Manufacture of other men's outerwear
- **14132** Manufacture of other women's outerwear
- **14141** Manufacture of men's underwear
- **14142** Manufacture of women's underwear
- **14190** Manufacture of other wearing apparel and accessories n.e.c.
- **14200** Manufacture of articles of fur
- **14310** Manufacture of knitted and crocheted hosiery
- **14390** Manufacture of other knitted and crocheted apparel
- **15110** Tanning and dressing of leather; dressing and dyeing of fur

- **15120** Manufacture of luggage, handbags and the like, saddlery and harness
- **15200** Manufacture of footwear
- **16100** Sawmilling and planing of wood
- **16210** Manufacture of veneer sheets and wood-based panels
- **16220** Manufacture of assembled parquet floors
- **16230** Manufacture of other builders' carpentry and joinery
- **16240** Manufacture of wooden containers
- **16290** Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
- **17110** Manufacture of pulp
- **17120** Manufacture of paper and paperboard
- **17211** Manufacture of corrugated paper and paperboard, sacks and bags
- **17219** Manufacture of other paper and paperboard containers
- **17220** Manufacture of household and sanitary goods and of toilet requisites
- **17230** Manufacture of paper stationery
- **17240** Manufacture of wallpaper
- **17290** Manufacture of other articles of paper and paperboard n.e.c.
- **18110** Printing of newspapers
- **18121** Manufacture of printed labels
- **18129** Printing n.e.c.
- **18130** Pre-press and pre-media services
- **18140** Binding and related services
- **19100** Manufacture of coke oven products
- **19201** Mineral oil refining
- **19209** Other treatment of petroleum products (excluding petrochemicals manufacture)
- **20110** Manufacture of industrial gases
- **20120** Manufacture of dyes and pigments
- **20130** Manufacture of other inorganic basic chemicals
- **20140** Manufacture of other organic basic chemicals
- **20150** Manufacture of fertilizers and nitrogen compounds
- **20160** Manufacture of plastics in primary forms
- **20170** Manufacture of synthetic rubber in primary forms
- **20200** Manufacture of pesticides and other agrochemical products
- **20301** Manufacture of paints, varnishes and similar coatings, mastics and sealants
- **20302** Manufacture of printing ink
- **20411** Manufacture of soap and detergents
- **20412** Manufacture of cleaning and polishing preparations
- **20420** Manufacture of perfumes and toilet preparations
- **20510** Manufacture of explosives
- **20520** Manufacture of glues
- **20530** Manufacture of essential oils
- **20590** Manufacture of other chemical products n.e.c.
- **20600** Manufacture of man-made fibres
- **21100** Manufacture of basic pharmaceutical products
- **21200** Manufacture of pharmaceutical preparations
- **22110** Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
- **22190** Manufacture of other rubber products
- **22210** Manufacture of plastic plates, sheets, tubes and profiles
- **22220** Manufacture of plastic packing goods
- **22230** Manufacture of builders' ware of plastic
- **22290** Manufacture of other plastic products
- **23110** Manufacture of flat glass
- **23120** Shaping and processing of flat glass
- **23130** Manufacture of hollow glass
- **23140** Manufacture of glass fibres
- **23190** Manufacture and processing of other glass, including technical glassware
- **23200** Manufacture of refractory products
- **23310** Manufacture of ceramic tiles and flags
- **23320** Manufacture of bricks, tiles and construction products, in baked clay
- **23410** Manufacture of ceramic household and ornamental articles
- **23420** Manufacture of ceramic sanitary fixtures
- **23430** Manufacture of ceramic insulators and insulating fittings
- **23440** Manufacture of other technical ceramic products
- **23490** Manufacture of other ceramic products n.e.c.
- **23510** Manufacture of cement
- **23520** Manufacture of lime and plaster
- **23610** Manufacture of concrete products for construction purposes
- **23620** Manufacture of plaster products for construction purposes
- **23630** Manufacture of ready-mixed concrete

- **23640** Manufacture of mortars
- **23650** Manufacture of fibre cement
- **23690** Manufacture of other articles of concrete, plaster and cement
- **23700** Cutting, shaping and finishing of stone
- **23910** Production of abrasive products
- **23990** Manufacture of other non-metallic mineral products n.e.c.
- **24100** Manufacture of basic iron and steel and of ferro-alloys
- **24200** Manufacture of tubes, pipes, hollow profiles and related fittings, of steel
- **24310** Cold drawing of bars
- **24320** Cold rolling of narrow strip
- **24330** Cold forming or folding
- **24340** Cold drawing of wire
- **24410** Precious metals production
- **24420** Aluminium production
- **24430** Lead, zinc and tin production
- **24440** Copper production
- **24450** Other non-ferrous metal production
- **24460** Processing of nuclear fuel
- **24510** Casting of iron
- **24520** Casting of steel
- **24530** Casting of light metals
- **24540** Casting of other non-ferrous metals
- **25110** Manufacture of metal structures and parts of structures
- **25120** Manufacture of doors and windows of metal
- **25210** Manufacture of central heating radiators and boilers
- **25290** Manufacture of other tanks, reservoirs and containers of metal
- **25300** Manufacture of steam generators, except central heating hot water boilers
- **25500** Forging, pressing, stamping and roll-forming of metal; powder metallurgy
- **25610** Treatment and coating of metals
- **25620** Machining
- **25710** Manufacture of cutlery
- **25720** Manufacture of locks and hinges
- **25730** Manufacture of tools
- **25910** Manufacture of steel drums and similar containers
- **25920** Manufacture of light metal packaging
- **25930** Manufacture of wire products, chain and springs
- **25940** Manufacture of fasteners and screw machine products
- **25990** Manufacture of other fabricated metal products n.e.c.
- **28110** Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
- **28120** Manufacture of fluid power equipment
- **28131** Manufacture of pumps
- **28132** Manufacture of compressors
- **28140** Manufacture of taps and valves
- **28150** Manufacture of bearings, gears, gearing and driving elements
- **28210** Manufacture of ovens, furnaces and furnace burners
- **28220** Manufacture of lifting and handling equipment
- **28230** Manufacture of office machinery and equipment (except computers and peripheral equipment)
- **28240** Manufacture of power-driven hand tools
- **28250** Manufacture of non-domestic cooling and ventilation equipment
- **28290** Manufacture of other general-purpose machinery n.e.c.
- **28302** Manufacture of agricultural and forestry machinery other than tractors
- **28410** Manufacture of metal forming machinery
- **28490** Manufacture of other machine tools n.e.c.
- **28910** Manufacture of machinery for metallurgy
- **28921** Manufacture of machinery for mining
- **28922** Manufacture of earthmoving equipment
- **28923** Manufacture of equipment for concrete crushing and screening and roadworks
- **28930** Manufacture of machinery for food, beverage and tobacco processing
- **28940** Manufacture of machinery for textile, apparel and leather production
- **28950** Manufacture of machinery for paper and paperboard production
- **28960** Manufacture of plastics and rubber machinery
- **28990** Manufacture of other special-purpose machinery n.e.c.
- **31010** Manufacture of office and shop furniture
- **31020** Manufacture of kitchen furniture
- **31030** Manufacture of mattresses
- **31090** Manufacture of other furniture
- **32110** Striking of coins
- **32130** Manufacture of imitation jewellery and related articles
- **32200** Manufacture of musical instruments
- **32300** Manufacture of sports goods
- **32401** Manufacture of professional and arcade games and toys

- **32409** Manufacture of other games and toys, n.e.c.
- **32500** Manufacture of medical and dental instruments and supplies
- **32910** Manufacture of brooms and brushes
- **32990** Other manufacturing n.e.c.
- **33110** Repair of fabricated metal products
- **33120** Repair of machinery
- **33190** Repair of other equipment
- **33200** Installation of industrial machinery and equipment
- **71121** Engineering design activities for industrial process and production
- **71122** Engineering related scientific and technical consulting activities
- **71129** Other engineering activities
- **71200** Technical testing and analysis
- **72190** Other research and experimental development on natural sciences and engineering

9 Other

- **01630** Post-harvest crop activities
- **01640** Seed processing for propagation
- **05200** Mining of lignite
- **07100** Mining of iron ores
- **07210** Mining of uranium and thorium ores
- **07290** Mining of other non-ferrous metal ores
- **08110** Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
- **08120** Operation of gravel and sand pits; mining of clays and kaolin
- **08910** Mining of chemical and fertilizer minerals
- **08930** Extraction of salt
- **08990** Other mining and quarrying n.e.c.
- **09900** Support activities for other mining and quarrying
- **36000** Water collection, treatment and supply
- **37000** Sewerage
- **38210** Treatment and disposal of non-hazardous waste
- **38220** Treatment and disposal of hazardous waste
- **38310** Dismantling of wrecks
- **38320** Recovery of sorted materials
- **39000** Remediation activities and other waste management services
- **49500** Transport via pipeline
- **58110** Book publishing
- **58120** Publishing of directories and mailing lists
- **58130** Publishing of newspapers
- **58141** Publishing of learned journals
- **58142** Publishing of consumer and business journals and periodicals
- **58190** Other publishing activities
- **80200** Security systems service activities
- **95220** Repair of household appliances and home and garden equipment

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