

Engineering and Technology

Skills & Demand in Industry

Annual Survey 2012



The Institution of Engineering and Technology

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Please Note:

Figures are rounded and do not always add to 100%

Multiple choice questions add to more than 100%

Means and averages are calculated in the data tables, therefore overall totals do not always add to 100%

With a sample size of 400 the data accuracy is + 4% or 0.2 on a scale of 1 to 5

Different organisations are surveyed each year

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1. Executive summary

This is the seventh *Engineering and Technology: Skills and Demand* in Industry report from the Institution of Engineering and Technology (IET), based on telephone interviews with 400 organisations in the UK.

Current recruitment:

- The number of companies recruiting staff is up on last year, with 51.5% (compared to 47% in 2011) of organisations currently recruiting engineering staff and 17.5% (compared to 12.5% in 2011) currently recruiting IT staff.
- More companies expressed difficulty recruiting engineers than in 2011, however this is not as bad as the skills shortages reported pre recession.

Recruitment plans over the next 12 months:

- In addition to current recruitment many organisations plan to recruit further new engineering, IT and technical staff over the next 12 months.
- 39% of companies are planning to recruit engineering, IT or technical staff in the next 12 months, a significant increase from 2011 (15%).
- The level of planned recruitment of engineers and technical staff was highest in aerospace (56%), defence (41%), education and skills (47%), electronics (52%) and energy (58%).
- As with previous years, the majority of planned recruits will be experienced staff (57% of new recruits) rather than postgraduates (11%), new graduates (20%) or school leavers (13%).

Skills gaps amongst new recruits:

- 39% of respondents reported that recent engineering, IT and technical recruits did not meet reasonable expectations for levels of skill.
- The biggest skills gap amongst new recruits was lack of practical experience: for example, 31% of organisations said that graduates did not have sufficient practical experience.

Training and retaining the existing skills base:

- In 2012 there has been a dramatic drop in the amount of in-house training offered by companies. In particular the amount of formal on-the-job training has decreased by more than a quarter since 2011.
- Conversely the amount of external training offered to technical employees has gone up considerably.
- Only 6% of companies do not offer any training support. This is a significant improvement compared to 2011.
- Almost half of companies expect to recruit apprentices in the next 4-5 years; a significant increase to previous years.

Addressing skills shortages:

- The most commonly cited action to address skills shortages was improving the profile and image of engineering (19% of respondents) followed by improving the school curriculum (17%).
- Many organisations contributed to efforts to promote engineering to young people, for example 60% said they took people on work experience.

Looking to the future:

- For the first time since the survey has been carried out, companies are more optimistic about being able to recruit the necessary staff in the medium-term (4-5 year's time) than in the short-term (in the next 12 months).
- 49% of organisations anticipate that they would employ more apprentices in 4-5 years' time, compared to 10% who thought they would employ fewer.

The engineering workforce today:

- The Electrical and Defence sectors employ the most engineers.
- The Defence sector employs a significantly larger number of apprentices than any other sector.
- Women are very under-represented in both engineering and IT: for example, in the engineering workforce 4% of technicians and 6% of engineers are women. There are no statistically significant differences between 2008 and 2012.
- The engineering workforce in general has a higher average age, with the Pharma and Education sectors aging more.

N.B when looking at results for the Construction sector, care should be taken when evaluating the results due to the small sample size.

4 Summary of 2012 Survey findings:

Engineering and Technology Skills and Demand in Industry

2. Key trends

		2008	2009	2010	2011	2012
The current workforce						
Gender	Proportion of technicians who are women	5%	6%	4%	3%	4%
	Proportion of engineers who are women	5%	5%	5%	6%	6%
Training and retaining the existing skills base						
Training	Proportion of organisations offering formal on-the-job training	79%	78%	59%	75%	48%
Retaining the existing skills base through tough times	Proportion of organisations concerned about loss of skills due to restructuring	N/A	40%	38%	33%	32%
Recruitment plans over the next 12 months						
	Proportion of new recruits who will be experienced staff	32%	45%	51%	49%	57%
	Proportion of new recruits who will be school leavers	16%	17%	9%	12%	13%
Looking to the future						
	Proportion of organisations who anticipate employing more apprentices in 4 – 5 years time	N/A	N/A	38%	39%	49%

3. The engineering workforce today

3.1 Sector profiles

Figure 1 shows a breakdown of the number of engineering staff employed by sector. The highest average number of engineering staff per organisation was found in the Electrical sector (average of 1435 per organisation).

Figure 1: Current Engineering workforce in the UK (2012 by sector)

How many people do you currently employ in Engineering? Of these, how many are professionals, apprentices or technicians?

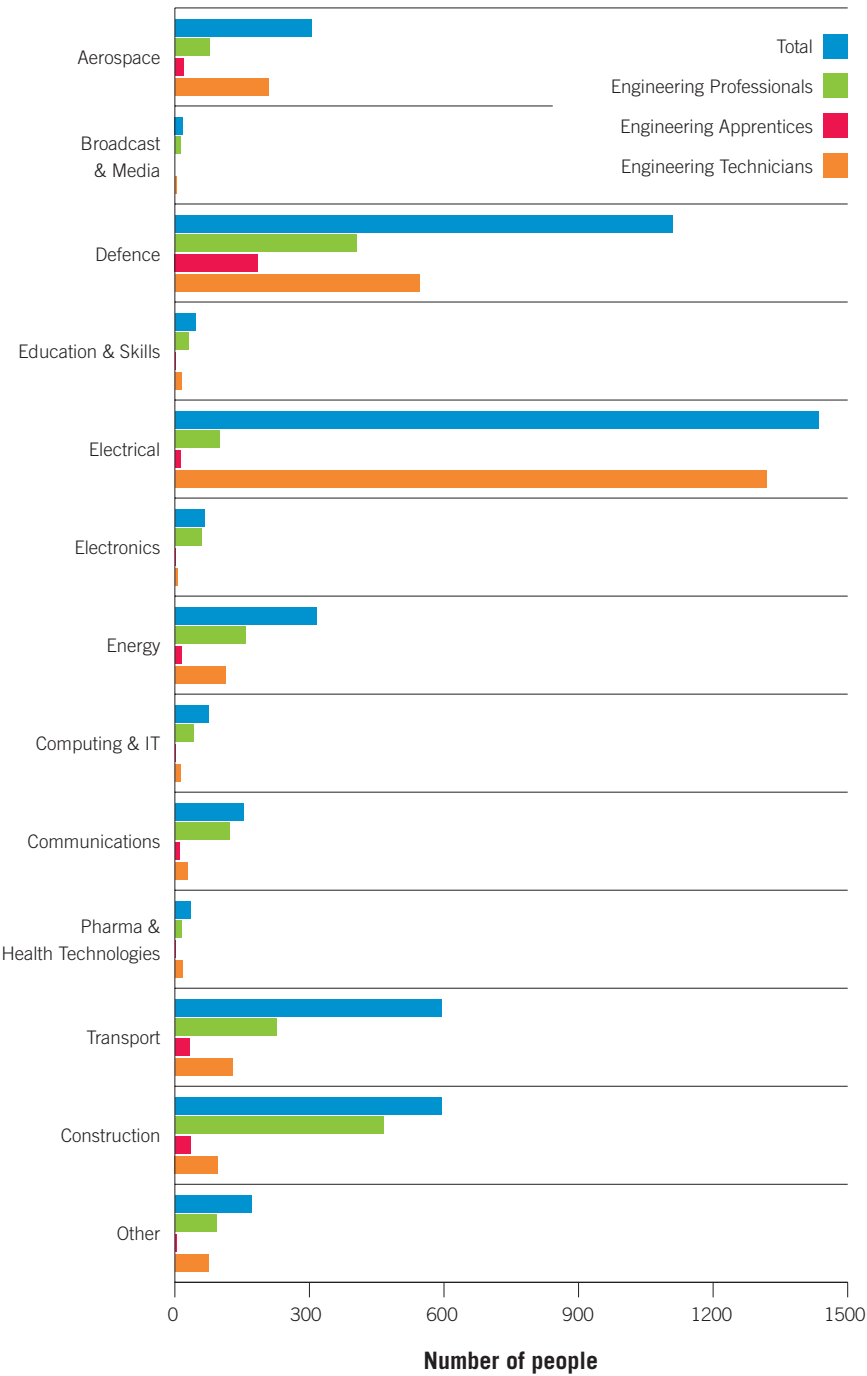


Figure 2: Current IT workforce in the UK (2012 by sector)

How many people do you currently employ in IT? Of these, how many are professionals, apprentices or technicians?

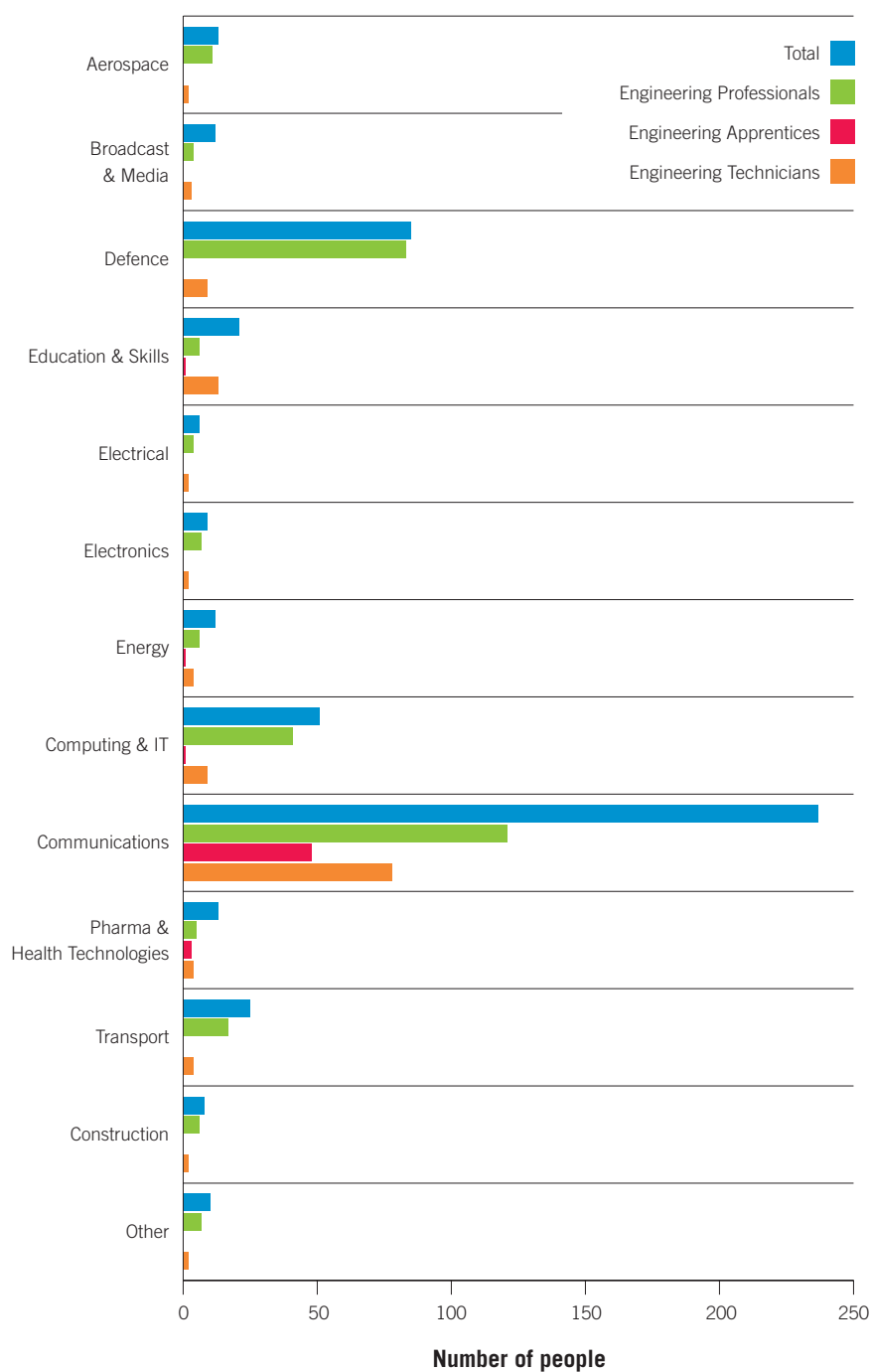


Figure 2 shows a breakdown of the number of IT staff employed by sector. The Communications sector employ most IT staff by far (average 237), followed by the Defence sector (average 85). The Communications sector also employed the most technicians (average 78) as well as a significant number of IT apprentices.

3.2 Gender

In line with previous years, a significant gender gap in the engineering and IT workforce was reported, with many fewer women employed than men at all levels and across all sectors. Overall, 23% of employees at the surveyed organisations are women. In engineering, IT and technical roles, the proportion of female staff are fewer still. Figure 3 shows the proportion of female employees analysed by job role. For the years in which surveys have been carried out, there has been no notable increase in the proportion of women employed in IT and engineering roles. The 2% increase in the number of female IT staff employed compared with 2011 is not statistically significant.

Figure 3: Female IT & Engineering workforce (year on year)
Considering your Engineering and IT workforce, what percentage of the following staff are female?

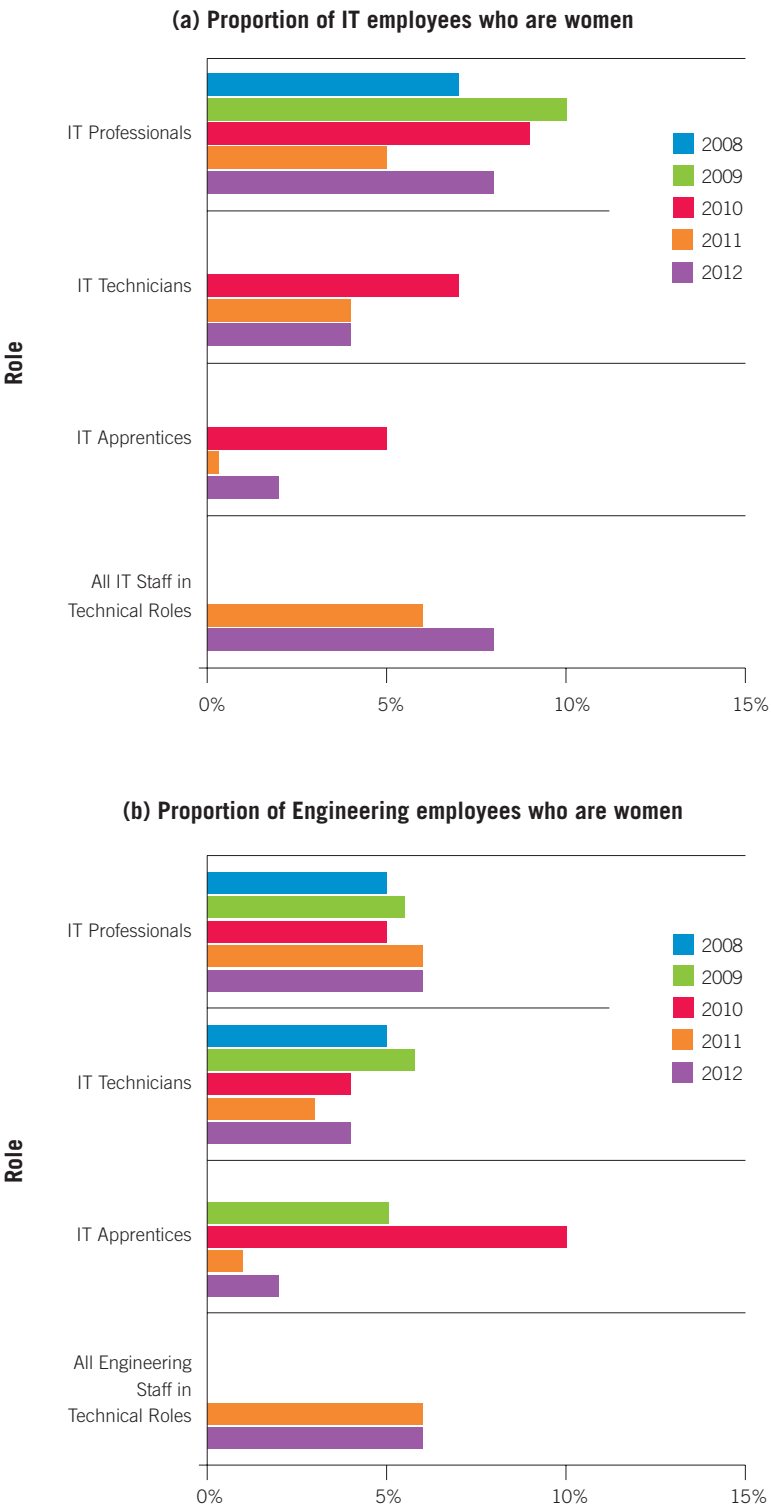


Figure 4: Female workforce by year and sector

Approximately, what percentage of your total UK workforce is female?

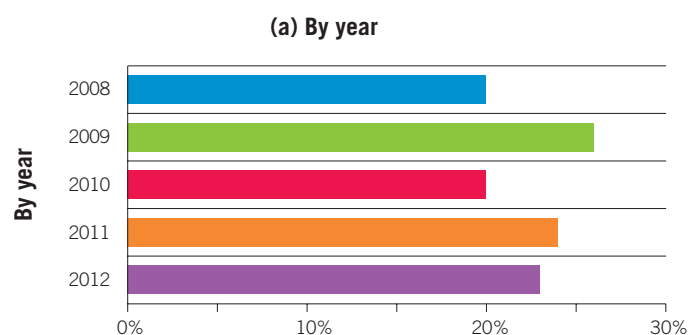
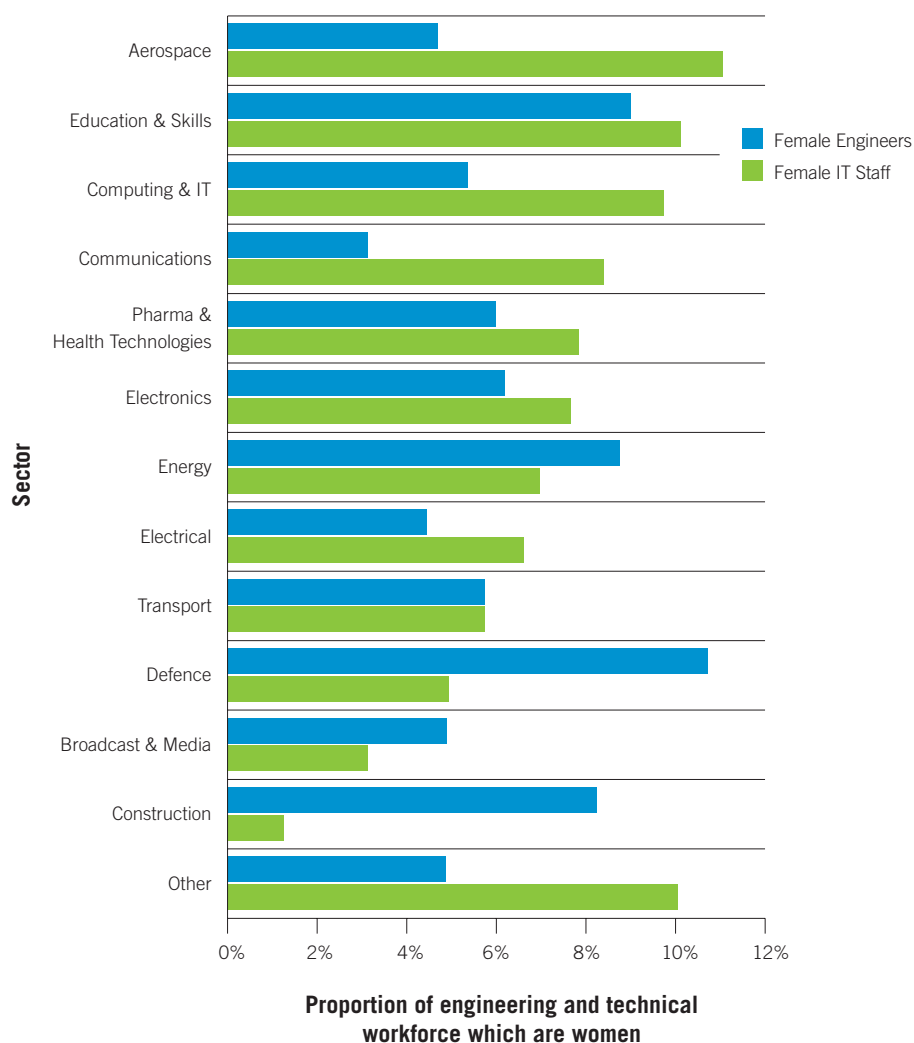


Figure 4 shows the proportion of female staff analysed by year and sector. Aerospace, Education, Communications and Computing & IT have the highest proportion of women in IT roles. Defence has the highest proportion of women employed in Engineering roles, followed by the Construction sector.

(b) By sector

Considering your Engineering and IT workforce, what percentage of the following staff are female?



3.3 Age of Employees

Figure 5 suggests that the engineering workforce age profile continues to increase, with the Pharma and the Education and Skills sectors having a higher average age – see Figure 6.

Figure 5: Age of employees (year-on-year total)

Please specify what percentage of your engineering, IT and technical employees fall into the following age bands?

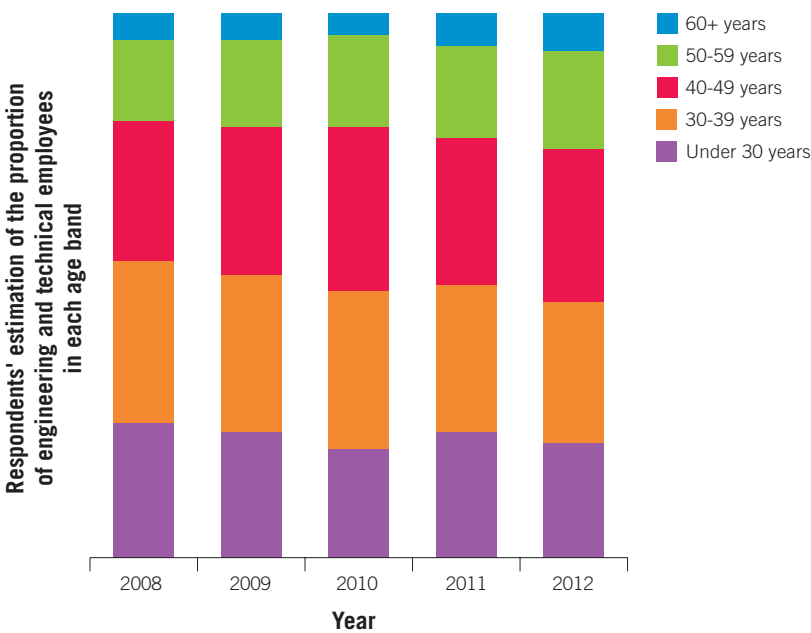
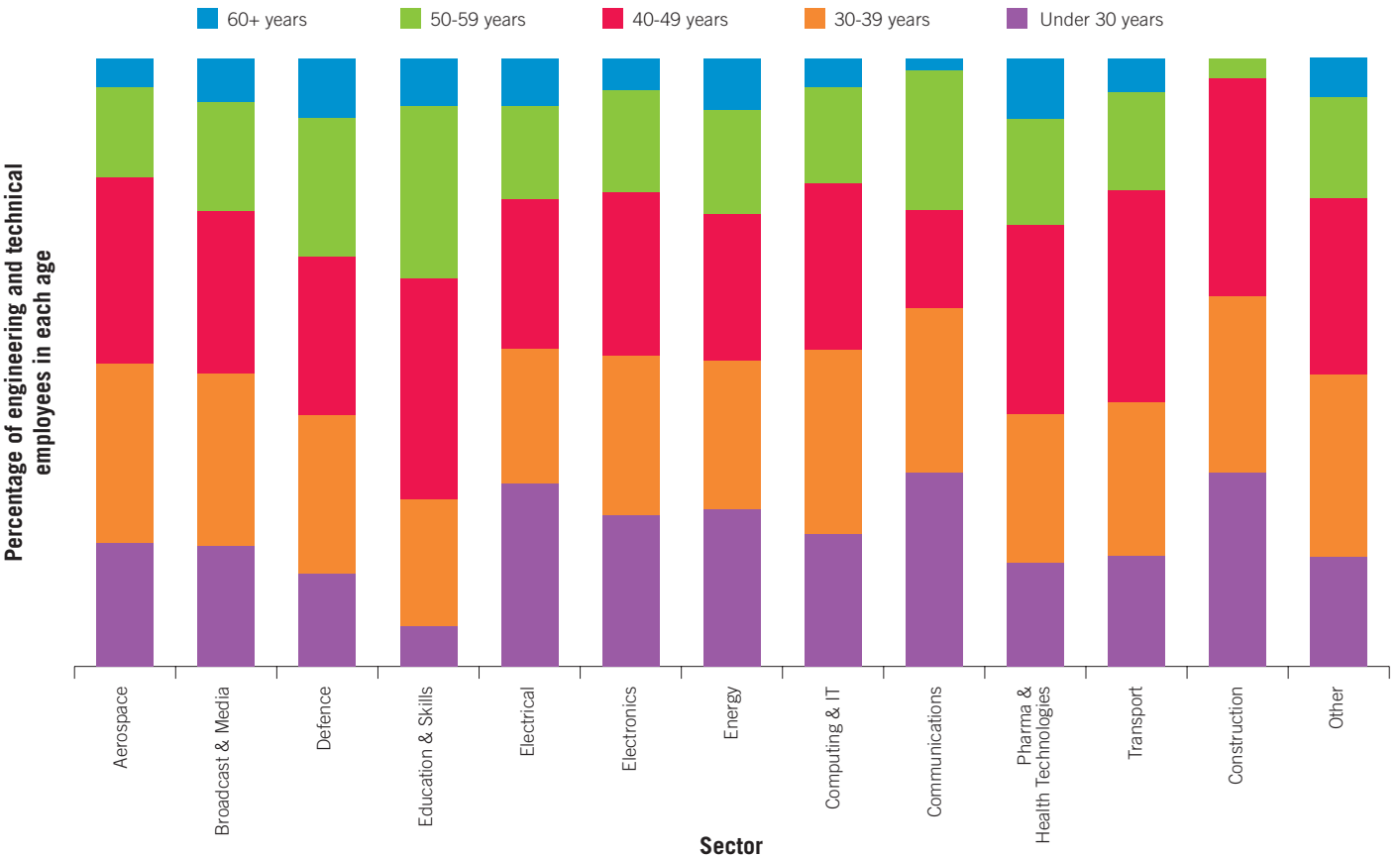


Figure 6: Age of employees by sector

Please specify what percentage of your engineering, IT and technical employees fall into the following age bands?



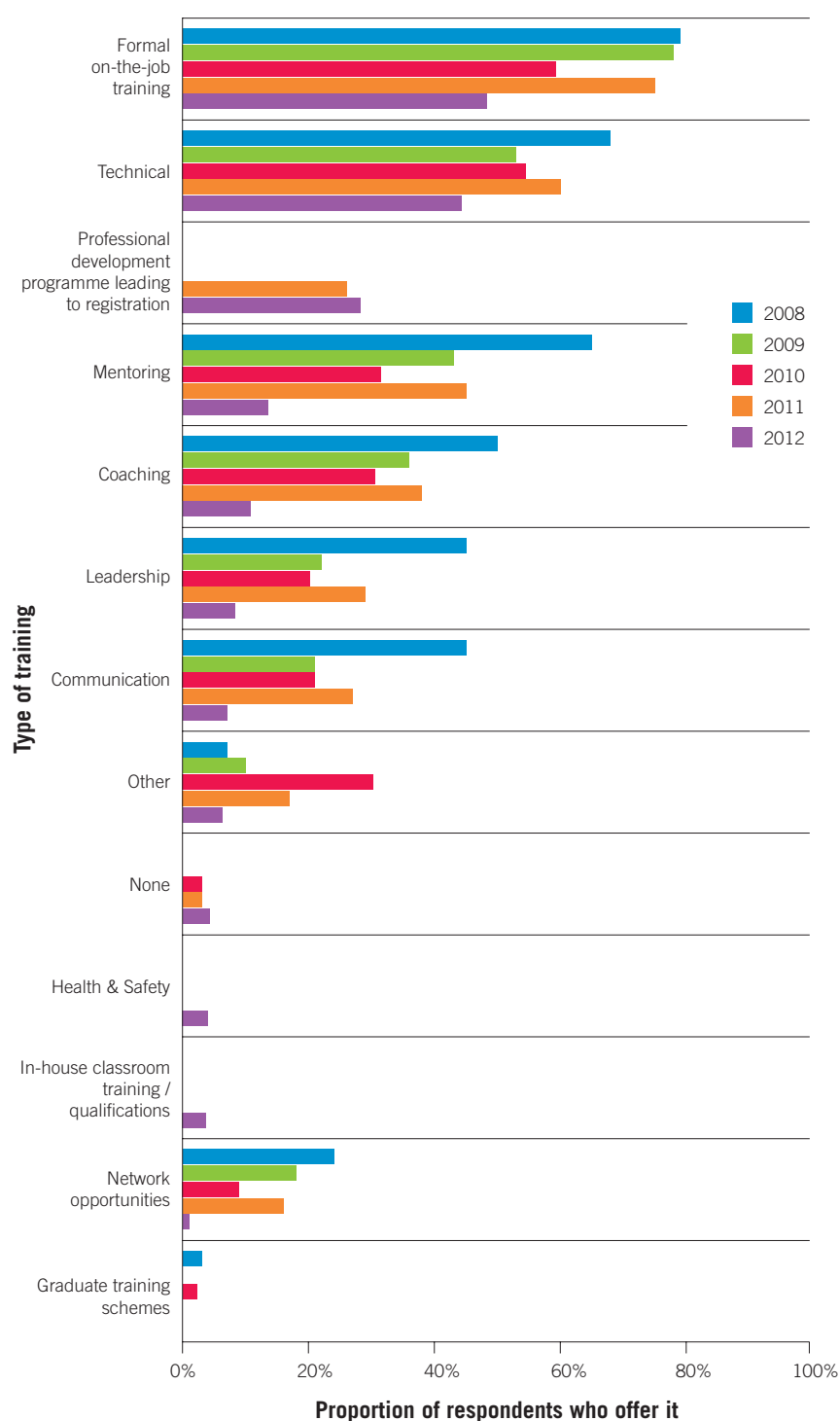
4. Training and retaining the existing skills base

4.1 Training

Figure 7: Training & Retaining the Existing Skills Base

- Current training provided to employees

What type of staff training or development are you providing for engineering, IT and technical employees?



Respondents were asked what type of staff training or development they were providing for engineers and technicians in their workforce. Responses shown in Figure 7 indicate a significant reduction in the amount of formal on-the-job training provided for staff, even lower than 2010 where a significant drop was observed compared to the previous year. Technical, on-the-job training, coaching, leadership, communication and professional development are all common forms of training which are still provided but to a much lesser extent compared with 2011.

Conversely, the level of external opportunities offered to staff has consistently increased in 2012, which indicates there is a shift emerging in the way that training is being offered in companies. In this respect, it was asked what types of qualifications were offered to employees. The results are shown in Figure 8. 73% of organisations offered a company development programme - a significant increase compared to 2011 - whilst 55% reported that they offered apprenticeships. The number of short courses offered to employees for both technical and soft skills has also increased significantly since 2011.

In addition, respondents who said they offered apprenticeships were asked what type of apprenticeship they offered. The results are shown in Figure 9. The number offering Advanced (Level 3) Apprenticeships has increased by 13%, again exceeding the number of Intermediate (Level 2) Apprenticeships, which has also increased (by 15%). The number of organisations who reported that they offer Higher (Level 4) Apprenticeships has also increased.

Figure 8: Support offered for technical employees

Which of the following do you offer/support for engineering, IT and technical employees?

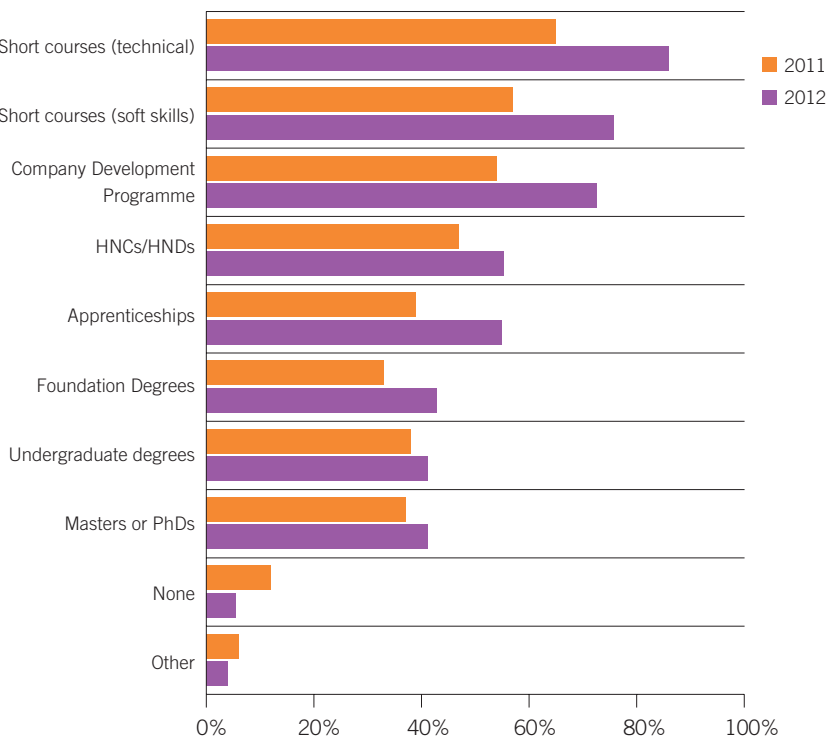
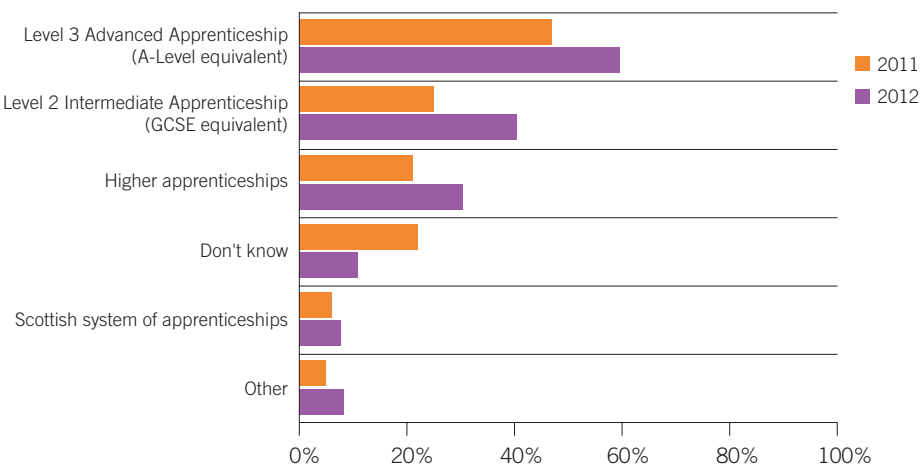


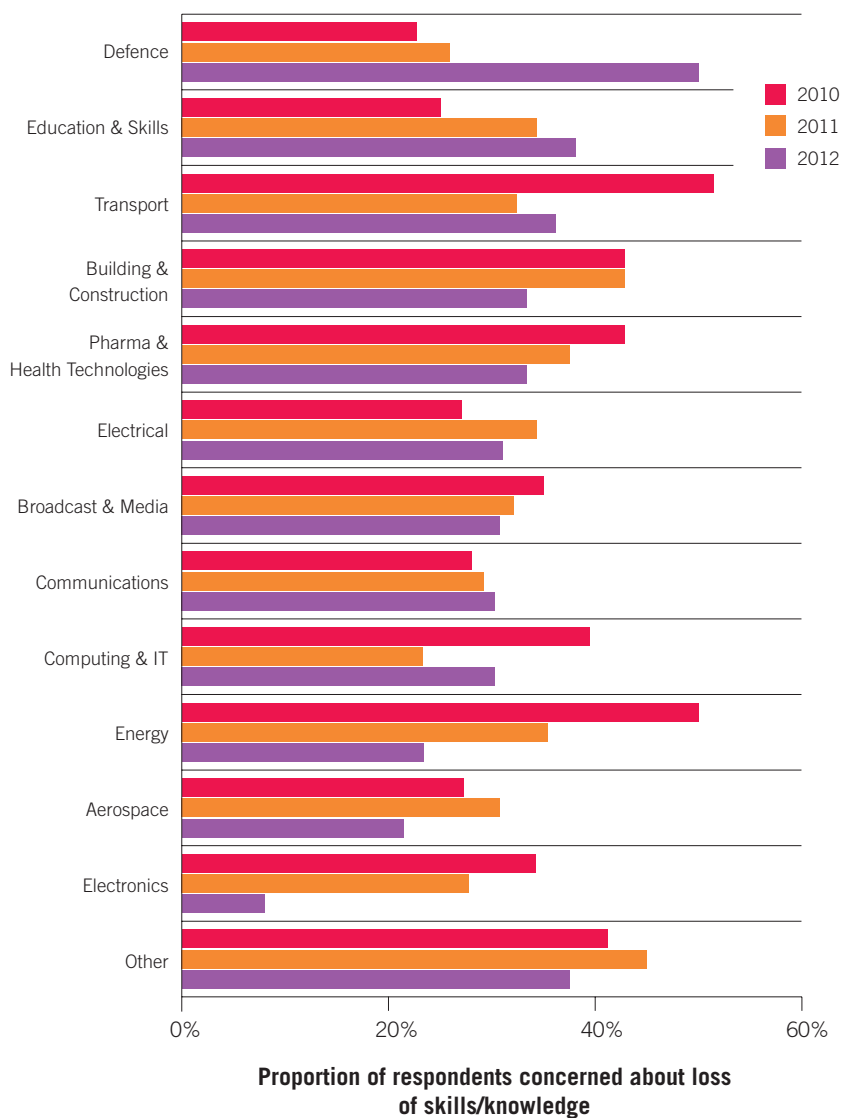
Figure 9: Apprenticeships offered for technical employees



4.2 Retaining the existing skills base

Figure 10: Risk of skill/knowledge loss due to restructuring by sector

In the current economic conditions are you concerned about the loss of skills or knowledge in your company due to restructuring?



When the UK has suffered recessions in the past engineering organisations reported that they found it difficult to replace skilled staff once the economy recovered. Since 2009, the IET survey has asked whether organisations were concerned about loss of skills or knowledge due to restructuring. 38% of organisations cited this as a concern in 2010, 33% in 2011 and 32% in 2012.

Figure 10 shows the responses to this question broken down by sector for 2010 to 2012. The Computing & IT, Electronics, Energy, Pharma & Health and Transport sectors have followed a year-on-year trend of becoming much less concerned about loss of skills. In contrast, levels of concern have risen dramatically in the Defence sector reflecting perhaps the current cuts in defence spending. Other sectors having significantly more concerns this year include Computing and IT, Transport and Education & Skills.

5. Current recruitment

Overall, 51.5% of respondents reported that they are currently recruiting engineering staff whilst 17.5% of respondents reported that they are currently recruiting IT staff. This is an increase on 2011 where 47% of respondents reported they were recruiting engineering staff and 12.5% recruited IT staff.

Figure 11 shows the proportions of those organisations which were recruiting who reported difficulties in filling vacancies at different career levels.

Recruiting engineers has become more difficult compared to 2011. There is a significant increase in the difficulty of recruiting Senior Engineers (37% to 43%), and Engineering Technicians (16% to 23%).

Figure 12 shows the sectors which are currently recruiting IT and engineering staff. The Energy sector is the most active sector in recruiting staff, followed by Defence.

Figure 11: Problems in recruiting Engineering staff (year-on-year)

Are you currently or have you recently experienced problems in recruiting...?

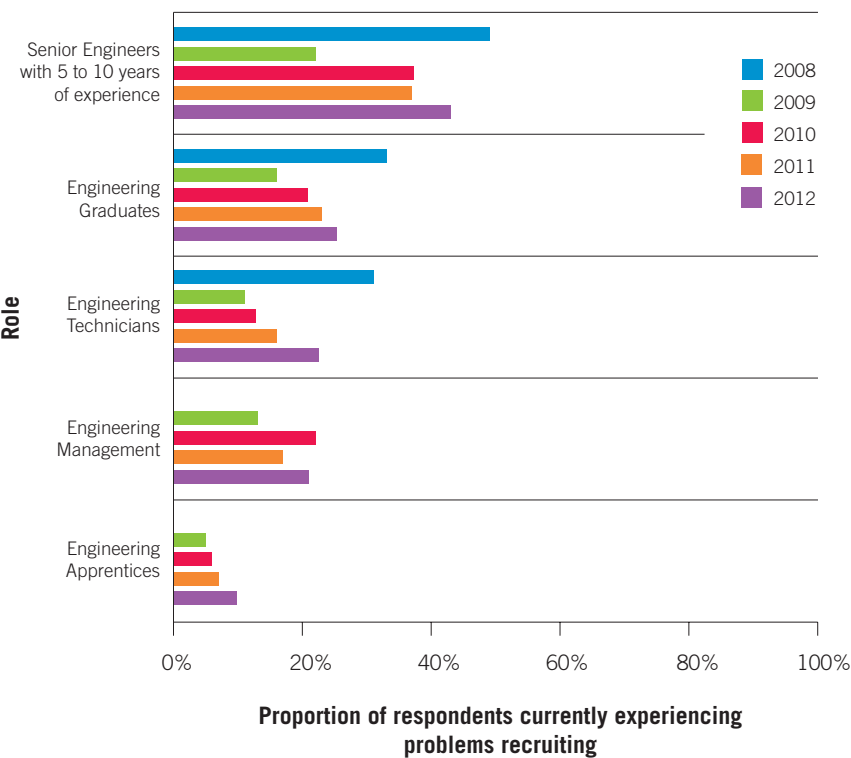
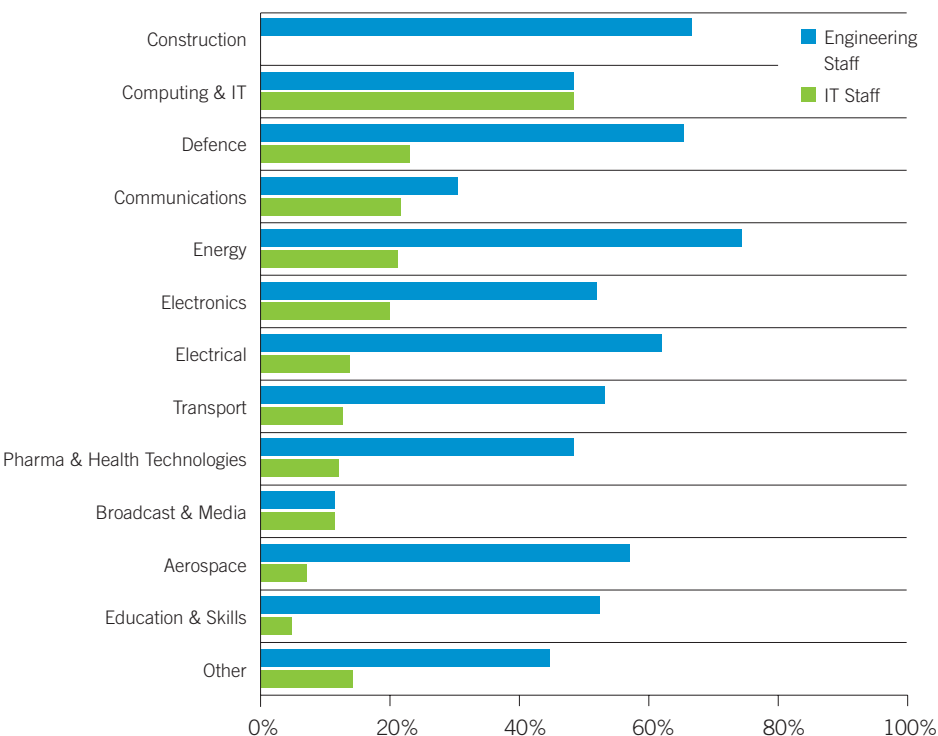


Figure 12: Current staff recruitment by sector

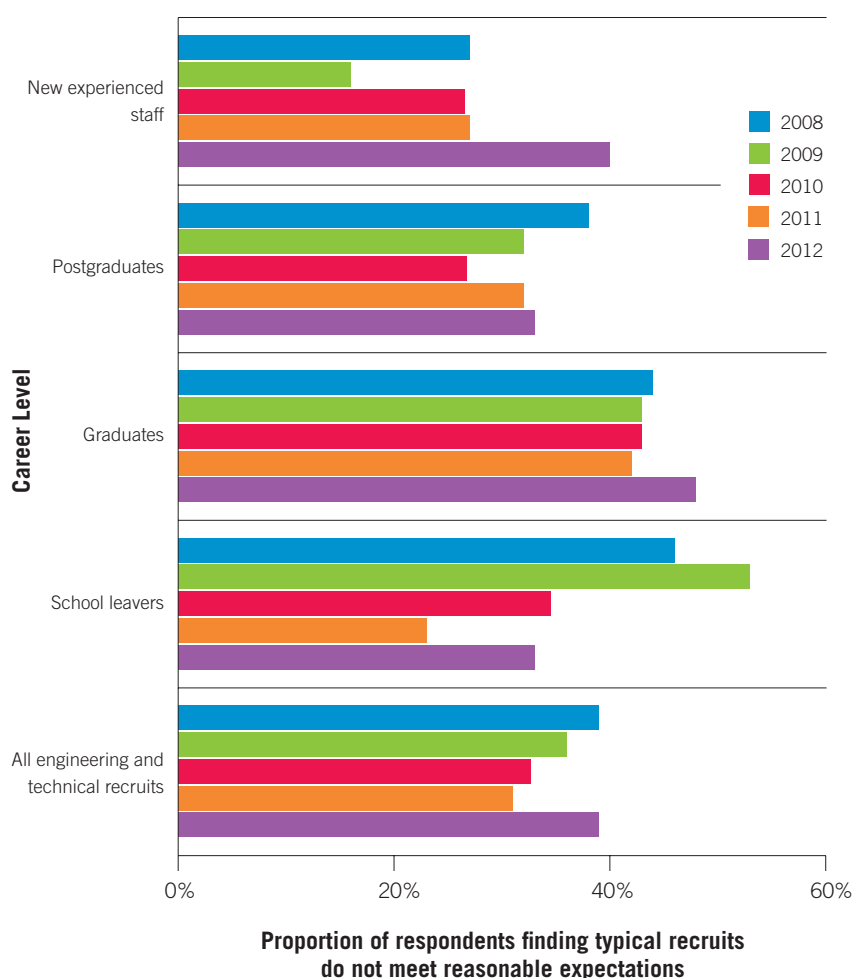
Are you currently recruiting the following staff?



6. Skills gaps amongst new recruits

Figure 13: Skills shortages of different new recruits

Do you find the typical new school leaver recruit/graduate recruit/postgraduate recruit/experienced staff recruit to an engineering, IT or technical role does not meet your reasonable expectations in any particular skill areas?



Respondents were asked whether new recruits to engineering, IT and technical roles are typically meeting reasonable expectations for levels of skill or whether there are gaps in their knowledge or experience. Overall, 39% of organisations surveyed stated that typical recruits do not meet their expectations. An 8% increase since 2011 has reversed the trend of the last 4 years. This is illustrated in Figure 13, which also shows these results broken down by the career level of recruits. It is notable that all levels except postgraduates have significantly higher skill gaps, than in previous years.

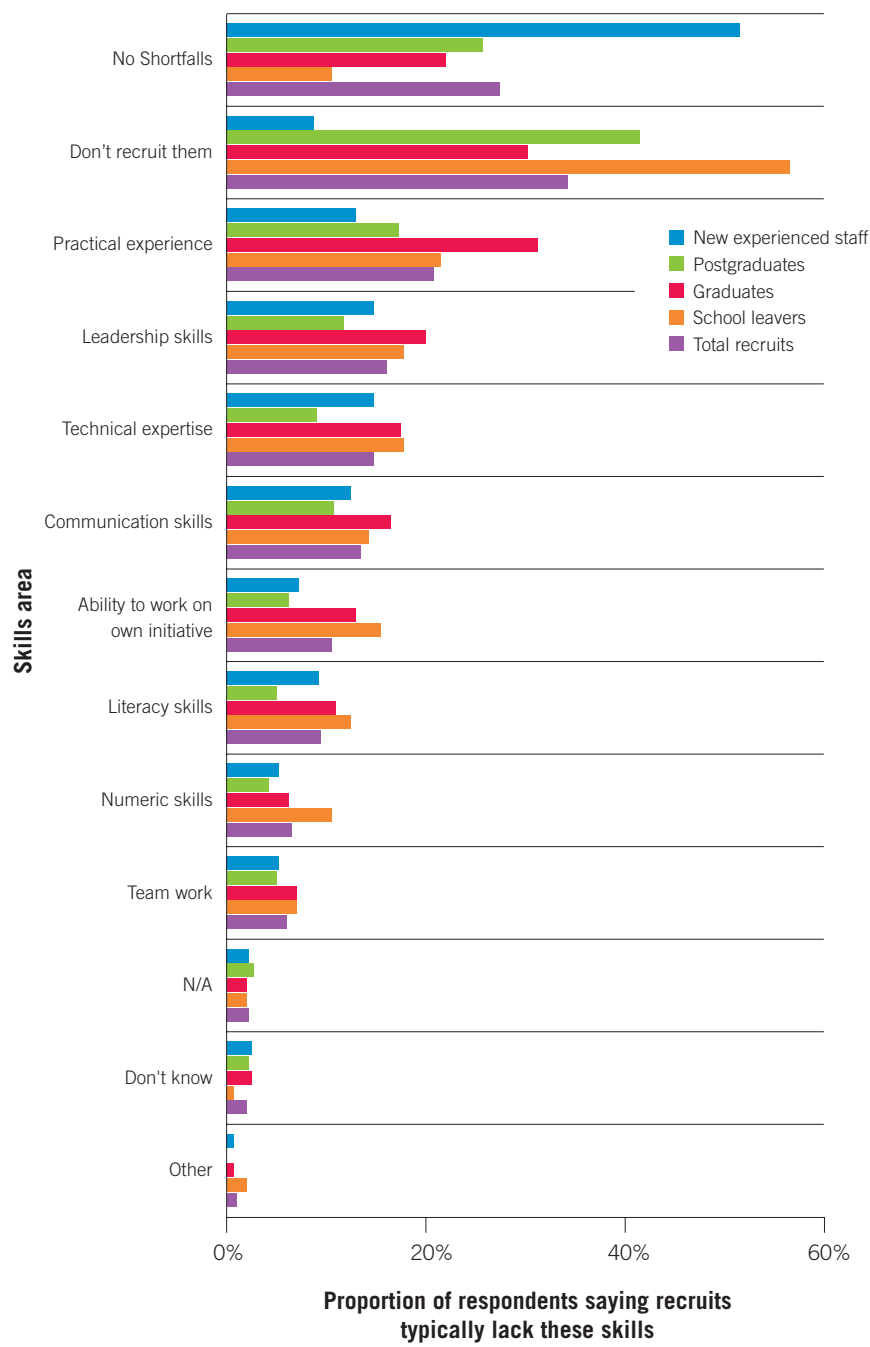
31% of companies said that the shortfalls mainly relate to lack of practical experience, especially for graduates. This emphasises the importance of industrial placements to increase the practical experience one can gain before leaving education and entering the workplace.

The variation in the postgraduate and school leaver figures may reflect variation in the extent to which these groups were being recruited rather than any actual improvement or decline in the skills of these groups.

Figure 14 shows a breakdown of the particular skills gaps of new recruits. As in previous years, shortfalls in 2012 are mainly related to practical experience, especially amongst graduates.

Figure 14: Specific skill shortages in 2012

Do you find the typical new school leaver recruit/graduate recruit/postgraduate recruit/experienced staff recruit to an engineering, IT or technical role does not meet your reasonable expectations in any particular skill areas?

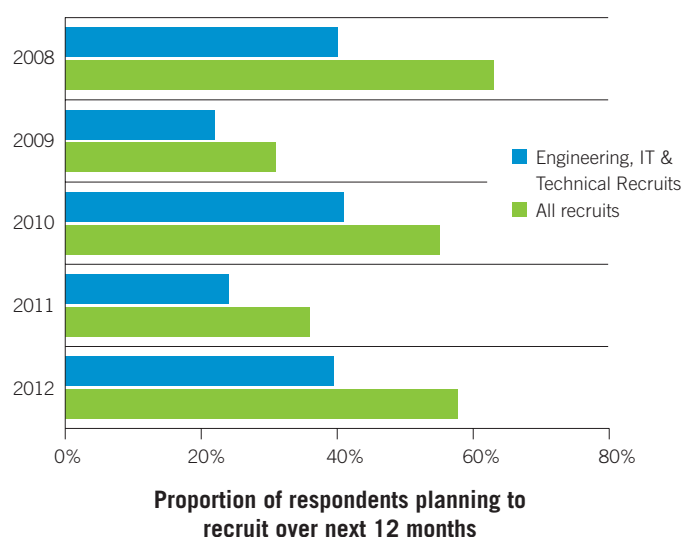


7. Recruitment plans over the next 12 months

7.1 Levels of recruitment

Figure 15: Recruitment Plans in the next 12 Months

In addition to current recruitment, across the organisation as a whole are you planning to recruit for any new roles over the next 12 months? What percentage of those new recruits do you consider will be engineering, IT or technical roles?



Surveyed organisations were asked whether, in addition to current recruitment, they plan to recruit further new staff over the coming 12 months. The results are shown by year in Figure 15. 58% of companies are planning to recruit staff in the next 12 months, a significant increase from 2011 and a return to the pre-recession figures of 2008. 39% of companies are planning to recruit engineering, IT or technical staff in the next year, again a significant increase on 2011 and a return to the level of 2010.

The results are shown by sector in Figure 16 and by function in Figure 17 (overleaf).

As in 2011, companies' key driver for new recruitment in technical and engineering roles is business expansion (77%).

Figure 16: Recruitment Plans in the next 12 Months

In addition to current recruitment, across the organisation as a whole are you planning to recruit for any new roles over the next 12 months? What percentage of those new recruits do you consider will be engineering, IT or technical roles?

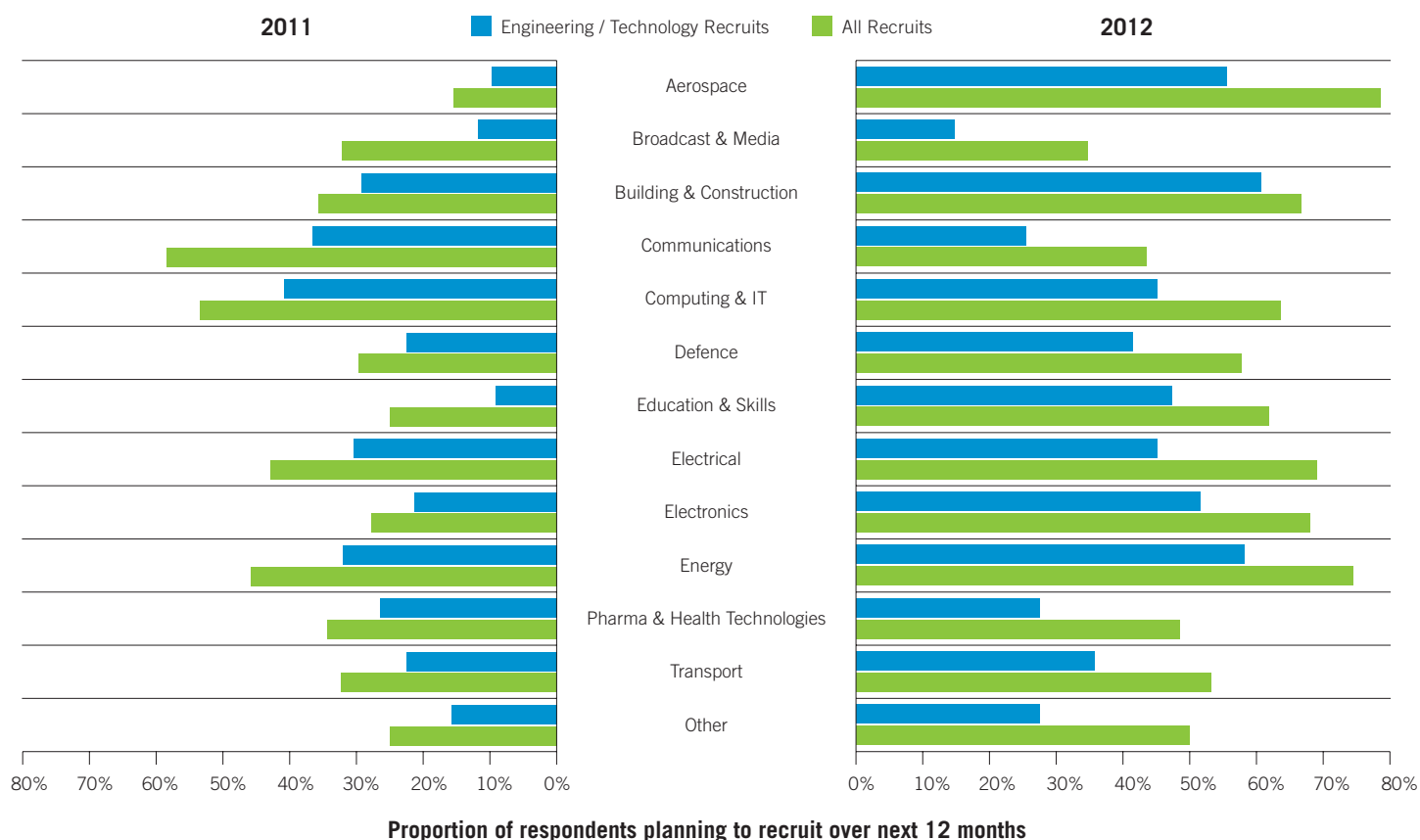
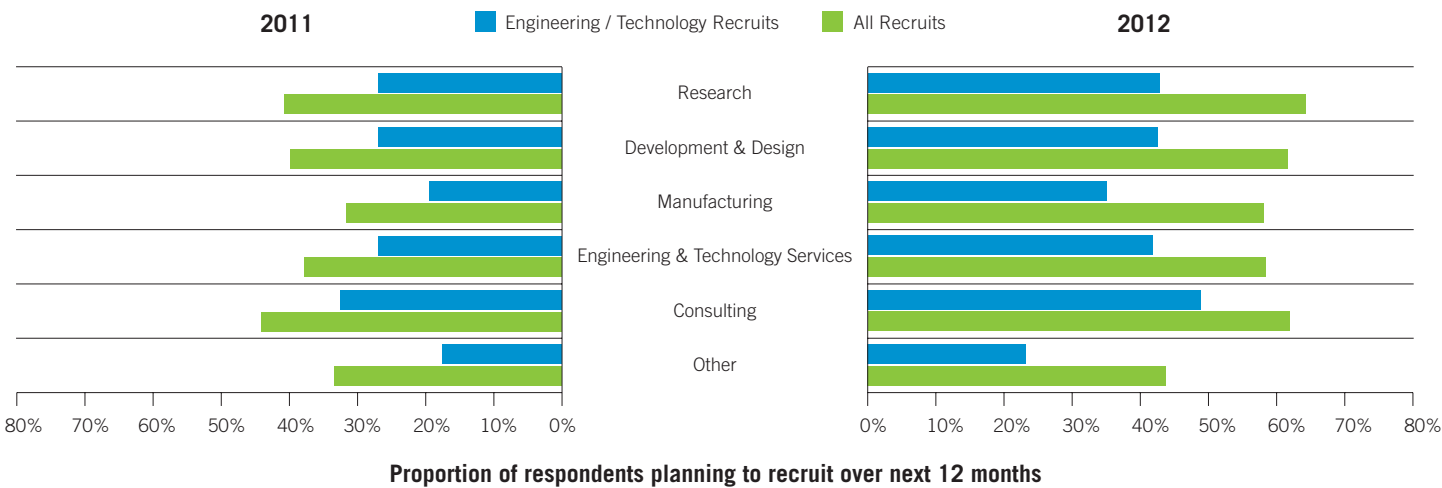


Figure 17: Recruitment Plans in the next 12 Months

In addition to current recruitment, across the organisations as a whole are you planning to recruit for any new roles over the next 12 months? What percentage of those new recruits do you consider will be engineering, IT or technical roles?



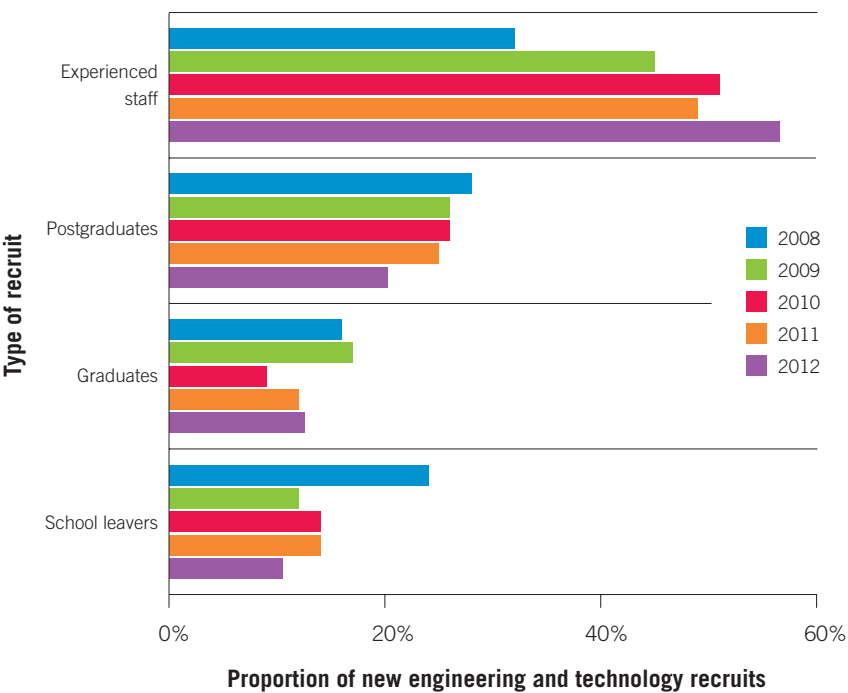
7.2 Career level of new recruits

The organisations which planned to recruit additional engineering, IT and technical staff over the coming 12 months were asked what proportion of these new recruits would be school leavers, graduates, postgraduates or experienced staff. The results are shown in Figure 18.

The demand for experienced staff continues to increase, whilst demand for graduates has declined slightly. Demand for school leavers and postgraduates remains consistently low.

Figure 18: Recruitment Plans in the next 12 Months - Sources of staff for recruitment

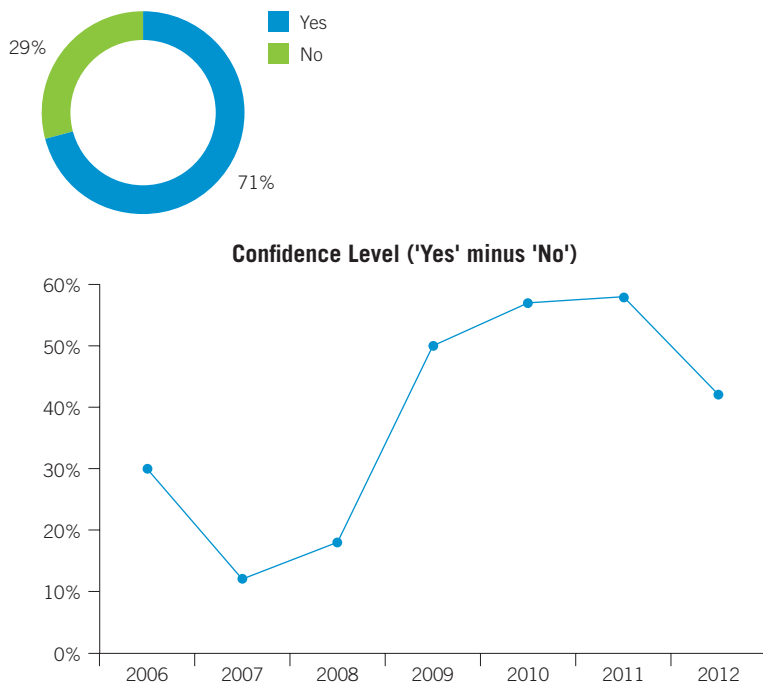
Considering those new engineering and technology roles you plan to recruit for, what percentage do you consider will be school leavers, graduates, postgraduates or those with several years of experience?



7.3 Anticipated recruitment challenges

Figure 19: Recruitment Plans in the next 12 Months
- Ability to recruit sufficient engineers and technicians to meet needs

Do you expect to be able to recruit sufficient suitably qualified engineers, IT staff and technicians to meet your needs this year?

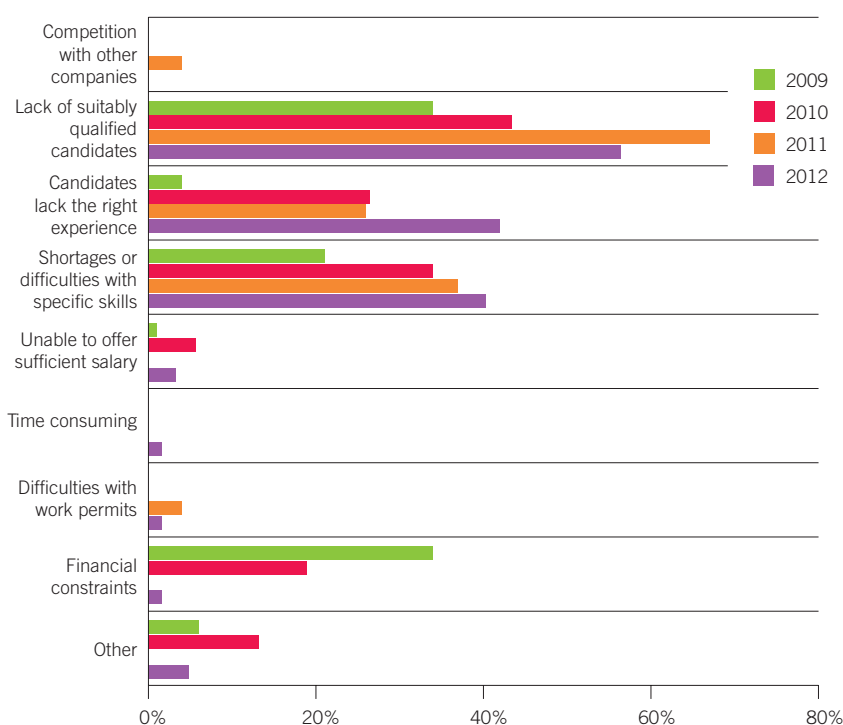


Respondents were also asked whether they expect to be able to recruit suitably qualified engineers, IT staff and technicians to meet their needs this year. 29% of companies said no, an increase of 8% from 2010. Compared to 2011, there is a significant decrease in the amount of companies that are confident they will be able to recruit suitably qualified engineers, IT staff and technicians to meet their needs for the current year. Figure 19 shows that the confidence level has dropped by 16% since 2011.

When companies who do not expect to recruit sufficient qualified staff were asked “why?”, the two key reasons were a lack of suitably qualified candidates (56%) and that candidates lack the right experience (42%). The problem of candidates lacking the right experience is much more of a concern than it was in previous years. This is illustrated by Figure 20.

Figure 20: Reasons why recruitment won't be sufficient this year

Why do you not expect to be able to recruit suitable candidates this year?



8. Looking to the future

8.1 Anticipated recruitment challenges over the next five years

The organisations were asked whether they expected to be able to recruit sufficient suitably qualified engineers, IT staff and technicians to meet their needs over the next 4 to 5 years. Figure 21 shows that in 2012 companies are significantly less confident that they will be able to recruit sufficient suitably qualified engineers and technicians to meet their needs (42%).

In contrast, it is interesting to note that the confidence levels looking 4-5 years in the future appear to be much more positive compared to the ability to recruit in the current year.

Additionally, organisations which were not confident of meeting their needs were asked why they were uncertain. The results are shown in Figure 22. The two key reasons cited were a lack of suitably qualified candidates and that candidates lack the right skills. The two key reasons cited were a lack of suitably qualified candidates and that candidates lack the right skills.

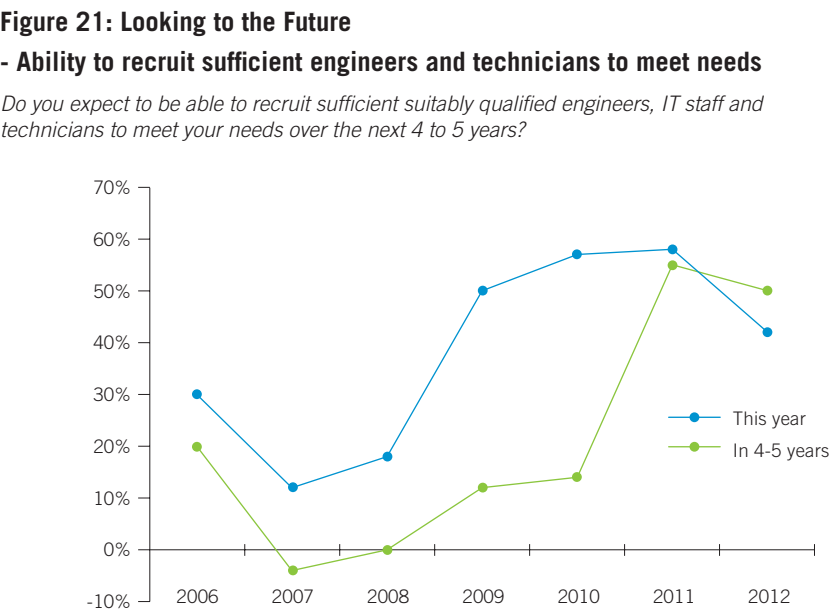
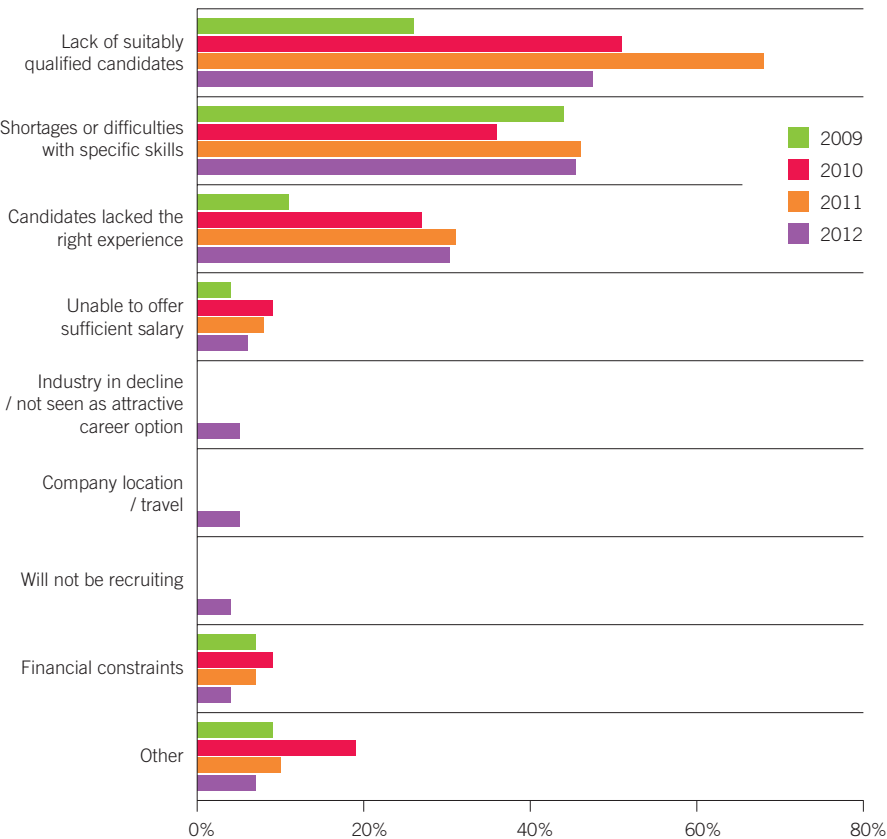


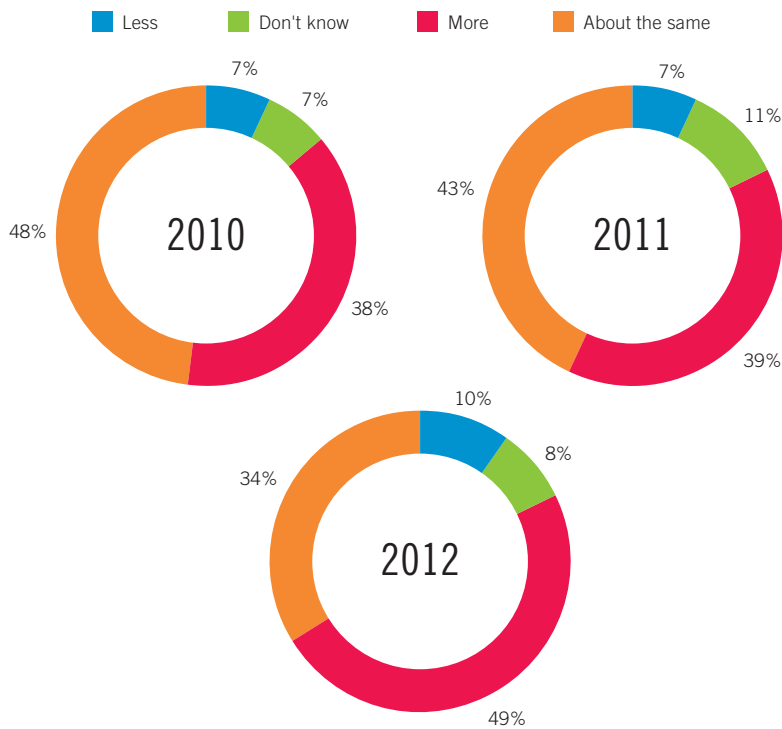
Figure 22: Reasons why recruitment won't be sufficient in 4 to 5 years
Why do you not expect to be able to recruit suitable candidates over the next 4 to 5 years?



8.2 The future of apprenticeships

Figure 23: Five-year forecast for apprenticeship recruitment

Over the next five years, do you think you will employ more or less apprentices in engineering, IT and technical roles than you have in the past?



Respondents were asked whether, over the next five years, they expected to employ more or fewer apprentices than they had in the past. The responses are shown in Figure 23. 49% of respondents said more (39% in 2011), 34% about the same (43% in 2011), 10% said fewer (7% in 2011) and 8% said that they did not know (11% in 2010).

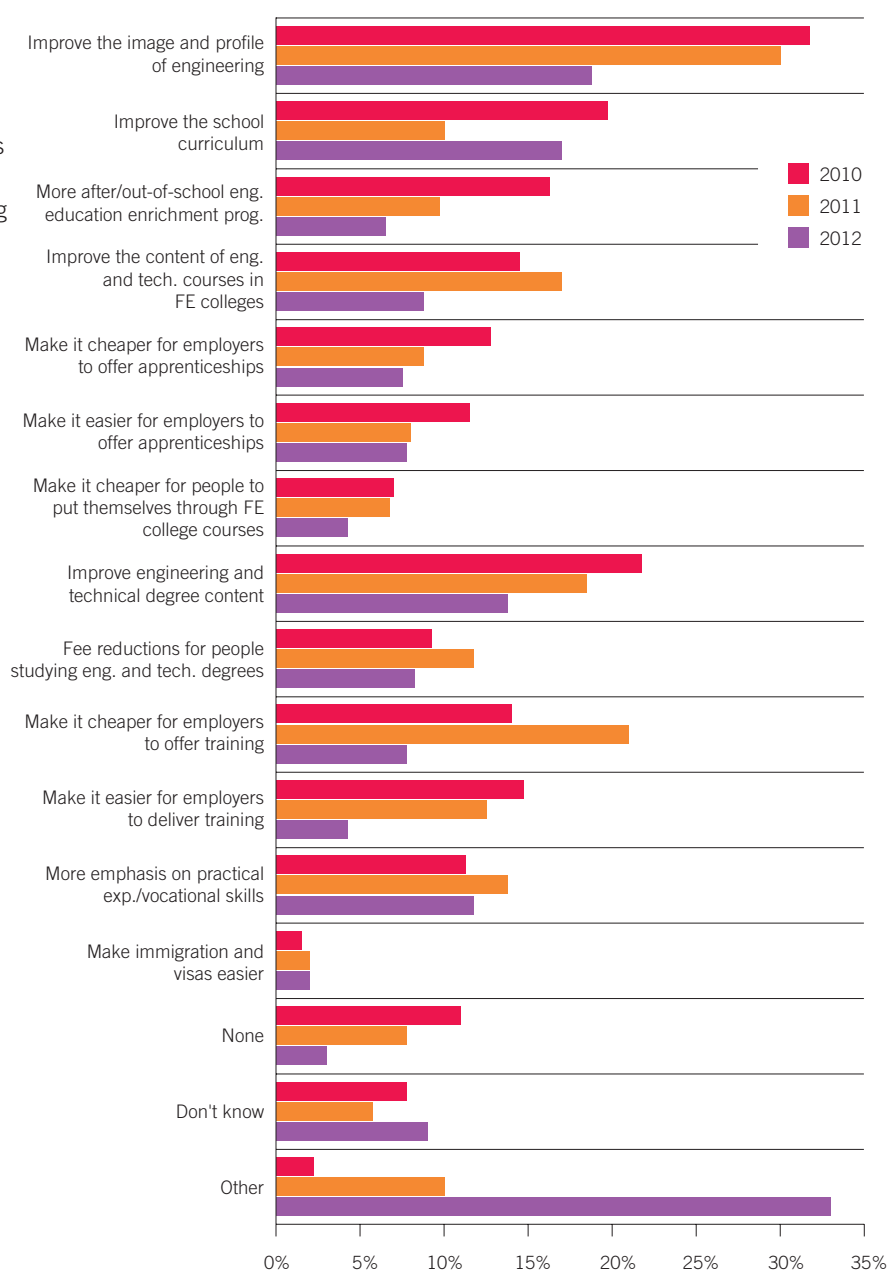
9. Addressing skills shortages

9.1 Areas for improvement

Respondents were asked what actions by engineering institutions, the government, employers or other bodies could help to address skills gaps. It would seem that employers now see skills shortages as a more complex problem. The results for 2012, 2011 and 2010 are shown in full in Figure 24. As in previous years, the most commonly cited action in 2012 was to improve the image and profile of engineering but this was much less than in previous years (19% compared to 30% in 2011). Improving the school curriculum and the content of engineering and technical degrees were the other key actions reported.

Figure 24: Actions to resolve perceived skills shortages (year on year)

What actions, either by the engineering institutions, the Government, yourselves or some other body do you believe would help resolve any skills shortages you perceive?



9.2 Content of engineering degrees

In 2011 and 2012, the survey asked some additional questions to explore in greater depth the extent to which engineering degree programmes met the needs of employers.

Overall, the great majority of respondents were satisfied with the content of degrees. 74% of all organisations felt that the content of engineering, IT and technical degrees suited the needs of their organisation. 19% thought that engineering degrees were not meeting their needs. Figure 25 shows these results broken down by sector, where it is clear that some sectors feel stronger than others.

Further, those organisations which said that engineering degrees did not suit the needs of their organisation were asked why. As shown in Figure 26, the most commonly cited reason was lack of practical content.

Figure 25: Content of degrees suit the organisation (by Sector)

Does the content of engineering, IT and technical degrees suit the needs of your organisation?

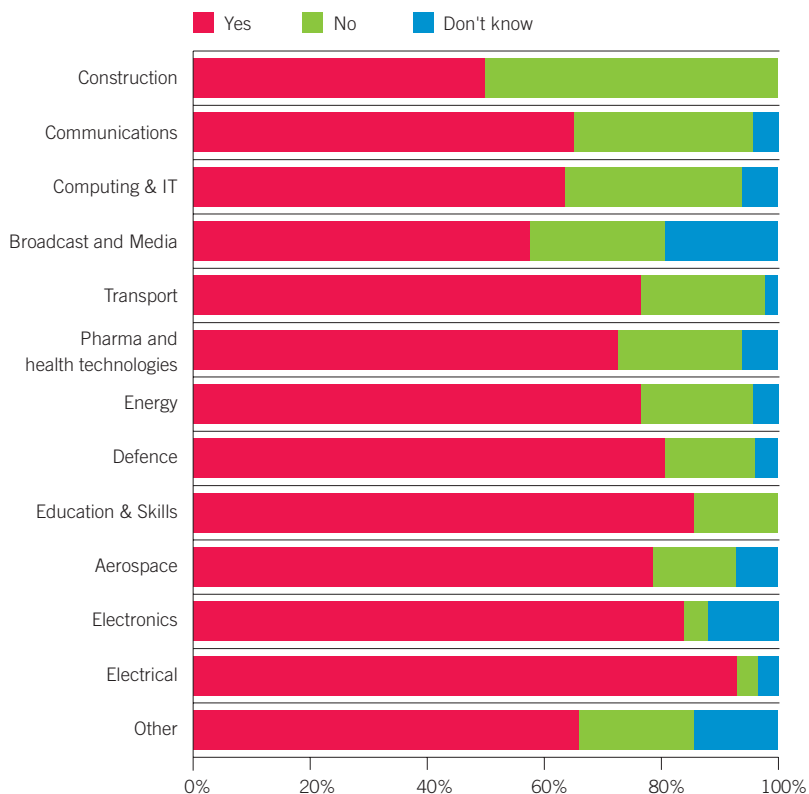
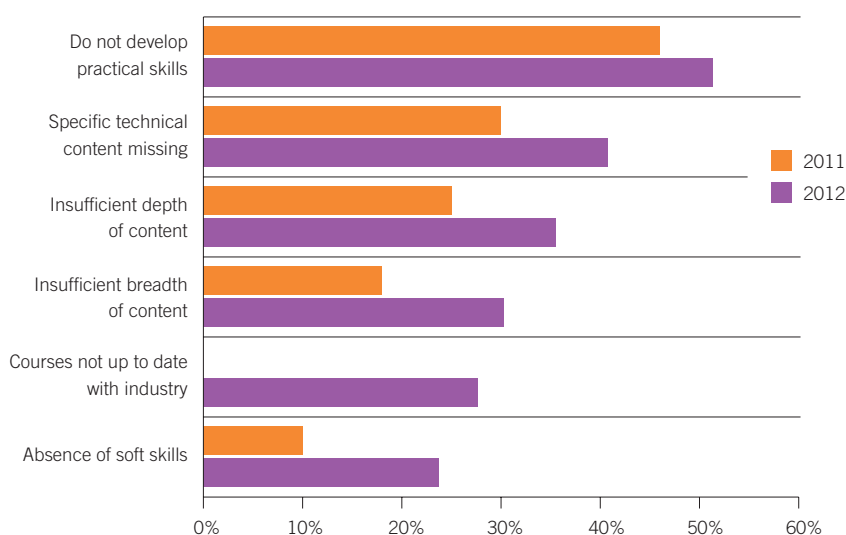


Figure 26: Why degrees aren't suiting the needs of the organisation

Why are engineering, IT and technical degrees not suiting the needs of your organisation?



9.3 The role played by respondents

Respondents were asked whether or not their organisation engaged with elements of the education and skills system. This year the engagement with schools has increased by 8% and with colleges by 13%.

When asked about the barriers that companies face in supporting education, 25% of all companies surveyed see no benefit from engaging with the education and skills system and 17% see no value in the process. In previous years the main barrier to engagement was cited as lack of time but this year the responses have been much more specific as shown in Figure 27.

Respondents whose organisations did engage with elements of the education and skills system were asked to provide further details. Their responses are shown in Figure 28 which demonstrates that work experience features heavily in educational engagement – although to a much lesser extent than in previous years.

Figure 27: Barriers to engagement

What barriers are there to your company supporting the education and skills system?

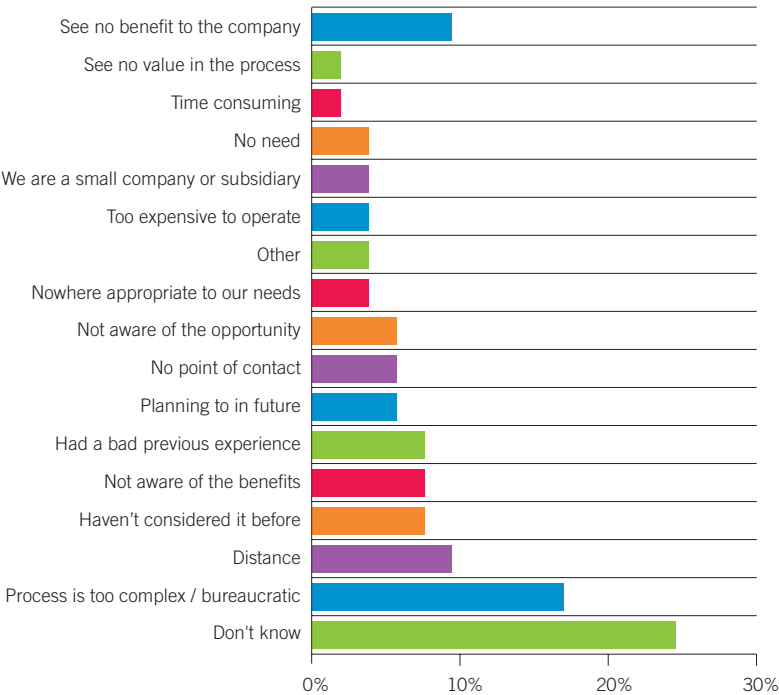
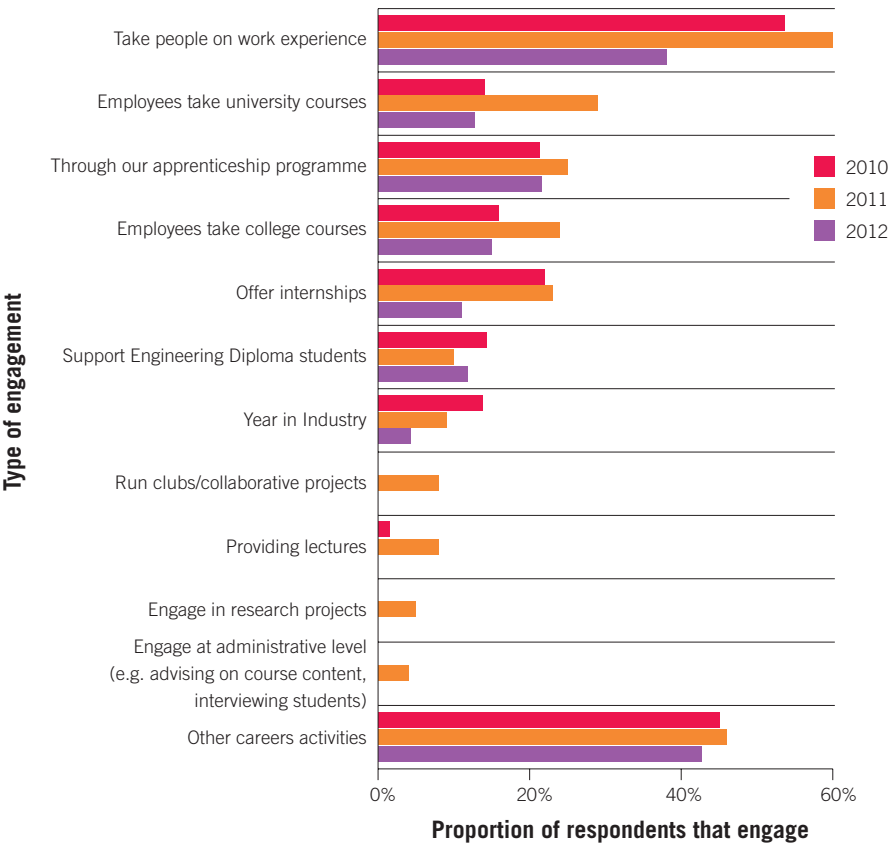


Figure 28: Methods of engagement

In what way do you engage with them?



10. Survey methodology and sample profile

10.1 Methodology

The report is based on a survey carried out by the independent research agency 2Europe Limited. The information was collected by computer assisted telephone interviews with representatives from 400 employers of engineers and technicians in the UK. The interviews took place in May 2012 using a 24 minute questionnaire.

Interviews were conducted with those within the organisation responsible for the recruitment of engineers and other technology staff; in most cases these were Engineering Managers/Directors or HR Managers/Directors.

Results for 2012 were compared to results for the 2011, 2010, 2009 and 2008 surveys, which followed the same methodology.

10.2 Sample

Four hundred employers were interviewed. Respondents included 200 IET business partners and 200 other employers of engineers and technicians. The majority, but not all, of the employers surveyed were from the private sector. The sample was mainly composed of organisations for which engineering and technology form a central part of their work – for example, manufacturers and engineering consultants – but the sample also included some service sector organisations for which technical employees represent only a very small proportion of their total workforce (listed as “other” in cases where results are broken down by sector).

Figures 29 and Figure 30 show the size of employers surveyed, by number of employees and annual turnover respectively. There was a small shift towards smaller companies compared to 2011 however more smaller companies were surveyed in 2012 than in previous years, with less larger companies being interviewed. Company turnover in 2012 was not significantly different to previous years.

Figure 29: Company size

How many people do you estimate you currently employ in this country?

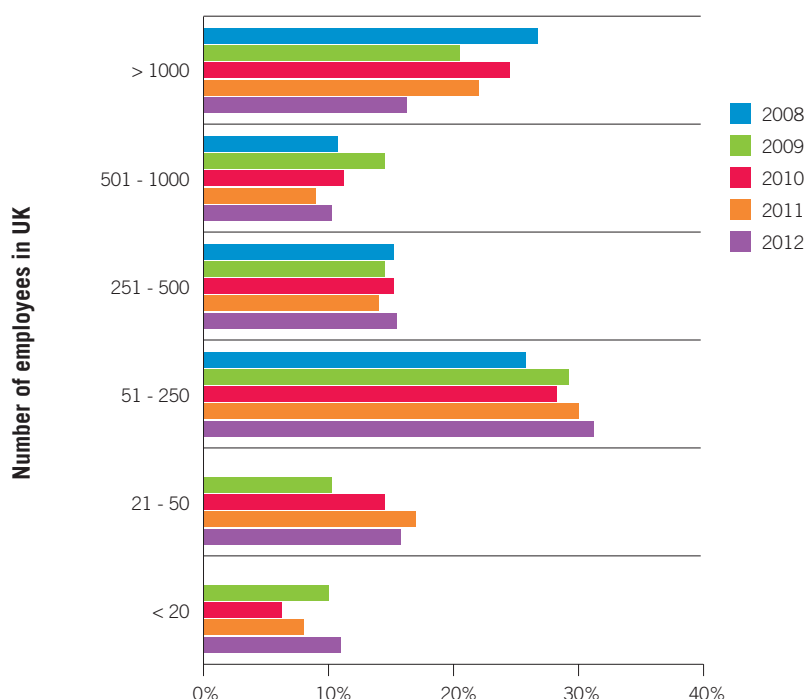


Figure 30: Company turnover (UK)

What is your approximate UK turnover?

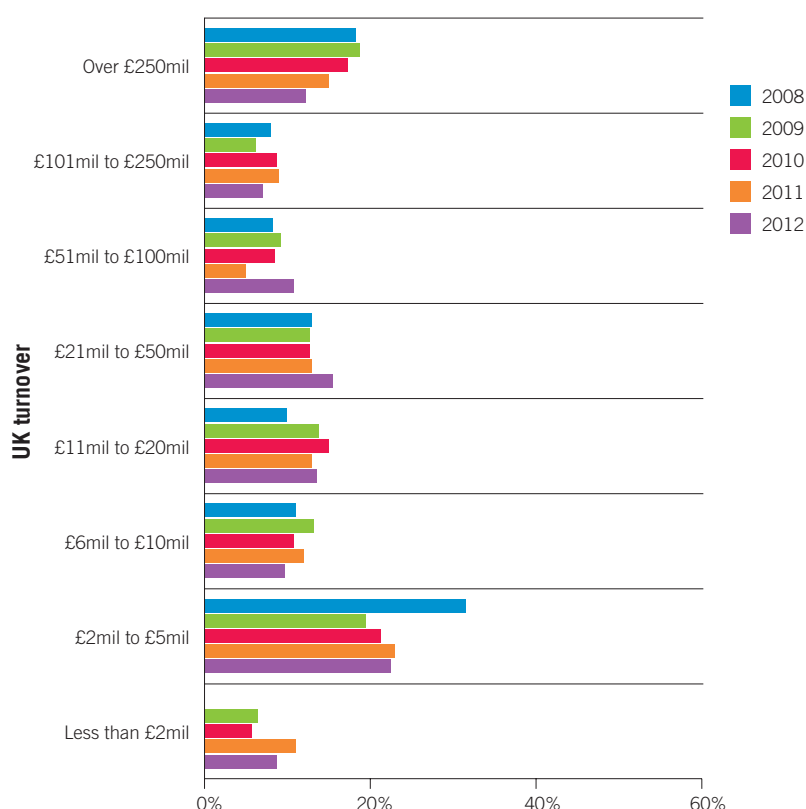


Figure 31 shows the proportion of organisations from each industry sector. This question has been asked since the 2010 survey and there are no statistically significant differences in the respondent's answers except for a considerable decrease in building and construction as a core business sector.

Employers were also asked about the function(s) of their organisation. Their responses are shown in Figure 32. Most organisations carried out more than one function and it is clear that respondents work across multiple areas. Compared to 2011, all functions have increased in usage, in particular Development and Design, Engineering and Technology Services and Research.

Figure 31: About the Organisation & its Workforce

Core business sector (2010, 2011 & 2012)

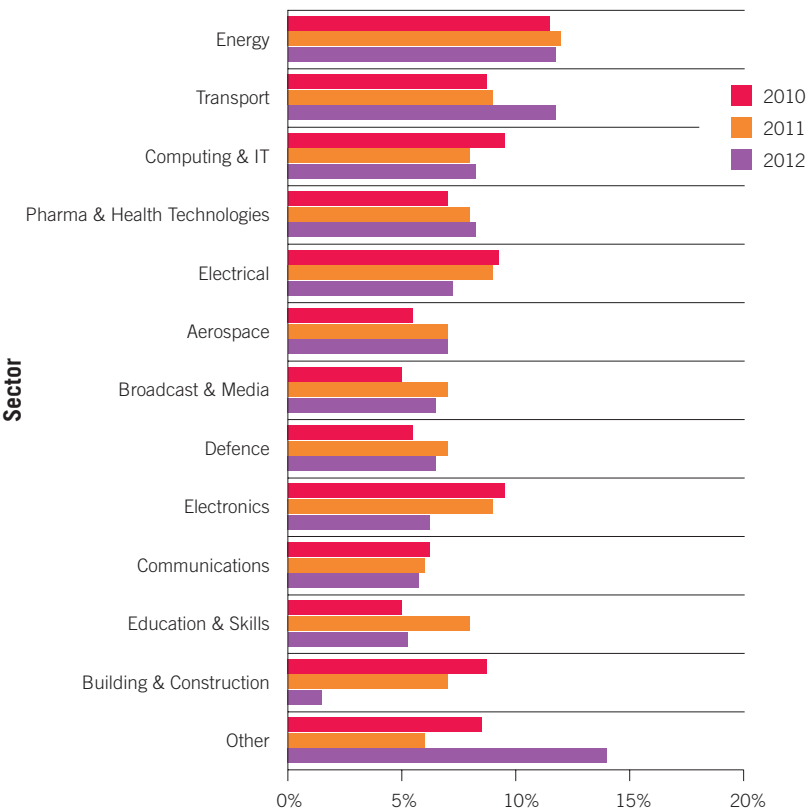


Figure 32: About the Organisation & its Workforce - Functions

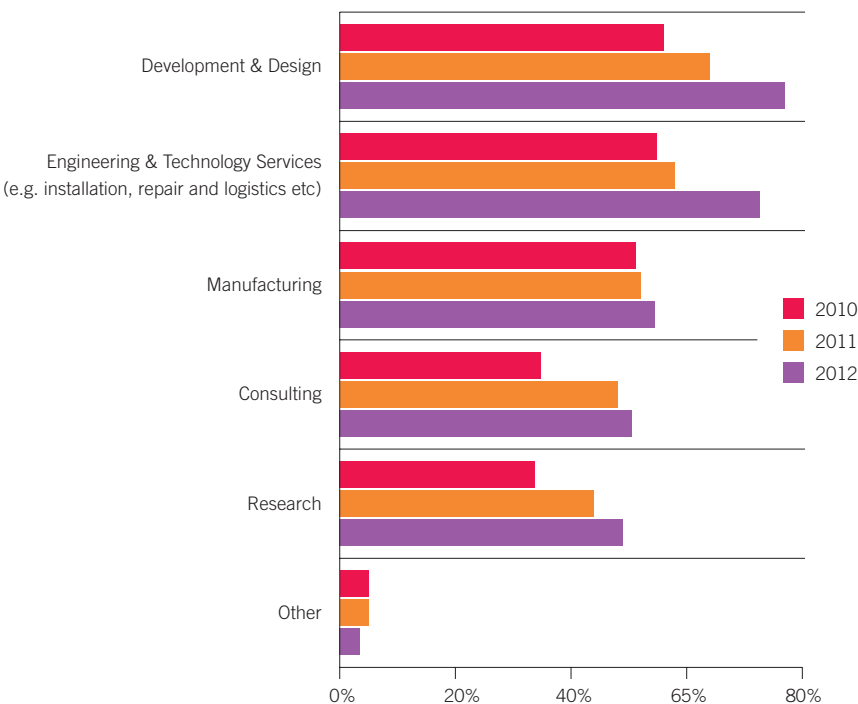


Figure 33: Employment throughout UK (2011)

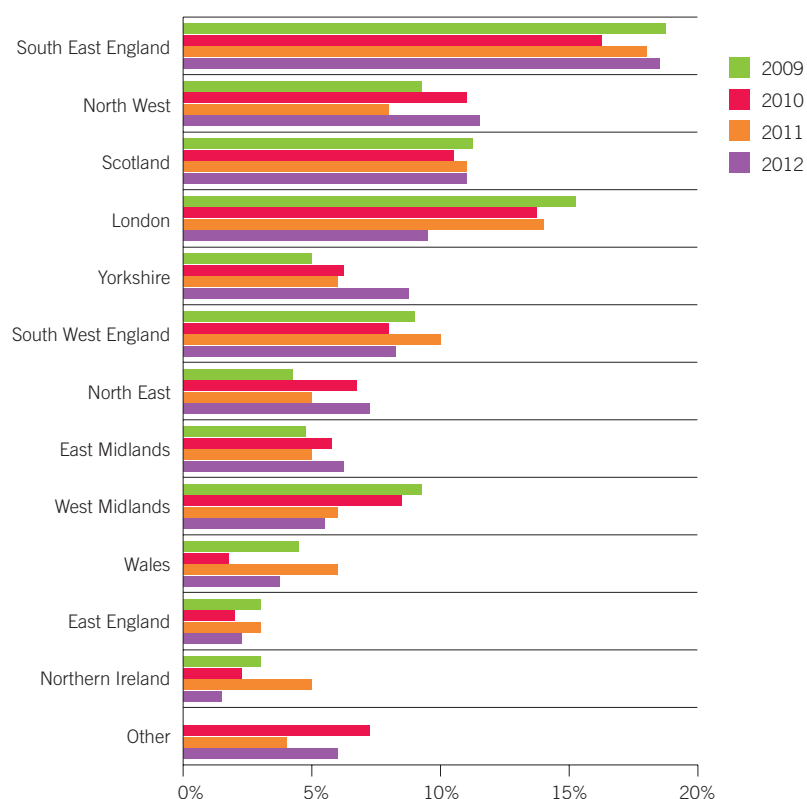
In which area of the country do you employ most engineering, IT and technical staff?



Surveyed employers were asked in which area of the country they employed most engineers. The responses are shown in Figure 33, which demonstrates that the survey covered employers from all over country. Figure 34 shows the main areas of engineer employment in the UK. As in previous surveys, a large proportion of engineers (19%) are located in the South East of England. However, a significant increase has been identified in the North West as the area of most employment and a significant decrease has been observed for the London area.

Figure 34: Main area of engineer recruitment in the UK

In which area of the country do most of your recently recruited engineering, IT or technical staff work?



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