

Engineering and Technology

Skills & Demand in Industry

Annual Survey 2011



The Institution of Engineering and Technology

As engineering and technology become increasingly interdisciplinary, global and inclusive, the Institution of Engineering and Technology reflects that progression and welcomes involvement from and communications between all the sectors of science, engineering and technology.

The Institution of Engineering and Technology is a not for profit organisation, registered as a charity in the UK.

For more information, please visit: **www.theiet.org**

© The Institution of Engineering and Technology 2011

The Institution of Engineering and Technology is registered as a Charity in England and Wales (no 211014) and Scotland (no SC038698)

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

Contents

1. Executive summary	p4
2. Key trends	p5
3. The engineering workforce today	
3.1 Sector profiles	p6
3.2 Gender	p8
4. Training and retaining the existing skills base	
4.1 Training	p9
4.2 Retaining the existing skills base	p11
5. Current recruitment	p12
6. Recruitment plans over the next twelve months	
6.1 Levels of recruitment	p13
6.2 Career level of new recruits	p14
6.3 Anticipated recruitment challenges	p14
7. Skills gaps amongst new recruits	p15
8. Looking to the future	
8.1 Anticipated recruitment challenges over the next five years	p17
8.2 The future of apprenticeships	p17
9. Addressing skills shortages	
9.1 Areas for improvement	p18
9.2 Content of engineering degrees	p19
9.3 The role played by respondents	p20
10. Surveys methodology and sample profile	
10.1 Methodology	p21
10.2 Sample	p21

1. Executive summary

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

The engineering workforce today:

- The average number of engineering staff in surveyed organisations was 348 whilst the average number of IT staff was 31.
- Women were very under-represented in both engineering and IT: for example, in the engineering workforce 3% of technicians and 6% of engineers were women.

Training and retaining the existing skills base:

- Following reductions in 2009 and 2010, the 2011 survey showed a partial recovery in the amount of training which organisations were offering for engineering, IT and technical staff.
- 54% of organisations had a company development programme whilst 39% reported that they offered apprenticeships.

Current recruitment:

- 47% of organisations were currently recruiting engineering staff and 12.5% were currently recruiting IT staff.
- Of the organisations currently recruiting engineering or IT staff, 48% reported difficulties in finding suitable senior engineers to fill vacancies whilst 34% said they were finding it difficult to recruit IT managers.

Recruitment plans over the next 12 months:

- In addition to current recruitment many organisations planned to recruit further new engineering, IT and technical staff over the next 12 months.
- The level of planned recruitment of engineers and technical staff was highest in the communications (58%) computing and IT (53% of organisations), sectors.
- As in 2009 and 2010, more of the new recruits to be taken on would be experienced staff (49% of new recruits) rather than postgraduates (14%), graduates (25%) or school leavers (12%).

Skills gaps amongst new recruits:

- 31% of respondents reported that new 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, 28% of organisations said that graduates did not have sufficient practical experience.

Looking to the future:

- 18% of organisations were not confident that they would be able to recruit suitably qualified engineering, IT and technical staff in four to five years time.
- 43% of organisations anticipated that they would employ more apprentices in four to five years time, compared to 11% who thought they would employ fewer.

Addressing skills shortages:

- The most commonly cited action to address skills shortages was improving the profile and image of engineering (30% of respondents) followed by making it cheaper for organisations to offer training (21%).
- Many organisations contributed to efforts to promote engineering to young people, for example 60% said they took people on work experience.

2. Key trends

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

3. The engineering workforce today

3.1 Sector profiles

Figure 1 shows a breakdown of the number of engineering staff employed by sector. Overall, the average number of engineering staff in surveyed organisations was 348, comprised of 199 engineering professionals, 139 engineering technicians and 10 apprentices. By sector, the highest average number of engineering staff per organisation was found in the building and construction sector (average of 1,272 per organisation).

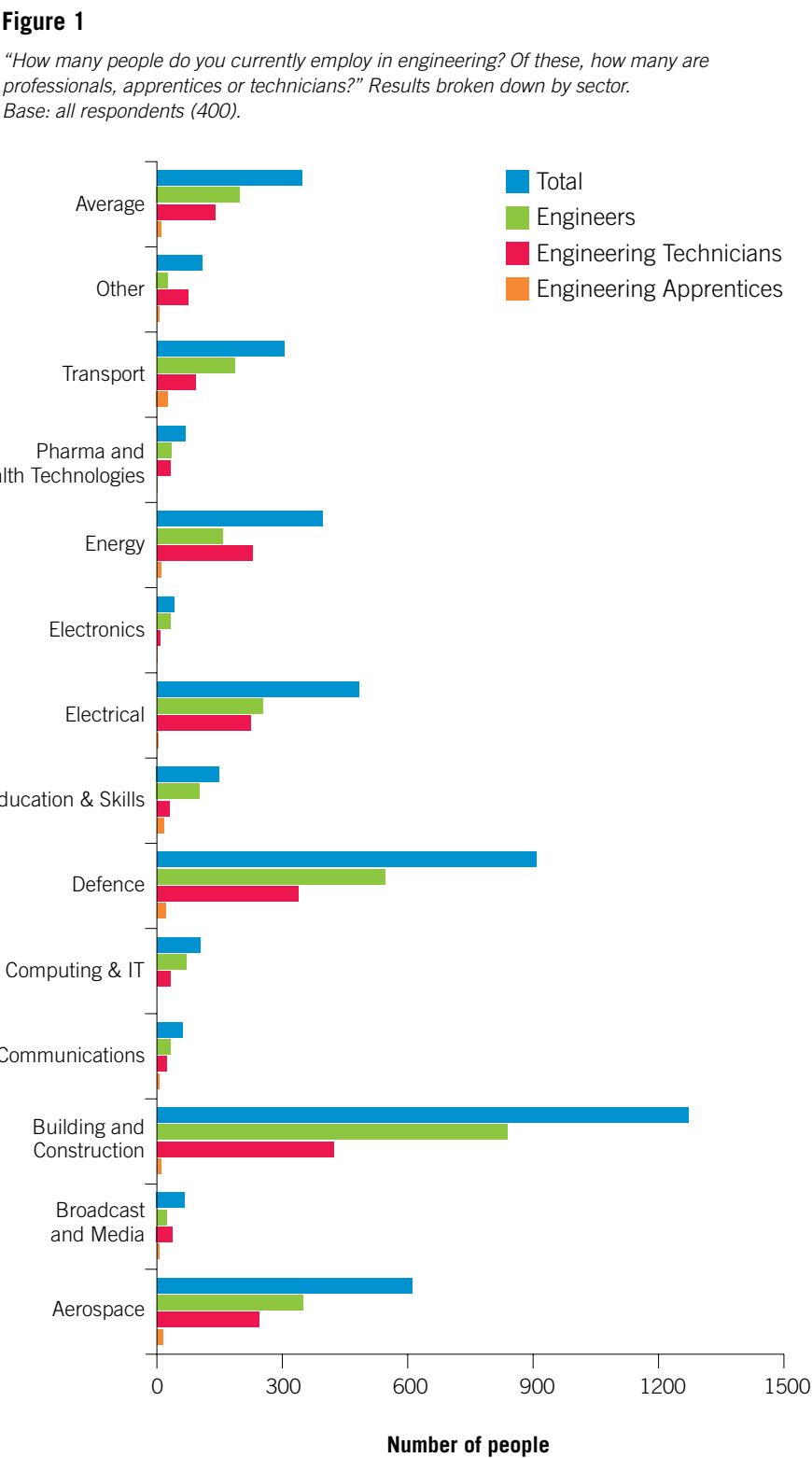
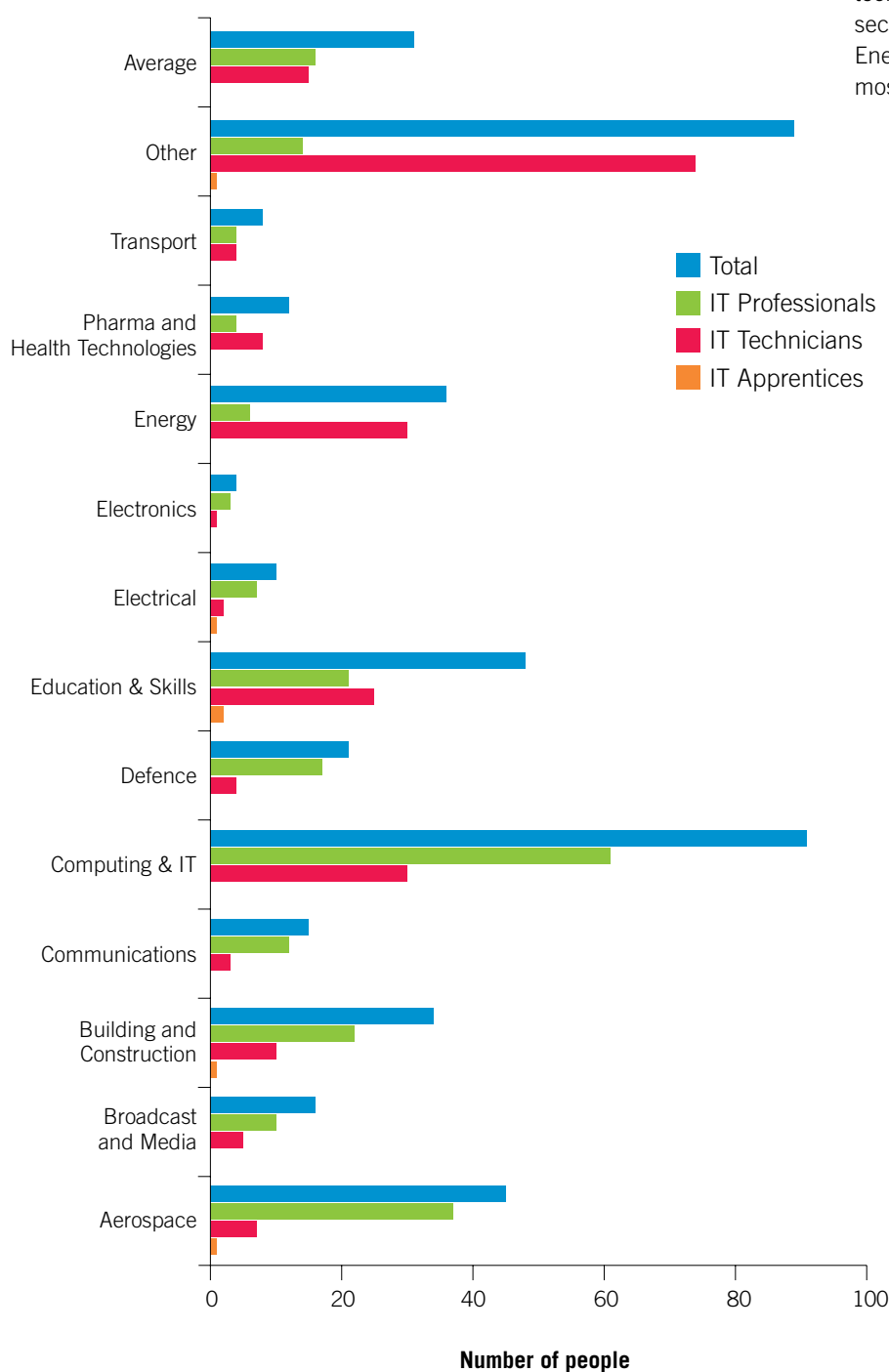


Figure 2

"How many people do you currently employ in IT? Of these, how many are professionals, apprentices or technicians?" Results broken down by sector. Base: all respondents (400).

Figure 2 shows a breakdown of the number of IT staff employed by sector. Overall, the average number of IT staff in surveyed organisations was 31, comprised of 16 IT professionals and 15 IT technicians. Not surprisingly, the computing & IT sector employed most IT staff (average 91). The Energy and Computing and IT sectors employed the most technicians (average 30).



3.2 Gender

There was a significant gender gap in the engineering and IT workforce, with many fewer women employed than men at all levels and across all sectors. Overall, 24% of employees at the surveyed organisations were women. In engineering, IT and technical roles, the proportion of female staff was 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 technical roles. The proportion of female IT professionals has actually declined.

Figure 4 shows the proportion of female staff analysed by sector. Overall it cannot be said that any one sector has been particularly successful in increasing the proportion of women employed. For all sectors the proportion of women employed in technical roles appears stuck at around one in ten or one in twenty.

Figure 3
“Considering your Engineering workforce, what percentage of engineering technicians/engineering professionals are female? Considering your IT workforce, what percentage of IT technicians/IT professionals are female?” Base: all respondents (400).

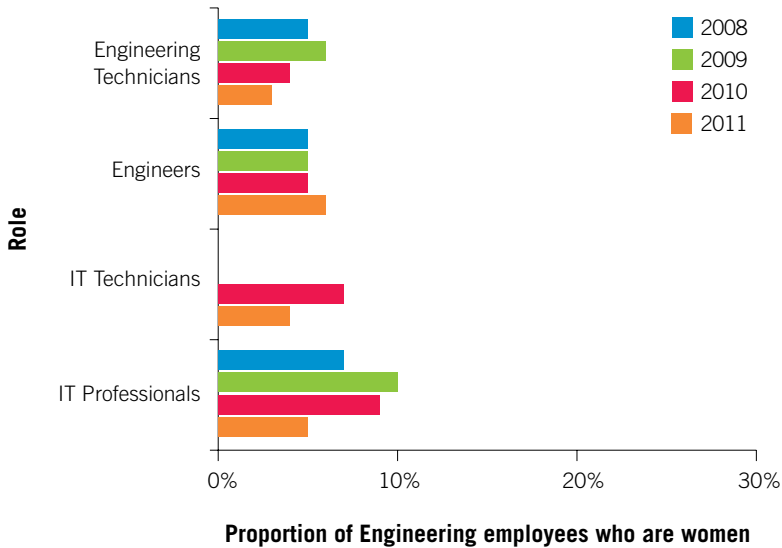
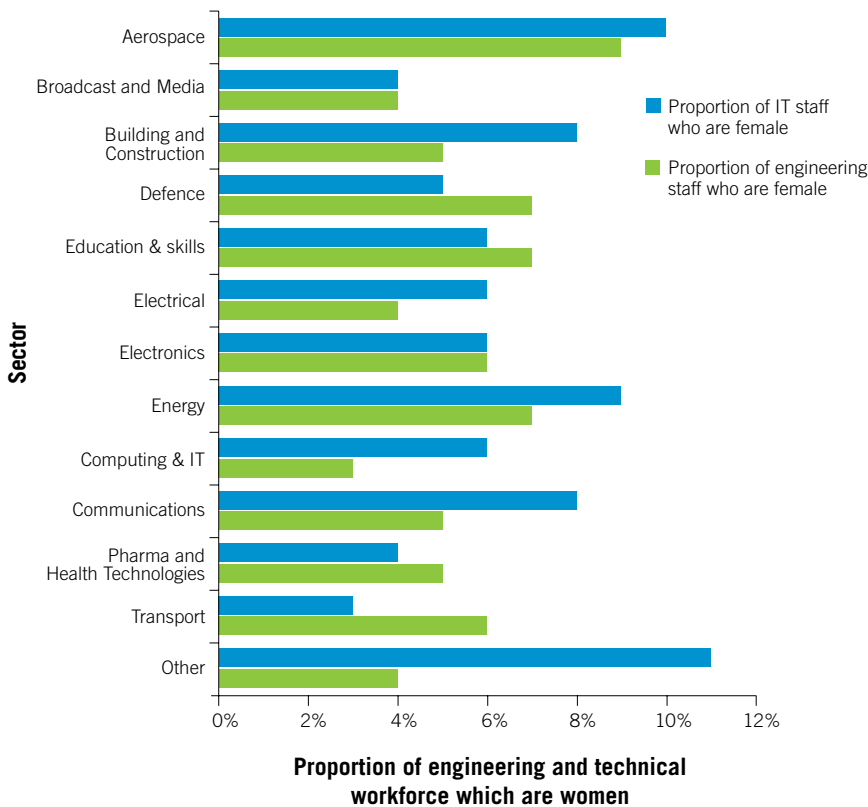


Figure 4
“Considering your engineering workforce, what percentage of engineering technicians/engineering professionals are female? Considering your IT workforce, what percentage of IT technicians/IT professionals are female?” Answers for different job roles combined and results broken down by sector. Base: all respondents (400).

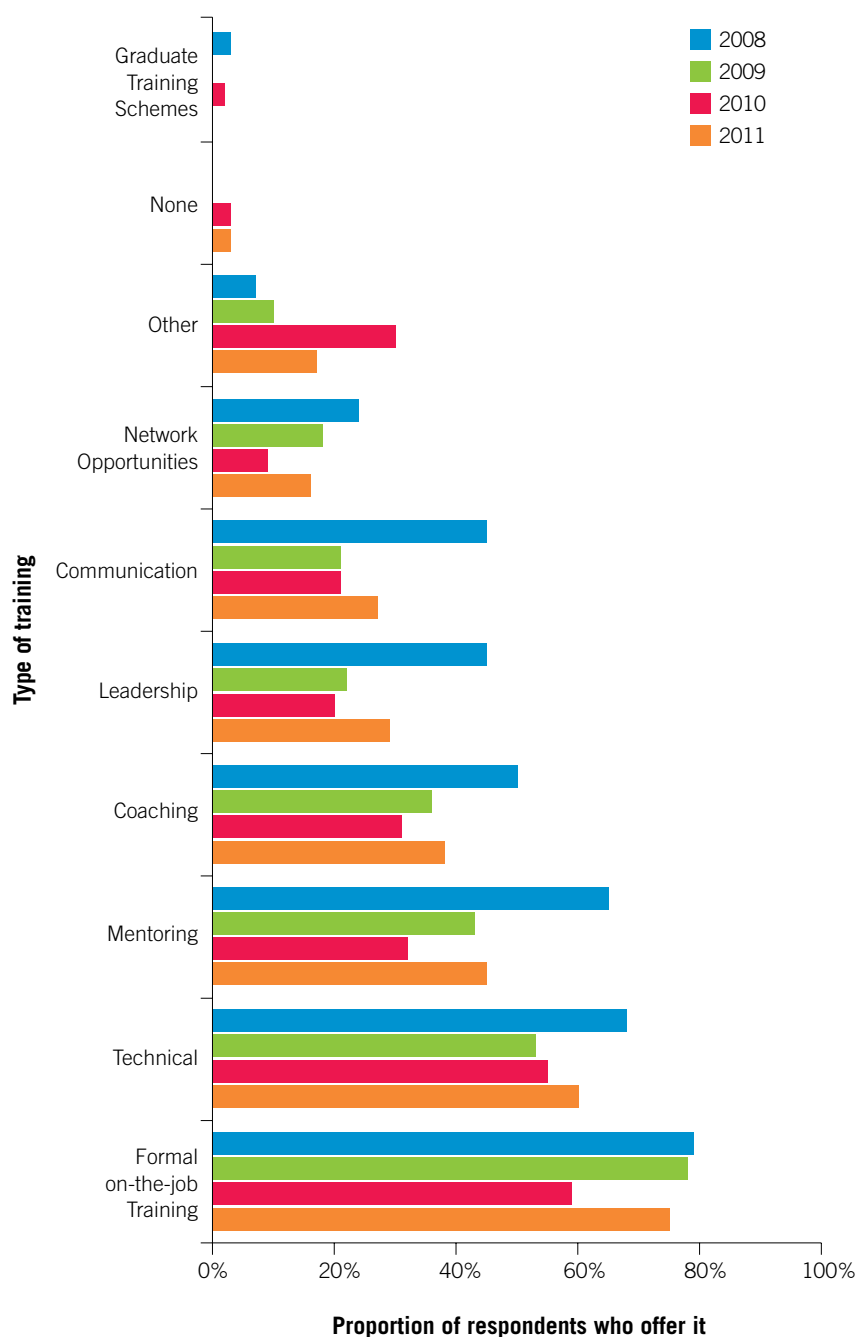


4. Training and retaining the existing skills base

4.1 Training

Figure 5

“What type of staff training or development are you providing for engineering, IT and technical employees?” Base: all respondents (400)



Respondents were asked what type of staff training or development they were providing for engineers and technicians in their workforce. Figure 5 indicates that in 2011 the amount of staff training which took place had partially recovered from the drops seen in 2009 and 2010 (probably associated with the recession). However, the amount of training was not yet back at the levels of 2008.

For the 2011 survey an additional question was asked about the types of qualifications companies offer to or support their employees with. The results are shown in Figure 6. 54% of organisations had a company development programme whilst 39% reported that they offered apprenticeships.

In addition, respondents who said they offered apprenticeships were asked what type of apprenticeship they offered. The results are shown in Figure 7. Advanced (Level 3) Apprenticeships exceeded the number of Intermediate (Level 2) Apprenticeships, as would be expected for the engineering sector. The number of organisations who reported that they offer Higher (Level 4) Apprenticeships is remarkably high which may just reflect respondents' confusion about the terms, as other sources suggest the number of Higher Apprenticeships on offer across the country is low.

Figure 6
“Which of the following do you offer/support for engineering, IT and technical employees?”
Base: all respondents (400)

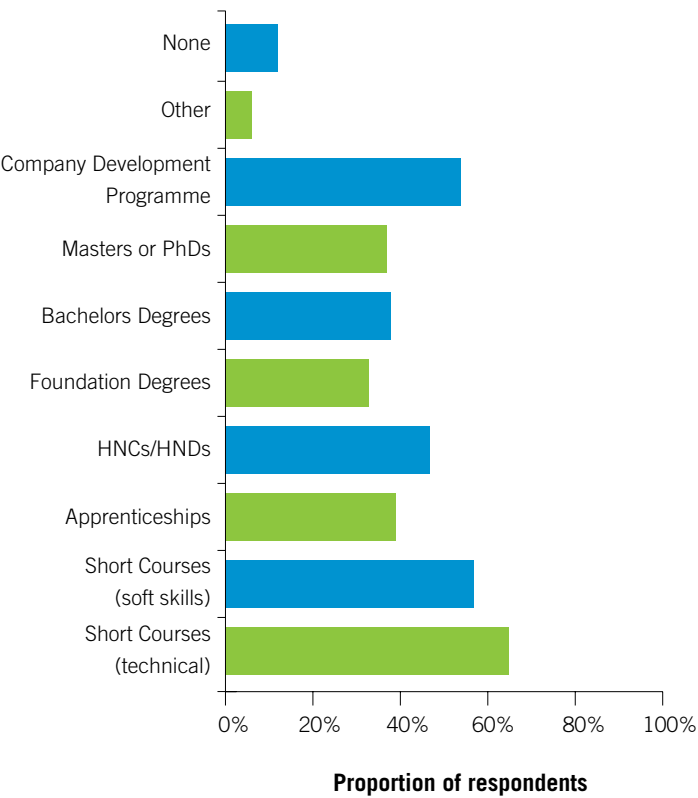
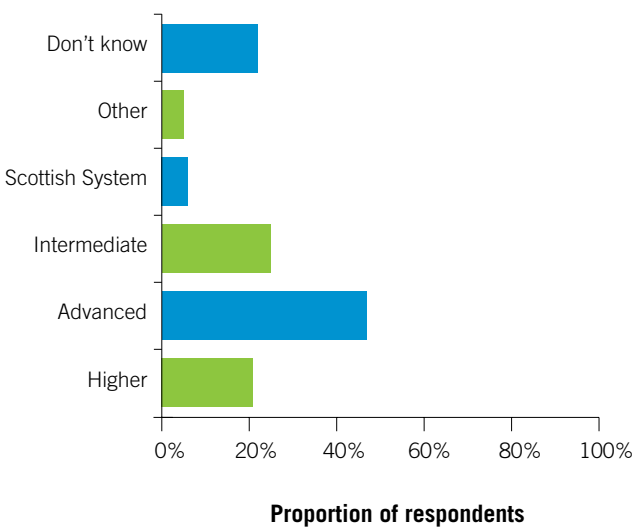


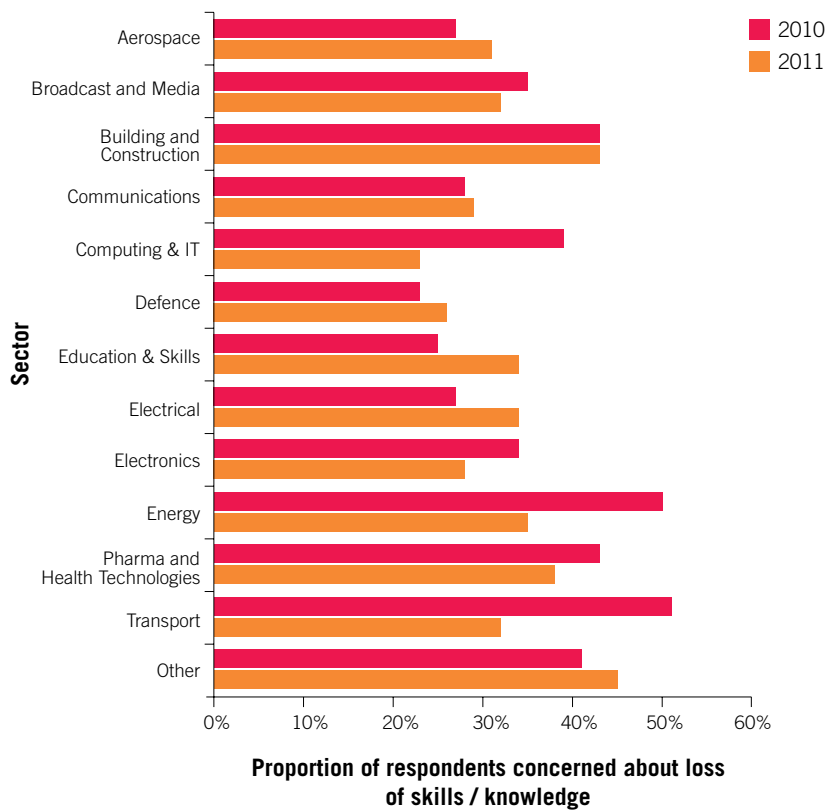
Figure 7
“What kind of Apprenticeships do you offer?” Base: all respondents who offer apprenticeships (154)



4.2 Retaining the existing skills base

Figure 8

"In the current economic conditions are you concerned about the loss of skills or knowledge in your company due to restructuring?" Results broken down by sector. Base: all respondents (400)



When the UK has suffered recessions in the past, engineering organisations lost skilled staff who they then found difficult to replace once the economy recovered. Since 2009, the IET survey asked whether organisations were concerned about loss of skills or knowledge due to restructuring. 40% of organisations cited this as a concern in 2009, 38% in 2010 and 33% in 2011.

Figure 8 shows the responses to this question broken down by sector for 2011 and 2010 (figures for 2009 are non-comparable by sector). The computing & IT, electronics, energy, pharma & health and transport sectors were less concerned about loss of skills in 2011 compared to in 2010. In contrast, levels of concern had risen in the education and skills and electrical sectors.

5. Current recruitment

Overall, 47% of respondents reported that they were currently recruiting engineering staff whilst 12.5% of respondents reported that they were currently recruiting IT staff. Figure 9 shows these results broken down by sector.

Figure 10 and Figure 11 show the proportions of those organisations which were recruiting who reported difficulties in filling vacancies at different career levels. The difficulties were more pronounced for engineering than for IT staff. In particular, almost half (48%) of organisations who were currently trying to recruit senior engineers with five to ten years experiences reported difficulties in doing so.

Figure 9

“Are you currently recruiting the following staff?” Results broken down by sector.
Base: all respondents (400)

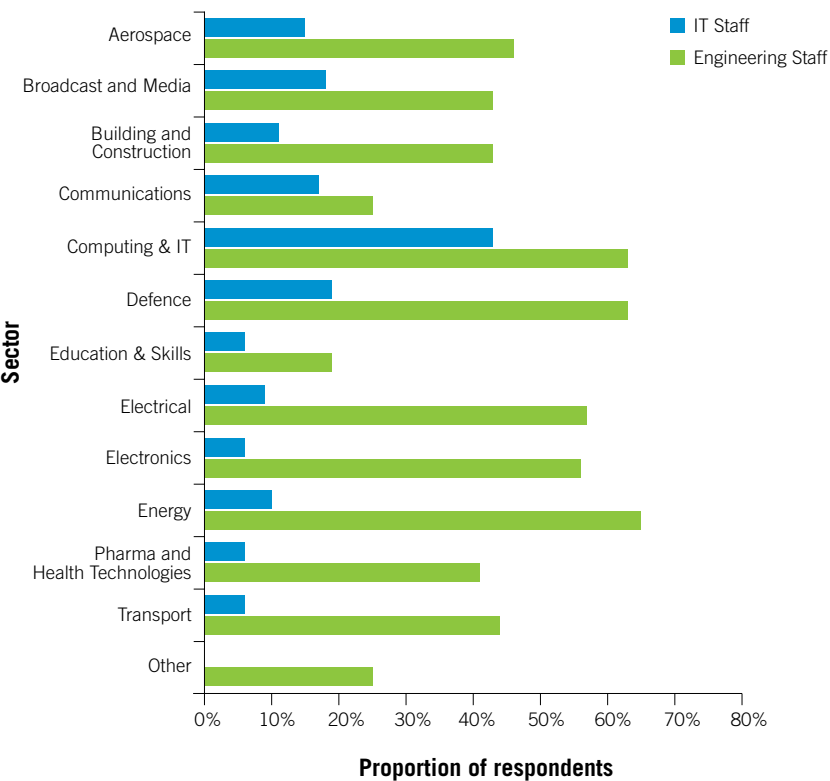


Figure 10

“Are you currently or have you recently experienced problems in recruiting senior engineers/engineering management/engineering graduates/engineering technicians/engineering apprentices?”
Base: all respondents currently recruiting Engineering staff (188)

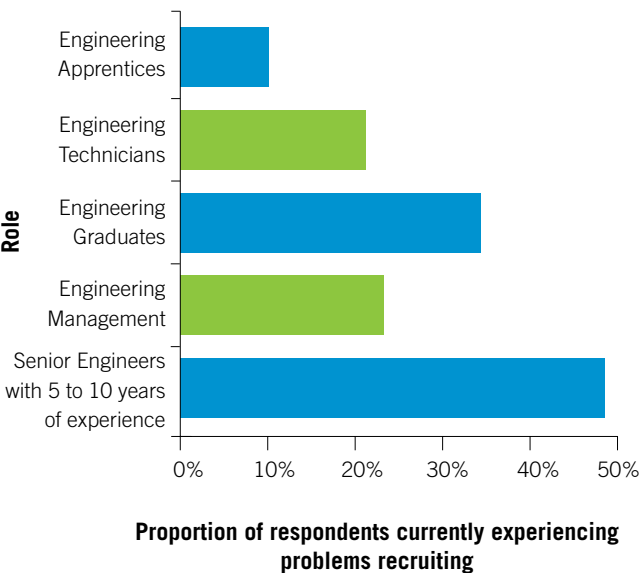
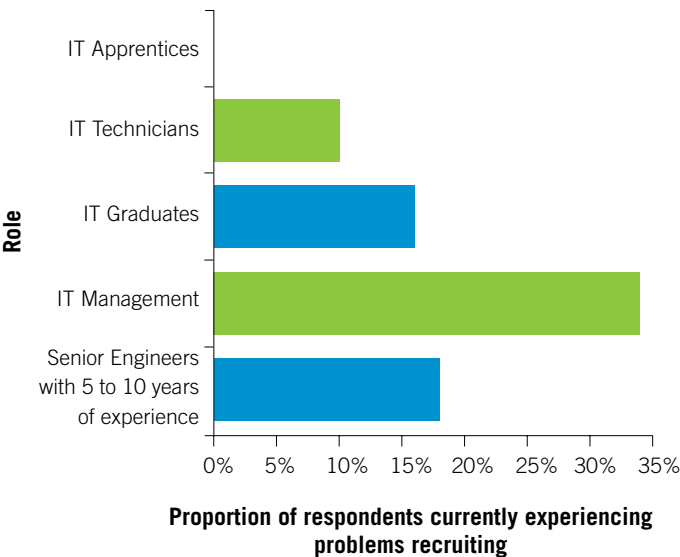


Figure 11

“Are you currently or have you recently experienced problems in recruiting senior IT staff/IT management/IT graduates/IT technicians/IT apprentices?” Base: all respondents currently recruiting IT staff (50)

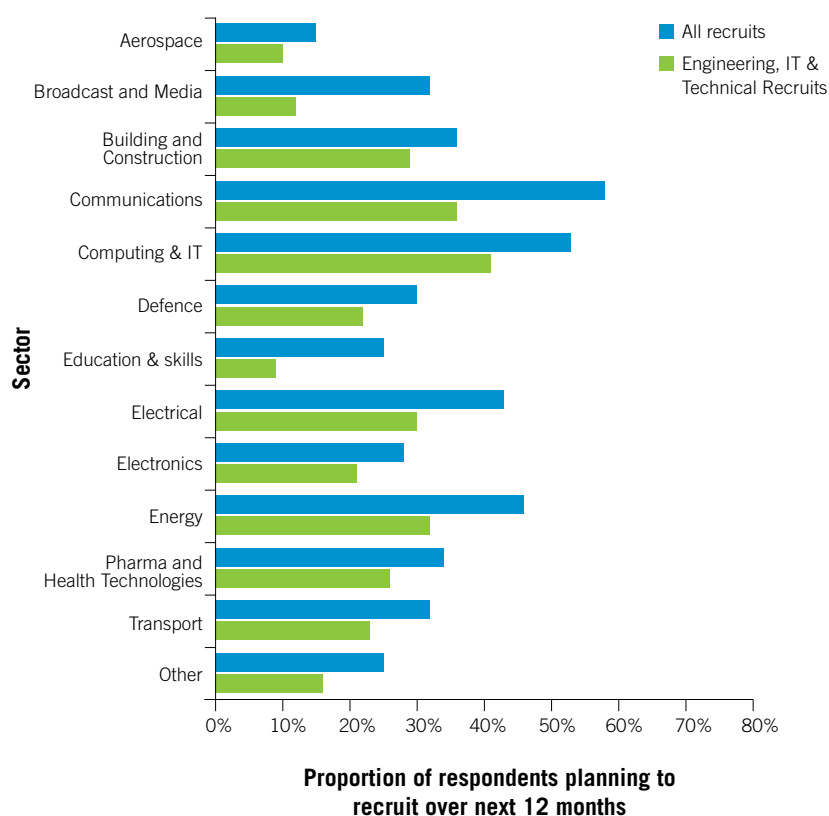


6. Recruitment plans over the next 12 months

6.1 Levels of recruitment

Figure 12

"In addition to current recruitment, are you planning to recruit for any new roles over the next 12 months?" Results broken down by sector. Base: all respondents (400)

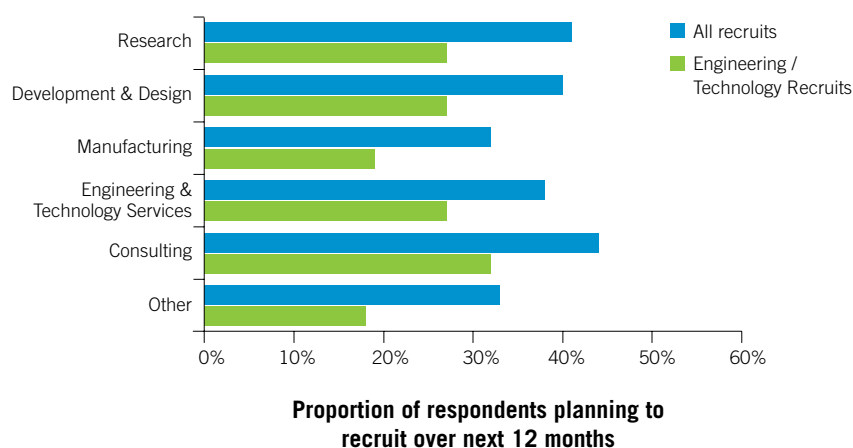


Surveyed organisations were asked whether, in addition to current recruitment, they planned to recruit further new staff over the coming twelve months. The results are shown by sector in Figure 12. The Communications (58% of organisations) and Computing and IT (53%) sectors planned for the most recruitment of engineering, IT and technical staff.

Figure 13 shows answers for the same question but broken down by organisation function. Consultancies planned to do most recruiting of engineers (32% of organisations), whilst manufacturers planned to do the least (19%).

Figure 13

"In addition to current recruitment, are you planning to recruit for any new roles over the next 12 months?" Results broken down by the function which the organisation carried out. Base: all respondents (400)

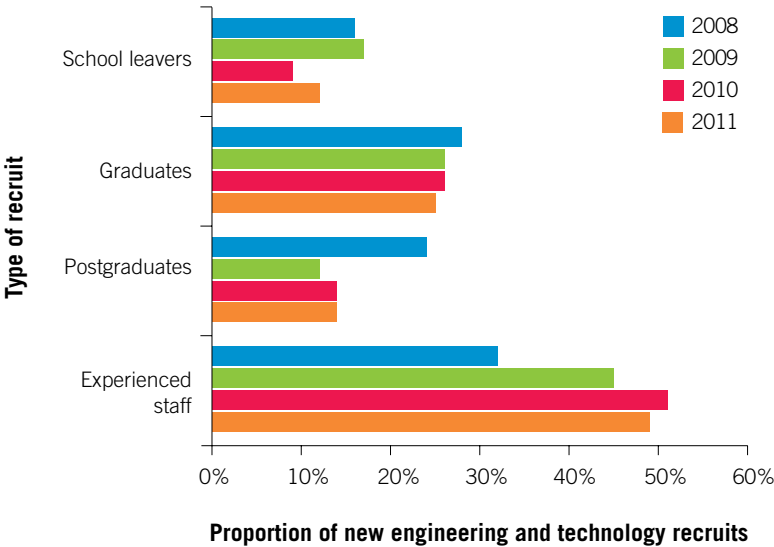


6.2 Career level of new recruits

The organisations which planned to recruit additional engineering, IT and technical staff over the coming twelve months were asked what proportion of these new recruits would be school leavers, graduates, postgraduates or experienced staff. The results are shown in Figure 14.

There has been a marked change towards recruiting experienced staff at the expense of school leavers. This is likely to be a product of the recession. Demand for postgraduates remains low.

Figure 14
“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?” Base: respondents who are planning to recruit for engineering and technology roles in the next 12 months (2011: 127, 2010: 219, 2009: 125, 2008: 400). All respondents were asked in 2008 due to a different questionnaire structure.



6.3 Anticipated recruitment challenges

As shown in Figure 15, there had been an increase in the “confidence factor” since the onset of the recession. The proportion of organisations which were “not confident” had increased in 2011.

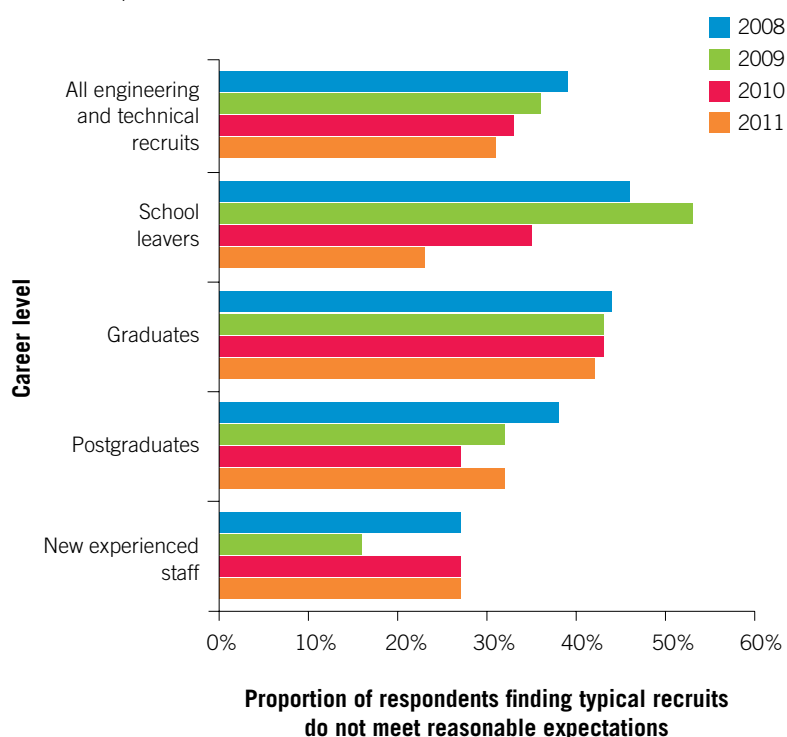
Figure 15
“Do you expect to be able to recruit sufficient suitably qualified engineers , IT staff and technicians to meet you needs this year?” Base: respondents who are planning to recruit for engineering and technology roles in the next 12 months (2011: 127, 2010: 219, 2009:125, 2008: 400). All respondents were asked in 2008 due to a different questionnaire structure.

	2008	2009	2010	2011
Confident	59%	75%	79%	79%
Not confident	31%	19%	13%	21%
Don't know	10%	6%	8%	0%
Confidence Factor (confident minus not confident & don't know)	18%	50%	57%	58%

7. Skills gaps amongst new recruits

Figure 16

"Do you find the typical new school leaver/graduate/postgraduate/experienced staff recruit to an engineering, IT or technical role meets reasonable expectations for level of skill?"
Base: all respondents (400)



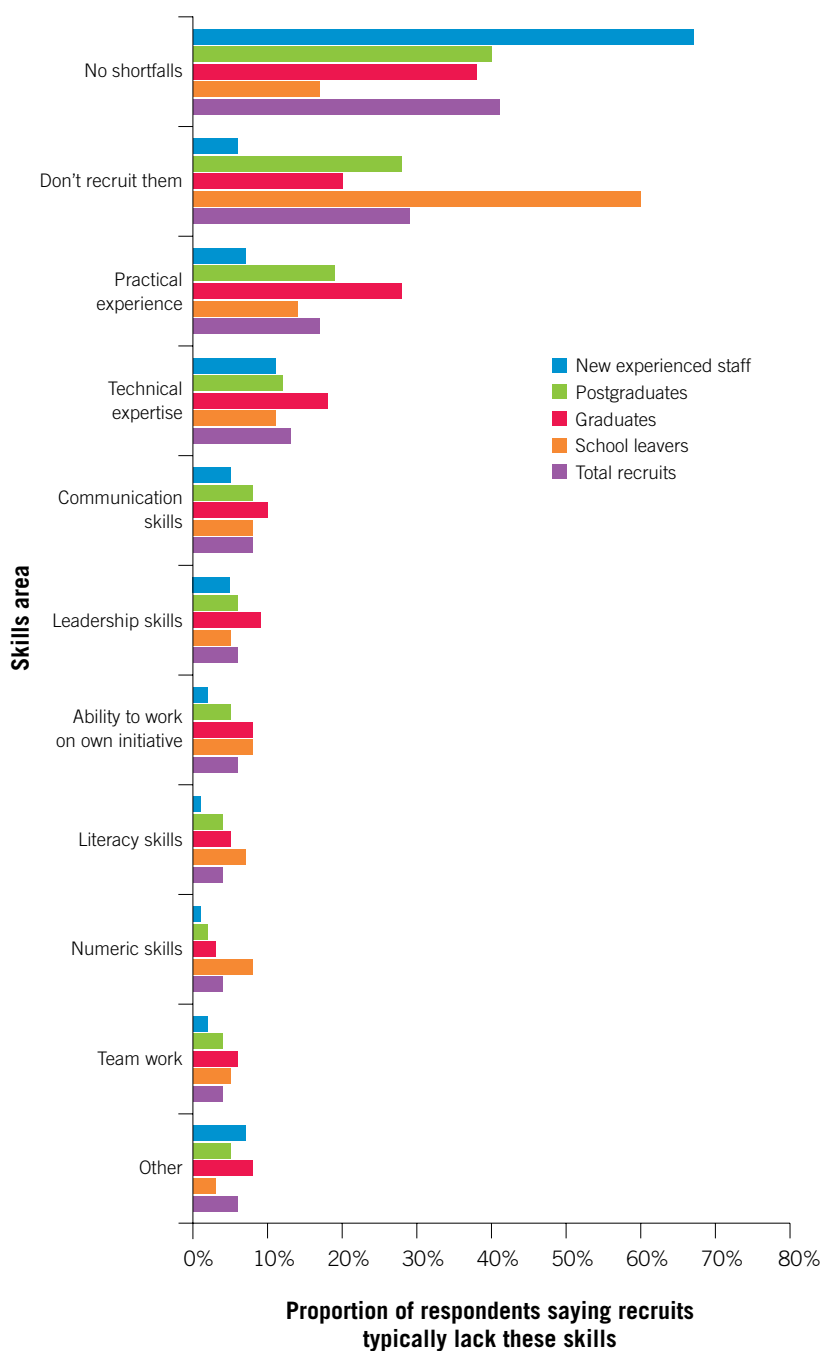
Respondents were asked whether new recruits to engineering, IT and technical roles were typically meeting reasonable expectations for levels of skill or whether there were gaps in their knowledge or experience. Overall, in 2011 31% of organisations surveyed stated that typical recruits did not meet their expectations. This figure has dropped each year (from 39% in 2008). The drop may be explained by the economic recession, which has resulted in more highly experienced/skilled/qualified people on the job market.

Figure 16 shows these results broken down by the career level of recruits. It is notable that the figures have stayed at similar levels for new experienced staff and graduates, but the figures for postgraduates and school leavers show more variation. The variation in the postgraduate and school leaver figures may reflect variation in the extent to which these groups were being recruited, rather than actual improvement/decline in the skills of these groups.

Figure 17 shows a breakdown of the particular skills gaps of new recruits. As in previous years, shortfalls in 2011 mainly related to practical experience, especially amongst graduates (28%). The IET has focused strongly on ways of increasing practical skills amongst engineering graduates in recent years. For example, the IET has introduced professional registration at technician level for undergraduates who have completed a year in industry, as a means of helping employers distinguish those students who have already gained practical experience in the workplace.

Figure 17

"Do you find the typical new school leaver/graduate/postgraduate /experienced staff recruit to an engineering, IT or technical role does not meet your reasonable expectations in any particular skill areas?" Base: all respondents (400)

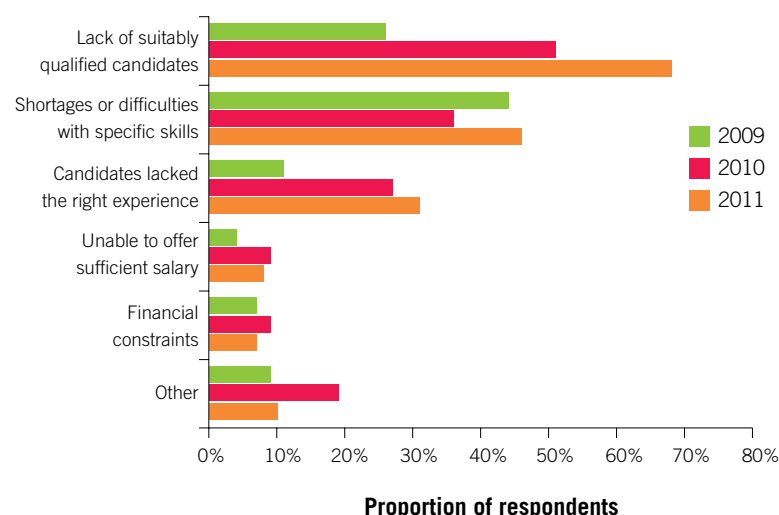


8. Looking to the future

8.1 Anticipated recruitment challenges over the next five years

Figure 18

“Why do you not expect to be able to recruit suitable candidates over the next 4 to 5 years?”
Base: respondents who do not expect to recruit sufficient engineers and technicians (2011: 72, 2010: 81, 2009: 57)



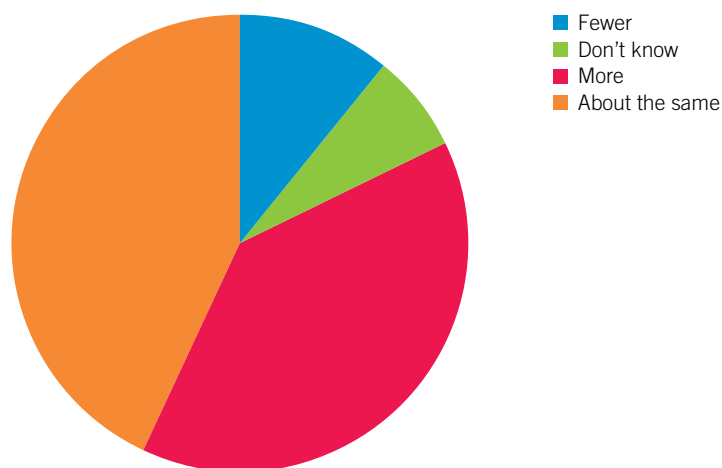
The organisations were asked whether they expected to be able to recruit sufficient suitably qualified engineers, IT staff and technicians to meet their needs over the next 4 to 5 years. 18% reported that they were not confident (compared to 20% in 2010, 14% in 2009 and 29% in 2008).

Additionally, organisations which were not confident of meeting skills needs were asked why they were uncertain. The results are shown in Figure 18. In 2011, lack of suitable qualified candidates was cited by a much higher proportion of respondents (68%) than has been the case in previous years. It would appear that most organisations can afford to recruit the staff they need and pay them at the necessary level.

8.2 The future of apprenticeships

Figure 19

“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?” Base: all respondents (400)



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 19. 39% of respondents said more (38% in 2010), 43% about the same (48% in 2010), 11% said fewer (7% in 2010) and 7% said that they did not know (7% in 2010).

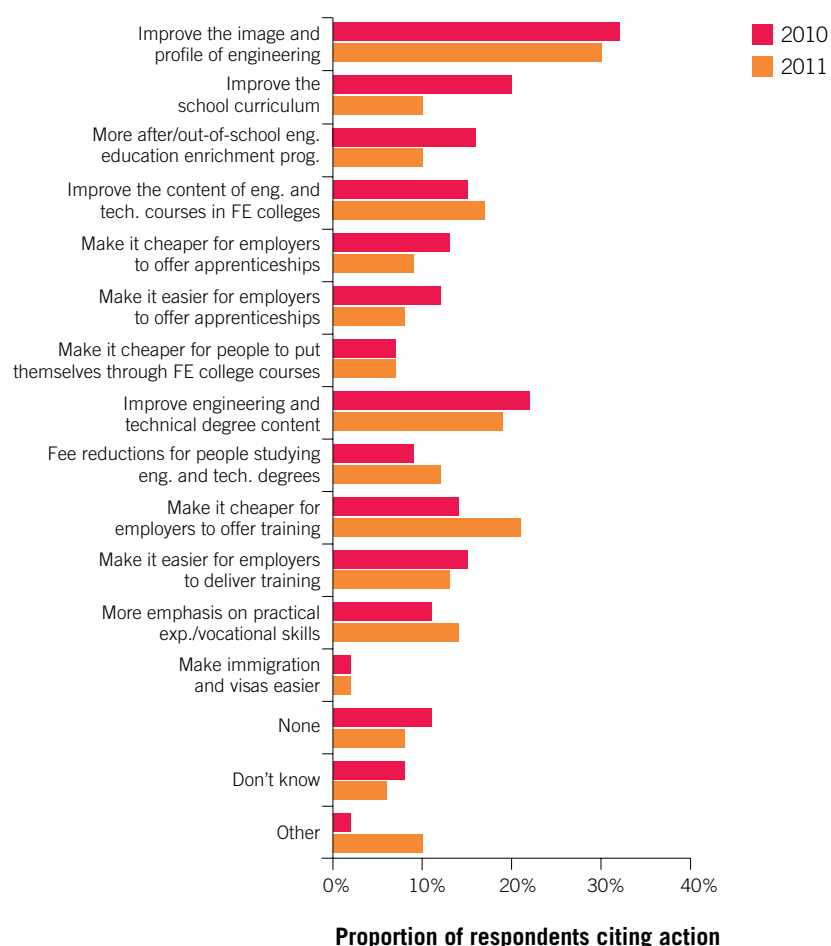
9. Addressing skills shortages

9.1 Areas for improvement

Respondents were asked what actions by engineering institutions, the government, employers or other bodies could help to address skills shortages. The results for 2011 and 2010 are shown in full in Figure 20. In 2011, the most commonly cited action was to improve the image and profile of engineering (30% of respondents). Although results were generally similar in both years, there are some areas of difference. In 2011 more respondents said that it should be cheaper for employers to offer training than did so in 2010 (21% compared to 14%).

Figure 20

"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?"
Base: all respondents (400)



9.2 Content of engineering degrees

In 2011, 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. 78% of all organisations felt that the content of engineering, IT and technical degrees suited the needs of their organisation. 17% thought that engineering degrees were not meeting their needs, whilst 5% of respondents said they did not know. Figure 21 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 22, the most commonly cited reason was lack of practical content. The IET is currently working with universities to help them ensure there is sufficient practical content in degrees.

Figure 21

“Does the content of engineering, IT and technical degrees suit the needs of your organisation?” Base: all respondents (400)

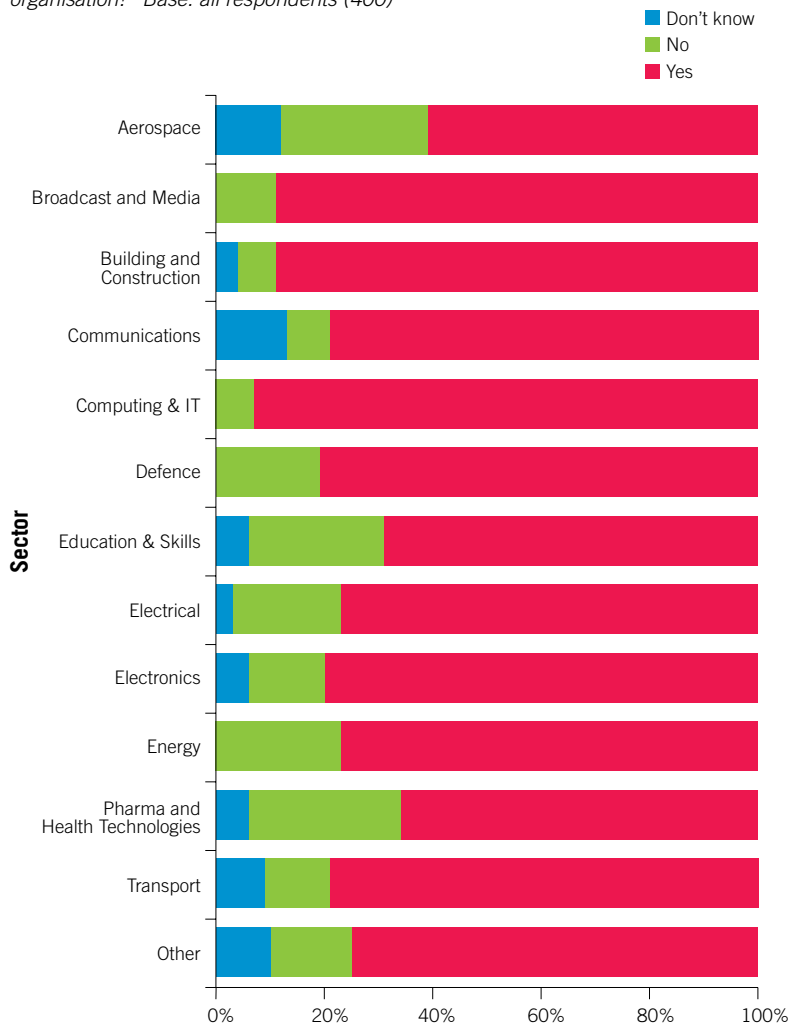
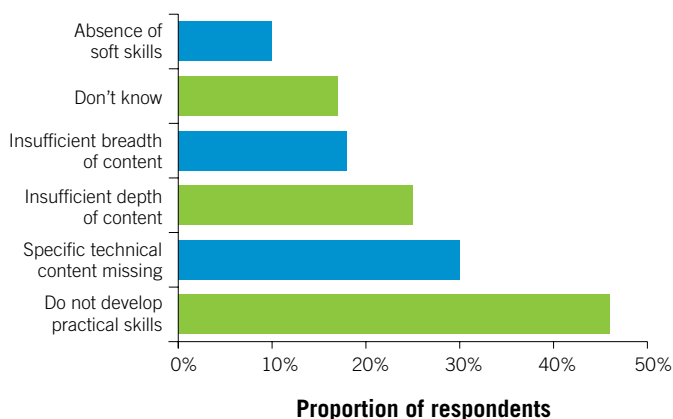


Figure 22

“Why are engineering, IT and technical degrees not suiting the needs of your organisation?” Base: respondents who stated the degrees aren't suiting the needs of their organisations (87)



9.3 The role played by respondents

Respondents were asked whether or not their organisation engaged with elements of the education and skills system. As show in Figure 23, interaction with universities and schools had risen slightly.

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 24 which demonstrates that work experience features heavily in educational engagement.

Figure 23
“Does your organisation engage with the following?” Base: all respondents (400)

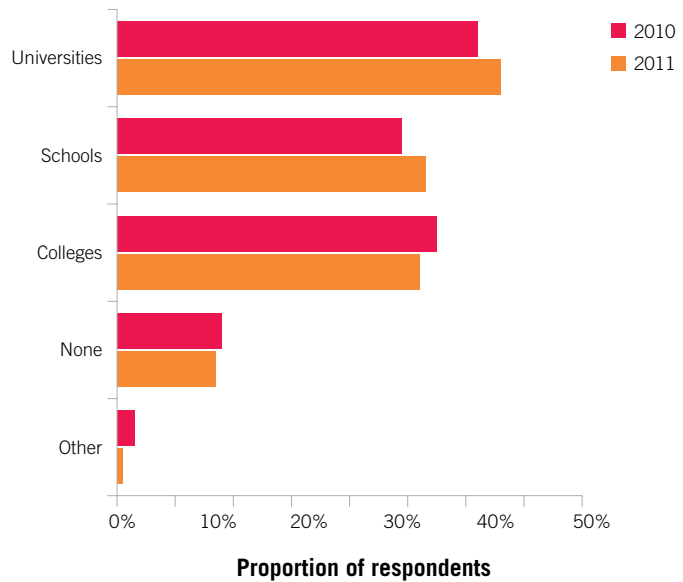
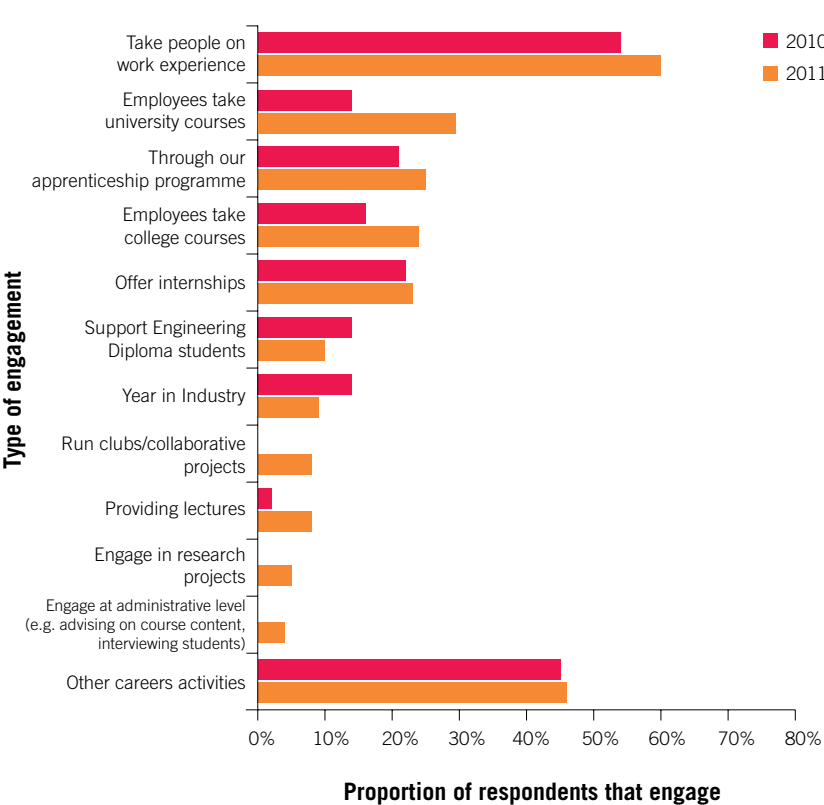


Figure 24
“In what way do you engage with universities, colleges and/or schools?” Base: respondents who engage with different levels of education (2011: 331, 2010: 328)



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 April 2011 using a twenty 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 2011 were compared to results for the 2010, 2009 and 2008 surveys, which followed the same methodology.

10.2 Sample

Four hundred employers were interviewed. Respondents included IET business partners (n = 200) and other employers of engineers and technicians (n = 200). The majority, but not all, of the employers surveyed were from the private sector. The sample was mainly comprised 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).

Figure 25 and Figure 26 show the size of employers surveyed, by number of employees and annual turnover respectively. There was a small shift towards smaller companies compared to surveys in previous years.

Figure 25

“How many people do you estimate you currently employ in this country?” Comparison of answers in the 2011 survey to previous years (the 2008 data was not worked out in the same way for organisations employing less than 50 people and therefore was not comparable). Base: all respondents (400)

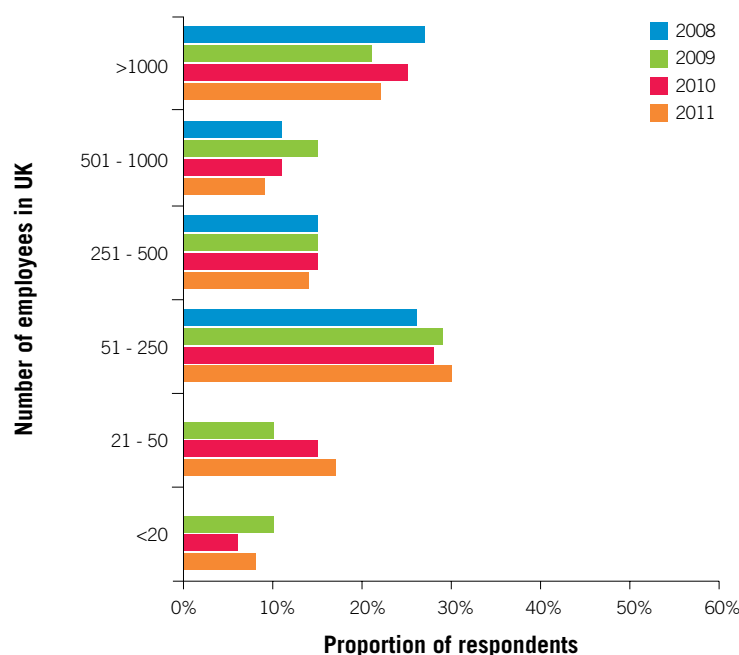


Figure 26

“What is your approximate UK turnover?” Base: all respondents (400)

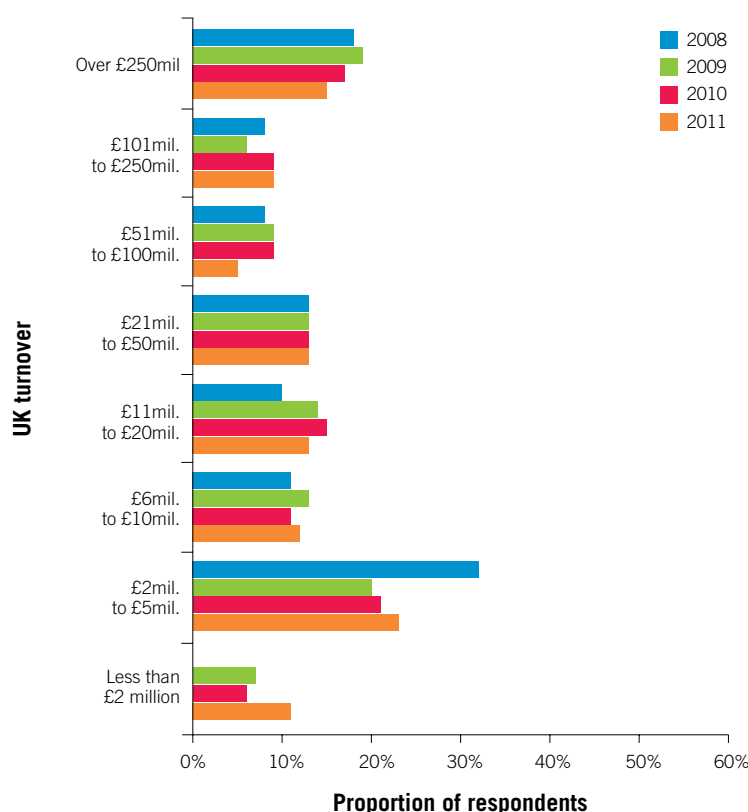


Figure 27 shows the proportion of organisations from each industry sector. When carrying out the survey, a quota was applied so that a minimum of 20 interviews were conducted with employers from each sector. There was no statistically significant change to the composition of the sample by sector compared to the 2010 survey.

Employers were also asked about the function(s) of their organisation. Their responses are shown in Figure 28. Most organisations carried out more than one function.

Figure 27

“What is the core sector that your organisation operates in?” The breakdown of sectors was different prior to 2010, hence results for 2009 and 2008 are not comparable. Base: all respondents (400)

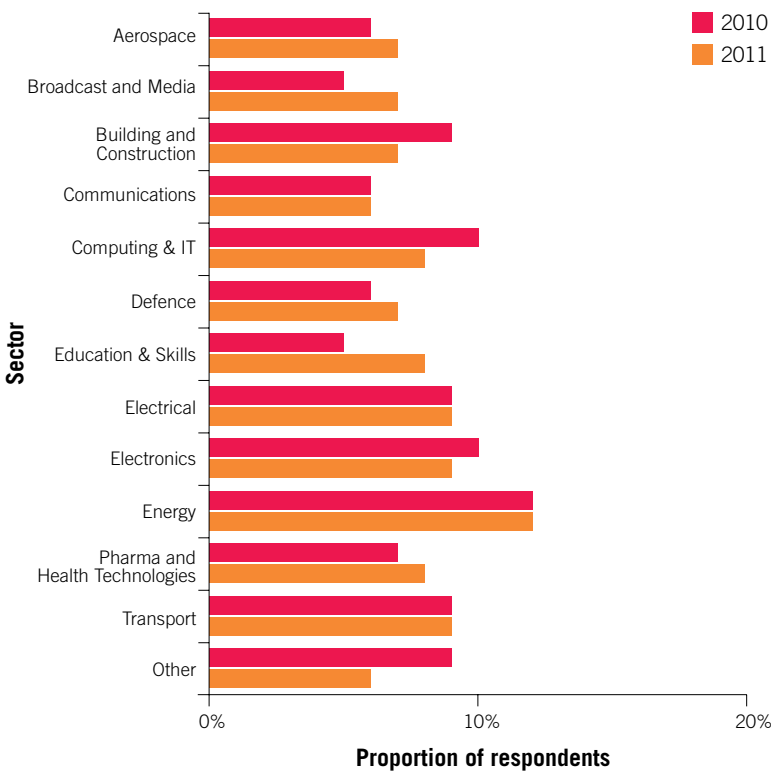


Figure 28

“Which of the following does your organisation carry out?” Most organisations carry out more than one function, hence their answers are included in more than one of the categories in this graph. Base: all respondents (400)

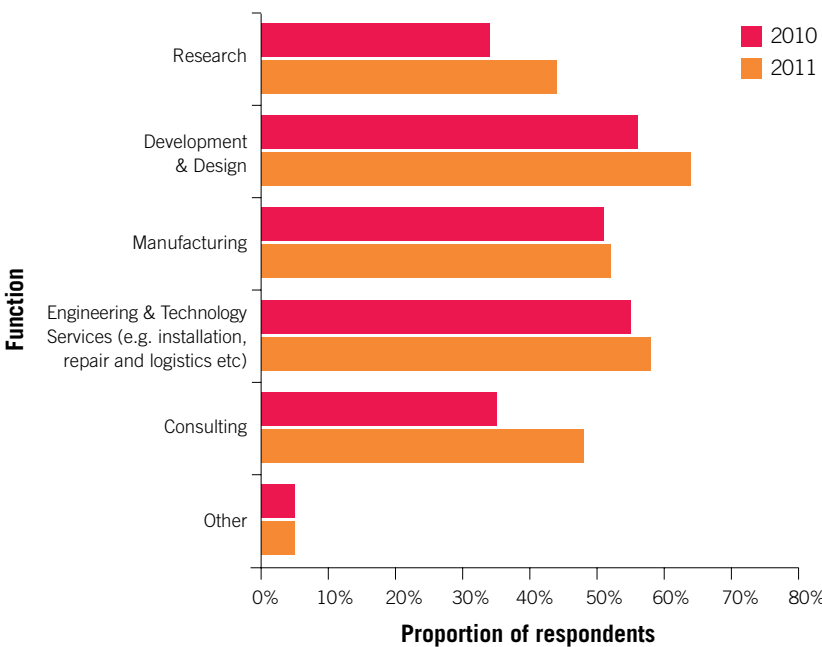
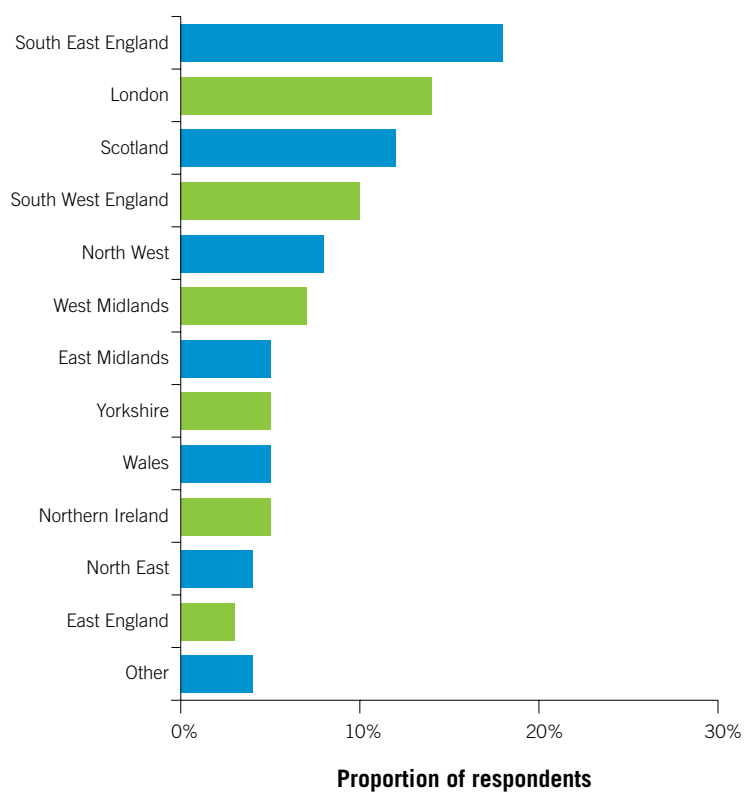


Figure 29

"In which area of the country do you employ most engineering, IT and technical staff?"
Base: all respondents (400)



Surveyed employers were asked in which area of the country they employed most engineers. The responses are shown in Figure 29, which demonstrates that the survey covered employers from all over country.

IET Offices

London

Savoy Place
2 Savoy Place
London
WC2R 0BL
United Kingdom
T: +44 (0)20 7344 5479
F: +44 (0)20 7240 7735
www.savoyplace.co.uk

Stevenage

Michael Faraday House
Six Hills Way
Stevenage Herts
SG1 2AY
United Kingdom
T: +44 (0)1438 313311
F: +44 (0)1438 765526
E: postmaster@theiet.org
www.theiet.org

New Jersey

379 Thornall Street
Edison NJ 08837
USA
T: +1 (732) 321 5575
F: +1 (732) 321 5702

Beijing

Suite G/10F
China Merchants Tower
No.118 Jianguo Road
Chaoyang District
Beijing China
100022
T: +86 10 6566 4687
F: +86 10 6566 4647
E: china@theiet.org

Hong Kong

4412-13 Cosco Tower
183 Queen's Road Central
Hong Kong
T: +852 2521 2140
F: +852 2778 1711

Bangalore

Unit No. 1103
11th Floor, West Wing
Raheja Towers
M. G. Road
Bangalore 560001
T: +91 (80) 4149 8080 or 4089 2222
F: +91 (80) 4089 2233
E: India@theiet.org