



2011 Engineering and Engineers Brand Monitor Executive summary

Understanding perceptions of engineering, engineers, manufacturing and technicians

Prepared for EngineeringUK

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July 2011

1 Executive summary

1.1 Introduction

EngineeringUK undertakes an annual survey to gauge the perception of engineering and engineers amongst the UK population and to measure its annual Key perception Performance Indicators. The 2011 Brand Monitor was conducted in May and June 2011 and a total of 4491 responses to an online survey were obtained across five different UK population groups: those aged 20 and above; 17–19 year olds; 12–16 year olds; 7–11 year olds and education professionals in STEM-related subjects.

The key themes explored in this research are listed below.

Themes relating to engineering:

- Awareness and understanding of engineering
- General perceptions of engineering
- Role of engineering in the UK economy
- Perceptions of engineers
- Perceptions of engineering as a career
- Perceptions of the educational pathways to engineering
- Consideration and recommendation of engineering as a career

Themes relating to manufacturing:

- General perceptions of manufacturing
- Role of manufacturing within the UK economy
- Perceptions of manufacturing as a career
- Consideration and recommendation of manufacturing as a career
- Perceptions of the educational pathways to manufacturing

Themes relating to technicians:

- General perceptions of technicians
- Awareness and understanding of the role of a technician
- Perceptions of the educational pathways toward becoming a technician
- Consideration and recommendation of becoming a technician

The report is split into five main chapters, each reporting on the findings relating to one of the sample groups. The sixth and final section is an appendix containing further information regarding the research methodology.

This executive summary reports on five key aspects of the research: drawing comparisons from the 2011 survey to the results from 2010; highlighting key findings from the 2011 survey; showing key findings around the perceptions of manufacturing; showing key findings around the perceptions of technicians and finally reporting EngineeringUK's 2011 key perception performance indicators compared to 2010.

1.2 2011 findings compared to 2010

As in 2010, men are significantly more positive and consider themselves more knowledgeable in most aspects relating to perceptions of engineering than women.

Men are more likely than women to claim greater knowledge of engineering. They are also more likely to: perceive it more positively; have considered it as a career; recommend it to others; make positive word associations with it. These differences are evident across a range of measures within all of the respondent groups. Table1 shows how the male and female responses to three key measures – knowledge, consideration and recommendation – compare between 2011 and 2010 for the 17+ general population. Year-on-year increases are larger amongst men than women, whilst the decline in recommendation seen among both sexes is more marked amongst women.

Table 1: Agreement with different attitude statements

Respondents aged 17+	Male		Female	
	2010	2011	2010	2011
How much would you say you know about what engineers do?	31% +ve ¹	36% +ve	11% +ve	14% +ve
Have you ever considered a career in engineering?	27% yes	33% yes	7% yes	9% yes
Would you ever recommend that your friends consider a career in engineering?	73% yes	70% yes	68% yes	60% yes

Knowledge of what engineers do has improved among respondents aged 17 and over but has decreased among 12-16 year olds

A quarter of the general public (in both the 17–19 and 20+ age groups) expressed ‘top two box’ knowledge of what engineers do². This represents a significant 4% increase from the 21% who said this in last year’s survey (Figure 1). However, knowledge of what engineers do decreased significantly from last year amongst the 12–16 age group (from 19% to 11%).

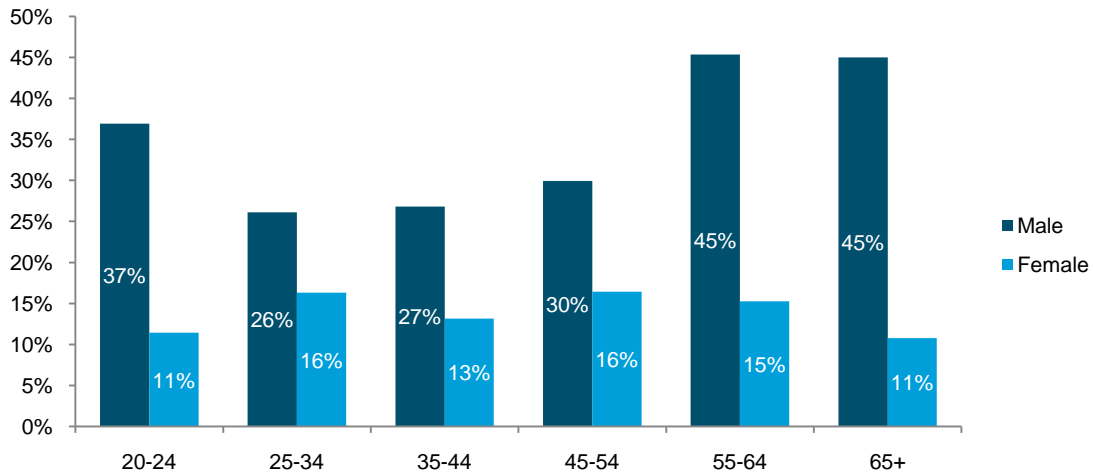
As was the case in 2010, men were significantly more likely than women to claim ‘top two box’ knowledge of engineering of a range of engineering specialisms.

Within the 20+ age group, claimed knowledge of what engineers do was significantly higher amongst respondents aged 55 (33%) compared to the other 20+ age categories: 20 – 24 21%, 25 – 34 20%, 35 – 44 19% and 45 -54 22%.

¹ ‘+ve’ the percentage of respondents choosing the two most positive answers to a question

² ‘Top two box’ refers to the sum of the two possible positive answers to a question (i.e. ‘very desirable’ and ‘somewhat desirable’ added together) on a five point scale

Figure 1: How much would you say you know about what engineers do? (20+, top two, by gender)



Base: Male: Age 20-24: 63, Age 25-34: 116, Age 35-44: 148, Age 45-54: 144, Age 55-64: 168, Age 65+: 243
 Female: Age 20-24: 99, Age 25-34: 190, Age 35-44: 194, Age 45-54: 180, Age 55-64: 120, Age 65+: 135

Efforts to improve the image and exposure of engineering seem to be having a positive impact on the perceptions of 17+ respondents but 12-16s are more negative in some areas

In 2010, 19% of respondents in the 17–19 age group and 24% of those in the 20+ age group expressed ‘top two box’ agreement with the statement ‘the image and reputation of engineers has noticeably improved over the past year’. This year these figures have increased to 30% and 29% respectively, indicating significant year-on-year change. Similarly, agreement with the statement ‘I have seen/heard more about the engineering industry over the past year’ has increased amongst the 17–19 age group from 23% to 28% and amongst the 20+ age group from 14% to 18%.

However among the 12-16 age group there has been a significant decrease in agreement that they have seen / heard more about the industry this year, dropping from 28% in 2010 to 17% this year; additionally there has been no significant year-on-year change in agreement that the image and reputation of engineers has improved.

Agreement with the statement ‘being an engineer is a well respected profession’ is also up significantly from 64% to 68% amongst 17–19 year olds and from 79% to 82% amongst those aged 20 or older.

The percentage of 20+ respondents who had ever considered a career in engineering is higher this year but among the 17-19 group it has remained stable and amongst those aged 12-16 it has declined

Last year 16% of respondents in the 20+ age group 'had ever considered a career in engineering', in 2011 this figure was 21%, representing a significant increase. Among 17-19s no such change is evident although in both the 17–19 and 20+ age groups men were significantly more likely than women to say that they had ever considered a career in engineering.

When respondents in the 12–16 age group were asked if they would 'ever consider a career in engineering' 45% responded 'yes'. This proportion is down significantly from 60% in 2010.

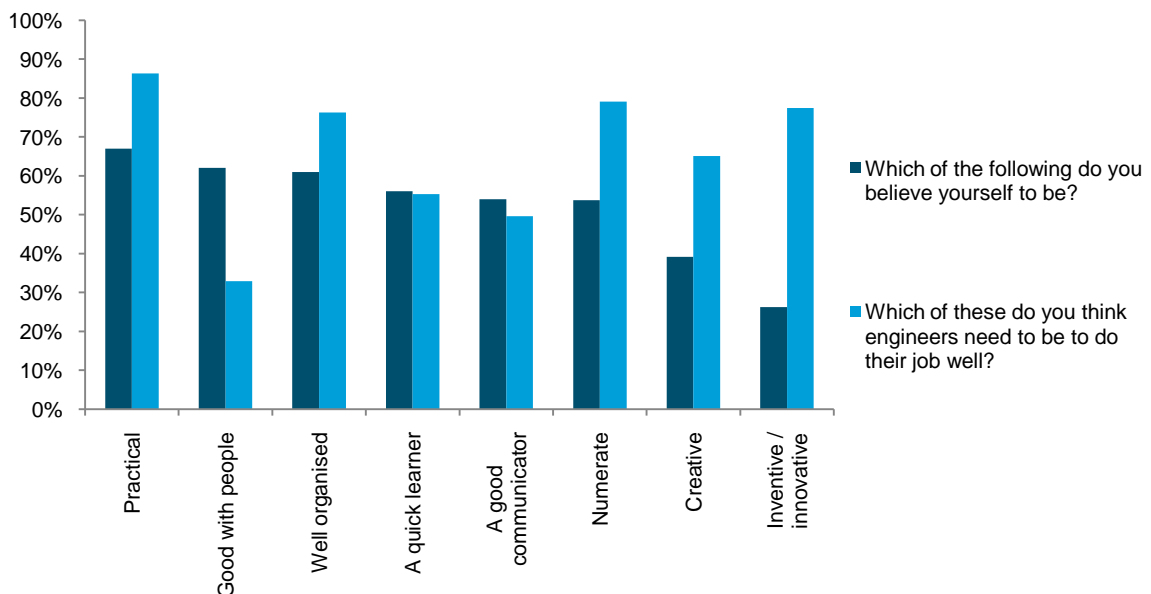
1.3 Key findings from 2011

Creativity and inventiveness are the two engineering attributes most perceived as lacking amongst the general population

From a range of provided attributes, two thirds (67%) of respondents in the 20+ age group selected 'practical' to describe themselves (Figure 2). This was the most commonly selected response to this question and also to the question asking what engineers need in order to do their job well, (86%). Other qualities regarded as necessary for engineers included 'numerate' (79%), 'well organised' (76%) and 'inventive / innovative' (77%). The majority of respondents considered themselves to be 'numerate' (54%) or 'well organised' (61%) suggesting a good fit with perceived skills engineers needed.

However, there were two areas in particular in which many of the general population considered themselves to lack the necessary skills required by an engineer. Just one quarter (26%) of respondents considered themselves to be 'inventive / innovative' (compared with the 77% who saw this as necessary for engineers) and two fifths (39%) considered themselves to be creative, versus the two thirds (65%) who saw this as an engineering requirement.

Figure 2: Perceptions of skills sets (20+)



Base: 1800

There were also significant differences between the sexes in these areas. Whilst women were more likely than men to see themselves as 'good with people' this was not widely considered to be necessary quality for an engineer. On the other hand, numeracy was considered to be an important element of the engineering role, and this was an attribute which men were more likely to consider themselves to possess along with the other important element of being 'inventive / innovative'.

Clarifying or addressing these gaps in gender perception is likely to be an area of development for EngineeringUK in widening the appeal of engineering.

Three fifths of the general population saw a career in engineering as desirable, primarily due to it being a 'good profession / career', 'challenging' and 'well paid'

61% of the general public believed that a career in engineering is desirable (top two box). In both the 17–19 and 20+ age groups, men (50% and 67% respectively) were significantly more likely than women (29% and 58%) to see a career as an engineer as being desirable.

Amongst the 12-16 age group 36% of boys and 21% of girls said they believed a career in engineering is in some way desirable.

Respondents in the 20+ age group tended to consider engineering to be desirable because they see it as a 'good profession / career' (78%) or because it is 'challenging' (71%). This echoes closely the most popular engineering associations which were 'challenging', 'hard work' and 'making a difference'. In the 17–19 age group as well as seeing engineering as a 'good profession / career' (66%) believed it to be 'well paid' (63%).

Those respondents who believed that a career in engineering is undesirable tended to do so for very general reasons, often not mentioning any particular engineering-related factors. The most common reason given was that they were simply 'not interested in it', it was 'not well known as a career' or simply 'don't know'.

Whilst this degree of ambivalence, is concerning, it should be considered as an opportunity for EngineeringUK. Evidence suggests that in seeking to improve perceptions, the challenge is not one of looking to convert people with entrenched negative views about specific aspects of engineering careers but rather one of enthusing people, communicating positive aspects, and enlightening them out of their often uninformed positions..

Amongst those aged 20 or older, finding 'something I'm interested in' (68%) was considered to be the most important factor when considering what career to pursue.

For 20+ year olds, the two most popular responses were 'something I'm interested in' (68%) and 'pay' (65%). In the same group, women (59%) were significantly more likely than men (53%) to say that 'being valued' is important. Amongst the 17-19 group 'something I'm interested in' (73%) and 'pay' (69%) were again the most important factors when choosing a career, with 'enjoyment' third (67%) – the same is true of the 12-16 age group. Noticeably in the 17-19 group women (80%) were significantly more likely than men (66%) to select 'something I'm interested in'.

In the 12-16 age group the most popular career choice from a provided list was teaching.

Overall, being an engineer was the third most popular career choice, from a list of possible occupations, for 12-16 year olds behind teaching and computer games development. However,

this differed quite substantially by gender. For boys, 12% expressed this sentiment, while for girls this figure was only 2%. The most desirable profession overall was teaching (12%); this was the most popular choice among girls (16%), however, the most popular choice for boys was to be a computer games developer (19%).

In the 7-11 age group the most popular professions for boys were computer games developer (19%), and footballer (11%) whereas for girls they were teacher (16%) and vet (10%). Small proportions (6-7%) of this age group selected engineer or scientist.

Seven out of ten 7-11 and 12-16 year olds enjoyed science and design and technology.

In the 12-16 age group, 70% enjoyed science 'a little' or 'very much' and among 7-11s this was 72%. A similar pattern exists for design and technology, which was enjoyed 'a little' or 'very much' by 69% of 7-11s and by 66% of 12-16s. ICT was enjoyed by 72% of 12-16s, however 7-11s were not asked about this subject.

Almost half (47%) of educators said engineering is a desirable career, but a fifth (21%) said it was undesirable.

Overall, nearly half (47%) of educators said a career in engineering is desirable, but a fifth (21%) said it was undesirable. Those who thought engineering was desirable mentioned that it was 'challenging' (74%), it is a 'good profession' (72%) and because it is 'interesting' (69%). Those educators who thought engineering was undesirable said it was 'seen as a career for men' (41%), 'not a well known career' (36%). Men (31%) were more likely than women (13%) to say engineering is a 'dying industry' and women (22%) were more likely than men (6%) to say that engineering is 'seen as a career without much human contact on impact on the world'.

Generally the influence of celebrities on the perception of engineering is considered to be negative, however there were some specific personalities identified as inspiring role models

Collectively, celebrities were generally considered by respondents to be a negative influence on perceptions of engineering. However, individual public figures may present some opportunity for inspiring young people in these areas. Over a quarter (28%) of 7–11 year olds believed that Professor Brian Cox could inspire them to consider a career in engineering and this did not vary substantially between boys (30%) and girls (25%). No other celebrity was identified clearly by both sexes at this age. Amongst 12–16 year olds Professor Brian Cox (31%) was again the celebrity most capable of inspiring them to consider a career in engineering. He was followed by Alan Sugar (29%) and Professor Robert Winston (21%). Professor Cox therefore seems to be the public figure most likely to be seen to be capable of playing an inspirational role for engineering.

1.4 Key findings around the perceptions of manufacturing

Many of the general themes previously described for engineering also apply to the questions asked about manufacturing. Further key findings relating to some of the manufacturing-specific questions are outlined below.

In the 'general population' groups (17-19 and 20+), around a quarter of respondents felt the recession has had a degree of positive impact on perceptions of manufacturing. 24% agreed with the statement 'a career in manufacturing has become more desirable since the recession'

and the same proportion with 'the manufacturing industry has gained a more prominent role in this country since the recession'.

The words most commonly associated with manufacturing were 'production', 'technology' and 'design', whilst those most commonly used to describe a *career* in manufacturing were 'challenging', 'varied' and 'creative'. Women in the 17–19 and 20+ age groups were significantly more likely than men to describe a career in manufacturing as 'male dominated'.

In general respondents were most likely to recommend a career in manufacturing to 'those who show an interest', 'practical people' and 'people who like making things'. Whilst amongst Educators, 29% of respondents said they were 'extremely likely' and 34% said they were 'quite likely' to recommend a career in manufacturing to their students.

As with last year, the academic requirements for a career in manufacturing were perceived by educators to be lower than those required for a career in engineering or as a technician.

Positively apprenticeships were more likely to be viewed by educators as a pathway to a technician or manufacturing role than to a role as a professional engineer. Table 2 displays which qualifications are most strongly viewed by educators as being required for the various roles.

Table 2: what level of qualifications would students need for a job in manufacturing?

Educators	Engineering	Manufacturing	Technician
GCSE / Standards	1%	39%	29%
A level / Highers	4%	12%	35%
First degree	43%	8%	6%
Higher degree	19%	0%	0%
Apprenticeship	3%	13%	14%
All of the above	27%	12%	9%

Student respondents were asked which words they associated with manufacturing. The word most commonly selected from a list of possible options equally by 7–11 year olds boys and girls was 'boring'. 20% of 7–11 year olds answered 'don't know' to this question; a higher proportion than that which gave the same response when asked about engineering (12%).

12-16 year-olds were asked an open-ended version of the word association question and the words most commonly mentioned were more value-neutral, such as 'factories', 'making' and 'production'. Where subjective associations were made, these were a mixture of negative ('boring', 'dirty') and positive ('creative').

1.5 Key findings around the perceptions of Technicians

As for manufacturing, many of the general engineering themes also apply to the questions asked about technicians. Further key findings relating to some of the technicians-specific questions are outlined below.

Knowledge of what technicians do is generally lower than knowledge of what engineers do, especially among 17-19s. In the 17–19 and 20+ age groups men (21% and 24% respectively) were significantly more likely than women (9% and 20% respectively) to express 'top two'

knowledge of what technicians do. . The task most commonly believed to be part of a technician's role was 'testing and maintaining systems'.

The largest proportion of respondents believed that the level of qualifications required to work as a technician is 'A levels / Highers'. 35% of educators believed that 'A levels / Highers' are necessary for a career in engineering, while 14% said that an apprenticeship is necessary.

In the 17–19 age group men (27%) were significantly more likely than women (12%) to find a career as a technician desirable. This was also the case for men (39%) and women (28%) in the 20+ age group.

Educators were most likely to recommend a career as a technician to 'practical students' (chosen by 72% of respondents) or 'those who show an interest' (71%).

In the 12–16 age group, boys (56%) were significantly more likely than girls (32%) to say that they would consider a career as a technician when they are older. Boys (26%) were also significantly more likely than girls (15%) to say that a career as a technician is desirable.

The word 12–16s most frequently associated with the word 'technician' was 'science' and this was followed by 'clever'. They believed the tasks most likely to be part of a technician's job are 'testing and maintaining systems' (64%), 'carrying out experiments' (63%) and 'repairing computers' (62%).

1.6 EngineeringUK KPI comparisons 2009-2011

1.6.1 Key Performance indicators compared to 2010 for 12-16 year olds and educators

EngineeringUK uses key performance indicators (KPIs) to track and report on its performance year on year. Different sets of KPIs are relevant to the different sample groups included in this study. Figure 3 includes all KPIs measured, split by sample group, and provides comparative figures from 2009 and 2010 where available. For clarity of reporting, KPI measures tend to be simplified to refer to specific sections ('top two box') of the response scales used.

Amongst 12–16 year olds, claimed 'top two' knowledge of what engineers do has dropped from 19% to 11% from 2010 to 2011. Statements of 'top two' desirability of engineering were also down from 37% to 28%. Consideration of engineering has also declined. In 2010, 60% of 12-16s said they would consider a career in engineering; however this year's figure is 45%. A more positive swing has been observed in relation to engineering being perceived as 'exciting'. 36% of 12-16s believed engineering to be exciting this year, compared with 23% last year.

In 2010, 21% of Educators agreed with the statement 'the image and reputation of engineers has noticeably improved over the past year'; this year this figure was 14%. Similarly, agreement with the statement 'I have seen / heard more about the engineering industry over the past year' dropped from 24% to 15% between 2010 and 2011.

Figure 3: Key performance indicators across the 12–16 and educators sample groups

Key performance indicators	12 – 16				Educators			
	2009	2010	2011	% change	2009	2010	2011	% change
How much would you say you / your students know about what engineers do?	29% +ve	19% +ve	11% +ve	-8% +ve	33% +ve	12% +ve	11% +ve	-1% +ve
How desirable do you believe being an engineer is, as a career for you / your students?	57% +ve	37% +ve	28% +ve	-9% +ve	69% +ve	52% +ve	47% +ve	-5% +ve
How exciting do you believe being an engineer is as a profession / How exciting do you believe that students feel being an engineer is as a profession? ³	27% +ve	23% +ve	36% +ve	+13% +ve	40% +ve	7% +ve	73% +ve	+66% +ve
Agree 1-5: The image and reputation of engineers has noticeably improved over the past year	42% +ve	22%+ve	21% +ve	-1% +ve	40% ve	21% +ve	14% +ve	-7% +ve
Agree 1-5: I have seen / heard more about the engineering industry over the past year	15% +ve	28% +ve	17% +ve	-11% +ve	44% ve	24% +ve	15% +ve	-9% +ve
Do you think you would ever consider a career in engineering / Have any of your students ever considered a career in engineering?	69% yes	60% yes	45% yes	-15% yes	69% yes	80% yes	78% yes	-2% yes
Which of the following words would you use to describe how you view a career in engineering?								
Challenging	87%	51%	50%	-1%	87%	85%	90%	+5%
Dynamic	63%	24%	18%	-6%	63%	48%	58%	+10%
Creative	76%	37%	33%	-4%	76%	61%	66%	+5%
Make a difference	60%	29%	26%	-3%	60%	67%	72%	+5%
Dull (Boring for 12 – 16)	5%	15%	13%	-2%	5%	3%	3%	0%
Dirty / greasy / messy	15%	32%	36%	+4%	15%	10%	10%	0%
Technical / complicated	25%	65%	41%	-24%	25%	73%	9%	-64%
Hard work	46%	N/A	N/A	N/A	46%	61%	62%	+1%
Would you ever recommend that your friends / family consider a career in engineering?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Agree 1-5: Being an engineer is a well respected profession	79%	N/A	N/A	N/A	79% agree	71% agree	71% agree	0% agree
Agree 1-5: Engineers make a good contribution to society	97% agree	N/A	N/A	N/A	97% agree	91% agree	92% agree	+1% agree
Agree 1-5: Hardly anyone knows what engineers do	48% agree	N/A	N/A	N/A	48% agree	33% agree	35% agree	+2% agree
Agree 1-5: Engineers will have a positive impact on our future	95% agree	N/A	N/A	N/A	95% agree	93% agree	93% agree	0% agree

³ In the 2011 questionnaire educators were asked about their perceptions of how exciting engineering is

1.6.2 Key Performance indicators compared to 2010 for the general public sample groups

Amongst the General Public (17+), professed 'top two' knowledge of what engineers do has increased from 21% last year to 25% this year (Figure 4). Agreement with the statement 'the image and reputation of engineers has noticeably improved over the past year' from 24% to 29%. Similarly agreement with the statement 'I have / seen heard more about the engineering industry over the past year' has increased from 15% to 19%. While last year 17% of the 17+ age group said they had considered a career in engineering, this year this figure had increased to 21%.

Figure 4: Key performance indicators across the general public sample groups

Key performance indicators	General Public (17+)				17 – 19			20+		
	2009	2010	2011	% change	2010	2011	% change	2010	2011	% change
How much would you say you know about what engineers do?	18% +ve	21% +ve	25% +ve	+4% +ve	14% +ve	20% +ve	+6% +ve	21% +ve	25% +ve	+4% +ve
How desirable do you believe being an engineer is, as a career?	57% +ve	59% +ve	61% +ve	+2% +ve	31% +ve	40% +ve	+11% +ve	61% +ve	63% +ve	+2% +ve
How exciting do you believe being an engineer is as a profession? ⁴	27% +ve	30% +ve	56% +ve	+26% +ve	13% +ve	43% +ve	+30% +ve	31% +ve	57% +ve	+26% +ve
Agree 1-5: The image and reputation of engineers has noticeably improved over the past year	42% agree	24% agree	29% agree	+5% agree	19% agree	30% agree	+11% agree	24% agree	29% agree	+5% agree
Agree 1-5: I have seen / heard more about the engineering industry over the past year	27% agree	15% agree	19% agree	+4% agree	23% agree	28% agree	+5% agree	14% agree	18% agree	+4% agree
Have you ever considered a career in engineering?	22% yes	17% yes	21% yes	+4% yes	23% yes	25% yes	+2% yes	16% yes	21% yes	+5% yes
Which of the following words would you use to describe how you view a career in engineering?										
Challenging	88%	76%	75%	-1%	71%	67%	-4%	76%	76%	0%
Dynamic	56%	33%	39%	+6%	35%	36%	+1%	33%	39%	+6%
Creative	80%	47%	50%	+3%	34%	38%	+4%	48%	50%	+2%
Make a difference	78%	50%	54%	+4%	38%	41%	+3%	51%	55%	+4%
Dull	21%	5%	4%	-1%	14%	10%	-4%	4%	4%	0%
Dirty / greasy / messy	59%	19%	17%	-2%	32%	28%	-4%	18%	17%	-1%
Technical / complicated	45%	72%	27%	-45%	75%	34%	-41%	72%	27%	-55%
Hard work	80%	58%	60%	+2%	70%	61%	-9%	57%	59%	+2%
Would you ever recommend that your friends / family consider a career in engineering? ⁵	N/A	70% yes	68% yes	-2% yes	60% yes	56% yes	-4% yes	71% yes	69% yes	-2% yes
Agree 1-5: Being an engineer is a well respected profession	78% agree	78% agree	81% agree	+3% agree	64% agree	68% agree	+4% agree	79% agree	82% agree	+3% agree
Agree 1-5: Engineers make a good contribution to society	86% agree	79% agree	81% agree	+2% agree	68% agree	70% agree	+2% agree	80% agree	82% agree	+2% agree
Agree 1-5: Hardly anyone knows what engineers do	47% agree	28% agree	25% agree	-3% agree	26% agree	32% agree	+6% agree	28% agree	24% agree	-4% agree
Agree 1-5: Engineers will have a positive impact on our future	91% agree	78% agree	79% agree	+1% agree	66% agree	67% agree	+1% agree	79% agree	80% agree	+1% agree

⁴ It should be noted that in the 2010 questionnaire the respondents were asked to answer this question on a scale of 1 – 10, whereas in 2011 they answered it on a scale of 1 – 5. As a result, this change may be wholly or partially attributable to the change in scale and not necessarily reflect a real change in perception.

⁵ In the 2011 questionnaire the wording of this question was changed to not include the word 'family'