Engineers and Engineering Brand Monitor[1]

Annually EngineeringUK undertakes research to measure the perceptions of engineers and engineering in order to inform our own and partner programmes and gauge if progress is being made in this key area. Our research is conducted across five key audience groups:

- The general public 17-19 (nationally representative sample)
- The general public 20 (nationally representative sample)
- Educators
- School children aged 7-11
- School children aged 12-16

In March 2010 FreshMinds, an independent research consultancy, were appointed to conduct the latest wave of the Brand Monitor – a yearly study that first commenced with a pilot in 2008. The Brand Monitor measures perceptions held by children and those that influence them, the general public and education professionals, of engineering, engineers, and engineering careers. The 2010 Brand Monitor also looked at perceptions of manufacturing, science and technicians. The themes explored are detailed below:

Themes explored in the 2010 Brand Monitor Themes relating to engineering:

- Awareness and understanding of engineering
- General perceptions of engineering
- Role of engineering within the UK economy
- Perceptions of engineers
- Perceptions of engineering as a career
- Perceptions of the educational pathway to engineering
- Consideration and recommendation of engineering as a career
- Perceptions of how students see engineers (*relevant to educator group*)
- Perceptions of student career values (*relevant to educator group*)

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 pathway to manufacturing

[1] http://www.engineeringuk.com/viewitem.cfm?cit_id=382749

Themes relating to science and technicians:

- General perceptions of science
- General perceptions of technicians
- General perceptions of apprenticeships
- Perceptions of science as a career
- Consideration and recommendation of science as a career
- Awareness and understanding of the role of a technician
- Perceptions of the educational pathway toward becoming a technician
- Consideration and recommendation of becoming a technician

The 2010 Brand Monitor was conducted between April and July 2010, utilising an online survey methodology with a total of 5,781 respondents across five different target groups.

Key themes from the research

1 Increased knowledge of engineering leads to improved perceptions of engineering across all groups

The study demonstrates a relationship between perceived knowledge and understanding of engineering and positive sentiment towards it across the groups studied. For example, in the 20+ year old group, those who feel they have better knowledge (8%) are also more likely to see engineering as desirable or enjoyable (28%); more likely to consider it as a career (57%) and more likely to recommend it as a career to others (21%). Those who count engineers amongst their friends (35%) or close family (42%) also tend to have greater knowledge of and more favourable attitudes towards the industry.

Awareness could be raised in many ways. However, there appear to be specific existing deficiencies in public knowledge of the range of engineering roles available (20-40% of 20+ year olds knew 'nothing' about specific types of engineering) as well as of the day-to-day realities of these roles and what they involve (28% of 20+ year olds agreed that 'hardly anyone knows what engineers do'). Similarly there is confusion around the educational pathways into the profession (e.g. 36% of 20+ year olds think students need a first degree to become an engineer, 22% think A-levels or highers are required and 20% think higher level degrees are required). Respondents felt that better communication of possible career paths through the industry would be of benefit (66% of 17 to 19 year olds felt this was somewhat or very important).

For all ages it seems the engineering discipline tends to be described either with reference to its outputs (structures, systems, etc.), or by its processes (mechanical equations, technical drafting, etc.) but less often by its human element: what people who work as engineers do and how this interacts with, or influences the people in the world around them. For instance among the 20+ year old group less than half felt that engineers need to be good communicators (46%), and only a third (33%) said they need to be 'good with people' in order to do their job well. Drawing and communicating clearer links between these elements would be likely to have a positive impact on knowledge and awareness and, by extension, on perceptions.

2 For all age groups the challenging nature of engineering is seen as a desirable quality, however other aspects such as pay, level of interest and enjoyment are likely to be more attractive to those considering it as a career

Among the 17 to 19 year old group, those who find engineering desirable tend to do so because they consider it challenging (72%). This descriptor was strongly associated with engineering even when compared with accountancy (47%), law (24%), teaching (48%) and medicine (7%).

However, a sense of challenge is not the primary element people consider when making career choices. Of the 17 to 19 year old sample, the majority are more likely to consider pay as a priority (77%) alongside level of interest (70%) and level of enjoyment (38%).

Pay is one area where engineering is perceived to be falling short of other industries. 20+ year old respondents considered engineering to pay better than teaching (57%) but worse overall than accountancy (14%), law (4%) and medicine (11%). If engineering pay is in fact comparable with these professions then the reality of this needs to be communicated clearly in promoting engineering as a career option. If engineering pay matches people's perception of it and is not on par with these other professions, then alternative approaches could be taken.

One possible key aim would be to identify ways of enhancing interest in, and enjoyment of, engineering-related subjects and disciplines. Promoting the industry from this angle rather than from a 'challenge' angle, if effective, would be more likely to have a real influence on the career decisions that people make. Again, this is likely to come down to awareness and communication.

3 Some key skills that the general public stated they had were seen by them not to be those required by engineers even though they clearly were e.g. creativity and communications

Among the 20+ year old respondents the qualities most commonly identified as being necessary for an engineer to be good at their job were being practical (87%), being numerate (78%), being inventive or innovative (76%) and being well organised (75%).

There are some mismatches, however, between the qualities engineers are seen to need and the qualities that the general public consider themselves to have. A majority of 17 to 19 year old respondents considered themselves to be practical (55%), well organised (53%) or numerate (43%), however only around a third considered themselves to be inventive or innovative (37%).

On the other hand, being good with people was the trait identified second most frequently amongst 17 to 19 year old respondents (61%), yet it was the quality deemed least important for engineers (41%), alongside being a good communicator (53%).

If good communication and social skills are in reality a key requirement of engineering roles, then shifting the focus from an emphasis on practicality and numeracy to the social characteristics needed may generate interest among a broader cross-section of the population, especially females.

This could be done in part by using different language to talk about the industry, emphasising the need for those qualities that people more commonly believe that they themselves possess.

Encouragingly, younger people were slightly more likely to think of themselves as inventive or innovative (37% 17 to 19, 27% 20+), which may yield opportunities for further promotion of engineering among those who are yet to make career decisions. If measures or programmes can be put in place which develop or feed off activities which engender innovation and inventiveness from an early age, then a stronger pipeline of candidates interested in, and suited to, engineering disciplines could be formed.

4 To reverse the negative view of engineering and make it more accessible and attractive to females; the creative and people aspects of engineering need to be better communicated along with access to female role models

One target group that would seem to be most responsive to a shift in emphasis would be women, who are currently under-represented in engineering roles. This is partly a result of a self-perpetuating cycle of perception of a male-dominated industry, which leads to greater male uptake and in turn reinforces perceptions.

Overall the 2010 Brand Monitor shows that men tend to have slightly more positive perceptions of STEM subjects and STEM careers, whereas women are more likely to consider them to be dull and technical.

Whilst 20+ year old males are more likely to think of themselves as inventive or innovative (33% males, 22% females) and numerate (64% males, 47% females)), women are more likely than men to consider themselves creative (44% females, 38% males), well-organised (61% females, 56% males) and good with people (66% females, 62% males). It is clear that both men and women have traits which are considered important for engineers. Creativity and innovation are arguably relatively similar qualities; however innovation perhaps has undertones of technicality and application, whereas creativity may be thought of as freer and less functional. It would seem that both could in fact be applied to engineering and, depending on which is used, attract or repel different groups in varying proportions. A more tailored approach, emphasising key traits using alternative terminology could be one way of maximising the reach and appeal of the industry. It certainly seems that greater emphasis on the social and human aspects of the role are likely to be more relevant to women and thereby enhance appeal.

Among the 17-19 year old group, females were more likely to report little knowledge (70% versus 46%) and males were more likely to report good knowledge (21% versus 7%). Engineering also fared worse as a profession among females than males, compared to other roles.

For example, in the 17-19 year old group, more males said engineers are better paid than lawyers whereas more females say engineers are worse paid than lawyers. Similarly more males said engineers have a better reputation than lawyers and accountants whereas more females say engineers have worse reputations than lawyers and accountants.

Males are also more likely than females to consider there to be a greater general awareness of what engineers do. For example, in the NW Region, 29% of females disagreed that 'hardly anyone knows what engineers do' whereas 33% of males disagreed.

5 The public awareness of engineers is lower than other professions despite the fact they are viewed as the group most likely to get the country back on track

Despite their role within the infrastructure of modern society, the relative lack of awareness displayed about engineers among the general public (e.g. 45% of 20+ year olds) suggests they are in some ways viewed as being 'behind the scenes'. From a list of prominent professions including, amongst others, politicians, police, doctors, and teachers, engineers were identified by the most people aged 20+ years (55%) as the group most likely to be trusted to 'get the country back on track'. This could be a reflection of the part that engineers are expected to play in some of the big challenges faced by society. Climate change and the recent high-profile BP *Deepwater Horizon* explosion may be seen to present problems which engineers are in a stronger position to directly resolve than other professions.

Nevertheless, engineers are notably absent from everyday social commentary. Perhaps as a result they are therefore value-neutral, unlike, for example, politicians or environmental campaigners. This perceived neutrality could result in engineers being seen as more objective and trustworthy than other groups.

Celebrities were the only group identified by the study as having a negative influence on perceptions of engineering (-1.53 on a -10 to +10 scale, the only negative mean score among 20+ year old respondents). It is not clear in what ways they are perceived to exert this negative influence, however counteracting the negative influences of those who are ever-present in the media may be a challenge for the engineering industry so long as it sits outside of the social conversation and lacks a media 'face'.

Key findings on manufacturing, science and technicians

Many of the observations made about engineering are broadly applicable to these three areas. However due to the smaller number of questions asked specifically about manufacturing, science and technicians, fewer high level themes have been identified. The sub-sections below instead outline some specific observations that have been made from the findings within each category.

Manufacturing

- The vast majority of respondents had not seen or heard promotion of the manufacturing industry over the past year
- Overall perceptions of manufacturing careers are a mixture of positive and negative
- More males than females think positively of manufacturing and manufacturing careers
- Females generally view manufacturing careers as male-dominated

- ‘Production‘, ‘technology‘ and ‘design‘ were the words most commonly associated with manufacturing
- Older people have more positive associations with manufacturing careers than younger people
- Academic requirements for a manufacturing career were perceived to be lower than for an engineering career

Science

- People tend to have positive associations with the word ‘science‘ and most would recommend a science career to their friends/family
- Science is more popular among girls than boys at younger ages
- ‘Experiments‘, ‘chemistry‘, ‘biology‘ and ‘physics‘ come to mind most when people think of science

Technicians

- The technician role was most commonly viewed as a helpful, supportive, practical function
- There was widespread lack of knowledge about technicians, especially among younger people and females
- Words most commonly associated with technicians can be grouped into ‘technical‘, ‘supportive‘ and ‘practical‘ categories
- Healthcare, scientific and ITC sectors were the three in which technicians were most commonly thought to be employed
- There was much variation by age about the level of qualification required for a job as a technician
- Women and young people are more likely to think higher level qualifications are required to be a technician, perhaps suggesting the role should be de-mystified
- Educators are most likely to recommend a career as a technician to practical students, to those who show an interest, or to problem solvers