Science Foundation Ireland
For what's next

Science Foundation Ireland-Science in Ireland Barometer

An analysis of the Irish public's perceptions and awareness of STEM in society

October 2015

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Science Foundation Ireland
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Introduction:

Research objectives

In line with Agenda 2020 Science Foundation Ireland sought to initiate an analysis of public perceptions and awareness of the importance of STEM research to the Irish economy and society.

Science Foundation Ireland commissioned Millward Brown to undertake awareness, understanding and attitudinal research amongst the general public in Ireland with the following core objectives:

- To identify the perception of the general public towards investment in STEM research.
- To gain an understanding of the interest in and level of information/knowledge of STEM.
- To identify the level of understanding and knowledge of the role of STEM and Science Foundation Ireland in Ireland's future economic development.
- Explore current concerns in relation to STEM in society and to gain a deeper insight into specific concerns about these issues.
- Explore issues around an understanding of the scientific process, ethics in research, trust of scientists and scientific results, etc.
- Explore sources of information on STEM amongst the general public.
- Explore understanding, experiences and perceptions of STEM education and careers.

This report discusses the methodology used in the research, the resultant findings and makes recommendations in relation to those findings.

Research Methodology

(Quantitative)

This quantitative piece was designed to better understand the public's attitudes, understanding of, and engagement with science, and science related matters in Ireland.

The research was designed to answer Science Foundation Ireland's key research objectives, namely –

- Understand the current levels of knowledge in the country about STEM, and STEM research
- Understand Science Foundation Ireland's role in this area
- Gauge levels of public trust in science and science related issues
- Identify what value the public places on the role of science
- Comparative questions were also asked, based on previous international research conducted both in the EU (Eurobarometer, 2013) and New Zealand (Neilson, 2014). We have referenced these international results where applicable.

This quantitative piece was the first part of the research programme, and this helped form the design of the qualitative research. There is a link to the full questionnaire in the appendix of this report.

1,008 interviews were conducted amongst a nationally representative sample of adults aged 15+ in the Republic of Ireland.

Interviews were conducted face to face in the respondent's own homes, and quotas were set on gender, age, social class and region.

Fieldwork was conducted between 10th March – 27th March 2015.

The margin of error (at an overall level) is +/- 3.1%.

Introduction:
Research Methodology (Qualitative)

Eight focus groups were conducted throughout the Republic of Ireland with a strong representation across social class groups, gender and region. The focus group interviews were held in Dublin, Cork, Galway, Waterford, Portlaoise and Sligo.

Note regarding recruitment:

- One 'expert/well informed' group with a high degree of engagement and enthusiasm related to science.
- Groups were to have no respondents included who were working in the field of STEM.
- General groups to use/apply STEM in their day-to-day jobs.
- For the non-expert groups these were to have little knowledge in the area of STEM to represent the general public.
- Student groups were to have studied science in secondary school but not on a primary degree level.

Group no.	Sex	Age	Social Class	Life Stage	Location
1.	Mixed	18-24yrs (3rd level students)	C1	Students	Waterford
2.	Female	15-16yrs (transition year students only)	C2D	Students	Cork
3.	Mixed	35-45yrs	BC1	Family	Dublin
4.	Mixed	35-50yrs	C1C2F	Family	Sligo
5.	Mixed	50+yrs	BC1	Family	Dublin (expert group)
6.	Mixed	55+yrs	DEF	Empty nesters	Galway
7.	Mixed	18-25yrs	BC1F	Single/no children	Galway
8.	Mixed	25-35yrs	C1C2	No children	Portlaoise

Social Class definitions, as referred to in this report are largely as follows (based on the occupation of the chief income earner in the household):

- ABs are professionals
- C1s are white collar workers
- C2s are blue collar workers
- Ds are unskilled workers
- Es are those relying on State assistance
- Fs are those in the farming community

Summary of Findings

Science, at its best, is a vibrant, invigorating and inspirational subject area for Irish people. It prompts genuine fascination, curiosity and excitement. When asked what is the first thing that comes to mind, top of the spontaneous levels of association is 'research' in a wide capacity – covering fields such as medical and IT research. When asked specifically of their understanding of "research", the public is generally positive, and cites aspects such as "Advancements" (18%) and "Cures" (11%).

Just under half of Irish adults feel well informed about research and development in science and technology. To a certain extent, many feel somewhat intimidated by science and STEM – 70% believe STEM is too specialised for them to understand. That is not to say many are unwilling to find out more about science related topics; they feel merely ill-equipped to do so.

Irish people who claim to be interested in science are typically motivated to seek more information on science when it impacts them personally or relates to an event or occurrence. Discoveries, health, technology and popular science all prompt interest where one in four people have actively sought information on a science-related topic in the past year.

Science in education is a crucial cog in the economy. It has many triggers and barriers to engagement among children/students and their parents. Aptitude and ability are important factors in fostering a passion for the subject areas. The manner in which the subject is taught, and the preconceived notions passed on by peers and parents, can impact many where (52%) claim they were put off science and maths by the way they were taught it in school.

STEM disciplines are seen to fall under the umbrella term of science; technology and science are largely synonymous in peoples' minds. Maths is seen as the foundation and language of science. Engineering is seen as a discipline in its own right.

Science is highly valued for its role in advancing society across a range of functions. Careers in science are viewed as desirable and well paid with 72% believing this to be the case. The supply of STEM graduates is considered vital to the future of the economy by the great majority (88%).

Third level institutions are at the core of scientific learning and producing graduates who will be in demand to help boost economic growth.

There is a deep appreciation that science is hugely valued in society and the economy. 81% feel that scientific research makes a direct contribution to economic growth in Ireland, and a further 85% believe that investment in scientific research should be ring-fenced in order to boost competitiveness.

Science is at its best when it produces positive outcomes for our everyday life, health, education and economy. The jobs dividend of investment in science is keenly observed. The Irish public want the education system to produce educated science graduates to live, work and add increased value to our economy.

56% of people believe Ireland is on a par with other countries in terms of competing in scientific, engineering and technology research. However, ominously, many believe science-based Foreign Direct Investment (FDI) is tax break based, labour intensive and lacks roots in Ireland, as opposed to harnessing genuine indigenous talent.

When compared to our International peers, Irish people surpass the EU average in terms of how informed we are on R&D and STEM and how interested we are in these subjects. Compared to the rest of the EU, Ireland tends to have a more positive view of the role of science in the future, with the exception of Denmark where Ireland lags behind.

In comparison to New Zealand, an economy of a similar size, Ireland is well behind on these measures; twice as many Irish people finding STEM too specialised to understand compared to our New Zealand counterparts. New Zealanders are more likely to enjoy finding out about new technology but on many other key variables the two countries are at similar levels.

The implicit value placed on science and scientists engenders strong trust compared to other institutions. The public can identify the negative implications of science – it is most keenly observed when it impacts one's local community and environment (both qualitatively and quantitatively, the issues of over ground pylons, fracking, wind turbines and GM foods were raised). Ethical issues surrounding science are difficult for the public to grasp and fully engage with.

Distinct groups emerge across the population in terms of their relationship with science. These range from the potential of secondary school students and 3rd level students to the disengaged and the disenfranchised amongst the population.

Those groups who are disengaged with science tend to be from lower socio-economic groups (C2DEs), and to a certain extent, are more likely to be female.

Parents are a key constituency who learn via their children. School curricula can have a very wide reach; as can popular culture which connects a lot of people to science.

Many older people are still excited by science and the possibilities it offers and there will be benefits to speaking to these people directly.

The disenfranchised, representing 19% of the Irish population and consisting largely of the C2DEF socio-economic segment, are a group who represent a strong possibility for conversion to greater interest in science and technology, they have latent interests which can be further tapped into.

Chapter 1

What is science?

Chapter 1: Summary

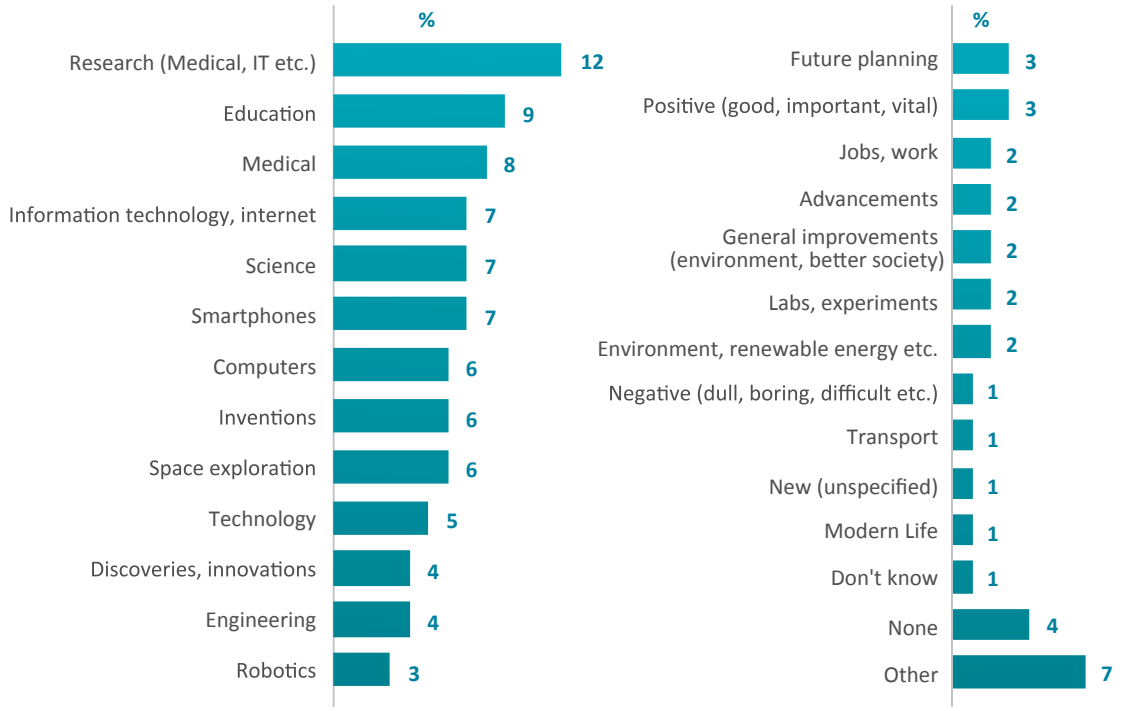
- **'Research' is the top public association with science; most associations are at low levels across a range of areas including smartphones, computers and space exploration.**
- **Qualitative knowledge of science is very much associated with an educational background.**
- **Science is very positively viewed at an emotive level, although there is a lack of confidence in the understanding of science.**

What is science?

Science is seen in a positive but relatively superficial light

The field of science in general stimulates a wide range of responses from the public. When asked what is the first thing that comes to mind, top of the spontaneous levels of association is 'research' in a wide capacity – covering fields such as medical and IT research. As seen in figure 1, 12% of the adult population state this without prompting, this level rises to a maximum of 17% of people living in Dublin. Following this, education is the next most mentioned factor at 9%. The rest of the associations with the term science are at quite low levels – between 2% and 7% – and as the graphic shows they range widely from smartphones and computers with which people interact on a daily basis to less tangible areas such as robotics, future planning and lab experiments.

Figure 1: Spontaneous Associations with STEM



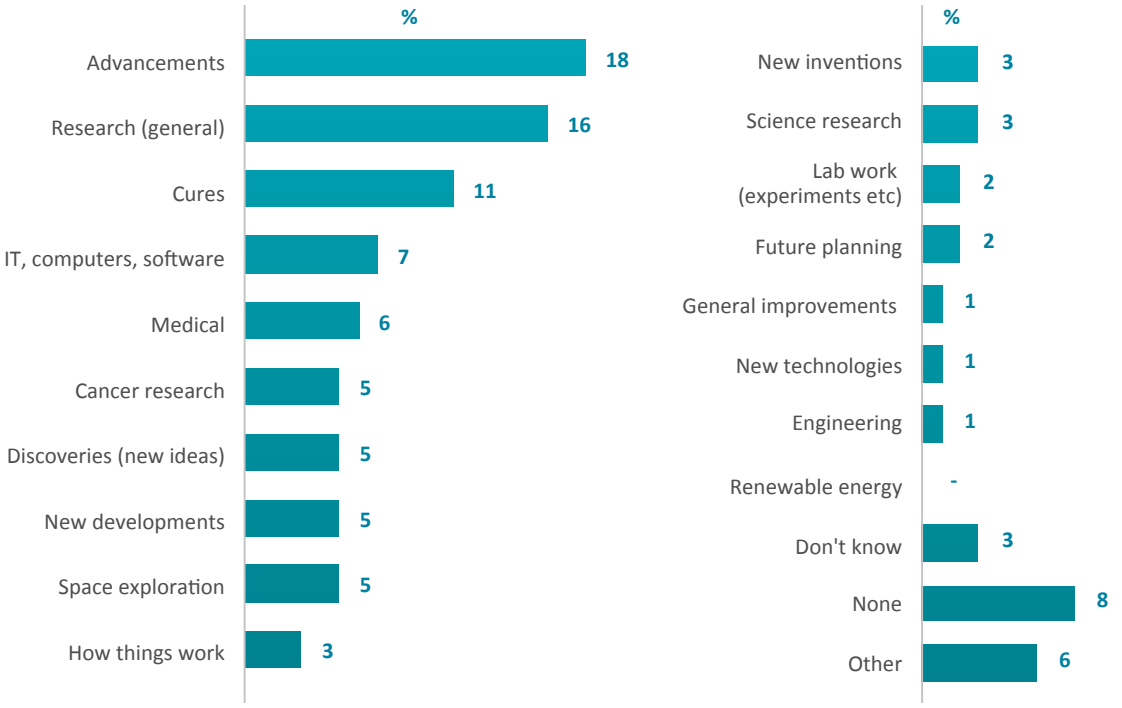
In terms of spontaneous associations with STEM, research and education come to the fore, followed by specific applications (medical, IT, communications)

Base: All Adults 15+ (n=1,008)

Question: What is the first thing that comes to mind when I mention science, engineering and technology to you? Anything else?

When a supplementary question on the understanding of research was asked, a further insight into public understanding of science is revealed. As presented in figure 2 the word most associated with research is 'advancements' – with almost 1 in 5 stating this and thereby revealing the positive light in which scientific research is held. 'Cures' also scores quite highly, with 1 in 10 mentioning this spontaneously. After these come a range of positive associations at lower levels of about 5%. Although it is encouraging to see such a range of positive associations with scientific research, it is perhaps necessary to be cautious: the levels of association for most forms of scientific research remain low. So, although they are positive, very few, if any, specific areas of scientific research have broken through to reach high levels of resonance with the public. This is of note in the effort to advance and promote the contribution and study of STEM more generally.

Figure 2: Understanding what 'research' means



Looking specifically at the understanding of Research, there is a sense of innovation, improvement and general positivity amongst the public

Base: All Adults 15+ (n=1,008)

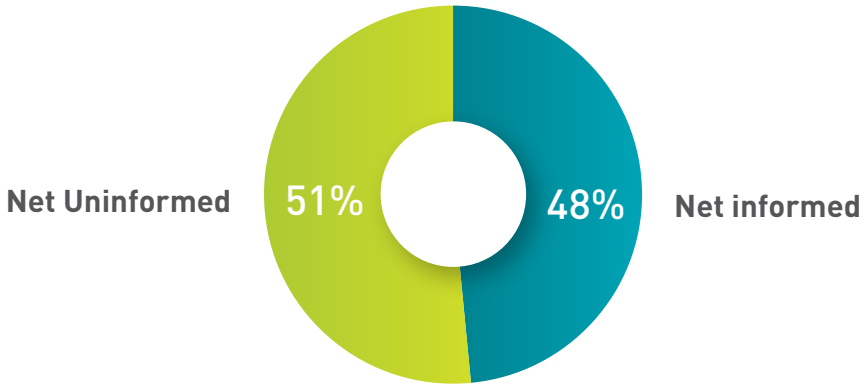
Question: What does scientific research mean to you? Anything else?

The qualitative results reflect and build on the numbers provided by the quantitative study. As such they confirm that knowledge of science is relatively superficial – albeit in a positive light. In addition to the findings noted above, the focus groups revealed knowledge of science to be founded very much in an educational sphere – with references to white coats and bunsen burners being common associations – exams and lectures fall within a similar vein.

At an emotive level science conjures up a host of positive feelings such as excitement, wonderment and curiosity. However these positive feelings can be tempered by an element of fear and a lack of confidence of the role of science in people's lives. The vastness and sometimes intangible nature of science can act as a deterrent to some who find it too intellectual or specialised and may be scared by its perceived difficulty. Nonetheless, these positive associations and general levels of recall for science all point to a field of study that is held in high regard and this forms a strong starting point for Science Foundation Ireland in its promotion of science to the Irish public.

Overall, as seen in figure 3, just under half of the population (48%) count themselves as informed about research and development in science, engineering and technology. Clearly this leaves a large cohort of the population who feel disconnected from the subjects – and who should be primed to be better informed.

Figure 3: How informed the public feel about research and developments in STEM



People's self assessment of their knowledge of STEM is divided – in both the qualitative groups and the quantitative research younger, more middle class people feel they are more informed, with females and older respondents less surefooted

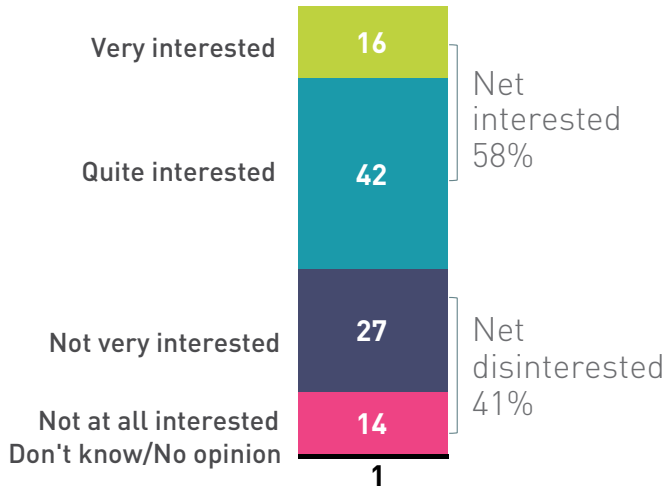
Base: All Adults 15+ (n=1,008)

Question: How informed do you feel about research and developments in science, engineering and technology?

There is a tacit acknowledgement that whilst the individual's appraisal of their knowledge of STEM is modest at best (71% of Irish adults feel that Science and Technology are too specialised to understand), this is not to diminish the importance of it – 85% believe it is important that people have a good understanding of science as it impacts on our lives (see Infographic 1).

While 51% of the public feel uninformed figure 4 demonstrates that 58%, or almost three in every five people are interested in STEM R&D. Those interested are more likely to be male (63%), or aged 35-49 (65%). In terms of socio-economic groupings, ABC1s are by far more interested in science related matters, with 69% of this grouping declaring an interest in STEM R+D, driven largely by the most affluent AB segment with three in four of them expressing an interest in the topic.

Figure 4: The public interest in STEM research and development



However, lack of knowledge does not necessarily mean lack of interest – three in five express an interest in STEM R+D developments

Base: All Adults 15+ (n=1,008)

Question: How interested are you in research and developments (R+D) in science, engineering and technology?

What is Science?

- Science Foundation Ireland has the opportunity to build on the positive associations with science by focussing public awareness around specific areas of research and technological developments.
- There is considerable scope for public education and awareness campaigns as many people, while interested, feel a lack of confidence in their knowledge of science, despite overall positive associations.
- There is much opportunity to lift science beyond the classroom in peoples' minds – too many classroom-type associations can limit the 'relevance' of science and how people relate to it as a subject and its application in their lives.
- Following on from above, science is more than third level institution and academic science; efforts could be made to lift science beyond these strong perceptions and associations.

Infographic 1: What is Science?

WHAT IS SCIENCE?

"RESEARCH"
is the first thing Irish adults think about when they think of STEM (12%)

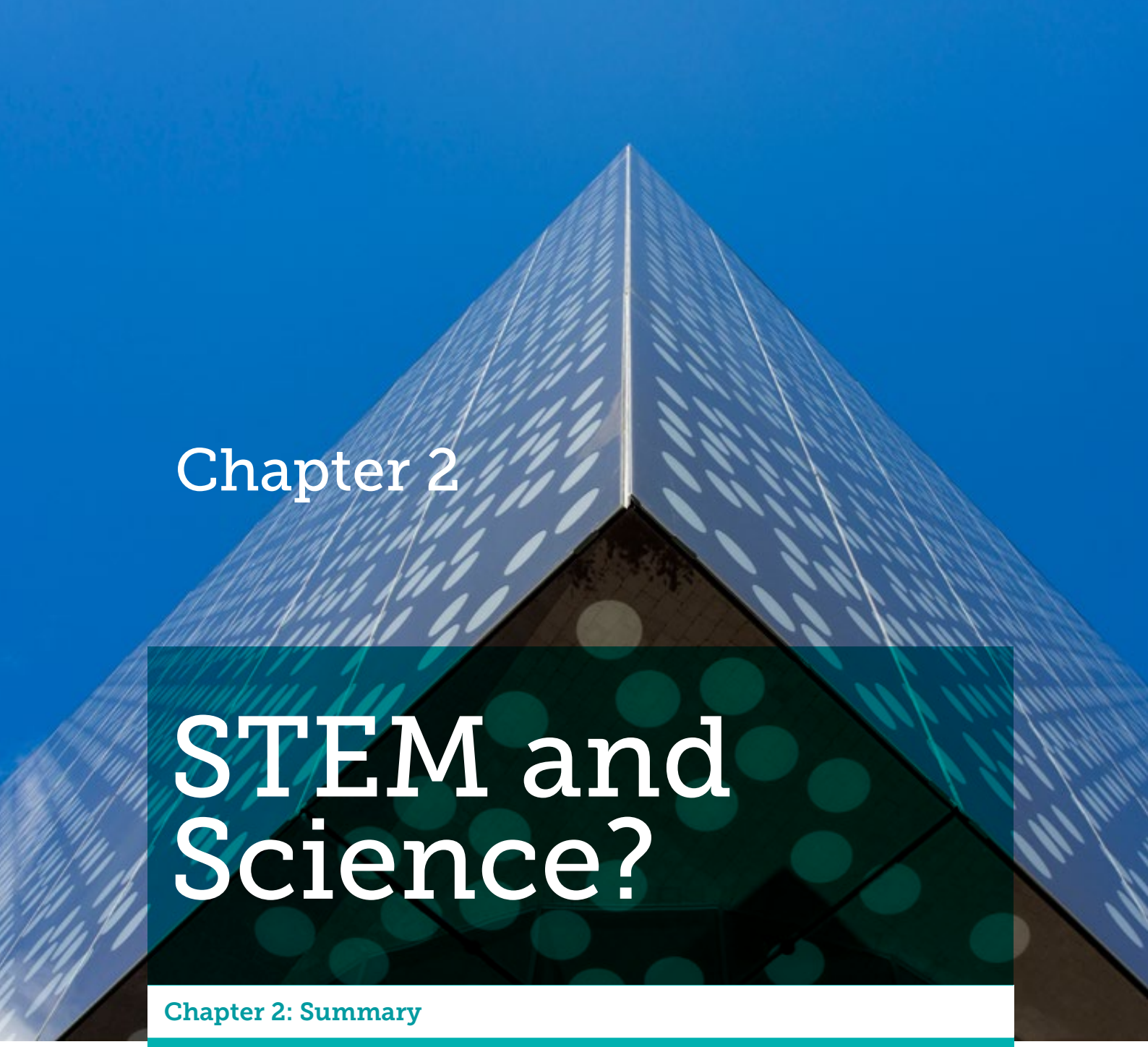
18%
think of "Advancement" when they think of Scientific Research

71%
of Irish adults feel Science and Technology are too specialised to understand

89%
think Science is important for improving human health

85%
believe it is important that people have a good understanding of Science as it impacts on all our lives

48%
feel informed about R & D in Science, Engineering and Technology



Chapter 2

STEM and Science?

Chapter 2: Summary

- STEM disciplines are seen to fall under the umbrella term of science; technology and science are largely synonymous in people's minds.
- Maths is seen as the foundation and language of science.
- Engineering is seen as a discipline in its own right.
- Science is highly valued for its role in advancing society across a range of functions.
- Third level institutions are at the core of scientific learning and produce graduates who will be in demand for generating economic growth.

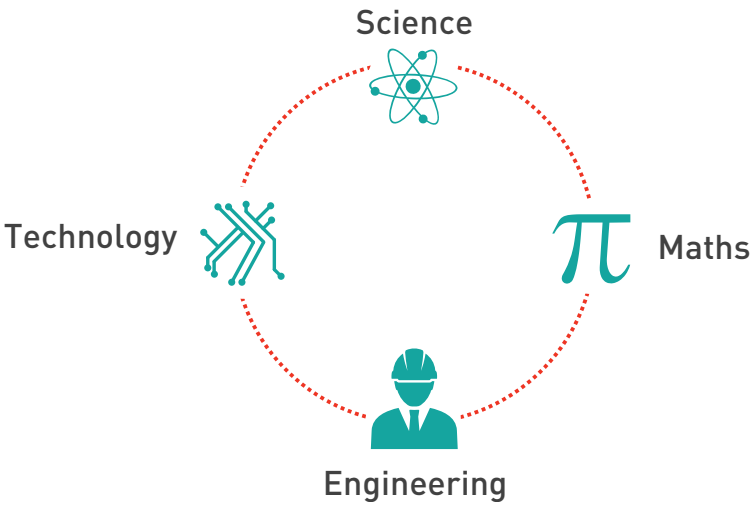
STEM and science

STEM (science, technology, engineering and maths), as a concept and term, and science are seen as both separate and the same when people are prompted within the construct of the focus group. Science is both a stand-alone term covering many different disciplines and an umbrella term for the STEM disciplines that exist within its remit. Thus, technology frequently emerges as synonymous with science and its outcomes and devices that inhabit our daily lives are easily identified with scientific progress and achievement.

Maths is also closely identified with science, indeed, for many it is the foundation on which science is based and the language in which science is advanced and communicated.

Engineering is less associated with science per se, rather it is often associated as a profession in its own right and a well-regarded one at that. Engineering is more likely to be seen as contributing to infrastructure and to the built environment rather than as a stand-alone scientific discipline.

Given the positive associations recorded for science and the wider STEM disciplines, it is not a surprise that science is highly valued in Irish society. Its primary functions are seen as creating a healthier society, a better functioning and resourceful economy and a better educated population. Science is seen, at its most salient, in its role in third level education. Our Universities and Institutes of Technology are seen as nexuses of discovery, innovation, creativity and excellence and produce graduates who are ready to take their place in an economy that will have an increasing reliance on the type of skills fostered by a broad scientific education. In terms of the wider understanding of STEM subjects, maths and engineering tend to be viewed in quite literal terms whereas science and technology are able to be articulated in a more conceptual way due to people's daily interactions with them.

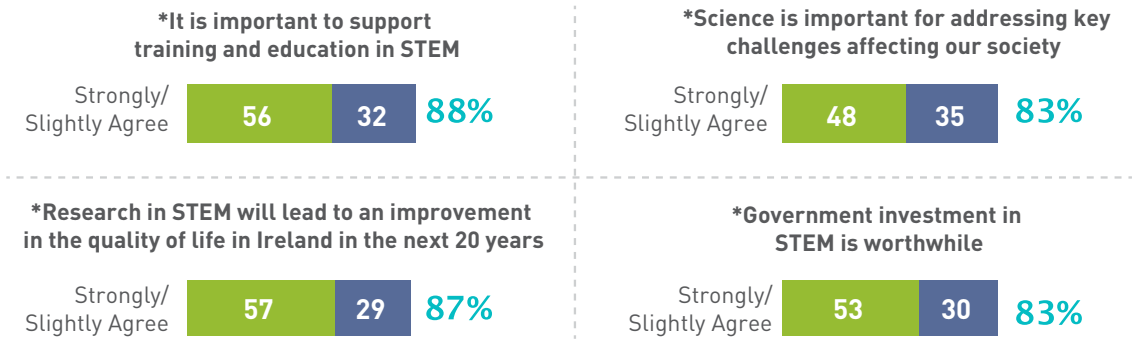


The public see the inter-connectivity of the STEM disciplines. Science acts as an umbrella term for many disciplines but is a stand alone 'concept' also.

It is quite clear that science is highly valued in Irish society as the results of the quantitative survey demonstrate. As presented in figure 5, 88% of the Irish public agree strongly or slightly that it is 'important to support training and education in STEM'.

The same number believe that 'research in STEM will lead to an improvement in the quality of life in Ireland in the next 20 years – underlining the importance of the field to future-proofing the overall wellbeing of the nation. Accordingly, as figure 5 illustrates, 83% endorse strongly or slightly both that 'science is important for addressing key challenges affecting our society' and that 'Government investment in STEM is worthwhile'. The latter figure is perhaps especially important in these difficult economic times, where government expenditure is under severe pressure; people are still willing to recognise the role of government investment in STEM which is an encouraging endorsement of its role in society and our overall economic wellbeing. Despite the varied levels of understanding of science – it is overwhelmingly endorsed as a way to the betterment of lives across numerous spheres and to this end the government has a clear license to continue to invest in science.

Figure 5: Public value on STEM



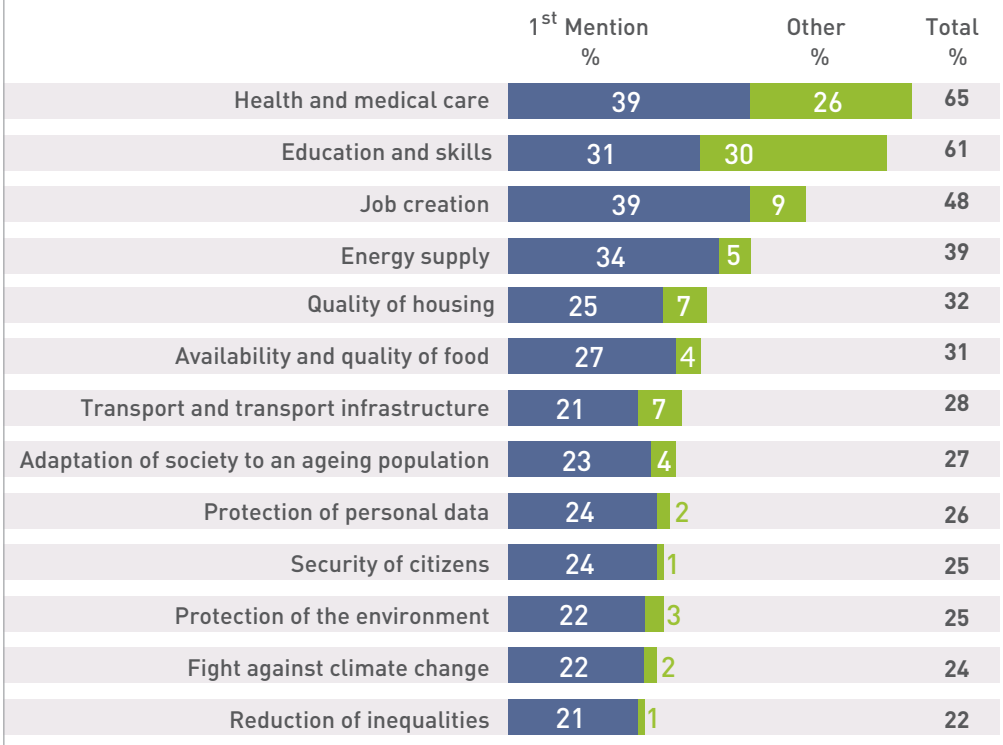
Science is an integral and valued part of Irish society – the public acknowledge the role it plays in improving our standards of living, and are keen it should be invested in.

Base: All Adults 15+ (n=1,008)

Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

In figure 6 we can see that health and education emerge as the highest priority for the Irish public for STEM advancement in the future. Looking at these primary desired priorities, some differences emerge. Females (30%) and those aged 65+ (32%) feel the main priority should be the advancement of Health and Medical care. Those favouring education and skills are more demographically balanced, although current students (35%) and those with tertiary education (34%) tend to place more emphasis on this aspect.

Figure 6: Future priorities for STEM



Looking to the future, the desired priorities for STEM are education and health matters.

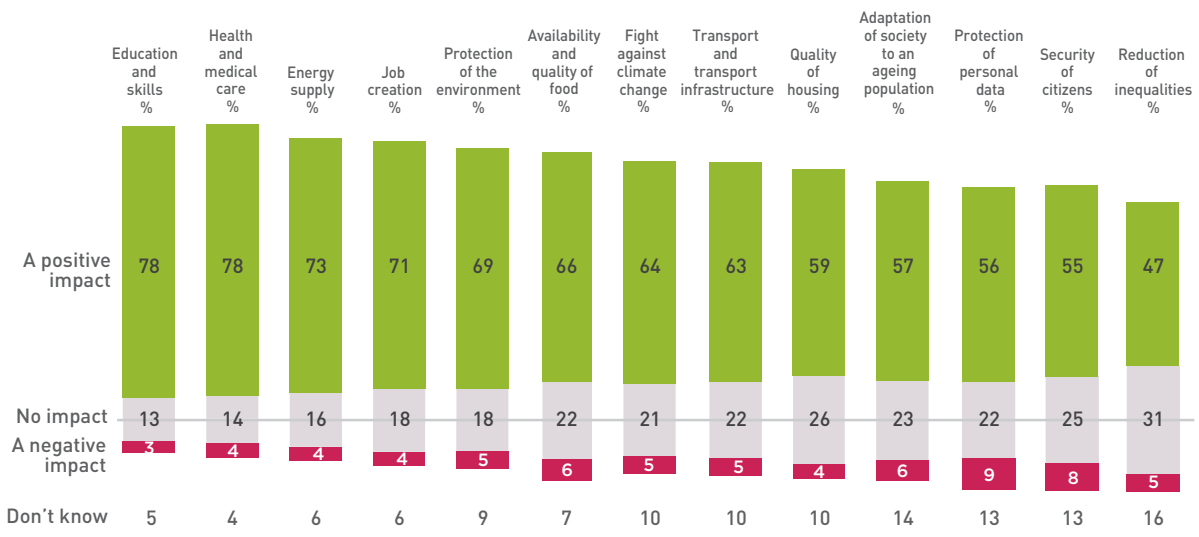
Base: All Adults 15+ (n=1,008)

Question: Over the next 15 years, what should be the priorities when it comes to science, engineering and technological innovation? And what else? Anything else?

In figure 7 it is clear that, generally speaking, there are few areas where STEM is perceived to potentially have a negative impact into the future.

Areas of relative concern relate to the protection of personal data and the security of citizens. However, even with these elements, there is no one demographic that is overly concerned with their potential impact.

Figure 7: Future impact of STEM



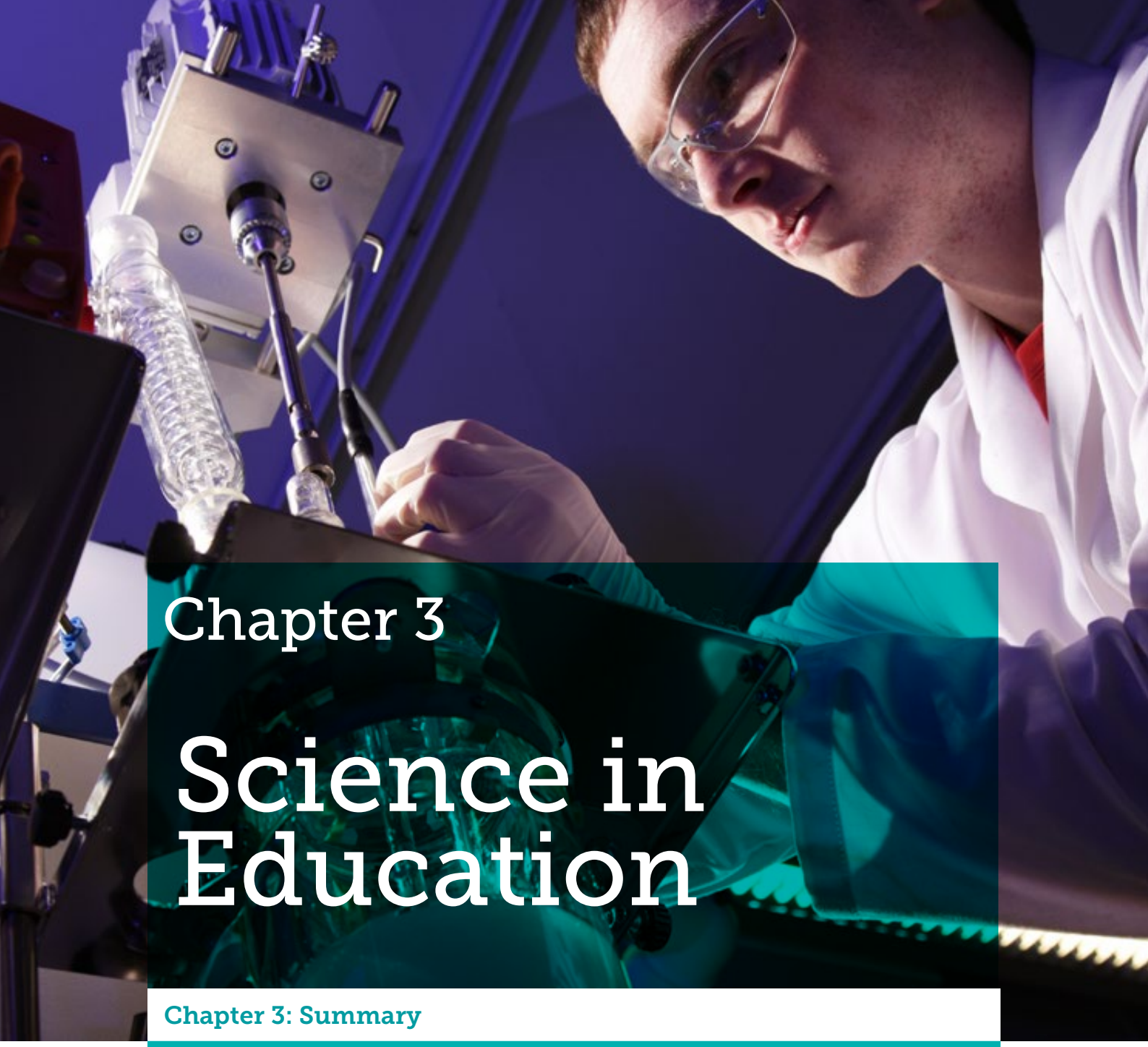
Base: All Adults 15+ (n=1,008)

Question: Over the next 15 years, what impact do you think science, engineering and technological innovation will have on the following areas ...?

In terms of STEM's anticipated impact into the future, most see positive benefits, with STEM projected to have a positive impact across a wide range of issues.

STEM and Science?

- The interdependence of engineering and science should be more closely linked – there is considerable scope for educating people on the synergies between the disciplines.
- Continue to underline how STEM can lead to improvements in quality of life and provide solutions for many of society's needs from healthcare to energy to data protection.
- There is also scope to promote the potential impact of STEM in areas where recognition of the impact is comparatively weaker such as in benefitting an ageing population and security of citizens.



Chapter 3

Science in Education

Chapter 3: Summary

- There is a strong belief in STEM and its contribution to the future prosperity of the country.
- Many were put off science and maths by their experience and exposure during school years.
- Careers in science are viewed as desirable and well paid.
- Supply of STEM graduates is considered vital to the future of the economy by the great majority.

Science in Education

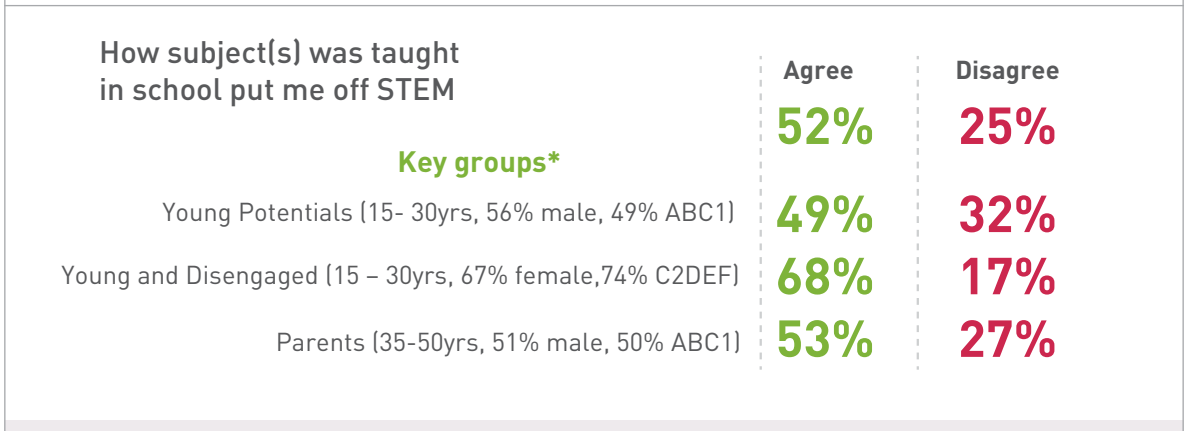
9 in 10 agree that 'young people's interest in science and technology is essential for our future prosperity'.

The quantitative results of the research point to a very strong relationship between science, education and the future progress and prosperity of the country. A number of statements underline this trend: for example, 63% strongly agree and a total of 92% agree that 'young people's interest in science, engineering and technology is essential for our future prosperity'. This endorsement is close to universal across demographic groups – the biggest difference is on the social class scale where the wealthiest ABs score 98% and the poorest DEs 88%. Nevertheless it is clear for most that young people's interest in science is a key engine of prosperity. A similar picture emerges for the statement 'scientific research makes a direct contribution to economic growth in Ireland' with 8 in 10 overall agreeing with this statement.

Looking backwards to secondary education, demonstrated in figures 8 - 10, 52% agree that 'how the subjects were taught put me off science/technology' – this must be of concern given the acknowledged importance of science to future prosperity. The qualitative findings back this up; science is seen to have a steeper learning curve than most other subjects, leading to some negative associations. Also, the issue of maths is often raised. Ability with maths is seen as a prerequisite for success in most areas of science (possibly excluding biology) which exacerbates the perceived difficulty of the field at second level and the mixed feelings regarding how the subject was taught. A similarly mixed picture emerges when the question specifically focuses on the teaching of maths. In this instance 54% agree that the way the subject was taught engaged them with maths, but a significant one in three disagree with this. The importance of maths to underpin science and technology is well recognised and the teaching of the subject should be a priority area if more students are to stick with the sciences throughout their secondary education.

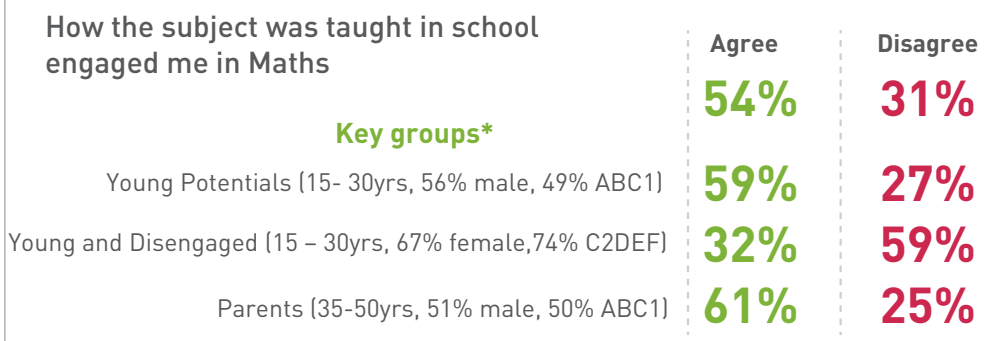
The statistics also show a historical problem with the way STEM subjects have been taught with half (52%) agreeing that the way the subjects were taught was off-putting to them. When looking at socio-economic backgrounds, this rises to 68% amongst the younger cohort from the C2DEF socio-economic group. Nevertheless there is little doubt that the consistent supply of STEM graduates is critical to the Irish economy (88%) – bridging that gap between the experience of being taught STEM subjects and their necessity for the economy is one area where effort should be focussed.

Figure 8: How subject(s) were taught in school put me off STEM



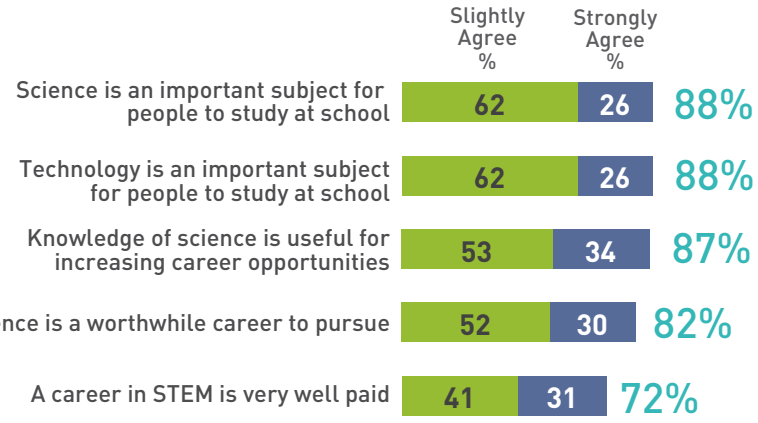
*See chapter 8 for further definition and detail of segments
Base: All Adults 15+ (n=1,008)
Question: To what extent do you agree or disagree with the following statements?

Figure 9: How the subject was taught in school engaged me in Maths



*See chapter 8 for further definition and detail of segments
Base: All Adults 15+ (n=1,008)
Question: To what extent do you agree or disagree with the following statements?

Figure 10: Attitudes and opinions of STEM in our schools



Base: All Adults 15+ (n=1,008)
Question: To what extent do you agree or disagree with the following statements?

The acknowledgement of the importance of science in education is clear.

At the qualitative level, careers in science were viewed as well paid and prestigious; although compared with other career fields and professions science is viewed as somewhat different in that its 'language' is not as accessible or as well-known as other career areas. To this extent scientists can be viewed with a degree of 'awe' and pedestalised beyond the scope of others. Happily however, science is viewed as very well paid by most 72%, a figure which bodes well for the continuing supply of graduates in the field.

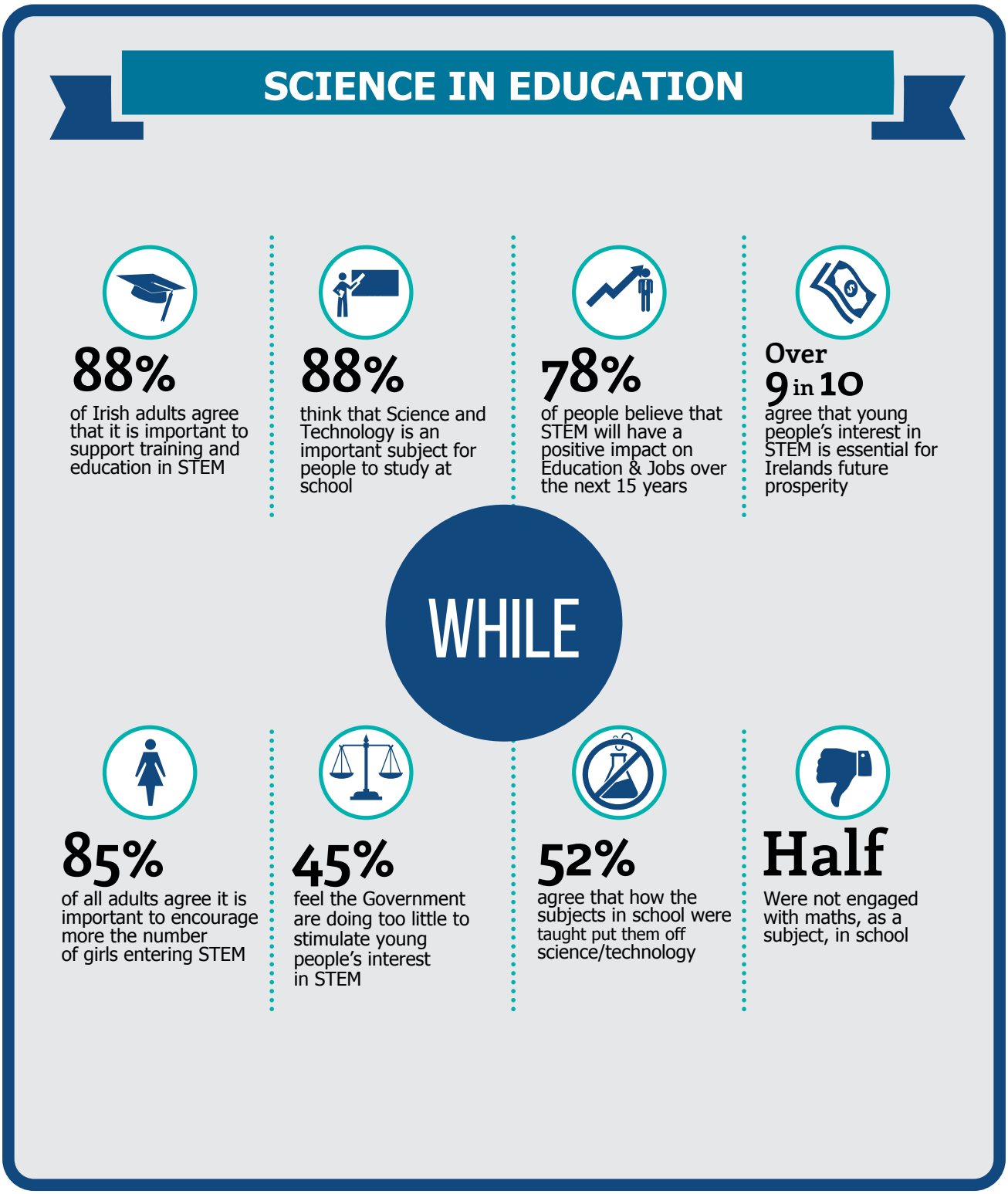
Furthermore, without exception, the Irish public assign strong value and social status on the profession of scientist or a career in science. Science is seen as complicated, challenging and requiring strong intellectual ability. With this in mind it confers on the scientist a special status which makes him/her stand out from other professional groups. The scientist is therefore a specialist and an expert who perhaps 'speaks' a different language to other professions and areas of Irish life such as the law, arts, religion amongst others.

Moreover, the supply of scientific, computing and engineering graduates is considered critical to Ireland's economic prosperity by 88% of Irish adults. There is little doubt that the supply of STEM professionals is of great importance to the country's economic wellbeing; there are however impediments to this supply and they are perceived to be at secondary school level. Overcoming these barriers to participation may unlock much more latent talent in the fields of science and technology in Ireland in the future.

Science in Education

- Continue to re-enforce the link between the supply of STEM graduates and economic growth. Connect the real world application of STEM and the 'normality' or breadth and diversity of scientist and engineers in society.
- Address the issues at 2nd level where students currently drop out of STEM subjects; primarily the way the subjects are taught.
- Underline the prestige of STEM related careers while making them accessible.

Infographic 2: Science in Education



Chapter 4

Interest in Science

Chapter 4: Summary

- Most people are interested in science, although many only passively so.
- Men and the more affluent are the most interested in science.
- One in four people have tried to find any information on science in the past year.
- Just under half of Irish adults feel well informed about research and development in science and technology.
- Seventy percent believe STEM is too specialised for them to understand.

Interest in Science

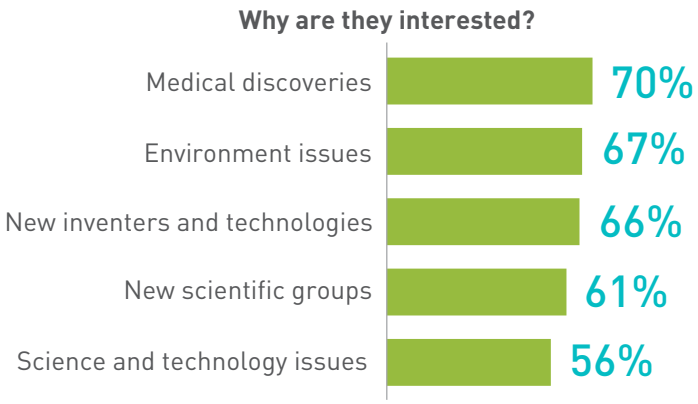
There is a significant gender gap with men more likely to be interested than women

Are Irish people interested in science? In its broadest definition most people express an interest in science but may struggle to give tangible examples of what this actually consists of. Probed further it seems most scientific knowledge is derived from passive sources – for example entertainment e.g. popular culture or documentaries; personal impact, usually in the field of healthcare; significant scientific/natural occurrences e.g. earthquakes, comets etc.; or science associated with careers or the workplace.

In total just under 6 in 10 (58%) declare themselves interested in R&D in science, engineering and technology. There is a significant gender gap, with men more likely to be interested than women (63% vs 52%). There is also a very pronounced difference in interest across social classes with the more affluent ABC1 ahead of the C2DEF by 69% to 50%. Interest in science is therefore far from evenly spread. This will have knock-on effects on how science is studied and used in the workplace. Segment groups, defined by age, gender and socio-economic group, are discussed in more detail in Chapter 8 and these display a range of interest from 18% for one group to well over 70% for another – this demonstrates the barriers and triggers to an interest in science in Ireland today when analysed by the demographics and segments generated by this research.

However, these results must be seen against a backdrop of science's overall position in Irish life as a 'subject of interest': it is towards the lower end of the list of areas shown in figure 11. Areas more likely to be of interest are more tangible fields such as medicine and the environment, as well as new technologies, scientific discoveries, energy issues and IT. When attempting to engage people with science, it seems that the more specific and current the idea or concept, the more likely it is to gain traction, rather than less tangible concepts such as science/ technology issues alone.

Figure 11: Areas of most interest to the General Public



Looking at areas related to science/STEM that the population express having an interest in, there is a striking correlation between levels of interest and socio-economic grouping. Without exception, interest in all of these activities is highest among those from the more affluent, professional classes (ABs), and levels of interest diminish as the socio-economic scale moves down. Those in unskilled jobs or on State subsistence express least interest in these topics consistently.

Figure 12 shows that just less than one in four (23%) have tried to find out any information on science in the past year. Those in education are by far the most likely to have done so with 15-19 year olds at 46% on this measure, with a strong socio-economic group bias also evident where 31% of ABC1s having sought to find out information. The level drops to fewer than 10% amongst the younger and lower socio-economic groups revealing the serious disconnect these groups have with anything to do with science. It is worth noting again that general science and technology attracts less interest than more specific areas such as new inventions and technologies – which highlights again the impact specific developments can have in encouraging interest in science. There are two stand out reasons for embarking on this information search amongst those who had done so, as seen in figure 13: 'it's an area that interests me – 57% and 'it was relevant to my work' – 28%.

Figure 12: Attempt to seek information on scientific or engineering research

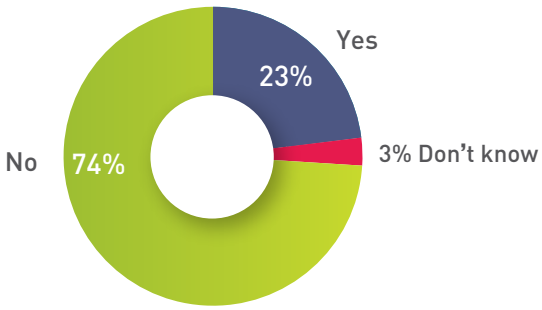


Figure 13: Reasons for seeking scientific or engineering information

One in four have had the need to actively search for STEM developments, with a two broad reasons evident – necessity (work/study) and issues that have sparked a specific interest.

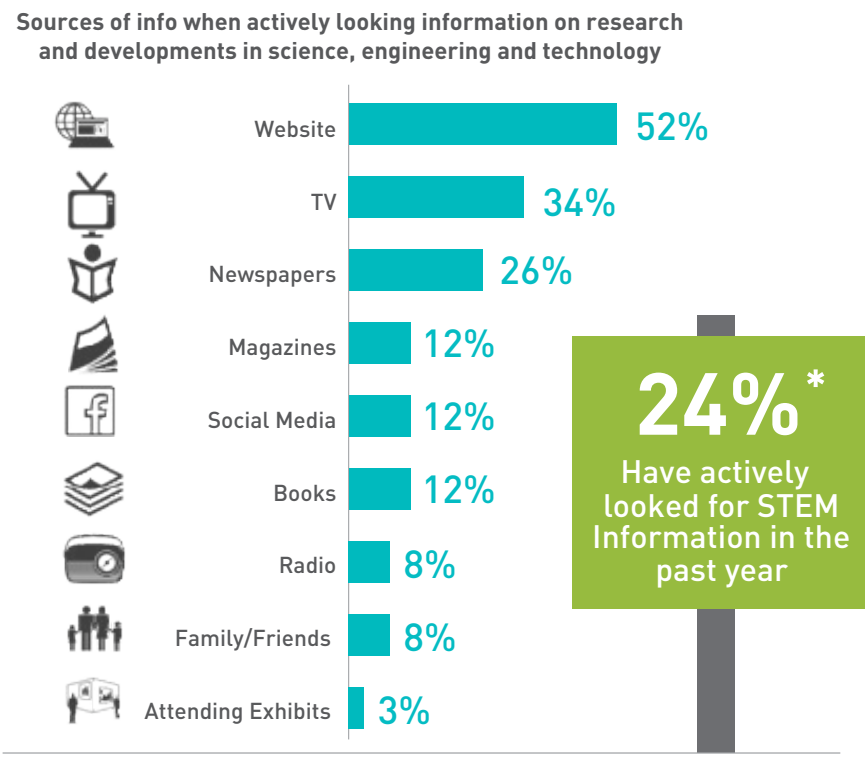
Base: All Adults 15+ (n=1,008)

Question Asked - In the past year have you tried to find out any information on scientific or engineering research or developments?

Question: Why were you looking for this information?

Figure 14 shows that the Internet is the key source of information on science subjects with 52% indicating that they had looked up websites for this information. TV comes next at 34% and newspapers at 26%.

Figure 14: Sources of information when actively looking information on research and developments in science, engineering and technology



The internet is the most popular source of information, with TV cited by one in three. Word of mouth is much less prevalent.

Base: All Adults 15+ (n=1,008)

Question: When actively looking for information on research and developments in science, engineering and technology where do you get that information from?

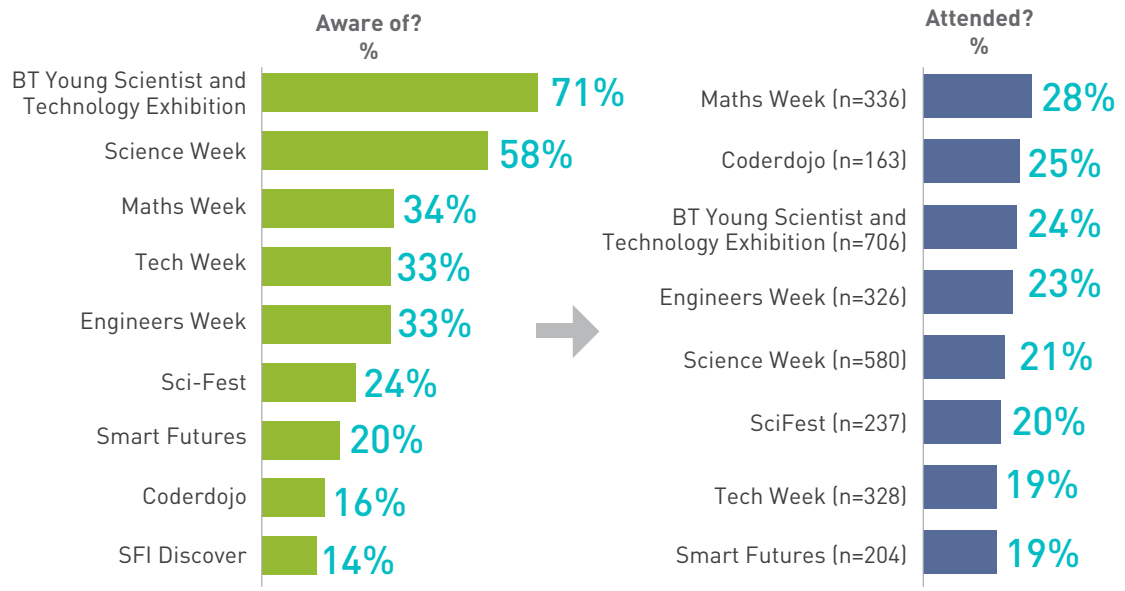
In terms of awareness of science related events, the BT Young Scientist and Technology Exhibition is by far the most well know event, with over seven in ten aware of it. This is followed by Science Week, with nearly three in five claiming to know of it.

Awareness is highest for the former among 15-24 year olds (75%) and ABs (83%), whilst awareness is also higher for Science Week among these same cohorts (64% and 78% respectively).

Among those aware of events, attendance has been quite respectable.

* unweighted data or the "actual" numbers seeking information

Figure 14.1: Awareness and attendance at Science events



Awareness of science related events are driven by the BT Young Scientist and Technology Exhibition and Science Week, and attendance by those aware is quite high.

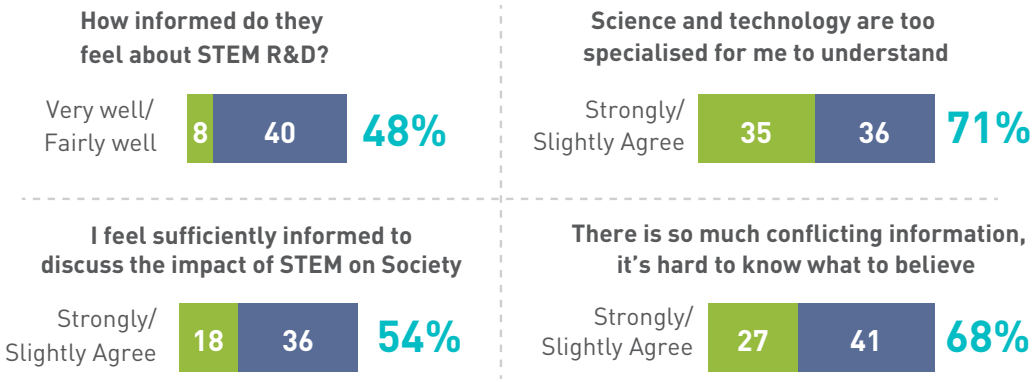
Base: All Adults 15+ (n=1,008)

Question: Have you ever heard of the following?

Figure 15 shows that in total only 48% of Irish adults feel well informed about research and developments in science and technology. This highlights a deficit in overall knowledge that is strongly exacerbated with particular demographic groups – for example 59% of ABC1s feel informed compared with just 40% of the less well off. There are also distinct regional variations, with those in urban areas (55%) far better informed than those in rural areas (37%). Tackling such demographic imbalances in terms of levels of information on science will be critical if the overall levels of interaction with science in Ireland are to be raised.

On the other hand, Irish people display a somewhat confused attitude to STEM: whilst 54% agree they feel sufficiently informed to discuss the impact of STEM on society, some seven in ten believe STEM is 'too specialised for me to understand'. Disentangling such apparent contradictions must be part of an overall strategy to improve public knowledge of STEM and the role that it plays in society.

Figure 15: How informed the General Public is about STEM and attributes of STEM



Many relate to the "by-products" of scientific research, such as discoveries/ innovations. There is a desire among some to further educate themselves.

Base: All Adults 15+ (n=1,008)

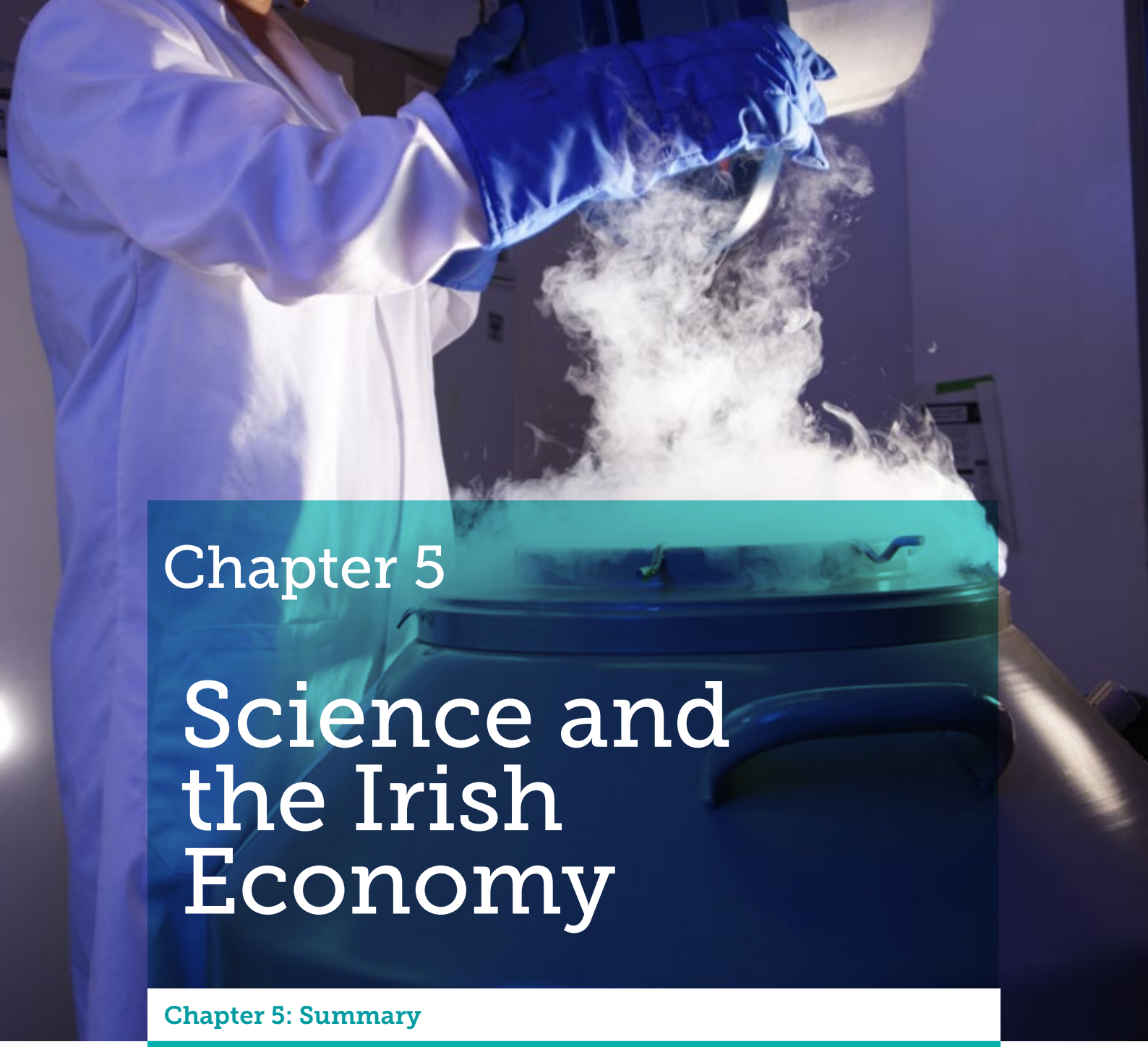
Question: How informed do you feel about research and developments in science, engineering and technology?

Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

In general, it might be said that Irish people engage best with the 'by-products' or outputs of scientific research rather than, necessarily, the research itself. Thus, for example, 70% are interested in medical discoveries, 67% in environmental issues and 66% in new inventions and technologies. These metrics point to a population that is well attuned to the world of science and discovery in general without perhaps being able to connect this to the processes of scientific research that bring such 'outputs' to life – or indeed to our retail shelves.

Interest in Science

- Target engaging key demographic groups who currently have less interest in science i.e. women and the less affluent.
- Portray and communicate STEM research and developments in real terms, relevant to people's lives. Place STEM news in stories that make it more accessible for the majority who disconnect when they find it too complex or difficult to understand.



Chapter 5

Science and the Irish Economy

Chapter 5: Summary

- 56% of people believe Ireland is competing. 'on average' in terms of scientific, engineering and technology research.
- 87% of people believe investment in STEM will deliver more jobs.
- Many believe science based FDI is tax break based, labour intensive and lacks roots in Ireland.
- A large majority see STEM as vital to the country's international competitiveness.
- Some four in ten people believe the Government is doing too little to promote science.
- Education and healthcare are the priorities for government spending on science.

Science and the Irish Economy

The majority of people (56%) believe Ireland is competing 'on average' in terms of scientific, engineering and technology research

STEM subjects and graduates are considered vital to the wellbeing of the Irish economy. However, given the nature of much of the FDI in Ireland there is a sense that much of our science based economy is imported, lacks ownership and roots in the Irish economy and is often focussed on industries that are more labour intensive than based on true intellectual capital and therefore easily moved to another country.

This has led to some scepticism in relation to the type of science-based jobs that are available in Ireland; there is no doubt that there is a jobs dividend deriving from science, but there is also doubt as to the quality of some of the jobs and the transient nature of the industries that produce them.

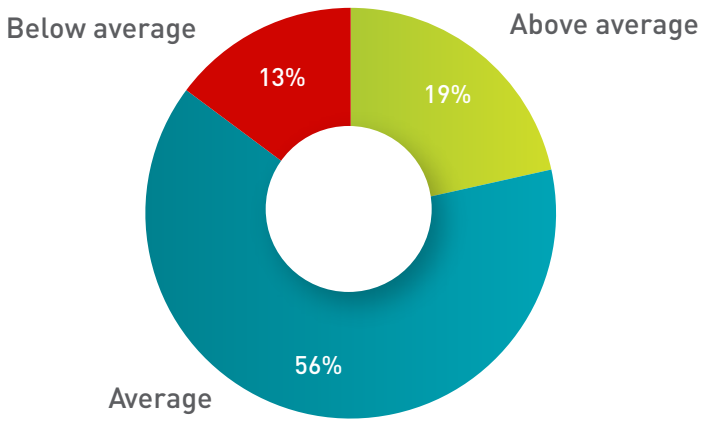
Focus groups, when probed, identified much of Ireland's science-based economy as one driven by tax breaks, low skills, highly mobile capital and part of a global supply chain. There is also a regional disparity in the perceived nature of science-based jobs in Ireland with the 'higher skills' jobs based in Dublin and the lower skills in the rest of the country.

Another interesting finding was the feeling that Ireland lacked a notable scientific heritage to match that of the arts, literature and music. Any scientific heritage the country does have is seen as more rooted in the Anglo/Irish colonial past, rather than as part of our indigenous culture. This may be another – albeit intangible – barrier to Irish people's interaction with the sciences.

The majority of people (56%) believe Ireland is competing 'on average' in terms of scientific, engineering and technology research. Figure 16 shows that one in five (19%) believe the country performs above average on this measure. When asked which areas the country performs above average in, as shown later in figure 18, engineering comes first (33%), followed by computers/IT (28%); other fields such as pharmaceuticals come some way behind at only 7%. Whether these reflect the reality of our scientific competitiveness is perhaps debatable, but this is how the country is currently seen to be performing.

Those who believe that Ireland punches above its weight in terms of research in STEM tend to be slightly older (26% of 50-64 year olds are more positive), or from a higher socio-economic background (26% of ABs also feel we are above average). They also tend to be more urban based (25%).

Figure 16: How Ireland is competing in STEM versus rest of the world



Base: All Adults 15+ (n=1,008)

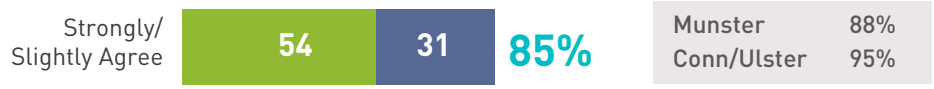
Question: How do you consider Ireland is competing globally in terms of achievements in scientific, engineering and technology research?

There is little doubt, as shown in figure 17, of the importance of scientific research to our international competitiveness (85% agree), or to the importance of scientific education 'knowledge of science is useful for increasing career opportunities' (87% agree). In addition 84% agree that Government investment in science, engineering and technology research is worthwhile.

However, people are less convinced of the role of government in promoting interest in science – four in ten people think it is doing 'about enough' but a similar number say 'too little'.

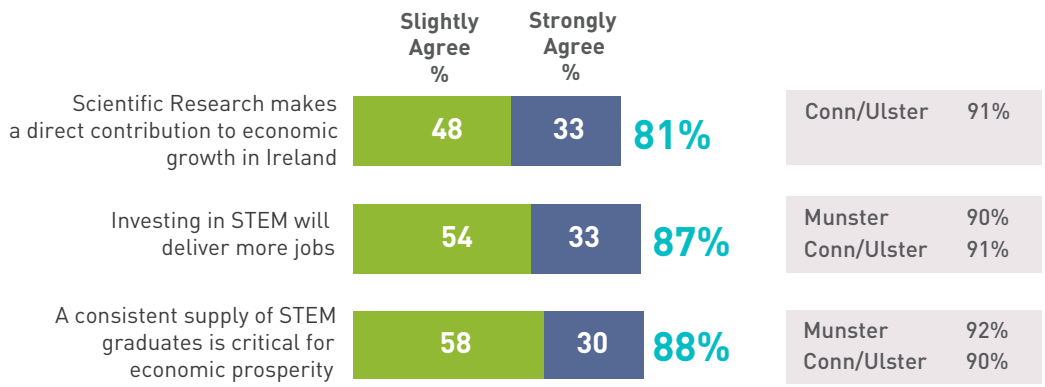
Overall the economic benefits of STEM are clear, 85% agree we need to invest in STEM to be competitive, a similar percentage believe investing in STEM will deliver more jobs and that a consistent supply of STEM graduates is critical for economic prosperity.

Figure 17: Do we need to invest in Scientific Research to be competitive?



Base: All Adults 15+ (n=1,008)

Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.



Base: All Adults 15+ (n=1,008)

Question: To what extent do you agree or disagree with the following statements?

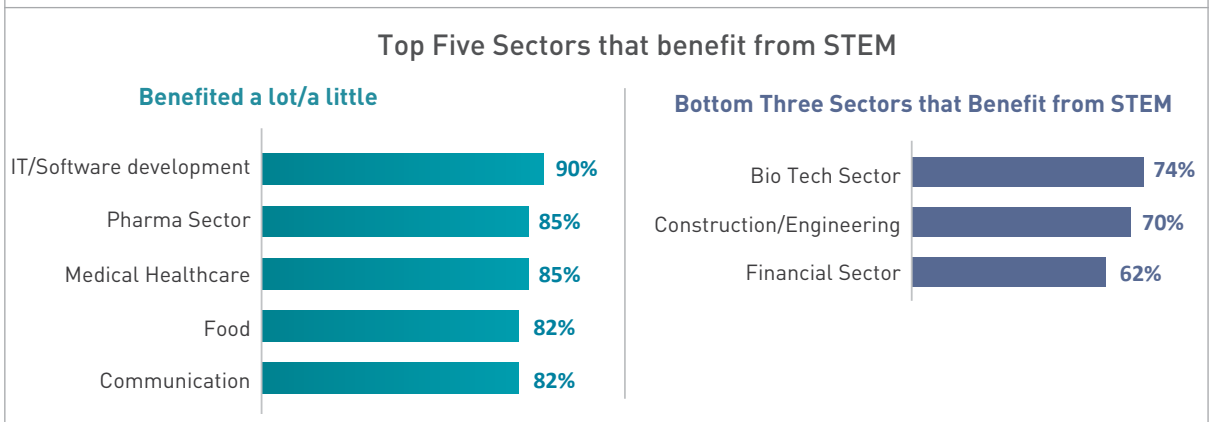
Figure 18: Key sectors where the public believe Ireland is competitive

Economic benefits of STEM are clear, and further investment is endorsed. Reactions are quite regionally diverse.

When asked which areas the country performs above average in, as shown figure 18, engineering comes first (33%), followed by computers/IT (28%); other fields such as pharmaceuticals come some way behind at only 7%. Whether these reflect the reality of our scientific competitiveness is perhaps debatable, but this is how the country is currently seen to be performing.

When asked which sectors of the economy have benefitted most from STEM five key sectors are grouped together at the top of the list, as presented in figure 19 - IT software development (90%), pharma sector (85%), medical healthcare (85%), food (82%) and communications (82%). There are some regional disparities across these answers e.g. Pharma is higher in Munster and Conn/Ulster than in Dublin which would reflect the strength and presence of particular industries on the ground.

Figure 19: Do we need to invest in Scientific Research to be competitive?



Who has benefited from STEM? The "big ticket" items of IT, Pharma and Medical are obvious to many, but again there are regional variations.

Base: All Adults 15+ (n=1,008)

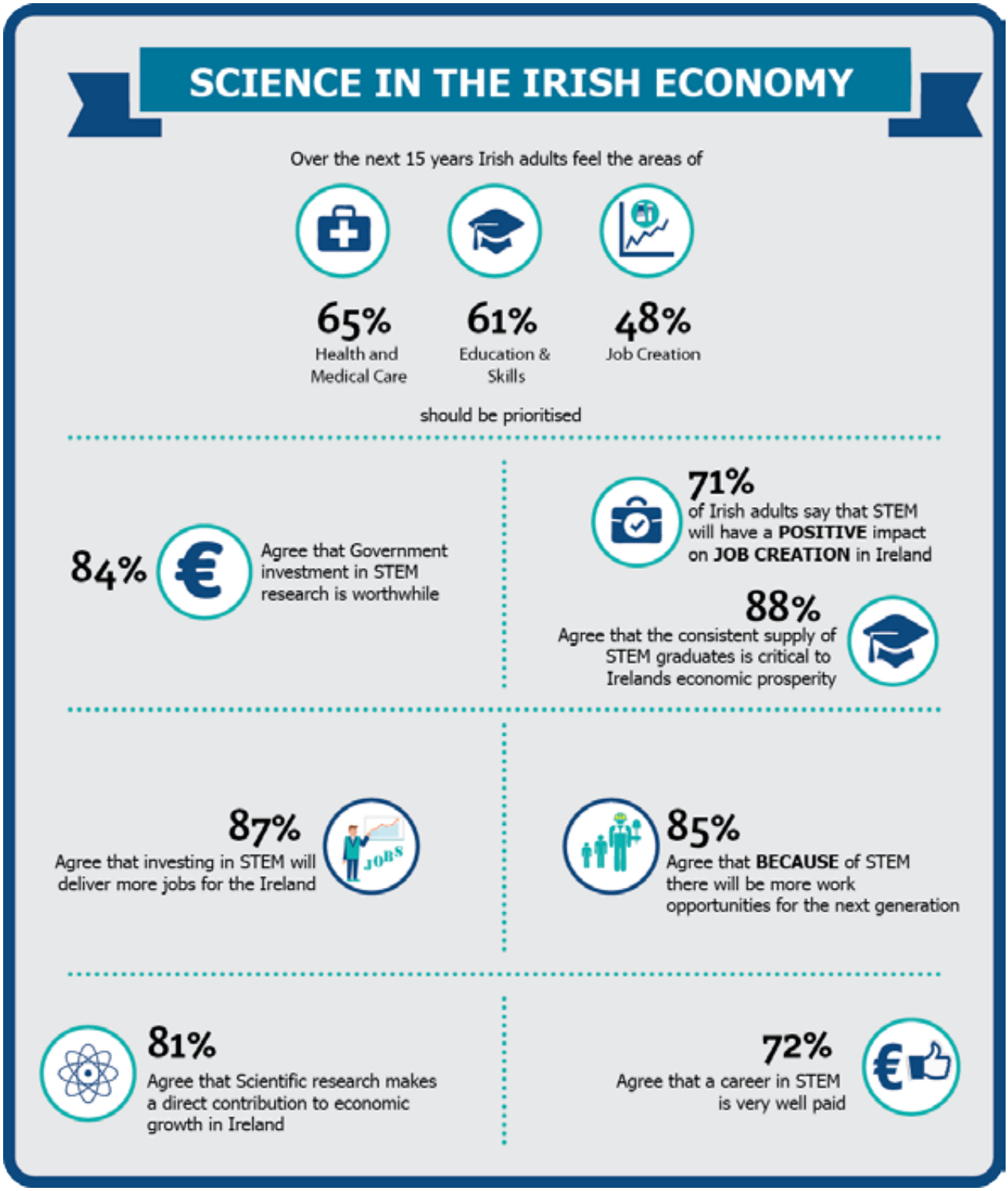
Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

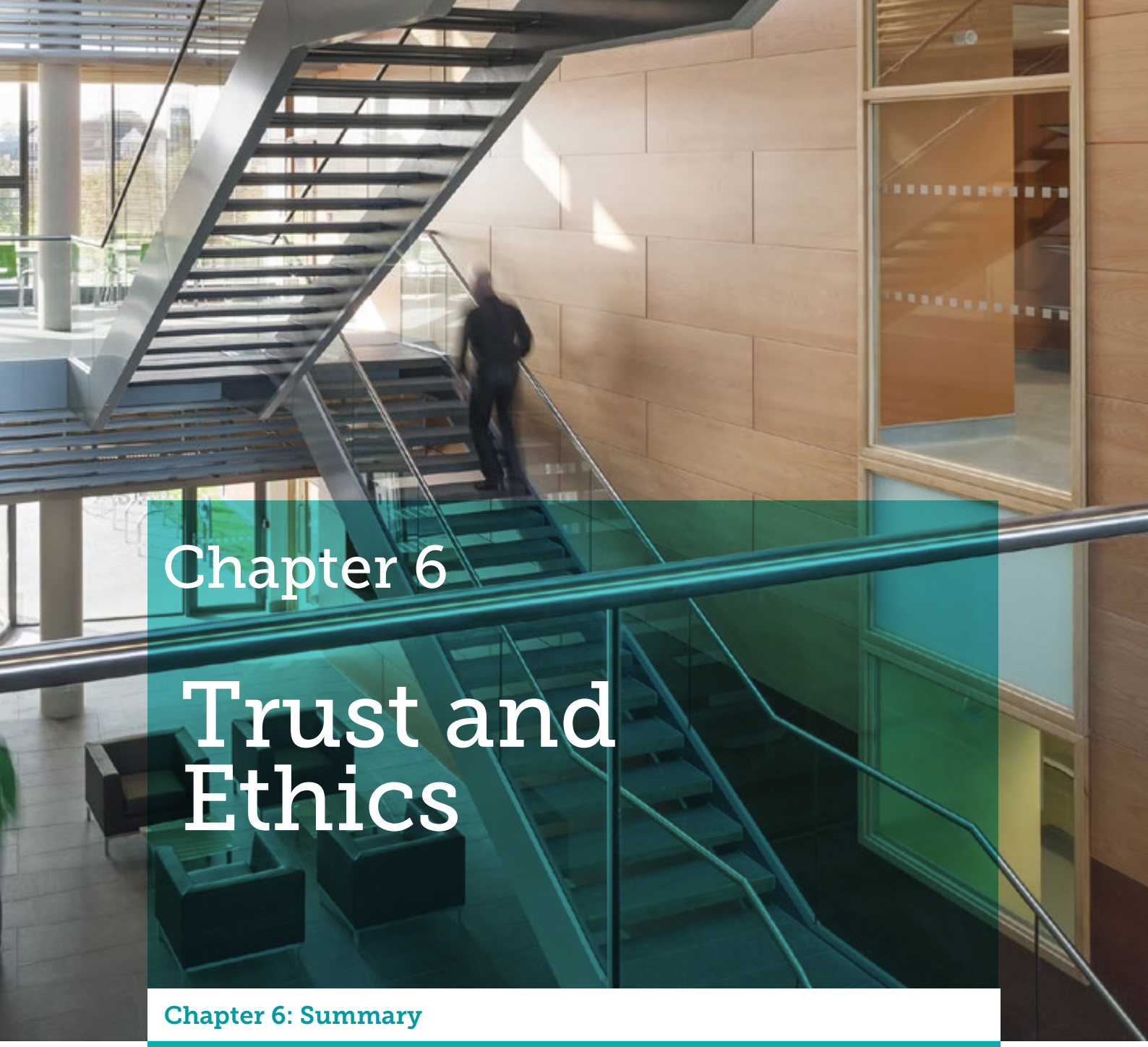
So what of the future? When asked where should the priorities be when it comes to STEM over the next 15 years, as seen in Figure 6 (chapter 2) Health and Medical Care (65%), as well as education and skills are clear priorities (61%). Third comes Job Creation (48%) which underlines the association between science, technology and economic growth. After this transport is cited at 28% which, as part of the country's infrastructure, is strongly linked to economic growth. Moreover 71% of Irish adults believe investment in STEM will have a positive impact on job creation and 88% believe a consistent supply of STEM graduates is critical to Ireland's economic growth. A very positive linkage between science and the economy generally is the finding that 85% believe that because of STEM there will be more work opportunities for the next generation and that 81% believe scientific research makes a direct contribution to economic growth in Ireland. The fact that 72% agree that a scientific career is very well paid is further reinforcement of the link people make with science and prosperity.

Science and the Irish Economy

- Continue to attract FDI that will have solid science-based foundations in the Irish economy.
- Build the public recognition of Ireland's ability, accomplishments and heritage in STEM achievements
- Underline the permanent and deep rooted, skilled nature of much of the FDI that comes into Ireland.
- Where possible highlight not just the government's role in investing in, but also in promoting to the public and young people, the technology and science-based economy.

Infographic 3:
Science and the Irish Economy





Chapter 6

Trust and Ethics

Chapter 6: Summary

- In terms of ethics, the public perceive both good and bad elements to science. Whilst it contributes greatly to the quality of life, of many it can also go against nature.
- Perceived 'bad science' involving interference with the natural world impacts on the trust and reputation of the profession.
- Many are not really able to engage with the topic of ethics within science.
- There is a trust deficit in terms of having 'a lot' of trust in what the scientific community advise.

Trust and Ethics

Just 22% of people have 'a lot' of trust in the advice given by the scientific community – this indicates the presence of a 'trust' deficit between experts and the wider population they serve

The Irish public perceive positive and negative aspects to science. Good science is seen as contributing to making life easier and more efficient and to a world of curiosity and discovery. Furthermore, it underlines progress in society and the improvement of health and the advancement of technology. Conversely 'bad' science is seen as that which interferes with the natural order of things – especially the environment and the natural world. Bad science can be driven by specific vested interests for profit and can be irreversible in its effects; it is also often misunderstood and disputable.

'Bad science' can erode trust in the scientific process and profession. Specific examples of such 'bad sciences' are those that impact on the environment such as fracking, mobile phone masts and high tension electricity pylons. Other sciences that raise suspicion are those that are seen to be driven by large corporations for profit – energy companies, tobacco and pharmaceuticals can all fall within the scope of this category. Science that interferes with the natural order can also be seen as unethical – examples of this that were cited include cloning, stem cells and artificial intelligence.

What Undermines Trust in Science and Scientists?

- **Impact on the environment:** such as fracking, mobile phone masts and high tension electricity pylons.

Other areas that raise suspicion in science are those that are seen to be driven by:

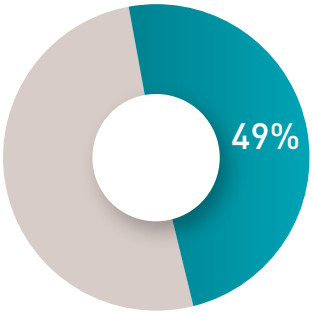
- **Large corporations for profit:** energy companies, tobacco and pharmaceuticals can all fall within the scope of this category.
- **Science that interferes with the natural order:** can also be seen as unethical – examples of this that were cited include cloning, stem cells and artificial intelligence.
- **Misunderstanding,** confusing and disputable: the absence of definitive answers, lack of clarity or conflict debate undermines trust.

Many people feel poorly equipped to engage in the ethical dimensions of scientific research. Depending on which attitudinal segment an individual belongs to will often colour their ability to engage with the ethics of science; for example, young people who have not engaged with science at school will often take a very 'black and white' view – usually driven by their own personal experiences of, or proximity to, an issue rather than demonstrating an openness to debate. In general, an ability to discuss the ethics of science correlates closely with the public engagement with science as a whole, with the most engaged having the most nuanced grasp of the subject. Some of the key issues that were raised at the qualitative level included macrobiotics where an overtly commercial marketing tone contrasted with a factually based and detailed understanding of the benefits of macrobiotics in the diet. The issue of fracking also emerged where a lack of understanding of the issue was mixed with a distrust of the motivations of large energy corporations which were seen to be driving the process. Mistrust in fracking was further deepened due to people's sensitivity over most issues relating to the environment and natural world. Such environmental concerns were keenly observed by those living in rural areas and outside Dublin. The nuclear debate is also one to frequently emerge where highly partial views can contrast with a detailed understanding of the science and technological benefits that can accrue from this technology. Despite awareness of numerous issues where controversy can arise, ethical issues were often hard to identify or verbalise due to lack of understanding or difficulty of subject.

Just 22% of people have 'a lot' of trust in the advice given by the scientific community – this indicates the presence of a 'trust' deficit between experts and the wider population they serve. The majority (60%) say they have 'some' trust in the advice of the scientific community which is a lukewarm endorsement of the word of the experts. Younger people tend to have considerably more trust with 15-19 year olds recording double the national rate of 'a lot of trust' in the advice of the scientific community at 44%. This is perhaps a reflection of their more recent experience of the education system and a subsequent closeness to STEM subjects compared to the rest of the population.

When given at a more personal level, the advice of the scientific community is better regarded. As can be seen in Figure 20, 49% of Irish adults have complete, or a great deal of, trust in the opinion of a scientist or engineer. This suggests there is considerably more trust in the scientific professions themselves than there is in some of the technical areas in which their expertise lies. In other words, qualitatively, people feel less trustful of organisations or groupings of scientists. Without knowledge of the institutions or business interests they may represent, they are more likely to question their impartiality. Groupings or organisations that are linked to Government or the education system are more likely to be trusted over corporate or independently funded groups. Moreover, when one accounts for the fact that three in four people believe the information they hear about STEM as generally true, it suggests that science is trusted in the general but not always in the particular. Analysis of individual areas of scientific research and developments show this to be true. Moreover the trust we have seen in the impact of scientific investment on economic growth is a further indicator of its standing in the public eye.

Figure 20: Levels of trust in scientific/engineering opinions



Do you trust the opinions of Scientists/Engineers?

49% have at least a great deal of trust.

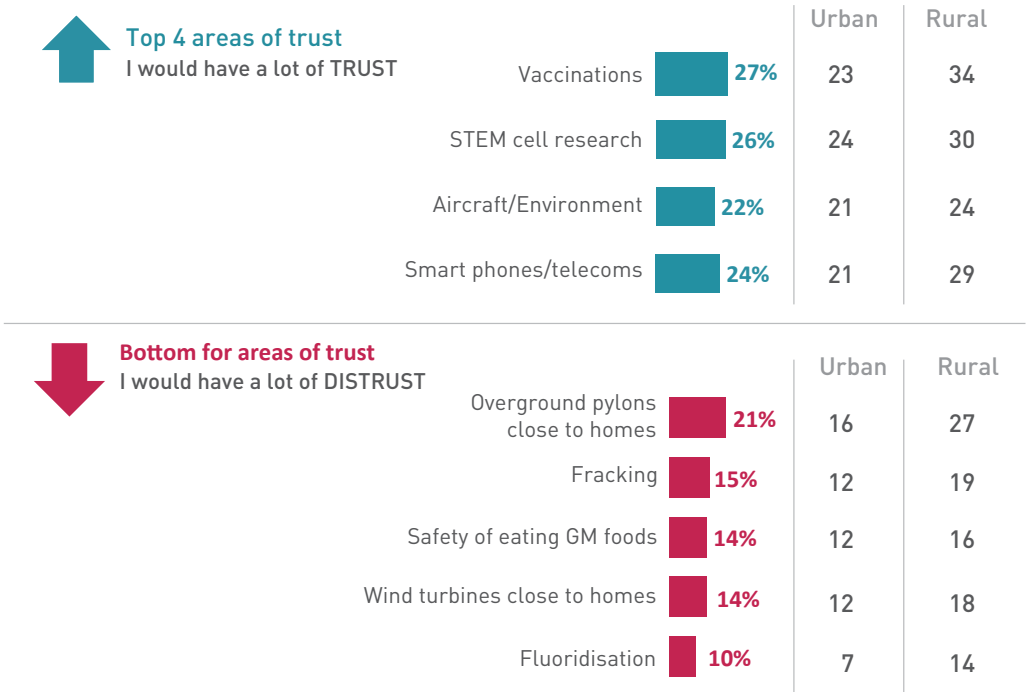
Base: All Adults 15+ (n=1,008)

Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?

When you hear/read an opinion from a scientist or engineer how much do you trust it?

What science do people trust the most and the least? Figure 21 shows the topics that record the highest levels of 'a lot of trust' are vaccinations 27%; STEM cell research 26% (which perhaps surprisingly only records 19% some/a lot of distrust – suggesting it is not as controversial in people's minds as much commentary on the issue might have us believe); smartphones and telecoms 24% and aircraft and environment 22%. In contrast the areas that record the highest levels of 'a lot of distrust' are over ground pylons close to homes 21%; fracking 15%; safety of eating GM foods 14%; wind turbines close to homes 14% and fluoridisation 10%. There is considerable localisation attached to these views with a distinct urban rural divide in evidence, which no doubt reflects the higher likelihood of being affected by these technologies. For example distrust of over ground pylons close to home is 16% in urban areas but 27% in rural areas – where they are more likely to be an issue.

Figure 21: Does the public trust the advice given by Scientific Community

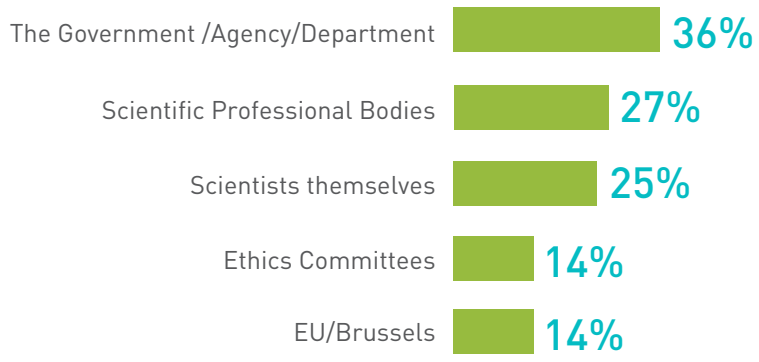


Base: All Adults 15+ (n=1,008)

Question: Which statement most closely reflects your own personal viewpoint on each issue? There are no right or wrong answers – we are just interested in your own beliefs.

When asked who should set the rules and regulations for scientists in Ireland a number of opinions arise, as shown in figure 22. Most popular is 'the government /agency/department at 36%, followed by professional bodies 27%, scientists themselves 25%, ethics committees 14% and the EU 14%.

Figure 22: Responsibility for setting the rules and regulations for scientists in Ireland



Base: All Adults 15+ (n=1,008)

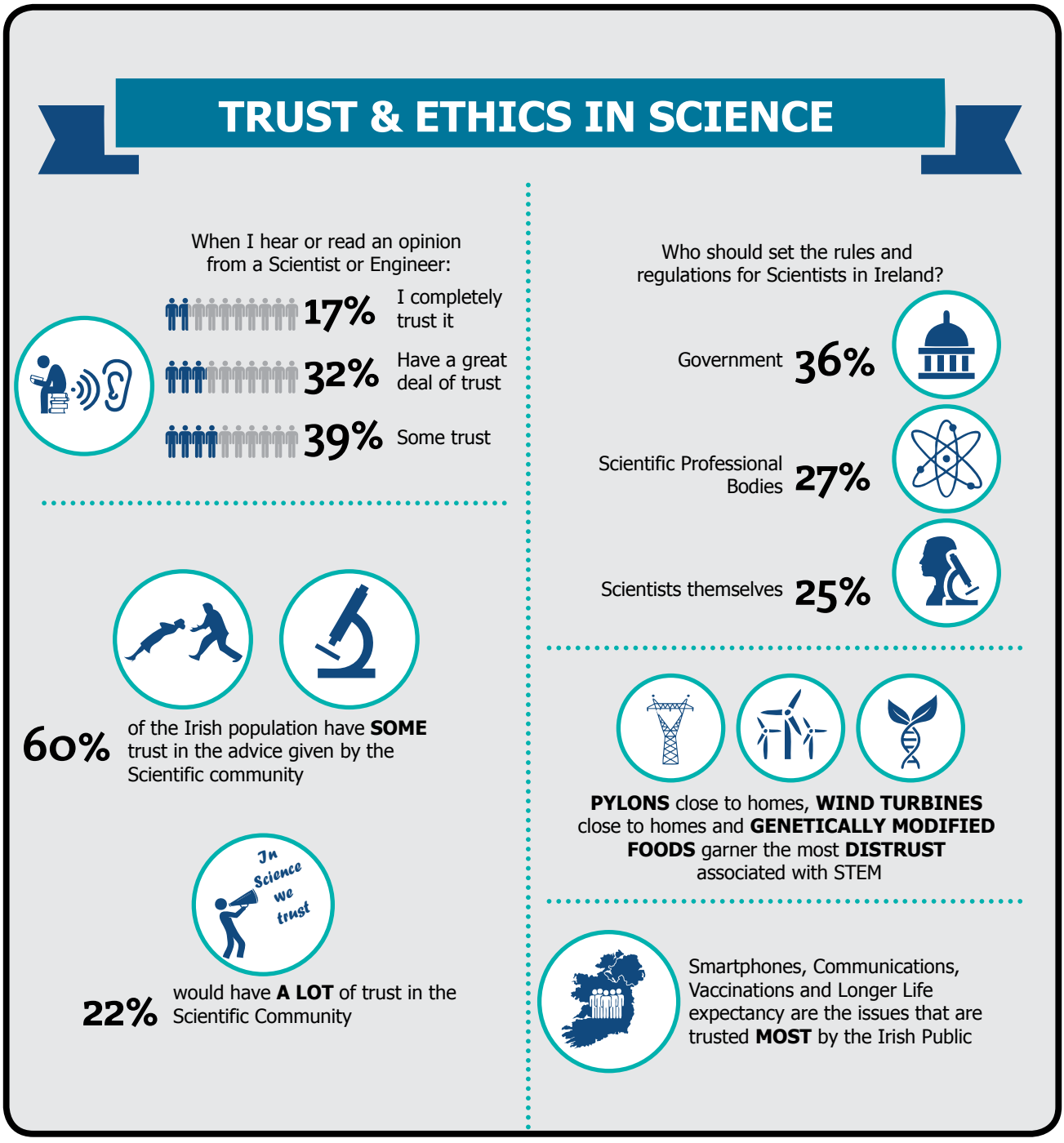
Question: Who, if anyone, sets/should set the rules and regulations for scientists in Ireland to follow when they are doing their job?

Chapter 6: Recommendations

Trust and Ethics

- Further educate people on the importance of ethics to science.
- The findings highlight the importance of growing the knowledge and value amongst the public of balanced debate as much as providing the balanced arguments.
- Provide a balanced debate on topical issues of 'bad' science e.g. fracking or nuclear power.
- Help bridge the 'trust deficit' by ensuring scientists/engineers are engaged with the public, and vice versa, and ensuring this reaches all demographic groups.

Infographic 4: Trust and Ethics



Chapter 7

International Comparisons

Chapter 7: Summary

- Irish people are ahead of the EU average in terms of how informed we are on R&D and STEM and how interested we are in these subjects.
- Looking specifically at key European counterpart countries (UK, Denmark), we feel less informed about R+D in STEM, and are also less interested in such developments.
- However, in comparison to New Zealand, Ireland is well behind on these measures; twice as many Irish people find STEM too specialised to understand than in New Zealand.
- New Zealanders are more likely to enjoy finding out about new technology but on many other key variables the two countries are at similar levels.
- Compared to the rest of the EU, Ireland tends to have a more positive view of the role of science in the future.

International Comparisons

New Zealanders consider themselves much more informed about STEM R&D – with 62% saying they are very, or fairly well, informed compared to 48% in Ireland.

Where possible this research has facilitated comparisons between the Irish data collected and the same questions that were asked in the EU (Eurobarometer) and also in a similar survey in New Zealand – which allows the Irish results to be viewed in comparison to a country of similar size and state of development, as well as to the average of the EU28, the UK and Denmark.

Figures 23 – 25 demonstrate the comparative results. Compared to the European average Ireland is ahead, both in terms of how informed we are of R&D in STEM, and how interested we are in STEM R&D. However, compared to the UK and Denmark, we do fall behind on both of these measures.

Ireland is also much more likely to get information from websites than our EU counterparts, a far larger proportion of whom depend on TV for their information (65% vs 34%). We need to bear in mind that the EU figures are based on 2013 data, and certain sources of information (especially websites) may have evolved since then in Europe.

However, New Zealanders consider themselves much more informed about STEM R&D – with 62% saying they are very, or fairly well, informed compared to 48% in Ireland. A major cause of this differential is revealed by the attitudinal statements on science issues – one in particular stands out in Figure 26: whereas 71% of Irish adults say 'STEM is often too specialised for me to understand', only half of this number (35%) agree with this statement in New Zealand. This suggests the New Zealand scientific community is doing a better job at explaining scientific concepts and issues to the population of that country.

Interaction and Touchpoints

Figure 23: International comparisons of how informed Ireland's public is versus other regions

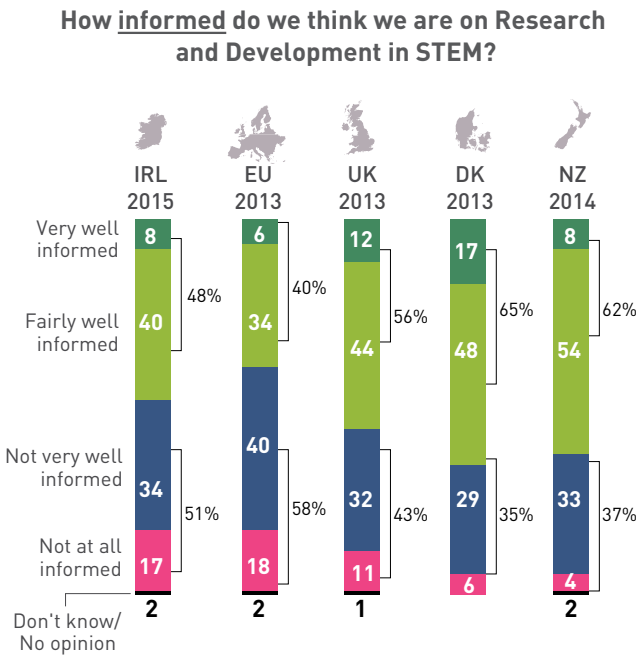
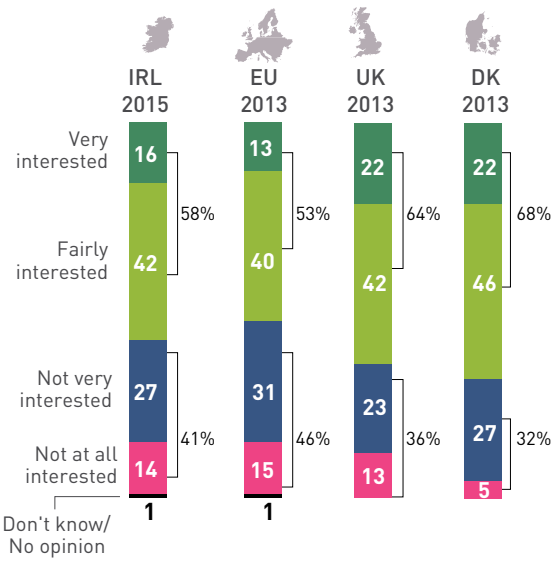


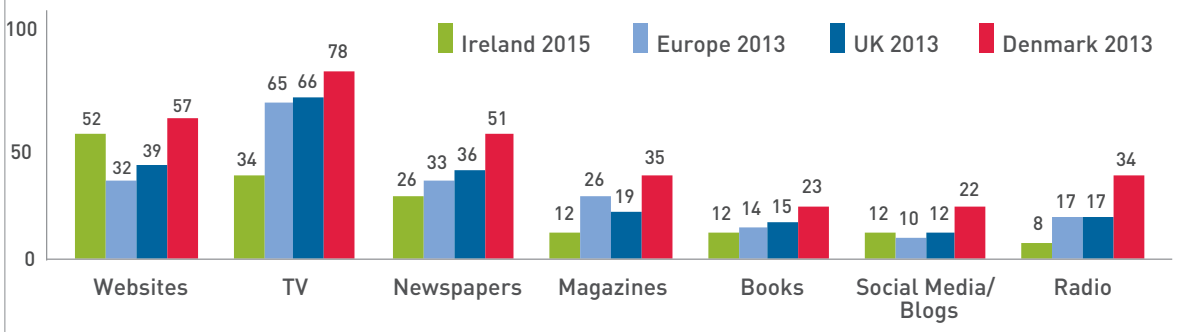
Figure 24: Comparison with Europe, the UK and Denmark on how interested the Irish public is STEM R&D



Question: How informed do you feel about research and developments in science, engineering and technology?
How interested are you in research and developments (R+D) in science, engineering and technology?

Where do we go to get information on STEM?

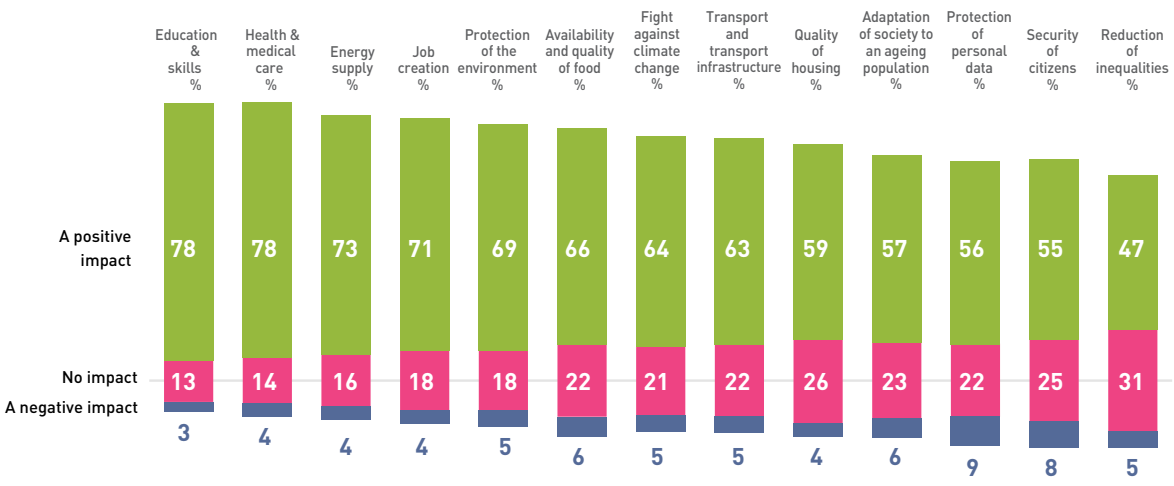
Figure 25: Obtaining information on STEM: Ireland and Europe



Question: When actively looking for information on research and developments in science, engineering and technology where do you get that information from?

Looking ahead, Irish people are much more positive about the future impact of science on society then the average of the EU 28 countries. As illustrated in Figure 25.1, in the field of education and skills, 78% of Irish people believe there will be a positive impact from science compared with just 60% in the EU. This pattern is reflected across a range of science-based impacts such as healthcare, energy supply and job creation where only 45% across the EU28 believe there will be a positive impact compared to 71% in Ireland. From protection of the environment, climate change, transport and housing, Irish people are consistently more likely to endorse the positive impact of science. These are encouraging findings and show that Irish people's view of, and trust in, science is progressive and optimistic and places the Irish people very much to the fore of belief in science in the EU. Compared to the UK and Denmark specifically, we are more positive than our near neighbours, but slightly less enthusiastic than Denmark.

Figure 25.1: Future impact of STEM



	Education & skills %	Health & medical care %	Energy supply %	Job creation %	Protection of the environment %	Availability and quality of food %	Fight against climate change %	Transport and transport infrastructure %	Quality of housing %	Adaptation of society to an ageing population %	Protection of personal data %	Security of citizens %	Reduction of inequalities %
Euro Positive Impact 2014 (28 Countries)	60	65	58	45	57	48	54	59	50	44	37	45	30
UK	63	69	54	47	54	52	51	60	47	48	40	45	28
Denmark	78	82	84	57	78	69	77	76	74	59	60	60	27

Base: All Adults 15+ (n=1,008)

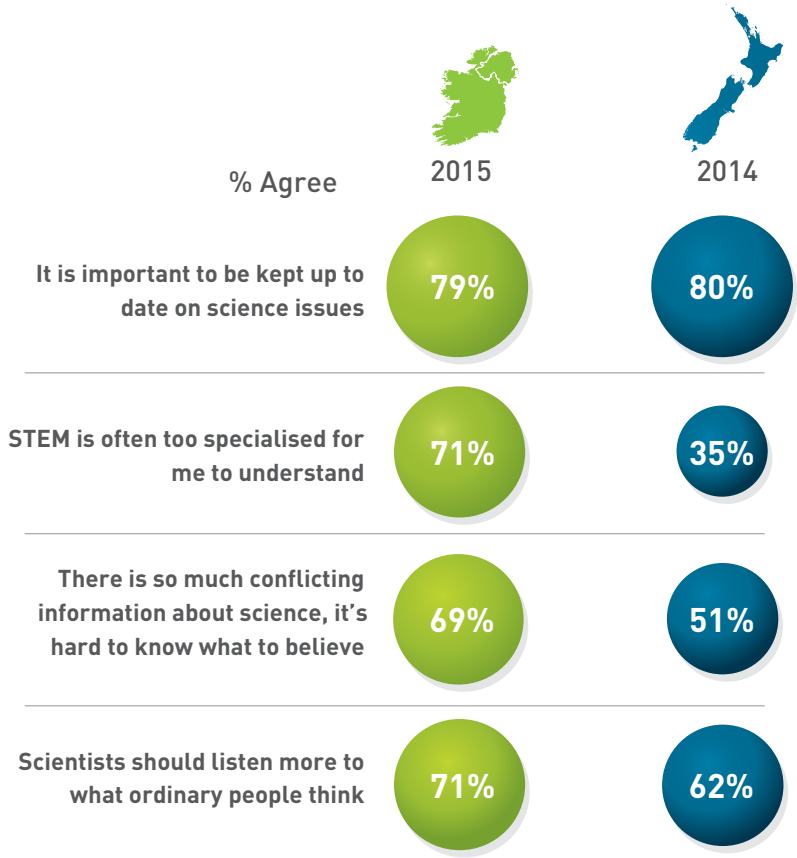
Question: Over the next 15 years, what impact do you think science, engineering and technological innovation will have on the following areas ...?

Irish people and their New Zealand counterparts share much in their attitudes to science; however there are some significant differences – particularly in the field of understanding science and technology. For example figure 26 illustrates that 71% of Irish people think STEM is often too specialised for them to understand – this is twice the number who respond to this finding in New Zealand. Where 69% of Irish people believe there is so much conflicting information it is hard to know what to believe only 5% of New Zealanders think this is the case. There is a clear gap in the understanding of science between two ostensibly similar countries, Ireland has much to learn from New Zealand in terms of wider education of the public on scientific matters.

Ireland vs. New Zealand - Attitudes towards Science

Figure 26 shows that Irish people recognise the importance of science, but are more self-depreciating in their familiarity with the topic.

Figure 26: Attitudes towards science in Ireland and New Zealand



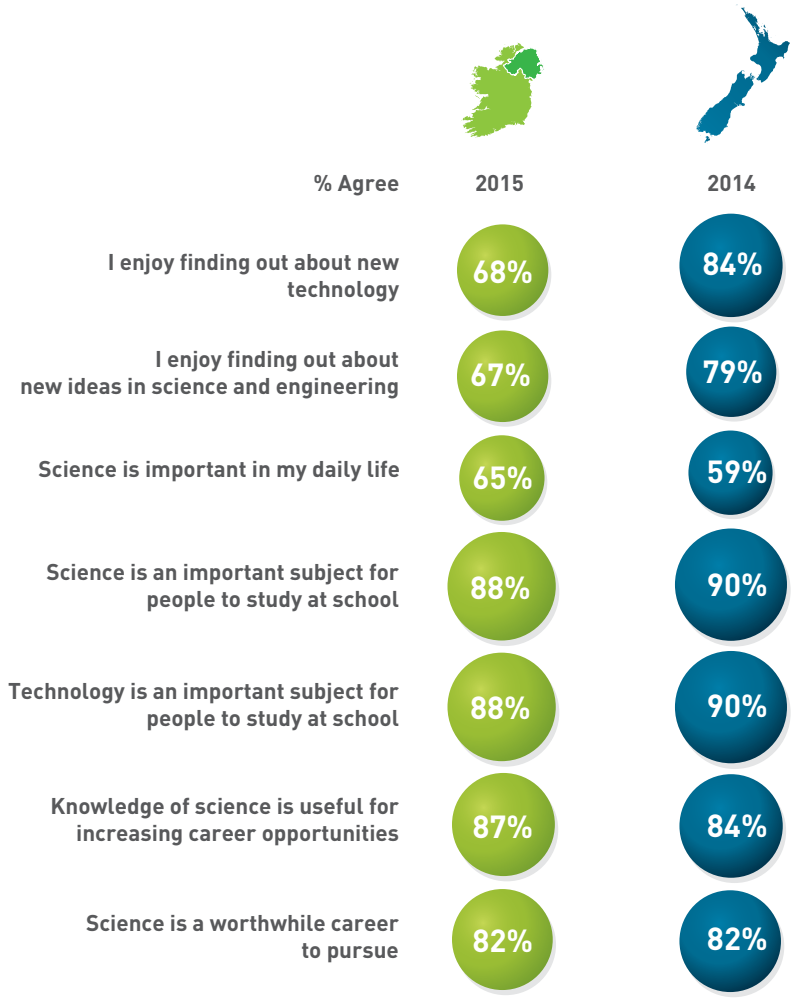
Other differences between the two countries are also in evidence which might help explain the disparity. New Zealanders appear to enjoy finding out about new technology (84% vs 68% in Ireland) and about science and engineering (79% vs 67%), see figure 27. This element of enjoying STEM perhaps underlies the large difference in believing that STEM is too specialised to understand between the two countries.

Elsewhere however, there is much agreement between the Irish and New Zealand populations on the role and importance of science in society at large. Across areas such as the importance of studying science in school, that science is a worthwhile career, that scientific research is needed to enhance international competitiveness and the importance of science in preserving the environment and addressing key challenges in society there are high levels of agreement in both countries.

Ireland vs. New Zealand - Attitudes towards Science in Education

Figure 27 shows that New Zealanders are generally more enthusiastic about discovering science, but Irish people do recognise the importance of education.

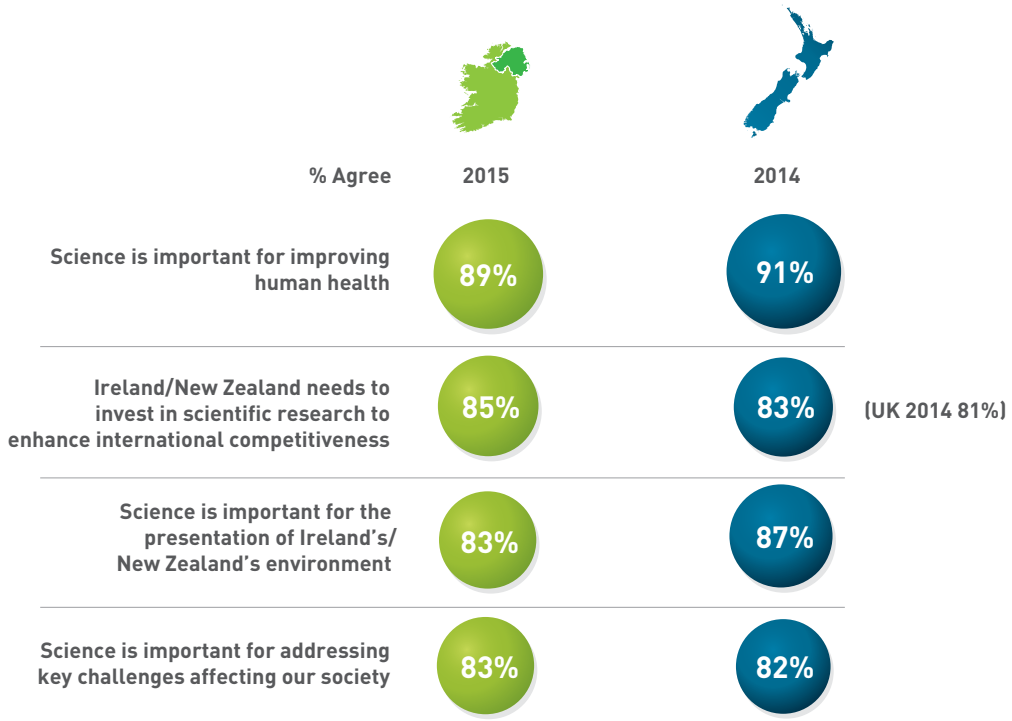
Figure 27: Attitudes towards science in education in Ireland and New Zealand



Ireland vs. New Zealand - Science and Society

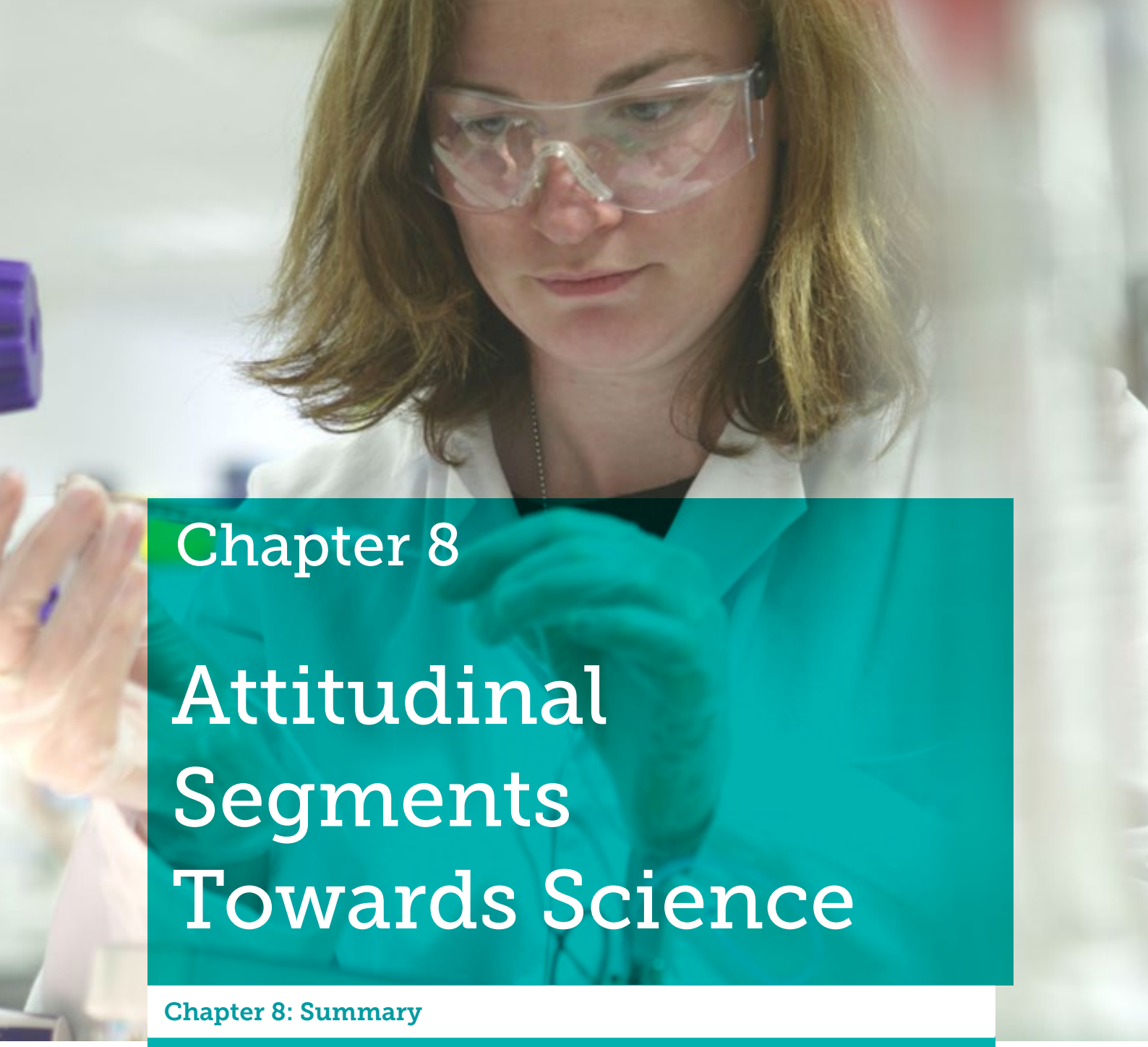
Figure 28 identifies a broad consensus across both nations of the importance of science to economic and societal development.

Figure 28: Attitudes towards science and society in Ireland and New Zealand



International Comparisons

- Continue to drive the awareness of the positive impact of science on society and to benchmark Irish attitudes compared with international studies.
- Science Foundation Ireland should investigate the methods used in New Zealand in terms of education and promotion to examine if there is potential to replicate work in Ireland to raise understanding of and engagement in specialised subjects. Denmark is also showing some interesting indications of greater positive attitudes towards science.
- Support compulsory science at second level.



Chapter 8

Attitudinal Segments Towards Science

Chapter 8: Summary

- Attitudes towards science can be segmented into distinct demographic groups.
- These range from the potential of secondary school students and third level students to the disengaged and the disenfranchised. Other trends within groups such as parents and the 'super interested' are also identifiable.
- Each segment is identified via a number of qualitative and quantitative factors allowing for key demographic indicators to be captured and utilised.

Segmentation profile; a demographic overview

By segmenting the population by their attitudes to science we can better understand how STEM should be promoted and to whom.

To really embed and target the recommendations made in previous chapters and using the results of both elements of this research project – qualitative and quantitative – we have built a segment based profile of the Irish population based on their attitudes towards science and their demographic profile. Using this data we have enabled all of the data collected to be fused into a single overview of attitudes towards science in Ireland today.

Young Potentials

- 15-30 year olds
- Have a positive or neutral interest in science/ technology issues.

18%

Young and Disengaged

- 15-30 year olds
- Have a little/no interest in science/technology Issues

7%

Parents/Informally Informed

- 35-50 year olds
- Have a positive or neutral interest in science/ technology issues.

24%

Disenfranchised

- 30-55 year olds
- Have a little/no/neutral interest in science/ technology Issues

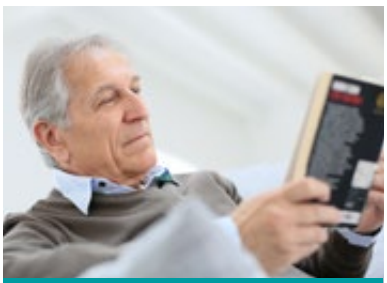
19%

The Super Interested

- 30-55 year olds
- Are Very interested in science/technology issues.

11%

Older But Still Curious



- 55+ year olds
- Have a positive or neutral interest in science/ technology issues.

16%

% population based on quantitative attitude based segmentation

Profile of segments

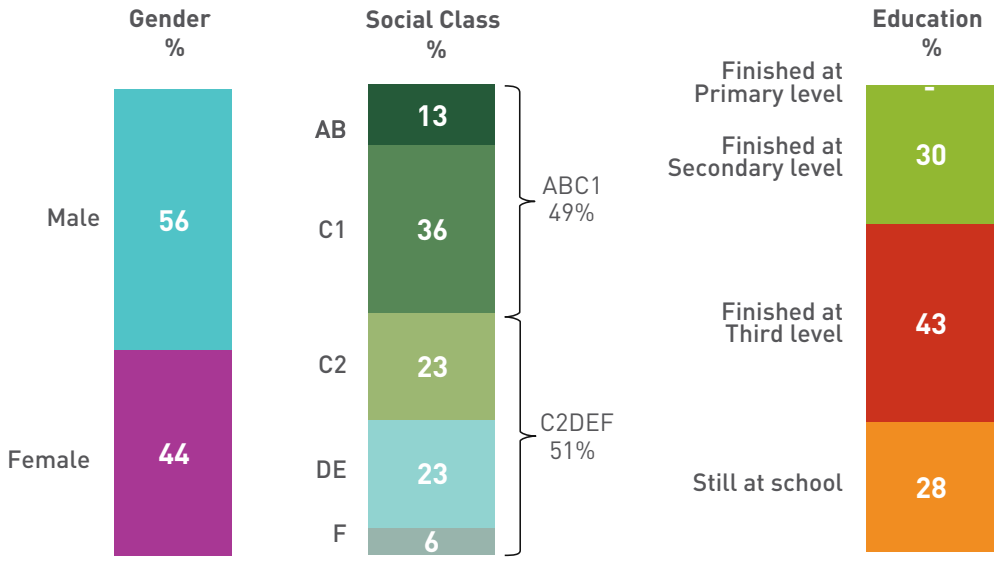
When profiled by their demographic breakdown the segments reveal a number of notable findings.

The 'young and disengaged' and 'disenfranchised' segments over-index strongly as female and less well-off C2DE social class. Furthermore, these segments are much more likely to have finished their education at second level; highlighting the barriers to scientific awareness that arise for many during their second level education. These are groups that will need to be carefully targeted if their knowledge of, and engagement with, science and scientific issues is to be improved. While this analysis points strongly to where the knowledge gaps lie in the general population, these groups require more basic levels of scientific information if their knowledge and interest levels are to progress.

In contrast the 'young potentials' and 'super interested' are much more male in their profile as well as being more likely to have had a third level education, or to be still at third level. They are also considerably more likely to be from the more affluent SEG (socio-economic group). These sectors are hungry for scientific knowledge and have the capacity to absorb more complex scientific information.

Young potentials: who are they?

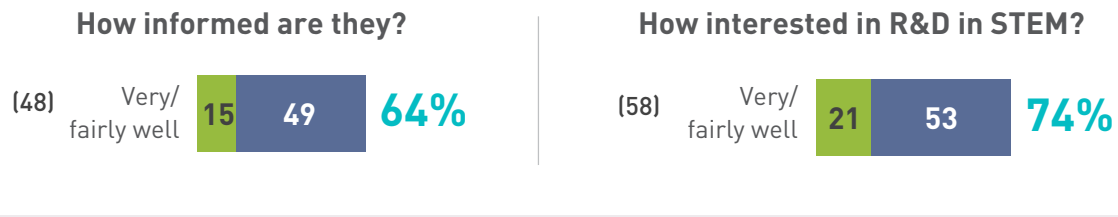
Figure 29: "Young Potentials": Who are they?



This group of 15-30 year olds have either a positive or neutral interest in science and technology issues. Their viewpoint tends to be coloured by secondary school experience where they have either studied a STEM subject, or have seen the outputs of one at close proximity. This group appreciate the importance of science to economic and social welfare and progress. Their interest in science outside of an academic context can often be shaped by interaction with popular culture references which can foster a more general interest in the subject.

In the first instance school very much dominates the relationship of this group with science, they recognise its importance for college and see it on a par with other subjects, albeit more challenging at times. This group are digital natives so have no difficulties with technology or other platforms which may be used to access scientific subjects. They also interact via many mediums of popular culture which put science and technology to the fore.

Figure 30: How informed/interested "young potentials" feel/are about STEM?



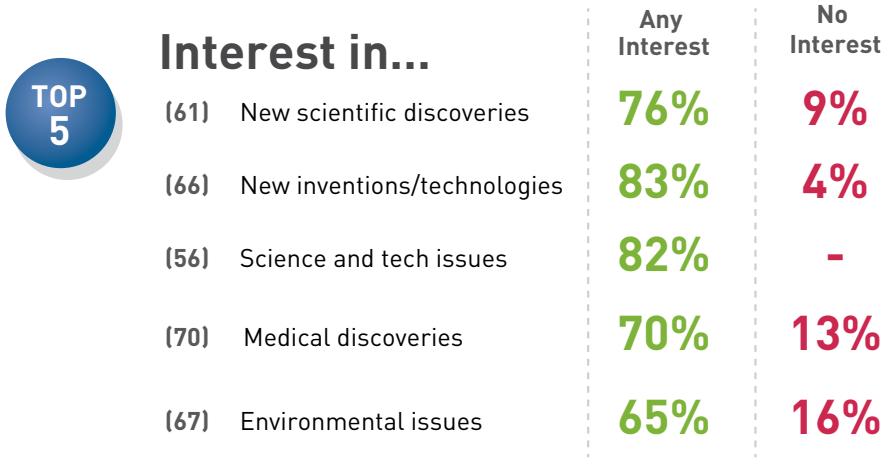
Base: All Young Potentials (n=187)

Question: How informed do you feel about research and developments in science, engineering and technology?

How interested are you in research and developments (R+D) in science, engineering and technology?

Bracketed figures = Total Sample

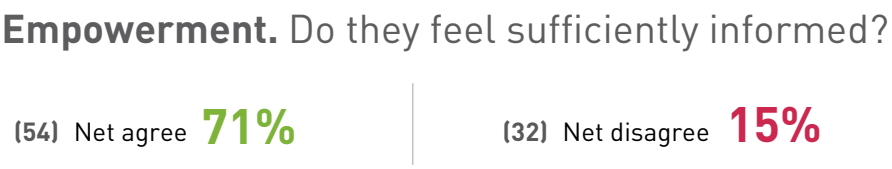
Figure 31: "Young Potentials": interests in free time



Base: All Young Potentials (n=187)

I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time.

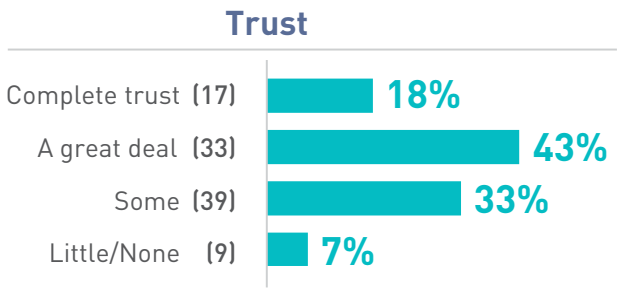
Figure 32: How informed "Young Potentials" feel about science and tech



Base: All Young Potentials (n=187)

Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

Figure 33: How much trust "Young Potentials" have in scientific /engineering opinions



Young Potentials – this cohort display both knowledge and interest in scientific matters. They also have confidence in their understanding, and their ability to articulate it.

Base: All Young Potentials (n=187)

Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?

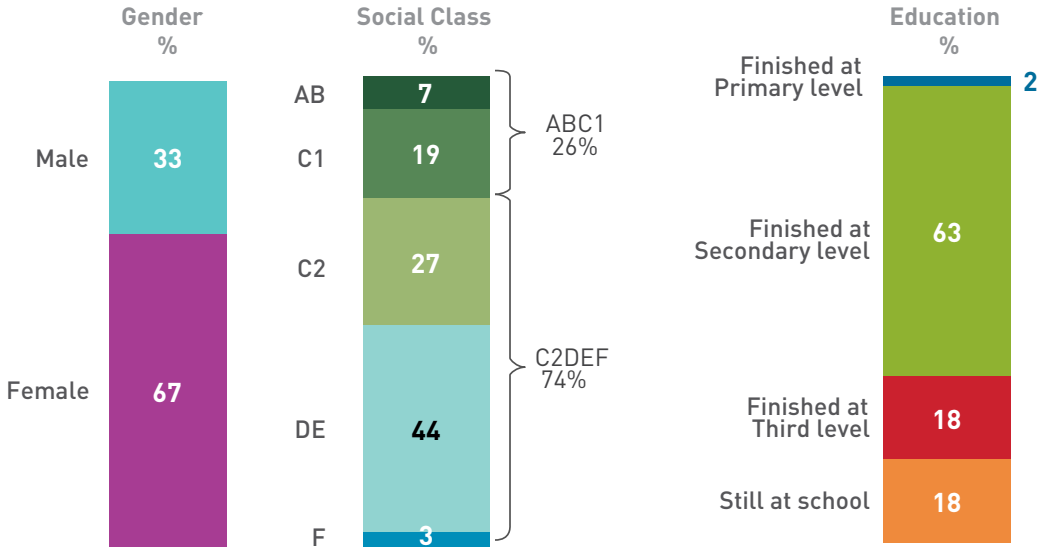
Bracketed figures = Total Sample

Young Potentials 2 – Third Level Focus

Eight in ten of this segment have an interest in new inventions and technologies and science and technology issues. Although 71% of this group believe themselves to be sufficiently informed about science and technology, only 64% actually consider themselves to be well informed – so there is clearly room for improvement as to how well this group are actually informed of scientific issues. Fortunately some three in four of this segment are very, or fairly, interested in R&D and STEM issues - indicating that they are fertile ground for on-going learning about scientific issues. For example, many have a very practical view of science and can perhaps relate to it not directly but instead via IT systems in their college or workplace; in this sense they often pro-actively seek out information on science and technology even when they are ostensibly studying or doing something else.

Young and disengaged: Who are they?

Figure 34: Young and Disengaged: Who are they?:

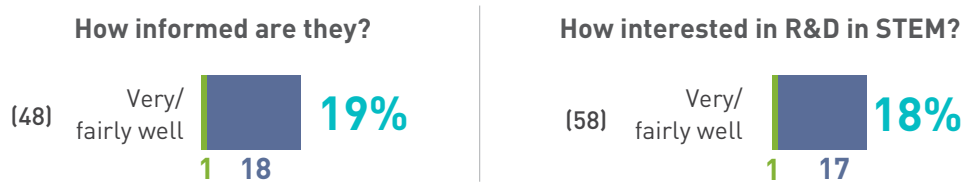


This group – comprising just 7% of the population – are less than half the number of their better informed and more enthusiastic peers. Most of them have disengaged from science and maths following the Junior Cert; as a result they tend to have a very negative view of science and all that is related to it.

Even popular culture scientific cues are of little interest to this group, who tend to decouple any aspect of science from their school experience. To all intents and purposes this group are a 'lost cause' from the point of view of further interaction with science; they connect with it neither as a subject in its own right, nor via popular culture channels, making them rather closed minded when it comes to any further education on the subject. They have separated themselves from science and thus view science negatively - this is a negative circle that will prove difficult to break.

When measured quantitatively their interest in science is very low, for example only 15% have any interest in new scientific discoveries and just three in ten admit to any interest in medical discoveries. In total, fewer than one in five (18%) state themselves interested in R&D and STEM (figure 35). It seems to be a tough ask to elicit much more interest in science from this group, whose negative mind-set towards science is most likely hard to shift.

Figure 35: How informed/interested "Young and Disengaged" feel/are about STEM?



Base: All Young and Disengaged (n=71)
Question: How informed do you feel about research and developments in science, engineering and technology?
How interested are you in research and developments (R+D) in science, engineering and technology?
Bracketed figures = Total Sample

Figure 36: "Young and Disengaged": Interests in free time

TOP 5

Interest in...	Any Interest	No Interest
(61) New scientific discoveries	15%	84%
(66) New inventions/technologies	39%	55%
(56) Science and tech issues	-	100%
(70) Medical discoveries	30%	61%
(67) Environmental issues	22%	69%

Base: All Young and Disengaged (n=71)
I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time.

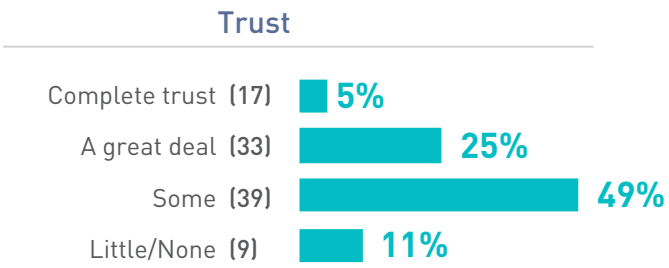
Figure 37: How informed "Young and Disengaged" feel about science and tech

Empowerment. Do they feel sufficiently informed?

(54) Net agree **25%** | (32) Net disagree **55%**

Base: All Young and Disengaged (n=71)
Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

Figure 38: How much trust "Young and Disengaged" have in scientific / engineering opinions

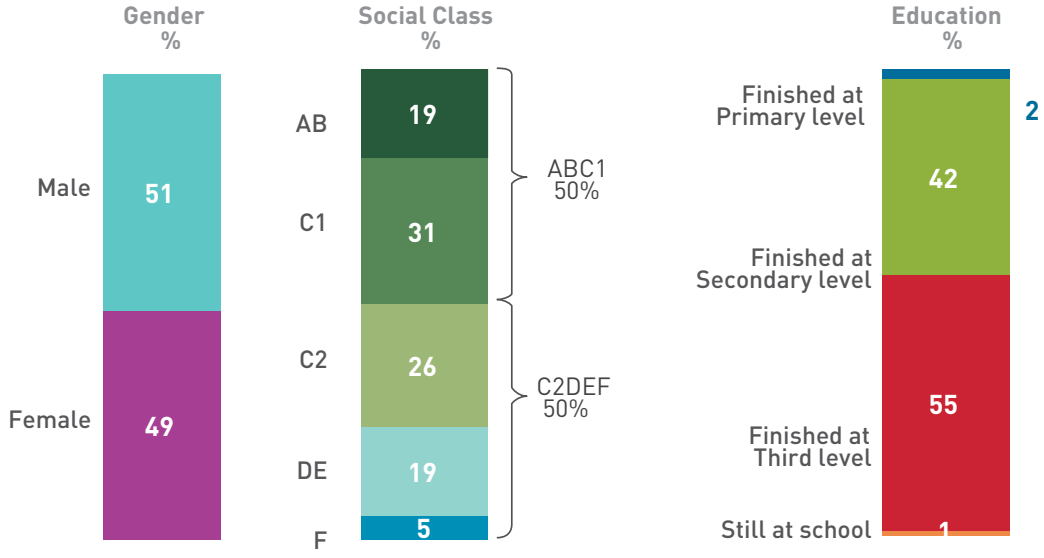


Young and Disengaged – this cohort are hugely disconnected with science and technology. They display neither interest in, nor trust in, scientific matters

Base: All Young and Disengaged (n=71)
Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?
Bracketed figures = Total Sample

Parent/Informally Informed: Who are they?

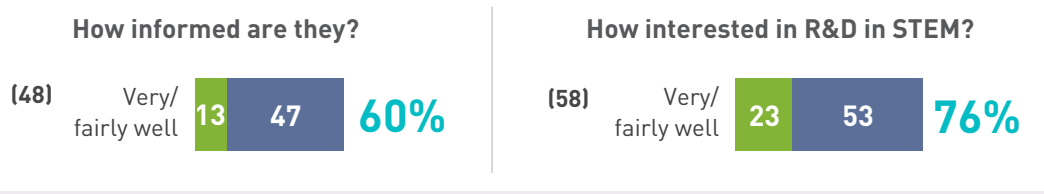
Figure 39: Parents/Informally Informed: Who are they?



This group of 30-50 year old parents have gleaned much of their scientific knowledge and attitudes via the education of their children. This being so they tend to have a very positive view of science and a well-rounded understanding of all aspects of the field from the earliest times – e.g. Archimedes and Galileo through to the most advanced applications of technology today. This group are interested in, and willing to engage with, science; their interest is aroused via their children's education or numerous other touch points – including scientific events that capture the public imagination. It is also true, however, that this cohort may take a jaundiced view of science, especially when it involves the efforts of large corporations. Overall, views were quite evenly balanced in how they regarded science and their interactions with it – both positive and negative.

On five of the statements measuring interest in science and STEM they score 8 in 10 or higher. Nevertheless when it comes to how informed they are only six in ten say very/fairly (figure 40 below) – so there is an evident knowledge gap between their levels of interest in subjects and how informed they actually are. Much of this gap is likely explained by the fact that their knowledge is derived from their children's education rather than first hand and thus may be less robust than their enthusiasm for the subject might imply. This group comprises 24% of 35-50 year olds.

Figure 40: How informed/interested "Parent/Informally Informed" feel/are about STEM?



Base: All Parents 'Informally Informed' (n=254)
Question: How informed do you feel about research and developments in science, engineering and technology?
How interested are you in research and developments (R+D) in science, engineering and technology?
Bracketed figures = Total Sample

Figure 41: "Parent/Informally Informed" interests in their free time

TOP 5

Interest in...		Any Interest	No Interest
(61)	New scientific discoveries	82%	5%
(66)	New inventions/technologies	82%	6%
(56)	Science and tech issues	83%	-
(70)	Medical discoveries	80%	6%
(67)	Environmental issues	81%	8%

Base: All Parents 'Informally Informed' (n=254)
I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time.

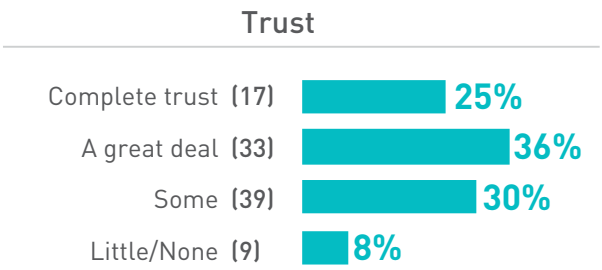
Figure 42: How informed "Parent/Informally Informed" feel about science and technology

Empowerment. Do they feel sufficiently informed?

(54) Net agree **65%** | (32) Net disagree **21%**

Base: All Parents 'Informally Informed' (n=254)
Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

Figure 43: How much trust "Parent/Informally Informed" have in scientific/engineering opinions

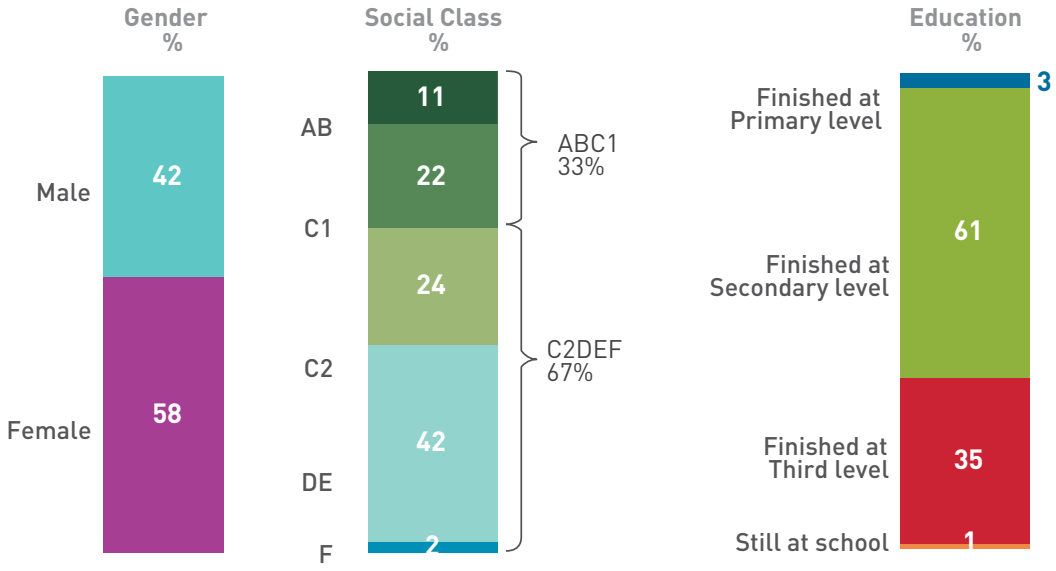


Parents have many touchpoints with science/technology matters, and are generally both informed and trusting. For some, however, there is a sense of wanting to learn more.

Base: All Parents 'Informally Informed' (n=254)
Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?
Bracketed figures = Total Sample

Disenfranchised: who are they?

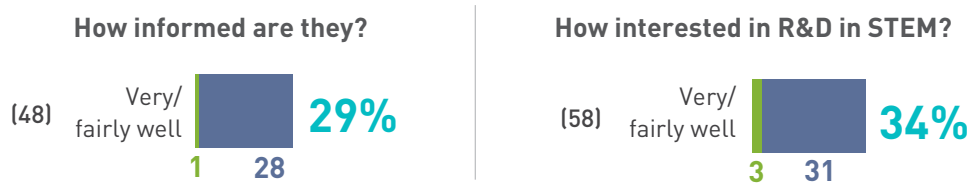
Figure 44: Disenfranchised: Who are they?



This segment of the 30-55 year old population have relatively low levels of interest in R&D and STEM (as shown in figure 45, just 34% very/fairly interested) and even fewer – just 29% subjectively consider themselves well informed on this measure. Moreover, their trust in the scientific professions is low with fewer than four in ten expressing complete or a great deal of trust. Their level of interest in STEM issues is also low, for example just 28% of this group say they are very or fairly interested in new scientific discoveries. This cohort of the adult population feels little connection with science and any interest that they do display tends to be via their children's studies and by references to popular culture. The disenfranchised actually have an interest in knowing more about science and technology so they may represent the most convertible group in terms of improving engagement.

As such, they can be seen as a key target constituency for Science Foundation Ireland, they are keen to learn more but feel they lack the facility to do so. This segment appreciate the way science is taught to their children (for example) and this offers them one route to expanding their knowledge. This group accounts for just less than one in five of the population (19%).

Figure 45: How informed/interested "Disenfranchised" feel/are about STEM?



Base: All Super Disenfranchised (n=189)
Question: How informed do you feel about research and developments in science, engineering and technology?
How interested are you in research and developments (R+D) in science, engineering and technology?
Bracketed figures = Total Sample

Figure 46: "Disenfranchised": interests in free time

TOP 5

Interest in...	Any Interest	No Interest
(61) New scientific discoveries	28%	46%
(66) New inventions/technologies	40%	43%
(56) Science and tech issues	-	64%
(70) Medical discoveries	52%	32%
(67) Environmental issues	46%	34%

Base: All Super Disenfranchised (n=189)
I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time.

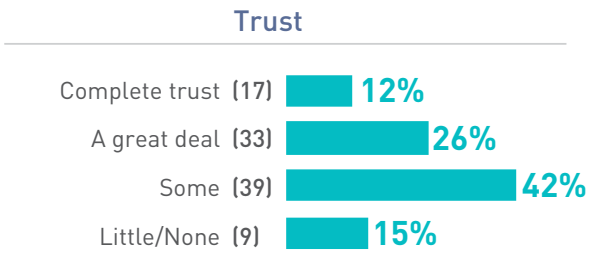
Figure 47: How informed the "Disenfranchised" feel about science and technology

Empowerment. Do they feel sufficiently informed?

(54) Net agree **34%** | (32) Net disagree **46%**

Base: All Super Disenfranchised (n=189)
Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

Figure 48: How much trust "Disenfranchised" have in scientific / engineering opinions



Disenfranchised –Their interaction with science is mixed, although not entirely negative. They feel only limited trust for scientists/engineers, arguably as a result of their perceived disconnection.

Base: All Super Disenfranchised (n=189)
Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?
Bracketed figures = Total Sample

Older and still curious: who are they?

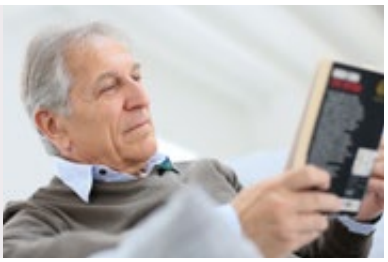
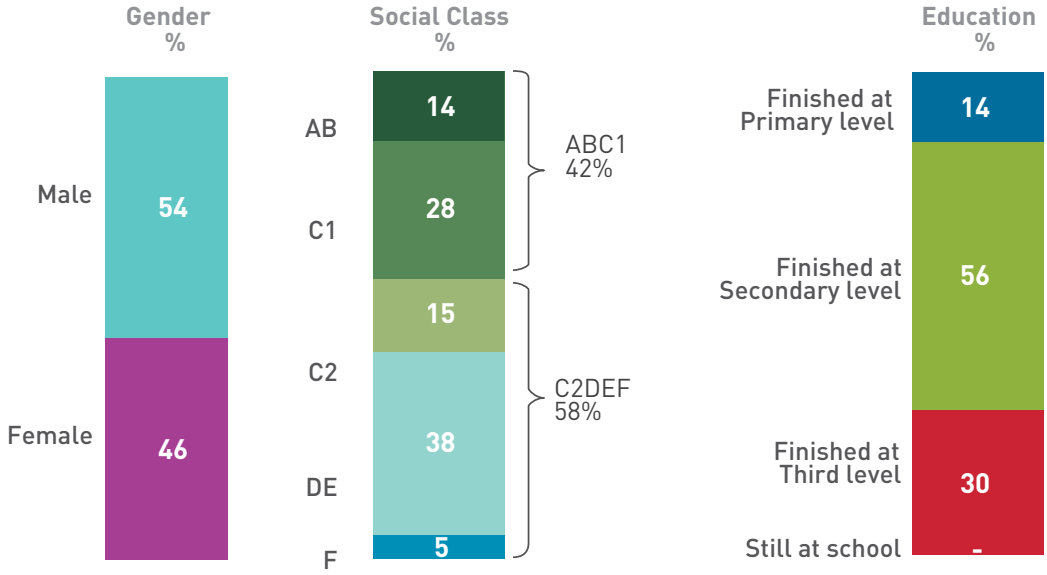
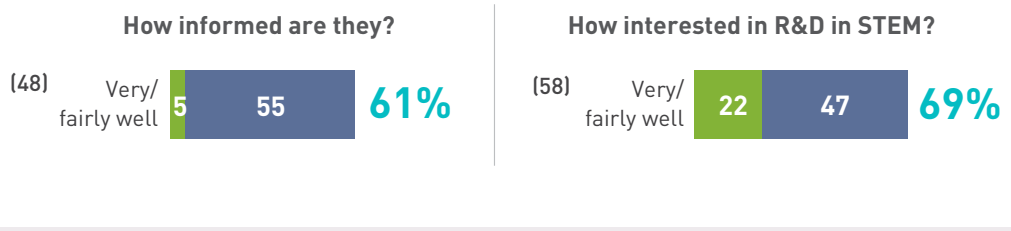


Figure 49: Older and still curious: Who are they?



This older cohort of the population aged over 55 have the longest life experience and therefore the best view of how science has advanced many areas of society for the better – especially in the fields of medicine and technology. Although there can be something of a disconnect between this group's enthusiasm for science and their actual knowledge, this does not diminish their overall respect for, and interest in, science and its discoveries. For example, as figure 50 shows, 61% agree that they are very/fairly well informed about science, whilst 77% are interested in new scientific discoveries and – probably reflecting their age – 86% are interested in medical discoveries. Although science can seem rather elitist to this group, this does not tend to translate into a lack of interest or trust. In total this group accounts for 16% of the adult population.

Figure 50: How informed/interested "Older and still curious" feel/are about STEM?



Base: All Older and still curious (n=159)
Question: How informed do you feel about research and developments in science, engineering and technology? How interested are you in research and developments (R+D) in science, engineering and technology?
Bracketed figures = Total Sample

Figure 51: Interests the "Older and still curious" have in their free time

TOP 5

Interest in...	Any Interest	No Interest
(61) New scientific discoveries	77%	12%
(66) New inventions/technologies	76%	9%
(56) Science and tech issues	78%	-
(70) Medical discoveries	86%	7%
(67) Environmental issues	83%	10%

Base: All Older and still curious (n=159)
I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time.

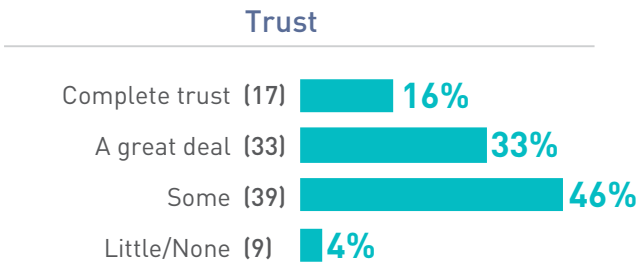
Figure 52: How informed the "Older and still curious" feel about science and technology

Empowerment. Do they feel sufficiently informed?

(54) Net agree **64%** | (32) Net disagree **23%**

Base: All Older and still curious (n=159)
Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

Figure 53: How much trust "Older and still curious" have in scientific/engineering opinions

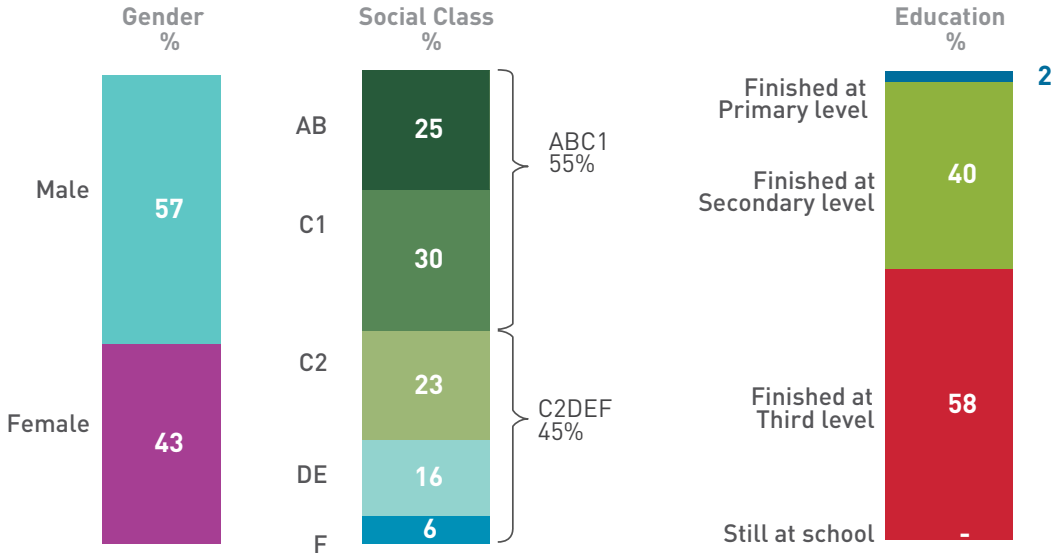


Older and still curious have a healthy interest in science, with medical and environmental issues being of most concern. They do not however blindly follow science – nearly half claim to just have "some" trust in the opinions of scientists.

Base: All Older and still curious (n=159)
Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?
Bracketed figures = Total Sample

The 'Super Interested': who are they?

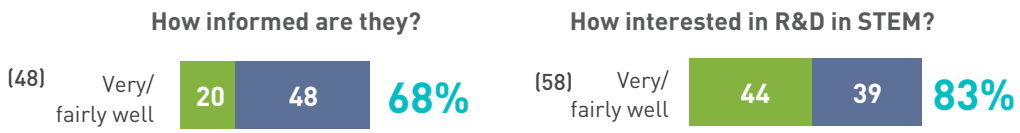
Figure 54: Super Interested: Who are they?



The key characteristics of this group are their understanding of science in its most holistic sense – science is all around them and is almost universally seen as a force for good. Figure 55 shows they are very interested in science with 83% stating an interest in R&D and STEM.

This group's interest in science is near universal: for example, 94% are interested in new scientific discoveries, 88% are interested in medical discoveries and 100% express the same sentiment for science and technological issues. Three in four of this segment consider themselves sufficiently informed, whilst almost seven in ten (68%) consider themselves well informed.

Figure 55: How informed/interested the "Super Interested" feel/are about STEM



Base: All Super Interested (n=111)
Question: How informed do you feel about research and developments in science, engineering and technology?
How interested are you in research and developments (R+D) in science, engineering and technology?
Bracketed figures = Total Sample

Figure 56: "Super Interested": interests in free time

TOP 5

Interest in...	Any Interest	No Interest
(61) New scientific discoveries	94%	5%
(66) New inventions/technologies	91%	3%
(56) Science and tech issues	100%	-
(70) Medical discoveries	88%	4%
(67) Environmental issues	87%	8%

Base: All Super Interested (n=111)
I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time.

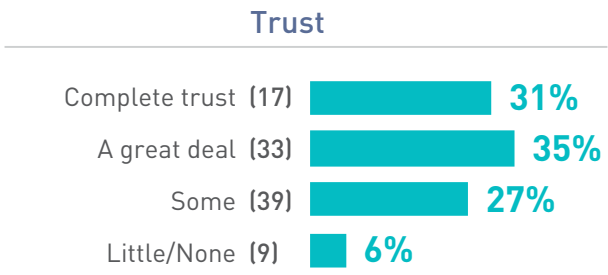
Figure 57: How informed the "Super Interested" feel about science and technology

Empowerment. Do they feel sufficiently informed?

(54) Net agree **74%** | (32) Net disagree **22%**

Base: All Super Interested (n=111)
Question: Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them.

Figure 58: How much trust the "Super Interested" have in scientific / engineering opinions



Super Interested – this cohort is insatiable in their appetite for science. They back it up by actively informing themselves, and have great trust in the discipline.

Base: All Super Interested (n=111)
Question: When you hear/read an opinion from a scientist or engineer how much do you trust it?
Bracketed figures = Total Sample

Furthermore, this group are able to discuss science and scientific progress beyond what they can tangibly see and engage with; they are able to tackle subjects such as the ethics, morality and philosophy of science marking them out as a group who are truly interested in science above and beyond the everyday and the newsworthy. Moreover, this group are very focussed on scientific education both at second and third level and are interested in the opportunities it offers them. This group largely embrace the rate of scientific change but are also capable of taking a holistic view as regards the positives and negatives of any scientific developments. Science and its benefits are greatly supported by this group and they will be key backers of any investment by government in science. In total this group of 30-55 year olds comprise 11% of the population.

Chapter 8: Recommendations

Attitudinal, Segments, Towards Science

- Awareness and appreciation of science can be targeted at different segments and in different ways.
- Parents are a key constituency who learn via their children – school curricula have a very wide reach.
- Some people are simply incurious about science and it may simply not be worth trying to communicate with them.
- Many older people are still excited by science and the possibilities it offers – there will be benefits to speaking to these people directly.

Summary of Recommendations

The following is a summary of the recommendations made throughout this report.

What is Science?

- Science Foundation Ireland has the opportunity to build on the positive associations with science by focussing public awareness around specific areas of research and technological developments.
- There is considerable scope for public education and awareness campaigns as many people, while interested, feel a lack of confidence in their knowledge of science, despite overall positive associations.
- There is much opportunity to lift science beyond the classroom in peoples' minds – too many classroom-type associations can limit the 'relevance' of science and how people relate to it as a subject and its application in their lives.
- Following on from above, science is more than third level institution and academic science; efforts could be made to lift science beyond these strong perceptions and associations.

STEM and Science?

- The interdependence of engineering and science should be more closely linked – there is considerable scope for educating people on the synergies between the disciplines.
- Continue to underline how STEM can lead to improvements in quality of life and provide solutions for many of society's needs from healthcare to energy to data protection.
- There is also scope to promote the potential impact of STEM in areas where recognition of the impact is comparatively weaker such as in benefitting an ageing population and security of citizens.

Science in Education

- Continue to re-enforce the link between the supply of STEM graduates and economic growth. Connect the real world application of STEM and the 'normality' or breadth and diversity of scientist and engineers in society.
- Address the issues at 2nd level where students currently drop out of STEM subjects; primarily the way the subjects are taught.
- Underline the prestige of STEM related careers while making them accessible.

Interest in Science

- Target engaging key demographic groups who currently have less interest in science i.e. women and the less affluent.
- Portray and communicate STEM research and developments in real terms, relevant to people's lives. Place STEM news in stories that make it more accessible for the majority who disconnect when they find it too complex or difficult to understand.

Science and the Irish Economy

- Continue to attract FDI that will have solid science-based foundations in the Irish economy.
- Build the public recognition of Ireland's ability, accomplishments and heritage in STEM achievements
- Underline the permanent and deep rooted, skilled nature of much of the FDI that comes into Ireland.
- Where possible highlight not just the government's role in investing in, but also in promoting to the public and young people, the technology and science-based economy.

Trust and Ethics

- Further educate people on the importance of ethics to science.
- The findings highlight the importance of growing the knowledge and value amongst the public of balanced debate as much as providing the balanced arguments.
- Provide a balanced debate on topical issues of 'bad' science e.g. fracking or nuclear power.
- Help bridge the 'trust deficit' by ensuring scientists/engineers are engaged with the public, and vice versa, and ensuring this reaches all demographic groups.

International Comparisons

- Continue to drive the awareness of the positive impact of science on society and to benchmark Irish attitudes compared with international studies.
- Science Foundation Ireland should investigate the methods used in New Zealand in terms of education and promotion to examine if there is potential to replicate work in Ireland to raise understanding of and engagement in specialised subjects. Denmark is also showing some interesting indications of greater positive attitudes towards science.
- Support compulsory science at second level.

Attitudinal, Segments, Towards Science

- Awareness and appreciation of science can be targeted at different segments and in different ways.
- Parents are a key constituency who learn via their children – school curricula have a very wide reach.
- Some people are simply incurious about science and it may simply not be worth trying to communicate with them.
- Many older people are still excited by science and the possibilities it offers – there will be benefits to speaking to these people directly.

Appendix One:

Who we talked to:

	Young Potentials	Young and Disengaged	Parents	Disenfranchised	Super Interested	Older and Curious
GENDER						
Male	56%	33%	51%	42%	57%	54%
Female	44%	67%	49%	58%	43%	46%
SOCIAL CLASS						
AB	13%	7%	19%	11%	25%	14%
C1	36%	19%	31%	22%	30%	28%
C2	23%	27%	26%	24%	23%	15%
DE	23%	44%	19%	42%	16%	38%
F	6%	3%	5%	2%	6%	5%
ABC1	49%	26%	50%	33%	55%	42%
C2DEF	51%	74%	50%	67%	45%	58%
EDUCATION						
Finished at Primary Level	-	2%	2%	3%	2%	14%
Finished at Secondary Level	30%	63%	42%	61%	40%	56%
Finished at Third Level	43%	18%	55%	35%	58%	30%
Still at School	28%	18%	1%	1%	-	-

Appendix Two:

Questionnaire:

Good morning / afternoon / evening. My name is _____ and I am conducting research on behalf of Millward Brown, an independent research agency. We are conducting a survey on people's attitudes towards issues of importance in Ireland in 2015. The survey is completely confidential, and all answers will be reported at an overall level, with no individual responses being identified. Remember, there are no right or wrong answers – we are simply interested in your own opinions
Depending on your answers, it will take around 22-24 minutes to complete.

SEX:
Male
Female

MARITAL STATUS:
Married
Living as Married
Single
Widowed/Divorced/Separated

WHETHER RESPONDENT WORKING:
Housewife (full time)
At school
Full time student (third level)
Temporarily unemployed (Actively seeking work)
Permanently unemployed
Retired
Full time (30 hours or more)
Part time (8-29 hrs per wk)
Self employed

RESPONDENT IS:
Chief Income Earner
Not Chief Income Earner

OCCUPATION OF CHIEF INCOME EARNER:
Record full job details:
If Manager/Self Employed State No. of Employees. Specify Qualifications/ Training.
If **FARMER**, state no. of acres:

*** CHIEF INCOME EARNER QUESTION:**
Which member of your household would you say is the **Chief Income Earner** - that is the person with the **largest income** whether from employment, pensions, state benefits, investments or any other source. If "**EQUAL INCOME**" relate to **OLDEST**.

CLASS:
AB
C1
C2
D
E
F50+
F50-

AGE:
(State exact and code)
15
16-17
18
19-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65+

Q1 I'd like to begin by asking you a few questions about yourself and the sorts of things you like to do in your free time. I'm going to read to you a short list of issues, and for each one I would like you to tell me how interested you are in each…

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT
SCRIPTER: SINGLE CODE PER STATEMENT. RANDOMISE STATEMENTS
FILTER: All 15+

Sport
International current affairs/politics
Irish Current Affairs/politics
The Arts
Music
New scientific discoveries
New inventions and technologies
IT/Social Media
Energy issues
Medical discoveries
Environmental issues
Economics and finance
Science/technology issues

Very interested
Quite interested
Neither
Not very interested
Not at all interested
Don't know/no opinion (do not read out)

Q2 What is the first thing that comes to mind when I mention Science, engineering and technology to you? Anything else?

INTERVIEWER: RECORD VERBATIM FULLY. PROBE FULLY
SCRIPTER: OPEN QUESTION
FILTER: All 15+

Q3 What does scientific research mean to you? Anything else?

INTERVIEWER: RECORD VERBATIM FULLY. PROBE FULLY
SCRIPTER: OPEN QUESTION
FILTER: All 15+

Q4 How informed do you feel about research and developments in science, engineering and technology?

INTERVIEWER: SINGLE CODE. READ OUT
SCRIPTER: SINGLE CODE
FILTER: All 15+

Very well informed
Fairly well informed
Not very well informed
Not at all informed
Don't know (do not read out)

Q5 How interested are you in research and developments (R+D) in science, engineering and technology?

INTERVIEWER: SINGLE CODE. READ OUT
SCRIPTER: SINGLE CODE
FILTER: All 15+

Very interested
Fairly interested
Not very interested
Not at all interested
Don't know (do not read out)

Q6 In the past year have you tried to find out any information on scientific or engineering research or developments?

INTERVIEWER: SINGLE CODE.
SCRIPTER: SINGLE CODE
FILTER: All 15+

Yes
No
Don't know

Q7 Why were you looking for this information?

INTERVIEWER: MULTICODE. DO NOT READ OUT
SCRIPTER: MULTICODE CODE. ASK IF YES (CODE 1) AT Q6
FILTER: ASK IF YES (CODE 1) AT Q6

It's an area that interests me
It's an area that worries me
It was relevant to my work
It was relevant to something I am studying
I saw a news story and wanted to know more
Other (PLEASE SPECIFY)

Q8. When actively looking for information on research and developments in science, engineering and technology where do you get that information from?

INTERVIEWER: MULTI CODE. SHOWCARD 1. SCROLL FOR FULL LIST
SCRIPTER: MULTI CODE
FILTER: Ask All 15+

Television
Newspapers
Magazines
Books
Radio
On websites
On social media or blogs
From my family/friends
From attending exhibitions/Fairs/Festivals

Other (do not read out)
You do not look for information about developments in science and technology (do not read out)
Don't know (do not read out)

Q9 How do you consider Ireland is competing globally in terms of achievements in scientific, engineering and technology research?

INTERVIEWER: SINGLE CODE. READ OUT
SCRIPTER: SINGLE CODE
FILTER: All 15+

Above average
Average
Below average
Don't know (do not read out)

If above average (code 1 at Q9), ASK–

Q10 In what areas do you think Ireland is above average?

INTERVIEWER: RECORD VERBATIM FULLY. PROBE FULLY
SCRIPTER: OPEN QUESTION. ASK IF CODE 1 AT Q9 (ABOVE AVERAGE)
FILTER: ASK IF CODE 1 AT Q9 (ABOVE AVERAGE). OPEN QUESTION

Q11 Here are some statements some people have made about science and technology. Please indicate how much you agree or disagree with them. *For many of these statements there is no right or wrong answer. We are just interested in your own opinion.*

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT. SHOWCARD 2
SCRIPTER: SINGLE CODE PER STATEMENT. RANDOMISE STATEMENTS
FILTER: All 15+

I enjoy finding out about new ideas in science and engineering
I enjoy finding out about new technologies
Science and technology are often too specialised for me to understand
There is so much conflicting information about science, it is hard to know what to believe
It is important to be kept up-to-date on science issues
It is important to support training and education in science, engineering, technology and maths
Science is important in my daily life
Research in science, engineering, technology and maths will lead to an improvement in the quality of life for people in Ireland in the next 20 years
Ireland needs to invest in scientific research in order to enhance our international competitiveness
Science is important for the preservation of Ireland's environment
Science is an important subject for people to study at school
Technology is an important subject for people to study at school
Knowledge of science is useful for increasing career opportunities
Science is a worthwhile career to pursue
Scientists should listen more to what ordinary people think
Science is important for improving human health
Science is important for addressing key challenges affecting our society
Research in science, technology, engineering and maths does not progress fast enough
Government investment in science, engineering and technology research is worthwhile
It is important that people have a good understanding of science as it impacts on all of our lives
I feel sufficiently informed to discuss topics that relate to science, engineering and technology that impact on society
I would like to be consulted on the areas of research and development supported by the Government in Ireland

Strongly Agree
Slightly Agree
Neither
Slightly Disagree
Strongly Disagree
Don't know (do not read out)

Q12 When you hear/read an opinion from a scientist or engineer how much do you trust it?

INTERVIEWER: SINGLE CODE. READ OUT OPTIONS
SCRIPTER: SINGLE CODE
FILTER: All 15+

Complete trust
Great deal of trust
Some trust
Little trust
No trust at all
Don't know (do not read out)

Q13 In your opinion, is the Government doing too much, about enough or too little to promote people's interest in science, engineering and technology?

INTERVIEWER: SINGLE CODE. DO NOT READ OUT
SCRIPTER: SINGLE CODE
FILTER: All 15+

Too much
About enough
Too little
Don't know

Q14 In your opinion, is the Government doing too much, enough or too little to stimulate young people's interest in science, engineering and technology?

INTERVIEWER: SINGLE CODE. DO NOT READ OUT
SCRIPTER: SINGLE CODE
FILTER: All 15+

Too much
Enough
Too little
Don't know.

Q15 Over the next 15 years, what should be the priorities when it comes to science, engineering and technological innovation? And what else? Anything else?

INTERVIEWER: RECORD FIRST AND OTHER MENTIONS. SHOWCARD 3.
SCRIPTER: RECORD FIRST AND OTHER MENTIONS
FILTER: All 15+

Transport and transport infrastructure
Education & skills
Quality of housing
Adaptation of society to an ageing population
Availability and quality of food
Protection of personal data
Reduction of inequalities
Energy supply
Health and medical care
Security of citizens
Job creation
Fight against climate change
Protection of the environment
No other mentions **(second screen option only)**

Q16 Over the next 15 years, what *impact* do you think science, engineering and technological innovation will have on the following areas …?

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT STATEMENTS. SHOWCARD 4
SCRIPTER: SINGLE CODE PER STATEMENT. RANDOMISE STATEMENTS
FILTER: All 15+

Transport and transport infrastructure
Education & skills
Quality of housing
Adaptation of society to an ageing population
Availability and quality of food
Protection of personal data
Reduction of inequalities
Energy supply
Health and medical care
Security of citizens
Job creation
Fight against climate change
Protection of the environment

A positive impact
No impact
A negative impact
Don't know

Q17. To what extent do you agree or disagree with the following statements?

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT STATEMENTS.
SCRIPTER: SINGLE CODE PER STATEMENT. RANDOMISE STATEMENTS
FILTER: All 15+

The information I hear about science, engineering and technology is generally true
Young people's interest in science, engineering and technology is essential for our future prosperity
It is important to encourage more the number of girls entering science, technology and engineering
Scientific research makes a direct contribution to economic growth in Ireland
Investing in science, engineering and technology research will deliver more jobs for the country
Because of science and technology there will be more work opportunities for the next generation
How the subjects were taught in School put me off science / technology
How the subjects were taught in School engaged me in Maths
The consistent supply of science, engineering and technology graduates is critical to Ireland's economic prosperity
A career in science, engineering and technology is very well paid

Strongly Agree
Slightly Agree
Neither
Slightly Disagree
Strongly Disagree
Don't know (do not read out

Q18 Thinking specifically about Ireland, and the impact of science and technology, which of the following sectors have benefitted as a result of science, engineering and technology initiatives in this country?

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT STATEMENTS. SHOWCARD 5
SCRIPTER: SINGLE CODE PER STATEMENT. RANDOMISE STATEMENTS
FILTER: All 15+

IT/Software development sector
Food sector
Agricultural sector
Biotechnology sector
Pharmaceutical sector
Energy Sector
Medical Healthcare sector
Financial sector
Manufacturing sector
Construction/Engineering sector
Communications sector

Has benefitted a lot
Has benefitted a little
Has not really benefitted
Has not benefitted at all
Don't know

Q19 Which of the following statements most closely reflects you own personal viewpoint? There are no right or wrong answers – we are just interested in your own beliefs.

INTERVIEWER: SINGLE CODE. SHOWCARD 6
SCRIPTER: SINGLE CODE
FILTER: All 15+

I would have **a lot of trust** in the advice given by the scientific community
I would have **some trust** of advice given by the scientific community
I would have **some distrust** of advice given by the scientific community
I would have **a lot of distrust** of advice given by the scientific community
Don't know/no opinion

Q20 There is a list of statements that I would like to you match with the following issues, some of which are often associated with science, engineering and technology. Which statement most closely reflects your own personal viewpoint on each issue? There are no right or wrong answers – we are just interested in your own beliefs.

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT STATEMENTS. SHOW CARD 6 AGAIN
SCRIPTER: SINGLE CODE PER STATEMENT. RANDOMISE STATEMENTS
FILTER: All 15+

Fracking
Internet and data protection
Climate Change
Safety of eating GM foods
Fluoridisation
Smart Phones and telecommunications
Vaccinations
Longer life expectancy
Wind Turbines close to homes
STEM cell research
Over-ground Pylons close to homes
Aircraft and the environment

I would have **a lot of trust** in the advice given by the scientific community on this topic
I would have **some trust** of advice given by the scientific community on this topic
I would have **some distrust** of advice given by the scientific community on this topic
I would have **a lot of distrust** of advice given by the scientific community on this topic
Don't know/no opinion

Q21 Which of the following scientific and technological topics would you be familiar with?

INTERVIEWER: SINGLE CODE PER STATEMENT. SHOWCARD 7
SCRIPTER: SINGLE CODE PER STATEMENT.
FILTER: All 15+

Artificial Intelligence
Nanotechnology
Data Analytics
DNA and the human genome
Personalised Medicine
Renewable Energy
Sustainable food production
Smart cities
Cybersecurity
Medical devices such as Heart stents
Fibre optic broadband

Familiar with
Not Familiar with
Don't know

Q22 Who, if anyone, sets/should set the rules and regulations for scientists in Ireland to follow when they are doing their job?

INTERVIEWER: MULTICODE. DO NOT READ OUT
SCRIPTER: MULTICODE CODE.
FILTER: ASK ALL 15+

The Government/agency/department
Scientists themselves
Scientific professional bodies
Ethics committees
European Union/Brussels
The general public
Global body (unspecified)
Don't know

Q23 Are you aware of any Government or Semi State body that promotes the development and funding of scientific research in Ireland?

INTERVIEWER: MULTICODE. DO NOT READ OUT
SCRIPTER: MULTICODE CODE.
FILTER: ASK ALL 15+

IDA
Department of Education
Department of Job, Enterprise and Innovation
Enterprise Ireland
Forfas
Science Foundation Ireland (SFI)
Other (please specify)
Not aware of any/ Don't know

Q24 Have you ever heard of Science Foundation Ireland (SFI)?

INTERVIEWER: SINGLE CODE. DO NOT READ OUT
SCRIPTER: SINGLE CODE. ASK IF CODE 6 (Science Foundation Ireland) NOT MENTIONED AT Q23
FILTER: ASK IF CODE 6 (Science Foundation Ireland) NOT MENTIONED AT Q23

Yes
No
Don't know

Q25 How familiar are you with what SFI (Science Foundation Ireland) does?

INTERVIEWER: SINGLE CODE. PROBE TO PRECODES
SCRIPTER: SINGLE CODE. ASK IF CODE 6 MENTIONED AT Q23 (Science Foundation Ireland) OR CODE 1 MENTIONED AT Q24
FILTER: ASK IF CODE 6 MENTIONED AT Q23 (Science Foundation Ireland) OR CODE 1 MENTIONED AT Q24

Very Familiar
Quite Familiar
Not very Familiar
Not at all Familiar
Don't know

Q26 What do you think SFI's role is in Ireland?

INTERVIEWER: RECORD VERBATIM FULLY. PROBE FULLY
SCRIPTER: OPEN QUESTION. ASK ALL
FILTER: ASK ALL

Q27 Which of the following statements apply to you regarding the following –

INTERVIEWER: SINGLE CODE PER STATEMENT. SHOWCARD 8
SCRIPTER: SINGLE CODE PER STATEMENT.
FILTER: All 15+

Maths
Foreign Languages
Technology in our day-to-day lives
Career paths in science, engineering and technology

I feel very comfortable dealing with /talking about this topic
I feel quite comfortable dealing with /talking about this topic
I feel quite uncomfortable dealing with /talking about this topic
I feel very uncomfortable dealing with /talking about this topic
I avoid it/them if at all possible

Don't know/no opinion

Q28 How important is it for Ireland to produce science, engineering and technology graduates from University and Institutes of Technology each year?

INTERVIEWER: SINGLE CODE.
SCRIPTER: SINGLE CODE
FILTER: All 15+

Very important
Important
Neither
Not important
Not important at all
Don't know

Q29 Have you ever heard of the following? PLEASE LET US KNOW WHICH ONES YOU HAVE HEARD OF.

INTERVIEWER: SINGLE CODE. READ OUT AND RECORD ANSWER
SCRIPTER: SINGLE CODE. RANDOMISE.
FILTER: All 15+

Science Week
Tech Week
Engineers Week
Maths Week
Smart Futures
SFI Discover
BT Young Scientist and Technology Exhibition
SciFest
Coderdojo

Yes
No
Don't know

Q30 Have you ever attended events at one of the following programmes?

INTERVIEWER: SINGLE CODE PER EVENT/STATEMENT. READ OUT AND RECORD ANSWERS
SCRIPTER: SINGLE CODE. RANDOMISE. ASK OF EVENTS MENTIONED AT Q29 ONLY
FILTER: ASK OF EVENTS MENTIONED AT Q29 ONLY

Science Week
Tech Week
Engineers Week
Maths Week
Smart Futures
SFI Discover
BT Young Scientist and Technology Exhibition
SciFest
Coderdojo

Yes
No
Don't know

Q31 Which of the following statements best fits your experience as a result of attending (answers given at previous question) of the following statements fits best?

INTERVIEWER: SINGLE CODE PER EVENT/STATEMENT. SCROLL DOWN FOR FULL LIST. READ OUT AND RECORD ANSWERS
SCRIPTER: SINGLE CODE. RANDOMISE. ASK OF EVENTS ATTENDED AT Q30 ONLY
FILTER: ASK OF EVENTS ATTENDED AT Q30 ONLY

I have more knowledge of science, engineering and technology because of attending (ANSWERS GIVEN AT Q30)

I am more comfortable debating science issues because of attending (ANSWERS GIVEN AT Q30)

I have some more knowledge of science, engineering and technology because of attending (ANSWERS GIVEN AT Q30)

I have little increased knowledge of science, engineering and technology because of attending (ANSWERS GIVEN AT Q30)

I did not increase my knowledge of science engineering and technology after attending (ANSWERS GIVEN AT Q30)

ADDITIONAL CLASSIFICATION DETAILS

Which, if any, of these have you visited or attended in the last 12 months?

INTERVIEWER: SINGLE CODE PER STATEMENT. READ OUT
SCRIPTER: SINGLE CODE PER STATEMENT.
FILTER: All 15+

Zoo or aquarium
Laboratory
Science museum
Science festival / exhibition
Nature reserve
Planetarium
Some other science based event

Yes
No
Don't know

To what level did you study science or a science subject?

At primary level
At secondary level
At third level
Still at school/college

To what level did you finish your education?

At primary level
At secondary level
At third level
Still at school/college

IF FINISHED EDUCATION AT THIRD LEVEL ASK: **SCRIPTER: SINGLE CODE. FILTER: CODE 3 THREE FROM EDUCATIONAL QUESTION 'To what level did you finish your education?')**
What was the final qualification you received?
Certificate/Diploma
Undergraduate degree
Postgraduate degree (Masters)
Postgraduate degree (PhD)

IF FINISHED EDUCATION AT THIRD LEVEL ASK:
What was the final course you studied? SHOW SCREEN
INTERVIEWER: SCROLL DOWN FOR FUL LIST
FILTER: CODE 3 THREE FROM EDUCATIONAL QUESTION 'To what level did you finish your education?')

1: Architecture, Building and Planning
2: Biological Sciences
3: Business and Administrative Studies
4: Computer Science
5: Creative Arts and Design
6: Education
7: Engineering and technology
8: History and Philosophy
9: Languages
10: Law
11: Maths and Physics
12: Medicine and Dentistry
13: Other Arts/ Humanities
14: Other Science
15: Other – please specify

NO. OF PEOPLE IN HOUSEHOLD (Incl Respondent)

1 2 3 4 5 6 7+

DEPENDENT CHILDREN:
(Regardless of Age)

Respondent has:
Any dependent children
No dependent children

HOUSEHOLD COMPOSITION x AGE:

Code Each Age Group Including respondent, All Adults & All Children

Aged under 1 year
Aged 1 - 2 years
Aged 3 - 5 years
Aged 6 - 10 years
Aged 11 - 14 years
Aged 15 - 17 years
Aged 18 and over

HOUSEHOLD RESPONSIBILITY:

Who in your household is mainly responsible for ordinary shopping and looking after the home?
Respondent (ie, Housekeeper)
Other Person

ETHNIC ORIGIN:

Irish National
GB/UK (excl NI)
USA/Canada
Eastern Europe
Other Europe
South Africa
Other Africa
India/Pakistan/Bangladesh
China/Vietnam
Other Asia
Australia/New Zealand
Poland
Nigeria
Other

RESPONDENT WILLING TO BE RE-INTERVIEWED:

Yes
No

HOUSEHOLD TENURE…

Rented
Owner
Living with parents

PHONE IN HOUSEHOLD:

No landline or mobile
Yes landline only
Yes Mobile only
Yes both landline and mobile
(Specify one Tel. No.)

PERSONAL USAGE OF INTERNET

Yes– at home
Yes – at work
Yes - elsewhere
No – do not personally use

Which of the following letters best matches your **Gross household** income per year?
Interviewer: SHOW PAPER CARD CLASS
If asked this is pre tax income
Scriptor: single code
Filter: ask all

1: Q. Under €25,000
2: S. Between €25,001 and €50,000
3: R. Between €50,001 and €100,000
4: T. Between €100,001 and €150,000
5: P. Over €150,001
6: DK/Refused

THANK AND CLOSE

Science Foundation Ireland
Wilton Park House
Wilton Place
Dublin 2
Ireland

t: + 353 1 607 3200
f: + 353 1 607 3201
e: info@sfi.ie
w: www.sfi.ie

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Foundation Ireland