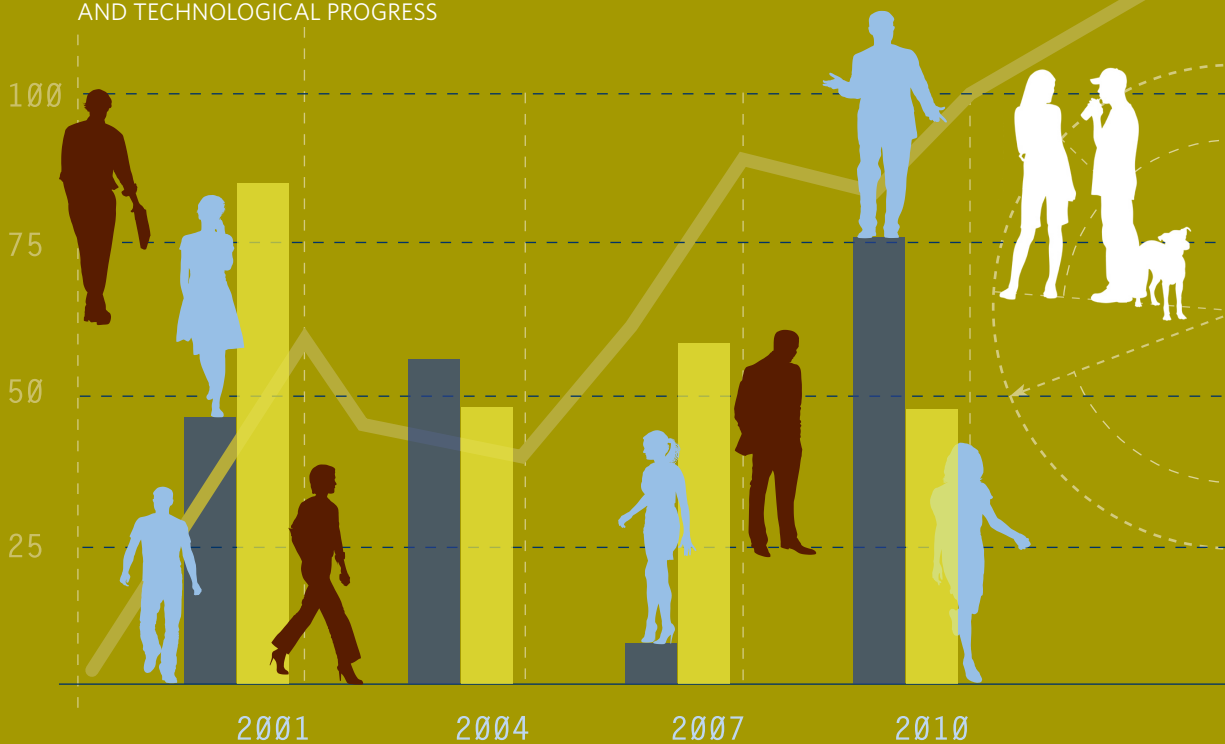


Summary of the Finnish Science Barometer 2010

A STUDY OF THE FINNS' ATTITUDES TOWARDS SCIENCE AND THEIR OPINIONS ON SCIENTIFIC AND TECHNOLOGICAL PROGRESS



**SUMMARY OF
THE FINNISH SCIENCE BAROMETER
2010**

**A study of the Finns' attitudes towards science and their
opinions on scientific and technological progress**

Finnish Society for Scientific Information

Editor: Jockum Hildén
Translation: Malcolm Hicks
Cover layout: Minna Ruusinen / Miks' ei! Oy
Cover picture: Minna Ruusinen
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Finland and Science

Finland invested about 3.9% of GDP in research and development in 2010, a total sum of 6.9 billion euros, of which the private business sector accounted for 73%. With some 80 000 people altogether working in R&D, Finland is among the leading performers in this field in relative terms and has a scientific output amounting in absolute figures to 1% of the OECD total.

The principal elements in the Finnish research and innovation system are education, research and product development, together with a knowledge-intensive enterprise culture and an all-pervading interest in broad-based international cooperation. Finland has set out to develop its education, science and technology policies for the express purpose of strengthening this national innovation system in the long term.

Finland has quite consistently been pointed out in international comparisons as a model country in terms of the skills of reading and comprehension, and increasing emphasis has been placed on the need to develop scientific reading abilities, the responsibility for which is seen to lie with the scientific community, the school system and the whole of society. This report presents some results regarding the Finns' attitudes towards science.

1. Introduction

How does the public perceive science? Is the scientific community effective in its research? Is it competent? Can you trust researchers? Is scientific research worth the money? How are these matters reflected in the attitudes and interests of common people?

The Finnish Science Barometer seeks to answer these questions on the national level. The current barometer is the fourth of its kind, which means that it also allows us to draw certain conclusions on how these perceptions have changed during the past decade (the first Science Barometer concerned the year 2001). Over all these answers reflect a certain spirit of the times rather than actually reflecting the level of scientific research.

The results presented in this report are based on written responses given by 1031 individuals in a survey carried out during the summer of 2010. The respondents had been randomly picked from the Population Register to be representative 18-70-year-old population over the whole country (disregarding the Åland Islands).

The report was commissioned by *Finnish Society for Scientific Information (Tieteen tiedotus ry)* from *Yhdyskuntatutkimus Oy* and was produced under the direction of the researcher Pentti Kiljunen.

This summary includes certain highlights from the original report, which is only available in Finnish.

2. The Finns' interest in science

To evaluate better how much the Finns actually appreciate science, the respondents were also asked to list to what extent other fields interested them. The widespread belief that the Finns live close to nature seems to be true, as 77% of the respondents reported being either quite or very interested in nature or the environment. Social affairs seemed to be the second most popular category, at 67%, which is paradoxical in view of the fact that few people seem to be interested in the actual administration of society. The third most popular area is entertainment, which 59% admitted to following regularly.

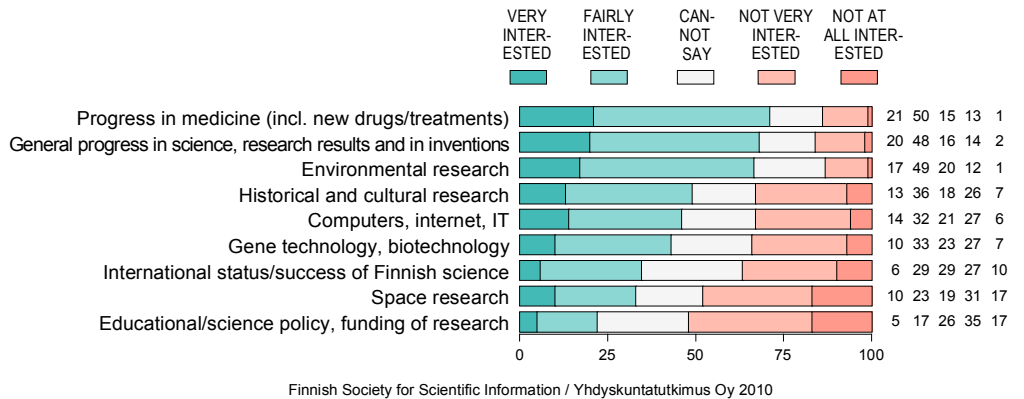
Science is the fourth most intensively followed field in the media, with 57% of the population announcing that they are keen followers of scientific, technological and research-related affairs. This high figure may partly be explained by the fact that science is seen as something highly civilised – one is supposed to be interested in it. On the other hand, this applies to all the other categories mentioned above as well, with the exception of entertainment, and is especially true of social affairs – as few people, even in an anonymous survey, want to be classed as politically ignorant. With regard to entertainment, this factor may have a negative effect: people may want to give the impression that they devote a larger part of their time to other, more serious fields.

Interests seldom come alone, however, and people showing an interest in science are usually also interested in the economy, society and nature. On the other hand, there seems to be a negative correlation between science and sport as well as between science and entertainment. These results seem to support the general feeling many people may already have had before reading the results. On the other hand, another common belief, that young people care only for entertainment, does not bear up to closer scrutiny. In fact young people have a greater interest in science than other age-groups, which is not the case in most other fields.

Not all scientific areas are equally appealing, however, despite the generally high interest shown by the population (Figure 1). Everyone is concerned about their own health, and this is also reflected in the fact that seven out of ten state that they follow advances in medical research closely. Here again the general love for nature is evident, as 66% of the respondents keep themselves abreast of research results regarding the state of the environment. Public campaigns to increase people's awareness of environmental issues seem to have bore fruit. Concern for the environment is no longer seen only as the useless, emotional bickering of an environmentally extremist minority but rather as a matter of confronting problems which concern most people.

Science Barometer 2010

Figure 1. HOW INTERESTED ARE YOU IN/HOW CLOSELY DO YOU FOLLOW CERTAIN SCIENTIFIC ISSUES (%)



The correlation noted above, that people with specific interests tend to have a greater thirst for knowledge in general, also applies to their interest in individual fields: i.e. being interested in one field of research is most likely to increase a person's interest in another.

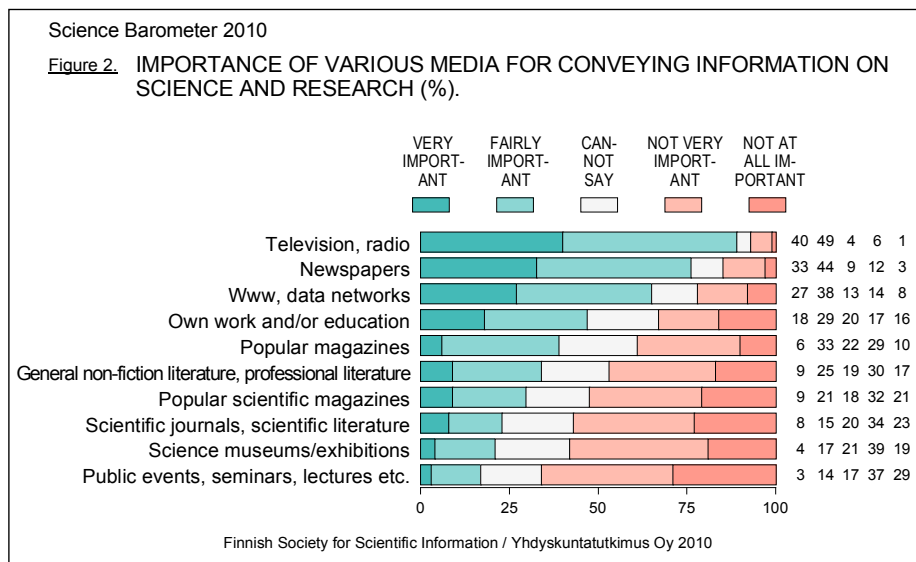
Although one can say that most Finns are interested in science, there are still fundamental differences between population groups regarding which research fields are perceived as interesting. Medicine, technology and innovations are followed more closely than space research, for example, and the least interesting category is the funding of science and policies related to science, although this area is of fundamental importance for those involved in the scientific community.

This is not to say that there are not differences among the Finns, however.

Medicine and genetics interest women more than men, while men are more interested in informatics (information technology) and space research. The interest in medicine is a fascinating topic, since all population groups regardless of age, sex or education seem to be interested in developments, even those who otherwise show a lack of interest in scientific research.

3. The role of the media

Scientific information does not come to the attention of the wider public by itself. Even though 80% of the population use the internet on a regular basis, the traditional media still reign supreme as sources of scientific information. Nearly nine out of every ten respondents, 89%, feel that television and radio are at least fairly important sources of scientific information, and nearly eight out of ten see newspapers as important (Figure 2).



There has been some further development even during the last three years, as 65% of the respondents now list the internet as an important source of scientific information, by comparison with 54% in 2007. This can partly be explained, however, by the more active online presence of the traditional media, so that much of the information published on websites belonging to newspapers or television channels may actually originate from traditional sources.

As it turns out, most Finns would like to see even more science discussed in the media. Nearly three fourths of the respondents are of the opinion that the media should provide even more scientific news and articles, and only 6% oppose this idea. This is true of all population groups and is something that the media organisations should take into consideration.

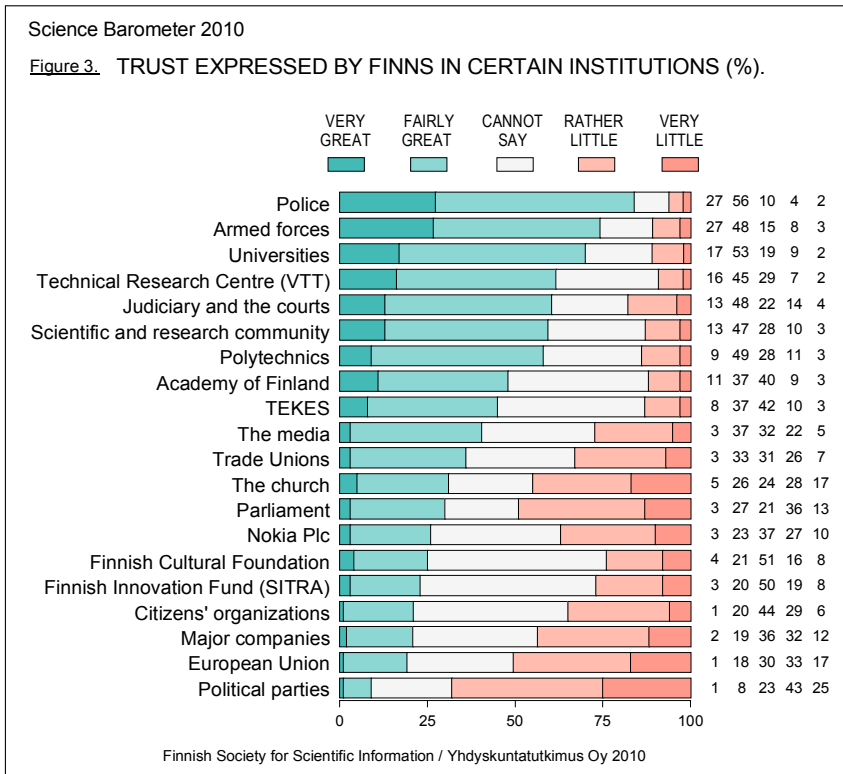
The media bring science closer to those not involved in the scientific community, but the perception that research is ensconced in an academic ivory tower still prevails. Every second respondent agrees with the view that “science is too separated from the rest of society, too out of touch with everyday life”, and only one out of every five Finns seem to be satisfied with the way science affects the regular lives of citizens. The results are understandable in view of the fact that the expert community differs so greatly from the general public. Scientists might not wish to be publicly known outside their own academic circle, something that has at least been the general opinion amongst scientists before.

The psychological distance between researchers and the public is also expressed in the view that there is some uncertainty regarding the actual usefulness of research for everyday life. One positive development, however, is that the scientific world is perceived as slightly less remote than in the first barometer survey.

The remoteness of the scientific community can partly be explained by the lack of popular scientific writing, as many of the respondents wanted scientists and academics to be more understandable, to present difficult subjects in a simplified form and to explain things in the mass media and not only in academic reviews. Here arises the difficulty of combining motives, of course, as it might be more important for the scientists themselves to maintain a high level of exactitude than to reach a wider audience.

4. In science we trust

After the armed forces and the police, it is the scientists that the Finns trust the most, so that the universities in Finland actually enjoy as much trust as the armed forces. Seven out of ten trust the higher academic institutions highly and only approximately one tenth (11%) report a lack of trust in these (Figure 3). The polytechnics, or universities of applied science, lag behind slightly in this respect, but they still manage to inspire a good deal of trust: 58% of respondents trust them highly and only 14% are critical. As a side remark one may also note that scientific literacy is high in Finland, as only a small percentage of the population (22%) agree with the claim that science cannot be trusted because experts from the same field may be of completely different opinions. Perhaps even more expressive of this is that three out of every four respondents agree that conflicting opinions are a fundamental part of science.

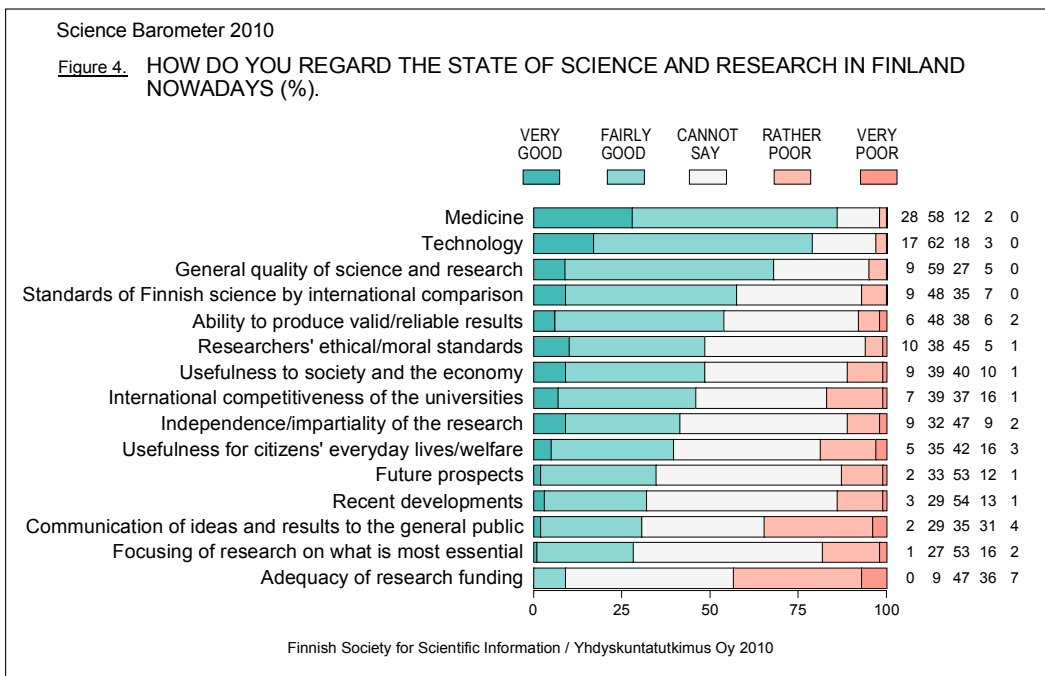


The trust placed in science and research organisations is slightly less positive, but this can partly be explained by their lesser publicity. The Technical Research Centre of Finland (VTT) is the most trusted of these organisations, with a score of 61%.

The results are very impressive when we remember that a mere 9% of the population trust politicians while 68% do not trust them at all and 49% distrust parliament as a whole.

4.1 The perceived level of research

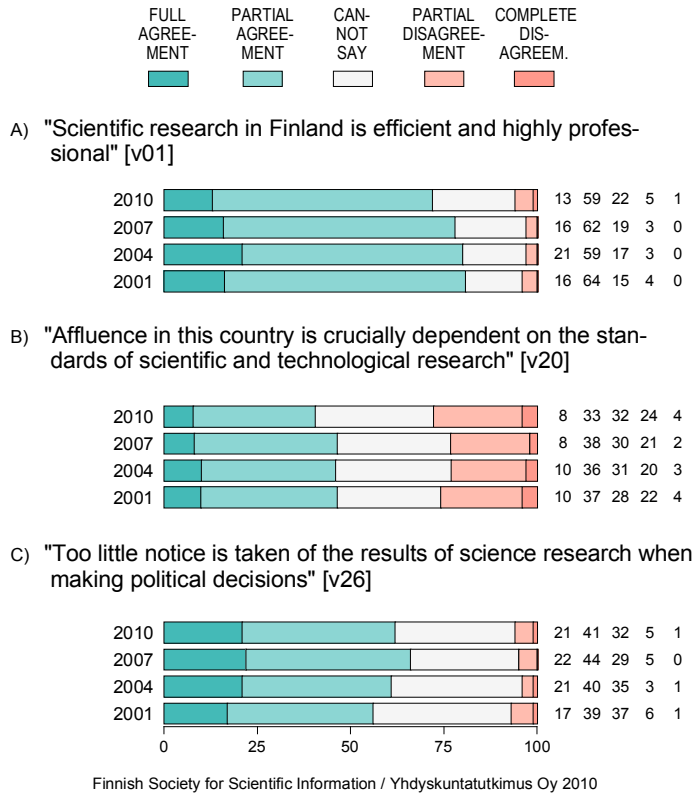
The barometer shows that the respondents regarded Finnish research as being of high quality. Medicine received the highest praise of all the research fields, with 86% good or very good reviews and technology was a close second with 79%. The overall level was also rated good by two out of every three respondents, while only a few (5%) seem to believe that the Finnish scientific research is of poor quality (Figure 4).



Even though three out of four seem to agree that the scientific research in Finland is effective and highly professional, the correlation between how the respondents see science and the wellbeing of Finnish society is not so direct. 41% of the respondents still believe that affluence is dependent on scientific research, but a fairly large percentage, 28%, are not entirely convinced (Figure 5).

Science Barometer 2010

Figure 5. ATTITUDES TOWARDS CERTAIN CLAIMS REGARDING SCIENTIFIC KNOWHOW AND ITS SIGNIFICANCE FOR AFFLUENCE (%).



Most people (68%) agree, however, that politicians should consult the results of scientific research more often and that science could be of help to politicians in their decision-making. The public are also willing to donate the necessary funds for research, even though it may be expensive, and the claim that only research which is economically feasible should receive funding is dismissed out of hand. Most of the Finns do not see cooperation between the universities and businesses or industry as inevitably involving a conflict of interests but only to a certain extent. At the same time, however, more than half (55%) believe that science is too widely subjected to market forces. The conclusion one can draw from this is that economic institutions may contribute financially to the scientific community, but that is where their influence should end.

Despite the positive impressions aroused by scientific research in Finland, there is still a small majority of respondents (51%) who feel that too much useless research is being conducted at the taxpayers' expense. This is only seemingly in conflict with the other results, as it is in fact completely logical that unnecessary research can exist in parallel with research that yields results. It remains quite impossible to deduce, however, exactly what research the respondents were thinking of when agreeing to this claim.

4.2 Science's ability to solve problems

The fact that the Finns believe that Finnish research is of high quality already gives support to the claim that people puts a lot of trust in science. This can also be seen from the answers given to the questions regarding the ability of science to solve problems.

Medicine is once again the star of the show, as more than 87% believe that science can help rid us of diseases such as cancer, AIDS and swine flu (H1N1). Furthermore, the majority (63%) believe that science is capable of prolonging human life.

On the topic of science's ability to solve environmental problems the answers are slightly more cautious, but there are significantly more who believe that science can solve the planet's environmental issues (51%) than are convinced that it cannot (27%). Similarly, 54% of the respondents believe that problems of energy production, a closely related category, can also be solved thanks to science, while 19% remain pessimistic.

These results reflect how people perceive a more specific environmental issue, climate change. Most Finns (76%) believe that climate change is a real and serious threat, so that politicians need to take swift action to combat its effects. As there are innumerable arguments both for and against climate change being aired in the media all the time, it is interesting to study how people perceive the agencies engaged in spreading this information. The argument that international climate researchers have purposely distorted their results leaves many people uncertain, but two poles of more or less the same size emerge comprising those who clearly agree and disagree with the argument (31% and 27%, respectively). The counter-argument that climate change sceptics spread misleading information similarly divides the population, although more agree (36%) with the argument than are inclined to dismiss it (18%). Here the young respondents were less inclined to accuse the climate researchers of deceitfulness.

Although science may be the answer to a lot of questions, it is not seen as capable of solving social problems. Few believe in society's ability to create world peace, promote democracy or reduce unemployment. The unemployment and looming risk of losing one's job which followed the financial crisis may have increased the proportion of critical opinions over the period since the earlier barometers. One interesting observation, however, is that the highly educated respondents are far more pessimistic than the others regarding science's ability to resolve armed conflicts and increase happiness.

The Special Eurobarometer employed in 2010 to give some indication of the Finns' trust in science compared with their European counterparts suggests that they are more sceptical of science's ability to solve any problems, but more optimistic regarding its ability to solve environmental problems.

5. World view

What can be said about the Finns' outlook on the world from a scientific perspective? The magazine *Science* found in 2005 that the Finns were less inclined to believe in the theory of evolution than other Europeans, a result that caused quite a scare in this country, but even today the results are the same: roughly two thirds (68%) believe in the theory of evolution. The only difference is that those who actively dismiss the theory are fewer in number than was claimed in the *Science* survey.

The differences between the groups are vast. The younger the respondents are, the more convinced they are of the validity of the theory of evolution, and the connection with education is just as clear: the higher their education the stronger their belief that we share our origins with animals. Not surprisingly, there is a close inverse correlation between trust in the church and acceptance of the theory of evolution.

Although a lot of trust is shown in medicine, a fair proportion of the respondents still believe that there might be less conservative alternatives available. Almost every second respondent agreed that nature healers possess information and skills which traditional medicine does not support – while three out of ten deny any such claim. Most of the support for such healers is to be found in smaller communities and amongst women and the elderly. Similarly, a significantly larger proportion of the women believe in homeopathy, 40% as opposed to only 20% of the men.

Continuing on the subject of quasi or alternative science, 17% believe that certain horoscopes which rely on astrology are more reliable than the ones seen in the yellow press. A notable proportion are not entirely sure (21%) and the majority who deny the claim (62%) may be seen as either large or small depending on the interpretation. Given that this is a science-oriented society, a considerable percentage of the respondents appreciate alternative science in one way or another.

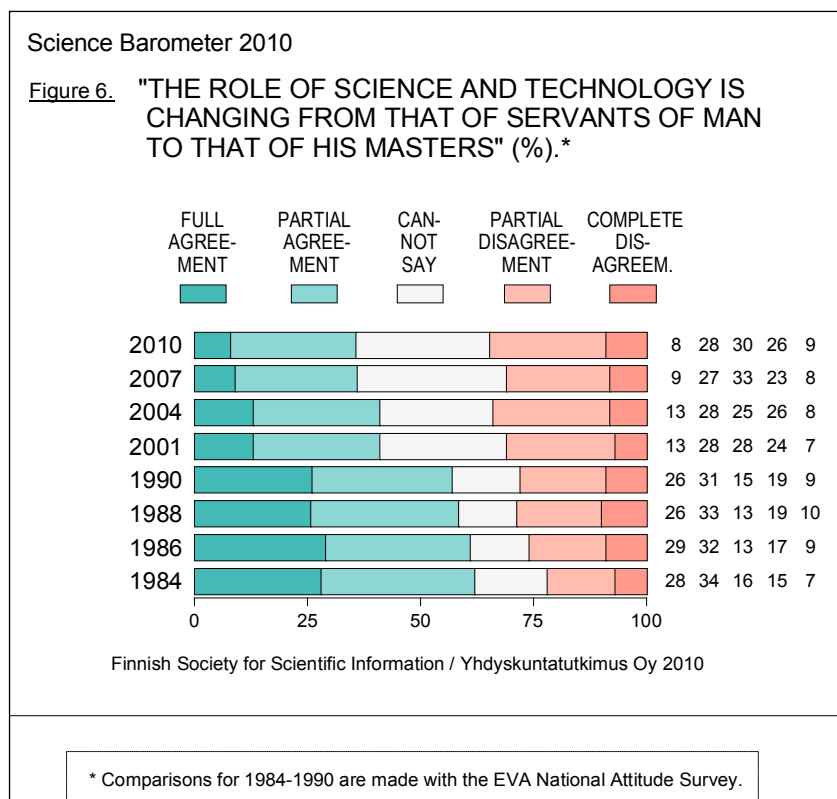
5.1 Science-related risks and threats

Is science changing our lives too quickly? Although the heyday of scare stories about science might be over, the Finns do seem to be mildly worried about how scientific investigation is evolving. Nearly half (44%) feel that technology and science make our ways of life change too fast, while 34% are not of this opinion. The Eurobarometer survey mentioned above showed that the Finns were slightly more at ease regarding how science changes our lives than European citizens in general. Looking at earlier Science Barometer results we can draw the conclusion that the Finns

worry less about this question nowadays than they did earlier, but according to the Eurobarometer they worry more. The reason for this difference in the results may lie in the slightly different formulation of the question in the two surveys.

At the same time the claim that science creates as many problems as it solves is supported by 28% of the respondents and opposed by 35%. The claim has met with slightly more opposition during the last 10 years, which indicates that society is slowly becoming more appreciative of science. As the level of education rises, people are becoming less inclined to believe that science creates problems.

The slightly more dystopian claim that science and technology are evolving from servants of man to become his master is not easily dismissed. Those who oppose this claim (35%) are roughly as many as those who do not (36%). We should not read too much into this, however, as many people may have interpreted the question as implying that technology is becoming more dominant in our everyday lives, rather than referring to a Terminator-type supremacy of machines over humans (Figure 6).



Overall, the results are slightly more encouraging than in the early nineties and earlier, when scientific advances were more openly feared than today.

5.2 Science and ethics

How far would the Finns let a scientist go in the name of research? The use of gene technology has been a subject of public debate, and this is also reflected in the survey answers. In general, gene technology is seen as something positive by about half of the respondents, although certain specific areas are best left untouched. Three out of four believe that humans should not be cloned, and that any such attempts should be forbidden in Finland and elsewhere. There are also few who would accept the use of genetically modified food (16%).

The use of animals in scientific experiments also receives public support. Nearly two out of every three respondents would agree that although these tests raise some ethical problems, the results are of such importance that they cannot be completely banned. A fourth would disagree with this claim, representing an increase in objectors over the years. Even so, 70% agree that cases of misconduct are exceptions and that one should not judge the whole scientific community on that basis. Likewise, 57% believe that the Finnish scientific community acts responsibly.

5.3 The rise of scepticism

Comparison with earlier results reveals a clear tendency for Finnish society to be more sceptical than earlier. Opinions on nearly all levels are more critical than in the earlier surveys, and a number of institutions seem to suffer from a lack of trust.

Science is not left untouched in this era of scepticism, but it is perhaps slightly less affected than most other areas. In particular, it is clear that as the level of education rises so does people's trust in all forms of scientific organisations.

At the time of the previous surveys we were living in an atmosphere of success, which also caused excessive expectations to emerge. The financial crisis is probably one of the fundamental reasons for the present mood of scepticism. One cannot blame the economy for everything, however, as a slight negative change in attitude could also be perceived before the crisis.

The role of the media cannot be overlooked in this. Since the last research the media has regularly conveyed critical messages to the public. The public debate has been saturated by a certain critical vision that unless we strengthen, support and renew our research activities, the Finnish scientific community will wither away. Only someone who is completely isolated from the media would maintain that the Finnish scientific community is in an optimal state at the present time.



How does the public perceive science? Is the scientific community effective in its research? Is it competent? Can you trust researchers? Is scientific research worth the money? The Finnish Science Barometer seeks to answer these questions on the national level. The current barometer is the fourth of its kind, which means that it also allows us to draw certain conclusions on how these perceptions have changed during the past decade.

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