

Public Trust in Scientific Information

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Abstract

It has been said that public trust in scientists, and indeed in science, is dwindling. People seemingly rely on beliefs rather than on fact and in any case do not trust authoritative information. In stead they rely on information presented to them by groups of individuals with whom they share beliefs or ideologies.

This paper sets out to explore this assumption by looking at available evidence of the level of trust in science, scientists, scientific information and in scientific institutions. The study is based entirely on already published material and is therefore confined to analyse on the questions asked in previous surveys. Especially the establishment of time-series is therefore difficult as very few longitudinal studies exist in the area. Time-series results should therefore be viewed as merely indicative of trends.

Summary

1-2 pages incl. Illustrative graph on historical development in 3 regions

Context

It seems to be a widely held view that the public do no longer trust scientists or the information they bring forth. In fact it has come to the point where this is not considered a point of view but rather a fact that is no longer questioned. Newspapers regularly report on the issue¹ referring to the growing gap, the existing gap, etc. Thus something is definitely not right, since so many sources state that it isn't.

Also in scientific magazines and journals this view can be found. In the debate columns of *Nature*² a debate has been going on for some time regarding public trust in science. Under the heading "How to restore public trust in science" two leading members of Greenpeace set out to help science get into closer contact and trustful partnership with the public. Their view is that science should be much more attentive to public opinion, and much less act as an appendix to government and industry.

Whether such suggestions would have any impact on public perception is not the issue of this paper. The paper merely sets out to gauge whether there has actually been a change in public perception, especially related to trust in science, and to the extent possible to shed light on who and what the public trust if it does not trust science. The notion is interesting, however, because it points towards the role of science, which has changed significantly over the past 100 years.

100 years ago science had a limited volume and a limited impact on people's daily life. Scientists may well have been viewed as trustworthy experts, but it mattered little to most people as they seldom came in close contact with science. Up through the first half of the 20th century the role of science changed gradually, and especially World War II speeded up this change dramatically. Discoveries and developments such as the Atomic Bomb, Cyclon B and certain medical experiments on human beings carried out during the war spurred discussions on the ethical responsibility of scientists, and marked a gradual departure from the view that science was innocent, pure and "value free".

The decades after the war, where the Cold War was raging, saw a very strong focus on science as an important tool or rather a weapon of the war. Developments such as the H-bomb, satellites, manned space flight, micro electronic, bio-warfare products, etc. are all products of the arms race. These developments in many cases have produced spin-off technology, which has transformed our daily life at an ever-increasing pace. Personal computers, Internet, cellular phones, satellite television, medical discoveries are all examples of "science products" which now affects all of us every day.

Thus the experience of the public is that of science evolving over a period of 100 years from a position of obscurity to a position at the centre stage of societal development. Over the same time people have experienced a mixture of blessings and curses brought on by science in conjunction with industry, government, military, etc. Science today takes on enormous proportions claiming in the range of 2-3% of GDP in major industrialised countries³.

¹ The Daily Telegraph in reporting on a report by the Select Committee on Science and Technology refers to the lack of confidence, due to e.g. BSE crises and debate on GM foods. Another example is The Guardian reporting on Tuesday March 14 that "Scientists must talk to public".

² *Nature*. October 7, 1999. Commentary.

³ Reported in COM (2000) 6, quoting Eurostat.

The effects are felt every day by people using high-tech products, just as well as the adverse effects of our science based industrial society are becoming more and more visible. Many effects may in reality not be the effects of science, but rather the effects of our use and dispose of products of science and industry. However, also here science plays a role, as it is often scientists, who warn the public of the danger. E.g. scientists have been strongly involved in the identification of ozone depletion, global warming, endocrine disrupters, etc. just to mention a few recent examples. Thus a significant role of scientists today is that of heralds of bad tidings.

A number of parallel developments may have affected the public perception of science during the second half of the 20th century:

- Science at the universities has been matched by science in companies. These companies have a vested interest in results, which helps them develop their products, and in some cases in suppressing evidence of potential harmful effects of use of their products. This has fostered discussions regarding definition of reasonable doubt⁴, which is crucial in science, but potentially difficult for people to understand.
- Over the past 20 years a growing influx of private capital into universities have blurred the distinction between "objective" university science and "subjective" privately funded research. In a number of cases this has led to arguments about publication of results not favourable to the sponsoring organisation⁵.
- The hunt for funds for universities has led some universities to publicise research findings, which had not undergone the proper peer-review process of the scientific community. In cases where findings were later found to be erroneous this has generated a view of science as rather speculative, and not founded in common sense⁶.
- General confidence in governments and authorities have decreased over the last half century. As scientists in many cases work for governments this also reflect on the confidence in the advice given by these scientists. Recent examples such as BSE has accelerated the decrease in governments in some countries.
- The role of NGO as a filter between the increasingly complex findings presented by scientists and the public, may have added to the decrease in confidence in authorities as these organisations are in many cases able to match the scientific skills of some scientists. Thus the discussion of e.g. reasonable doubt between science and the public (represented by NGO's) take on a rather scientific style.

All in all science today play a much larger role that it did early in the last century. Science today serves many masters (governments, industry, NGO's, etc). This in turn may have affected how the

⁴ The most publicized case is probably the discussion on the harmful effects of smoking. Here industry has been charged with withholding evidence concerning health-related problems. The view of science in this case is that of participating in the cover-up, and as that of adding to endless discussions about reasonable doubt in scientific results.

⁵ In a recent case a Danish oral hygiene chewing gum manufacturer was charged with trying to suppress results of sponsored research which showed that the gum was not as effective as claimed in advertisement.

⁶ The best publicized case is probably the case of cold fusion, where two well esteemed researchers at a press conference told about their experience with fusion a room temperature in some palladium electrodes immersed in heavy water. No one has been able to replicate their findings since then.

public view science. The object of this paper is to look into available studies and try to summarise the most visible trends.

Major reference studies

Very few studies exist, which explicitly set out to explore the public trust in science. Therefore this study rely on studies of other aspects parallel to the issue at stake. The studies are presented by region.

Europe

The Eurobarometer study series is a semi-annual study carried out to evaluate a range of topics of interest to European organisations. In addition to establishing very long time-series on a number of core-issues the studies focus on issues relevant for the present debate, e.g. the implementation of the Euro. From time to time themes such as public trust are treated as well.

Eurobarometer 35.1, (autumn 91)

Source pt. not available

Eurobarometer 39.1, (spring 1993)

Source pt. not available

Eurobarometer 46.1, (autumn 1996)

Source pt. not available

*Eurobarometer 52.1, (15-3-00)*⁷

This Eurobarometer theme study was conducted in November-December 1999 and reported in early 2000. It is the fourth study on Europeans attitudes towards science and technology.

In this survey people have been asked specifically about their trust in information originating from different sources concerning modern biotechnology. People have been asked to identify the source they trusted the most, and to indicate whether they trusted other types of organisations. Thus this question is not about science in general, but limited to biotechnology. This leads to the following table⁸:

⁷ In all 16082 people have been interviewed in this survey covering all 15 EU member states.

⁸ Eurobarometer 52.1 report, page 79. The figures on 1st choice do not add up to 100%. This is probably due to rounding off effects.

	1st	Others	Total	Classification
Consumer organisations	26	29	55	1
Environmental organisations	14	31	45	3
Animal protection organisations	4	21	25	5
The medical profession	24	29	53	2
Farmer' associations	3	12	15	9
Religious organisations	2	7	9	11
National public authorities	3	12	15	9
International institutions (not private companies)	4	13	17	8
A specific industry	0	3	3	12
Universities	7	19	26	4
Political parties	0	3	3	12
Television and newspapers	4	16	20	6
None of these (spontaneous)	6	5	11	10
Do not know	6	12	18	7

Consumer organisations (26+29%) and the medical profession (24+29%) emerge as clearly the trustworthiest entities, with environmental organisations (14+31%) trailing somewhat behind. Animal protection organisations (4+21%), universities (7+19%) and the media (4+16%) are rather low as first choice, but uphold some trustworthiness as secondary source. Industry (0+3%) and political parties (0+3%) are by far the least trusted organisations.

Even though there are some minor differences in the formulation of the questions, as compared with the 1996 study⁹, an indicative comparison has been made¹⁰:

	1996	1999
Consumer organisations	20	26
Environmental organisations	17	14
Animal protection organisations	4	4
The medical profession	16	24
Farmer' associations	2	3
Religious organisations	2	2
National public authorities	4	3
International institutions (not private companies)	4	4
A specific industry	1	0
Universities	9	7
Political parties	0	0
Television and newspapers	4	4
None of these (spontaneous)	7	6
Do not know	9	6

It can be seen from this comparison that there is a growing trust in consumer organisations (+6%) and the medical profession (+8%). There is some reduction in the trust placed in environmental organisations (-3%), and there is a slightly reduced trust in universities (-2%). For the remaining organisations differences amount to 1% or less.

Looking at the sociodemographic variables there is a tendency among women, elderly, low-income groups and low education level to place relatively higher trust in the medical profession. Among men, young people, high-income groups and those with long education there is a tendency to place relatively more trust in consumer organisations

⁹ Eurobarometer 46.1

¹⁰ Eurobarometer 52.1 report, page 82. When comparing it is important to note that columns do not add up to 100% due to rounding off. Thus differences of 1 or less should be viewed as insignificant

It is possible to group these organisations to get a clearer picture¹¹

	1996	1999
NGO's Consumer org. Environmental org. Animal protection org.	41	44
Governments, etc. National public authorities, International institutions	8	7
Producers Farmer' assoc. A specific industry	3	3
Independent Science Universities and the medical profession	25	31
Other Religious org. Political Parties, Media	6	6
None of these or do not know	16	12

Based on these figures it is not possible to detect any trend towards less trust in governments or industry. However, the trust is at a very low level and the time between the two studies is relatively short. On the other hand there is a strong growth in trust in NGO's and in Independent Science. This could indicate that the public tend to look for its own advocates - someone who does not have a financial interest in the outcome of a debate.

Select Committee on Science and Technology, House of Lords, UK, Third Report, (23-2-00)

The Select Committee on Science and Technology (SCST), House of Lords, UK, is charged with studying the area of science and technology policy. SCST does this by regularly reporting to the House on relevant policy issues. The third report, issued early 2000, reports on public attitudes and values¹², understanding of science, trust in different sources of information and science education.

The report contains a rather detailed discussion regarding the apparent paradox that many science and technology related products and services are taken for granted, just as well as popularised books on science sell very well, whereas people on the other hand are reluctant to embrace many of the tools deemed necessary for the advancement of science. An example is animal testing which is rejected on ethical grounds. The report also notes that rejection of developments is not necessarily a new trend. Both electricity, steam railroads and many other technologies have at one time been rejected by smaller or larger groups of the public. Thus there is a tendency towards rejection of new technologies until the public becomes familiar with them. The main question is then whether this tendency is growing and intensifying.

In a poll taken in 1996 a group of people were asked to name 2-3 groups to be trusted as regards the truth about pollution. Since people could name more than one source the figures does not add up to 100%. The ranking was the following¹³:

¹¹ The 1996 figures add up to 99% whereas the 1999 figures add up to 103%. A significant part of differences should therefore be assigned to rounding off effects. The grouping of responses into 6 groups cannot be found in the report and is the responsibility of the author of this paper.

¹² The committee deals with attitudes and values of people living in UK. I does, however, include some international comparisons. I should be borne in mind that public attitudes towards science in the UK may have been affected more by the BSE crises than the attitudes in other countries.

¹³ Select Committee on Science and Technology, Third Report, 23-2-2000, Annex 6, Table 5. Based on questions to 1015 persons, 16 years and older.

	%
Pressure Groups (e.g. Greenpeace or Friends of the Earth)	61
Independent Scientists (e.g. university professor)	60
Television	25
Government Scientists	23
Friends or family	15
Newspapers	14
Government Ministers	6
Private companies	5
Politicians generally	4
Civil servants	3
Other	*
None of these	2
Don't know	2

In a similar question concerning the truth about BSE the ranking was the following:

	%
Independent Scientists (eg university professor)	57
Farmers	22
National Farmers Union	21
Civil Servants at the Ministry of Agriculture, Fisheries and Food	18
Government Scientists	17
Television	16
Newspapers	12
Food Manufactures	11
Family/friends	9
Supermarkets	6
Government Ministers	4
Politicians generally	2
Other	1
None of these	4
Don't know	3

The trend is rather clear. The public trust sources they to some extent believe to be independent from government and industry. This is emphasised by reference to a range of other studies, all reaching similar conclusions.

The report also looks at different international studies of the interrelationship between supportiveness of science and how well the public understand science. It is reported¹⁴ that better understanding of science tend to generate less unmitigated enthusiasm for science. This is explained by the fact that people have a better understanding of positive as well as negative consequences.

The report contains no specific survey as to the development of trust over time. However, references are made to the deterioration of public trust in science. Thus the report provides a good look into the issues affecting trust, but not the development over time.

¹⁴ SCST report paragraph 2.8-2.10

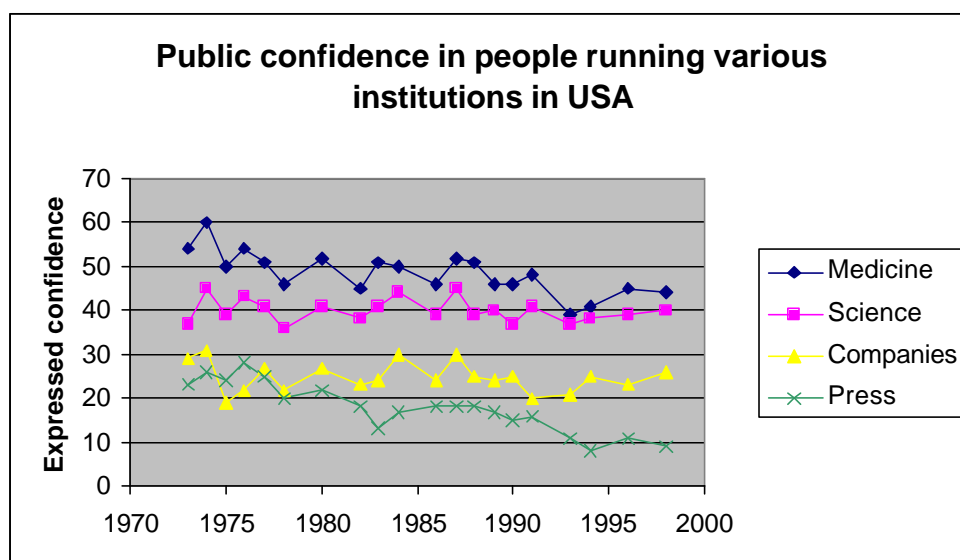
North America

*National Science Foundation, USA, Science and Engineering Indicators 2000 (13-1-00)*¹⁵

This study is an annual reporting from National Science Foundation to the US administration. The report covers a wide range of topics ranging from financial issues in science to education and public confidence in science.

Being an annual study the report contains a description of the development over time. Thus it is possible to find interesting time series. The most striking feature of the survey is the great stability in many of the figures representing trust and confidence issues. This seems to indicate that the US public does not share the apparent reduction in confidence reported by the media in Europe.

An interesting time series in this context is a question asked in a general social survey¹⁶. A group of people has been asked about their confidence in people running various types institutions. Some of the groups are relevant in this context.



There seems to be a slight tendency towards reduced trust in medicine (but at a very high level) and a marked decrease in confidence in the press. Confidence in scientific institutions (or rather the people running them), on the other hand, is at the same level as 25 years ago.

There are similar figures for politicians, military, etc. which are less stable. This is most likely explained by events such as Watergate, the Vietnam War, the Gulf War, etc. It does not seem that such issues have affected the trust in scientific institutions.

All in all it is difficult to detect any reduction in trust in science, at least to the extent that this can be represented by confidence in people running scientific institutions. There is, however, the

¹⁵ National Science Foundation, Science and Engineering Indicators 2000

¹⁶ NSF, Appendix table 8-23. Sample sizes vary between 899 and 2011, with an average around 1500. The graph represents a subset of the options presented to people.

possibility that the public trust the people running the institutions, based on these peoples general integrity, but still do not trust the advice given by the institutions.

The Pew Research Center, Millennium Survey part 1 and 2, (2-7 99)

The Pew Research Center is an independent opinion research group that studies attitudes toward the press, politics and public policy issues. Among the studies are studies on trends in values and fundamental political and social attitudes.

In the Millennium survey a total of 1546 adults have been asked a range of questions. One group deals with achievements of America as a nation during the 20th century. The technological achievements top the list by far (41%), whereas issues such as winning World War II and securing peace in general only achieve (7%).

These figures may to some extent be explained by "lack of memory" about e.g. WW II among younger people. However, it does indicate a great deal of confidence in science and technology as a way to advance, even though it does not tell anything specifically about trust in scientists.

Seen in context of the NSF study it seems reasonable to conclude that Americans are generally optimistic about science and scientific progress. At the same time they place great trust in people running scientific institutions. Therefore it appears likely that they are not more likely to mistrust scientific information today as compared to earlier.

East Asia/Pacific region

Eubios Ethics Institute. Attitudes to Genetic Engineering. Japanese and International Comparisons. (1992)

The Eubios report sets out to study and discuss ethical questions arising from human involvement with life. It includes a large survey of Japanese attitudes towards science in general and biotechnology in particular. In addition it includes references to a range of international studies of the same topics.

It is mentioned that the public debate in Japan is mostly confined to a very little group of decision-makers, industrialists, etc. Thus it is difficult to assess public opinions, as people are generally no used to being asked¹⁷.

Quoting 3 different surveys published by the Prime Minister's Office¹⁸, the report concludes that the general interest in science and technology has remained fairly stable over a period of 10 years. The interest is measured via a specific question in a survey, and very similar to a question asked in USA. By comparing the surveys it may be concluded that interest in USA is higher. However, given that there are significant cultural differences in the way people respond to surveys, it may be difficult to make international comparisons like this.

¹⁷ See section 1.1 of report. Page numbers are not provided as the web based version does not follow the original pagination.

¹⁸ Surveys performed in 1981, 1987 and 1990, and published by Prime Minister's Office in 1990. See section 3.1 of report.

Two questions, which were asked as part of the survey, which formed the basis for the report, dealt with credibility of statements made by scientists and companies. The public were asked if they would agree with a statement that they believed a statement made by a government scientist about safety of a research project, and a statement by a company about the safety of a new product. The response was as follows¹⁹:

	Statement made by a government scientist about safety of research project	Statement made by a company about safety of a new product
Sample	508	510
Strongly disagree/Disagree	20.5 %	36.2 %
Neither	44.5 %	46.9 %
Agree/Strongly agree	35.0 %	16.9 %

Based on this survey it seems reasonable to claim that scientists are viewed as more trustworthy than companies. However, the report does not yield much information about what the public expect when a government scientist is mentioned. In the UK case these are the least trusted (because of the BSE crises). In numerous cases throughout the report surprising results are explained by the fact that Japanese may use other words than the words used in this specific survey. Thus the survey does not shed much light on attitudes in Japan.

Institute of Biological Sciences, University of Tsukuba. Attitudes to Biotechnology in Japan and New Zealand in 1997, with International Comparisons. (1997)

In an attempt to update and refine the analysis from 1992 presented above, the authors have tried to use the Eurobarometer questionnaire²⁰. This has the advantage of generating readily comparable results, but may potentially lead to false conclusions, as insufficient adaptation to local conditions can generate results, which does not reflect reality.

The study deals primarily with biotechnology. Two sets of questions are considered of interest. One deals with which regulatory body is deemed most appropriate. The other deals with confidence in information received.

Concerning appropriate regulatory body people have been asked to name such among a number of options. It seems that in some cases the interviewer has accepted more than one answer. Therefore the table has been modified in order to indicate the ranking of the different entities, rather than their absolute score²¹.

	Japan	New Zealand	EU	Canada
International organisations, UN or WHO	1	1	1	1
Scientific organisations	2	2	2	2
Ethics committees	3	3	4	4
Public bodies in countries	4	4	3	3
National Parliament	5	5	5	5

¹⁹ Adapted from table 8-1 of the report.

²⁰ The Eurobarometer questionnaire from report 46.1 has been used in Japan and New Zealand with some minor modifications. Additional results are obtained from Canada, where another revision of the 46.1 questionnaire has been used. Original 46.1 studies were made in 1996. The studies from Japan, New Zealand and Canada are from 1997.

²¹ A modified version of the Table 8 in the article.

As can be seen the results are very similar. Looking at the specific numbers ethics committees were a very close runner-up for 3rd place in EU and Canada²². This seems to indicate at least some trust in the scientific community in general.

Going a bit further a survey similar to the one presented by Eurobarometer gauges the most trusted organisations in Japan and New Zealand. The same groups as used in the presentation of the Eurobarometer study have been used²³

	Japan	New Zealand
NGO's Consumer org. Environmental org. Animal protection org.	106	76
Governments, etc. National public authorities, International institutions	7	5
Producers Farmer' assoc. A specific industry	8	1
Independent Science Universities and the medical profession	37	54
Other Religious org. Political Parties, Media	3	4
None of these or do not know	9	5

Looking at the results one notes a distribution which is very similar to Europe, where NGO's are the most trusted group in general, and where independent science come as a clear second far ahead of any other group.

There seems therefore to be a public perception of science in Japan and New Zealand, which is very similar to the public perception in Europe.

Institute of Biological Sciences, University of Tsukuba. Biotechnology and young citizens: Biocult in New Zealand and Japan. (1997)

In a study from 1997 a group of researchers set out to study the attitudes of teenagers towards biotechnology. Among the questions asked was a question about trust in different sources of information. The percentages expressing trust or a lot of trust are indicated in the following table²⁴:

	Japan	New Zealand
Teachers	41	47
Doctors	49	69
Scientists	43	66
Environmental groups	47	43
Politicians	3	2
Journalists	15	8
TV news	21	18
Companies	8	10
Priests	9	28

²² The difference may reflect minor changes in the way the questions were asked. It has not been possible to evaluate this. However Japan and NZ are very much alike and were studied by one group working together. Canada and EU on the other hand were studied separately, but also show very similar characteristics.

²³ Table 9 in report. Even though the question asked concerned "the most trusted organization" sums add up to more than 100%. This must indicate that several cases of multiple answers have been included in the results.

²⁴ Table 3 in the report.

These figures are fairly consistent with what have been seen earlier. The only surprise is that environmental groups actually score in some cases lower than scientists do. However, science, the medical profession and NGO's seems to have a much higher credibility than do politicians, companies and the media.

Discussion

Before attempting to conclude anything on the available material it is important to note that many of the surveys are not directly comparable. The US surveys deal with trust in people running various institutions, whereas the European studies deal with the trust in information coming from somebody associated with such an institution. Additionally comparison between Europe and Asia is hampered by the fact that there seems to have been used other definitions in Asia than in Europe, in spite of the fact that the same questionnaire has been used in some of the surveys.

The general picture of Europe is that of a region where the public is most likely to trust information coming from a range of NGO's with consumer protection organisations at the most important group. The trust in these organisations is rising.

The public also trusts the medical profession and independent science. Also this trust seems to be on the rise.

Governments and scientists working directly for them, together with industry and the press, are not trusted by the public.

Thus there seems to be a tendency for Europeans to trust people and groups which can be considered as independent of major power interests, or which are "on the public's side". Thus it is a picture of a population which chooses carefully whom to trust.

The general picture of Japan and New Zealand (and possibly the rest of the East Asia/Pacific region) is very similar to Europe. The major difference seems to be that Japanese are more likely to trust government scientists than Europeans. This may be explained by the recent BSE crises in Europe, which may have led many Europeans to reject government scientists as such.

Finally the general picture of USA is that of a country where the public trusts scientists generally, does not trust governments or the press, but which does to some extent trust companies (or rather the people running them). No information regarding NGO's in USA is available.

In spite of the differences the striking feature is really the similarities. In all regions the public seems to be interested in science, seems to trust scientists, and seems to distrust industry and governments.

Why, then does all newspapers and journals talk about the decline in trust?

A number of possible answers could be:

- When people are asked if they trust scientists they think of a wide range of different scientists, of which most are working in non-controversial areas, and where there are no reason to expect them to tell anything but the truth as far as they know it. If this is the case then one must assume that science journalists reporting on e.g. lions in Africa or the search for neutron stars are synonymous with scientists.
- A number of groups have a vested interest in depicting the situation as moving from bad to worse. This could be groups such as environmental groups, which in order to be taken seriously portray the opponent (mostly government and industry) as not to be trusted. If this is the case it can be concluded that they have been successful, since they are part of the segment most trusted by the public.
- Finally an explanation could be that a well educated public in an open society makes informed decisions and based on experience tend to trust some groups "under their control" more than other groups.

Probably none of these explanations hold the full truth. A combination of them, however, may provide some insight into the working of development of trust.

Development of science ... 50 years

Examples of problems and cover ups by gov and indu

Educated public actually paying attention

Groups offering solutions and info, david and goliath myth

Groups also loose support if they are shown to be wrong Brent Spar

This points towards a role for governments, etc as that of opening up archives to ensure proper and correct information.... Create background for debate ... ensure education level in science ... understanding of risk ... open debate on controversial issues ... accept of result

Framework conditions

NGO science advice to media?

Conclusions

Access to independent information is important....

Framework conditions

References

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