Chapter 2
European Trends in Science Communication

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Abstract This chapter reports on current trends in science communication in Europe in the light of several recent studies by the European Commission. The author investigates why the European public's scientific knowledge, as measured by the surveys, has increased substantially over the past few years. He then reviews coverage of science in the European media and analyses the relationships between European scientists and journalists and recent trends in reportage. Noting that it has become harder to gain public acceptance of scientific and technological innovations in Europe, the author argues that the science–society dialogue is insufficiently developed because a genuine communication culture is lacking in the science and technology sector. This lack may hamper the advancement of the sector.

Keywords Science communication, science journalism, science and the media

2.1 Introduction

In Europe, recent scientific and technological developments in such areas as nuclear energy, GM (genetically modified) food and cloning have generated a lot of media coverage, public debates, political decisions—and even fights. This may create a general impression that the European public is losing confidence in science and technology (S&T). Some media have published reports about growing anti-science opinion in Europe.

Against this background, public opinion surveys (Eurobarometers) are carried out by the European Commission on a regular basis, with the most recent published in December 2007 (EC 2007a). Dedicated reports published in 1992, 2001 and 2005 show that science and technology are still valued positively in Europe. Citizens expect a lot from scientific progress. For example, more than 80% of Europeans are confident that scientific and technological progress will help to cure

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diseases such as AIDS, cancer and so on. Europeans put great trust in S&T: 87% agree that scientific and technological advances have improved their quality of life, and 77% believe that they will continue to do so for future generations. Europeans also want political decisions to rely more on experts' advice. Interest in S&T remains high (78% of citizens are very or moderately interested in new scientific discoveries), although it has decreased since 1992. The proportion of people who are 'very interested' in S&T issues has dropped significantly since then.

The S&T Eurobarometers include the following questions on S&T issues:

Here is a little quiz. For each of the following statements, please tell me if it is true or false. If you don't know, say so, and we will go on to the next one.

The Sun goes around the Earth
The centre of the Earth is very hot
The oxygen we breathe comes from plants
Radioactive milk can be made safe by boiling it
Electrons are smaller than atoms
The continents on which we live have been moving for millions of years and will continue to move in the future
It is the mother's genes that decide whether the baby is a boy or a girl
The earliest humans lived at the same time as the dinosaurs
Antibiotics kill viruses as well as bacteria
Lasers work by focusing sound waves
All radioactivity is man-made
Human beings, as we know them today, developed from earlier species of animals
It takes 1 month for the Earth to go around the Sun

Results of this knowledge quiz show that, for most statements, a majority answered correctly (see Fig. 2.1). The average proportion of correct answers reaches 66%, while that of wrong answers is quite low at 21%. However, one should not conclude from this that Europeans have a fairly good knowledge of scientific topics, as answering the quiz at random would give an average proportion of correct answers of 50%.

More interestingly, national averages show that there has been a clear rise in the number of correct answers to the quiz since 1992. This is the case in practically all countries surveyed.

This increase is one of the most stunning developments related to science in Europe. Since the previous surveys in 1992, 2001 and 2002, scientific knowledge, as measured by the surveys, has increased substantially in most European countries. Increases of over 15% have been observed in Luxembourg, Belgium, Greece, the Netherlands and Germany (see Fig. 2.2); among the new EU Member States, the Czech Republic and Slovenia show a 10% increase in only three years. Sweden achieved the highest rates of correct answers.

Further analysis of the Eurobarometer data confirms the overall trend towards higher scientific literacy in all European countries.[1]

[1] M. Bauer, London School of Economics, pers. comm., November 2007.

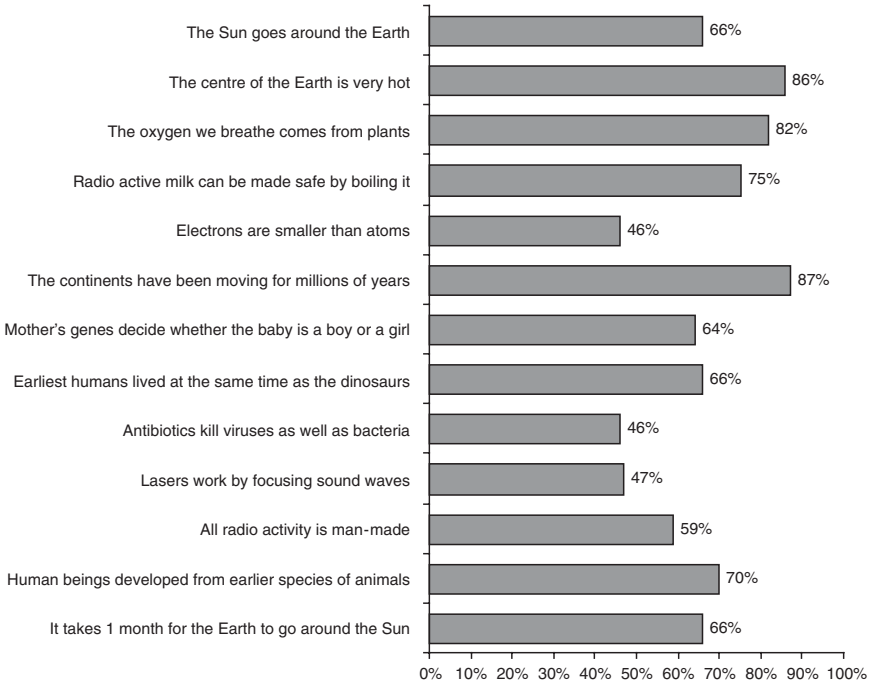

Fig. 2.1 Percentage of correct answers to the 13 questions in the Eurobarometer scientific quiz

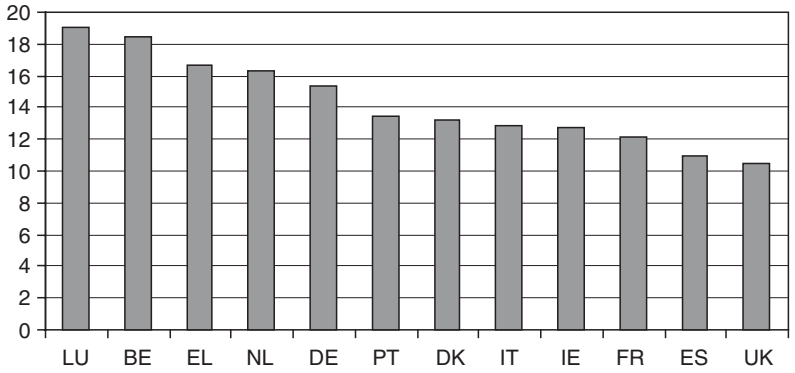

Fig. 2.2 Improvement in the percentage of correct answers to the Eurobarometer scientific quiz in 12 European countries, 1992 to 2005

There seems to be a contradiction here. While interest in S&T among Europeans is declining and Europeans claim to be poorly informed on the subject, their answers to a basic scientific knowledge test show improved results.

After the tsunami in 2005, the percentage of people who understand the movement of continents and tectonic plates seems to have risen by 20%. Analysing the

slight improvement of the Japanese understanding of science between 1991 and 2001, Shimizu (2007) argues that the 1995 Kobe earthquake contributed to the public understanding of plate tectonics, but more so among non-college-educated people than among the college educated. On the same basis, one may argue that media coverage of recent crises in Europe (Chernobyl, mad cow disease, contaminated blood, avian flu, SARS, nuclear energy, GMOs, etc.) has brought many scientific and technological concepts and issues onto the public radar and has subsequently raised the overall public understanding of science in the EU countries.

For those who have left school, newspapers and magazines are an important source of information about S&T. It is therefore important to gain a better understanding of the role of the media as the public's sources of information about S&T.

2.2 Europeans and Science Information

The Directorate-General for Research of the European Commission launched a special Eurobarometer survey to explore the role that the media is playing as an interface in the science domain, helping to increase public support and understanding about the need to create a knowledge-based society. Face-to-face interviews were conducted in people's homes, in their national languages, between 10 April and 15 May 2007. The countries surveyed were the 27 EU Member States. The methodology used was that of the standard Eurobarometer polls managed by the European Commission's Directorate-General for Communication.

This recent poll (EC 2007a) shows that television is still the most popular medium for information. It also has the widest reach. Figure 2.3 shows aggregated percentages for sources of information about scientific research cited among either the first or second preferred sources. Traditional TV channels lead, with a total of 47% saying they would like to receive information about scientific research through that medium. Around a quarter of Europeans prefer thematic TV channels (27%), the specialized written press (26%) and the general written press (23%), while radio and the internet share about the same level of importance.

In 26 of the 27 countries, most people's first choice for information about scientific research is television. Only in the Netherlands would citizens turn to the specialized press first. Thematic TV channels are outstandingly more popular in Sweden than elsewhere in the EU, with a rating of 42% in the aggregated table. The specialized written press is not only the most preferred medium in the Netherlands (35%), but it also reaches high aggregated percentages in France (37%), Finland and Sweden (both 35%). As expected, the youngest respondents have the most favourable views about the internet.

The data show very clearly that there is a link between people's use and trust of different media sources. The ranking of media sources by usage and by the level of trust in them is the same.

Generally speaking, EU citizens are satisfied with the way the media provide information about scientific research (56%). Almost a quarter express dissatisfaction (24%), and exactly a fifth have no opinion on this matter (20%).

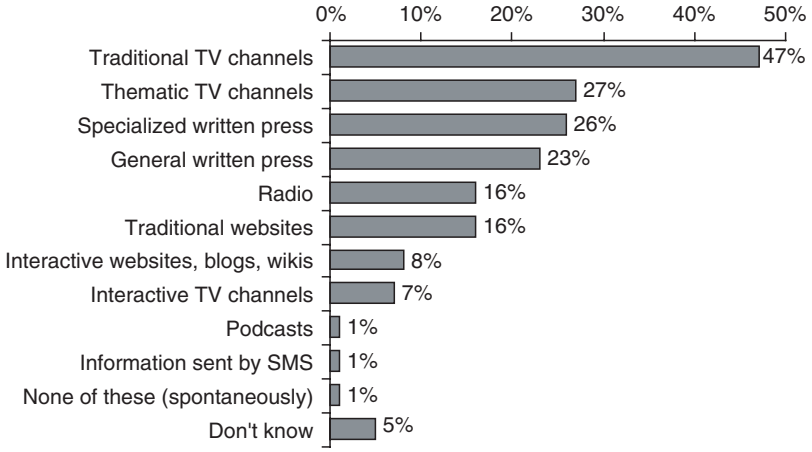

Fig. 2.3 Europeans' preferred sources of information about scientific research

The only country where the majority of respondents declare they are dissatisfied with the way the media treats this topic is Greece (53%). The 'don't know' rate is very high in several countries, reaching a maximum of 47% in Bulgaria.

The majority (50%) say that the space the media devotes to scientific research is sufficient. Around a third (31%) believe that the media does not give research enough importance. Only a few (4%) of respondents as a whole feel that the topic gets too much prominence.

Asked about content, most citizens across the EU have a generally positive view of the way news on scientific research is presented and consider it to be reliable (65%), objective (63%), useful (60%), varied (57%) and sufficiently visual (57%). At the same time, they also say it is difficult to understand (49%), far from their concerns (45%) and not entertaining (51%).

Questioned about what they wanted most in news on scientific research, a large proportion opt for ease of understanding (38%), information on the actual topic (37%) and usefulness. Reliability (29%), relevance to citizens' concerns and objectivity (both 20%) are ranked fourth to sixth. There is a need to improve the ease of understanding of scientific information in the media, as this aspect is the most important for people. Virtually one in every two respondents says scientific news is difficult to understand.

Most prefer that scientists (52%) rather than journalists (14%) present scientific information (Fig. 2.4). A striking finding of the survey is that one in five respondents replies spontaneously that they would like scientists and journalists to present scientific information together (20%). Europeans who prefer scientists as presenters argue that this approach is more trustworthy (61%) and results in more precise information being made available (60%). Objectivity is cited in third place (39%).

Europeans who prefer journalists to present scientific information mention most often the assumption that people would understand the content more easily (70%). Other reasons, such as objectivity (23%), usefulness in citizens' everyday life (19%) and diversity (18%), are cited significantly less often in this context.

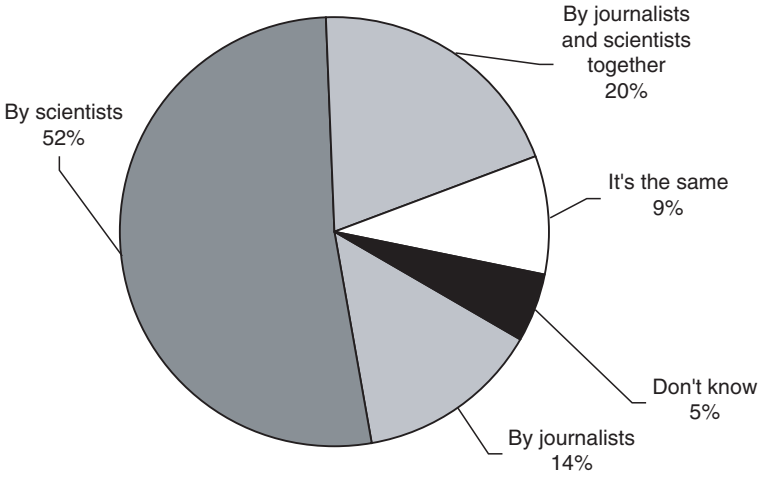

Fig. 2.4 Scientists vs. journalists as sources of information about scientific research

2.3 European Scientists and Communication

The increasing impact that science has come to have in society has paved the way in recent years for a more fluent dialogue between the scientific community and the general public. Because the EU is providing increasing funding to research and innovation, the Directorate-General for Research has decided to gain a detailed understanding of the issues, variables and constraints faced by European researchers when communicating with wider audiences (EC 2007b,c). To this end, in-depth telephone interviews were carried out with a sample of 100 researchers who have participated in projects funded by the European Commission's Research Framework Programme, based on the excellence of their scientific work. Researchers from all Member States and representing a broad spectrum of scientific fields were interviewed in order to adequately reflect different subgroups. The field work and data reporting were undertaken between the end of April and mid-June 2007.

Only 20% of scientists interviewed have an active relationship with the media, although most have been sporadically or very occasionally involved in some way in communicating to a wider audience. Those scientists who currently take an active role believe that it is their moral duty to do so. There appears to be a significant willingness to create dialogue and partnership with the media to achieve better coverage of science as the key to improving the public's perception of scientific culture and its benefits. Despite these good intentions, it is worrying that so few senior scientists are involved in explaining topics that are vital to everyday life, because the scientific community depends on outside support to allow it to continue to make significant advances that benefit society.

The survey shows that there is a clear misunderstanding between the media and the scientists. The great majority of scientists interviewed (just over 90%) recognise

an obvious mismatch between what scientists want covered in the media and what media people regard as newsworthy. It seems that, for many scientists, explaining science in general and the scientific method are more important than the short-term dissemination of the results of their work. Although groundbreaking research results are likely to interest the media, there is great potential for scientists to be the interpreters of the day-to-day events that affect people's everyday lives, but that potential does not seem to have been fully harnessed by either side.

For a scientist to feel comfortable in the science–media dialogue, there is a need for trust between the scientist and the media contact. However, scientists believe that this trust is best achieved through face-to-face contact, which means that establishing it remains difficult. This suggests that to improve communication between scientists and the media there is a need to find a more immediate and feasible mechanism to allow trust to be established.

Scientists understand that the media have the power to influence the public, but also believe that the media have a responsibility to educate the public rather than simply respond to popular interest areas. Thus, according to scientists, the way to improve the coverage of science and the public's perception of science is for the media to be provided with the 'right' scientific messages and commit to disseminating them. The scientists show a lack of realism in their view that the media can perform a purely didactic role and are not driven by the need to attract viewers, readers and listeners by being responsive to their interests.

Scientists report that they are often discouraged by the barriers they face in their efforts to disseminate the results of their work more widely. According to a survey published in June 2006 by the Royal Society, 70% of UK scientists believe that 'funders of scientific research should help scientists to communicate with the non-specialist public' and 46% of them do not 'feel well equipped to engage with the non-specialist public' (Royal Society 2006). The goodwill shown by many is pushed to its limits by difficulties that to some extent stem from the lack of professional recognition for those scientists who are successful at communicating their work to the public. In a community that rewards specialist publications and does not emphasise the need for general communication, it is obvious that scientists lack funding to support specific communication measures and lack time to communicate. To compound these systemic barriers, there is a skills gap: scientists often find it difficult to find the right language to communicate to the wider audience.

Many scientists recognise that there is a fundamental difference of approach in media reporting and scientific reporting, and suggest that this leads to frustrations on both sides. A key issue is that the media are thought not to understand the basis of the scientific method or its culture, including the timescales required to achieve results and the fact that the results are then only valid until proved otherwise. If the focus of media interest were on scientists interpreting everyday occurrences, rather than purely on the release of research results, this would not be a barrier. However, it may be that some scientists are not reaching their potential because they believe that the public is not really interested in science.

It also seems that many researchers feel intimidated by TV broadcasting and are more comfortable with written media. If this apprehension is not dealt with through

specific training, it will reduce the potential of science to reach wider audiences: TV has mass audiences, and visual images significantly aid comprehension.

Many researchers, particularly those from the 15 'old' EU Member States, report that the fact that their work is funded by the EU generates little media interest, so they do not try hard to include the source of their funding in their communications. This situation is different in some of the smaller and newer Member States (in Eastern and Central Europe), where EU research funding is perceived as more newsworthy. In the older Member States, it is vital to adapt messages to the national context, for example by highlighting national benefits.

It is important to note that there are no significant differences in the views of scientists by nationality, but that there can be differences where scientists were previously working under a communist regime. In addition, age seems to be a factor. Scientists who have been working in former communist countries, as well as the older generation of scientists (those around the age of 60 + years), seem to be more distrustful of the media because they are very aware of sensation-seeking behaviour. In contrast, younger generations seem to be more open and are particularly aware of the force of the internet.

2.4 The Communication of Science: Born of Fashion?

Public understanding of science, science communication and the science–society dialogue are today major issues in Europe. They are on the agenda of virtually every meeting of the EU's research ministers in Brussels. This prominence originates, at least in part, from reported low levels of scientific literacy and highly publicized resistance to S&T developments such as nuclear energy, stem cell research, cloning, GMOs and nanotechnology.

As a result, European scientists are now encouraged, urged and even obliged by research funders to communicate their research more effectively. Science communicators are now recognized and acknowledged by most research organizations as professionals and are expected to bridge the gap between the scientific community and the public, as summarized in the so-called 'gradient model' put forward by Hans-Peter Peters.[2] The model (see Fig. 2.5) assumes that, while there is a continuity of activities between scientific production and science popularization, there are also various constraints and obstacles (institutional, cultural, and so on) that make science communication difficult. As an example, when an astrophysicist refers to the 'Big Bang', he or she does not have in mind the same thing as the layperson.

Nevertheless, the gradient model implies that improving both the scientists' communication skills and the public's scientific literacy should allow a better science–society dialogue in Europe.

However, there are two sides to every coin. According to the study carried out by the Royal Society (2006), a quarter of the British scientists surveyed considered that popularizing science and engaging with the public had a negative impact on

[2] Pers. comm., January 2007.

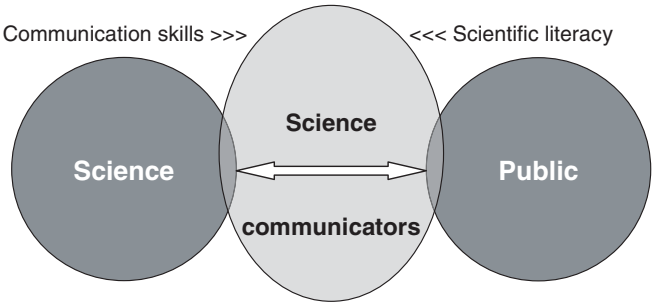

Fig. 2.5 The gradient model: bridging the gap between the scientific community and the public?

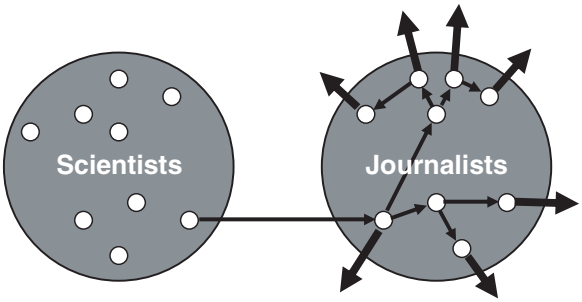

Fig. 2.6 The stellar model: a chain reaction develops in the media and 'enlightens' the public

their professional evolution. Moreover, as reported from the European Commission survey of researchers (EC 2007b), scientists too often see journalists as mere 'spokespersons'. They expect the media to just 'cut and paste' their words. As a result, scientists are keen to train themselves in science communication; they believe that this will enable them to 'package' their work in a form immediately digestible by journalists, hence discouraging detailed, in-depth investigations.

The real relationships between scientists and journalists are better described by a 'stellar model' (see Fig. 2.6). According to this model, a scientist responsible for a breakthrough will inform a few journalists, who will subsequently report on the achievements and, it is hoped, trigger a sort of chain reaction (journalists are keen to follow up each other's stories). In turn, this will send a lot of information to the public, who at the end of the process are expected to be 'enlightened'.

However, scientists should acknowledge the fact that the media follow their own rules on how to communicate, including on how to communicate science. For example, it is difficult to avoid the 'star' system in media coverage of science. On the other hand, one should expect to see at least as much reporting in the media on scientific 'stars' as on stars in football or in popular music.

Despite a growing interest among European scientists in science communication and media reporting, Europe still lacks a genuine communication culture between the scientific community and the public. While communication of every kind is on

everyone's lips, we are still far from the genuinely 'intelligent' communication promised by the advent of the 'knowledge society'. Technologies—first and foremost the internet and the mobile phone—may be partly responsible for this paradox. Having pervasive 'means' of accessing and exchanging information creates the feeling that we are communicating better. While this is no doubt true in so far as society is spontaneously generating new and creative initiatives, much remains to be done when it comes to the various levels in established institutions and organizations.

Rather late in the day, the world of science is now also in the grip of this communication fever. If nothing else, there is certainly a demand for S&T information! The 2005 Eurobarometer established that very clearly: Europeans want information on S&T, they want to be involved and they want to participate in decisions. The information supply is growing, albeit timidly and not without ulterior motives coming into play. However, many scientists wrongly view communication as the magic wand that will remove at a stroke all the doubts people have about new S&T. Also, but in this case with good reason, effective science communication is seen as a means of attracting extra funding for research. Of course, the danger is that funds will go to the most effective communicators rather than to the most excellent researchers.

Scientists are encouraged or even obliged to inform audiences about what they are doing, but they also have an imperative to listen. Researchers these days must understand the social context within which they operate: what people worry about, what they expect or need from science, what they do not want in their lives. In short, the ivory tower is no longer an option.

Communicating is truly an imperative in a democracy, if one is to build trust and legitimacy for activities funded in great part by the public. It is also a simple question of common sense: there are so many exciting developments and the public should be informed about them.

In a report published in June 2007, EURAB, the research advisory body of the European Commission, encourages researchers to interact more with civil society and communicate science (EURAB 2007):

> Researchers should remain aware of how the actions of the past have generated negative public perceptions of research today (as in issues arising from nuclear energy, GMOs, pesticides) and that better dialogue with the public either directly or via the societal actors could have prevented much of the friction and lost potential innovative developments in these research fields.

To avoid lost opportunities and suspicion about R&D in the future, the report urges more societal engagement and open dialogue on emerging research fields, such as nanotechnology and therapeutic food additives.

As stated in the report:

> European publics are not questioning the scientific information as much as they are actually questioning the institutions generating it (a lost confidence in business, government and academia). Research is seen to be good when it solves problems and is relevant to people's lives—when research is useful to society, and not just in an economic sense. Too often though, researchers are perceived to be addressing issues that the public may not necessarily consider as beneficial to society. Researchers work in systems that are rational and instrumental, and have a tendency to assume that society behaves likewise. But society does not always behave rationally, and in certain sensitive areas, researchers should keep in mind that their systems operate in a public context.

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