Qualitative Study

European Commission

EUROBAROMETER

QUALITATIVE STUDY ON THE IMAGE OF SCIENCE AND THE RESEARCH POLICY OF THE EUROPEAN UNION

STUDY CONDUCTED AMONG THE CITIZENS OF THE 27 MEMBER STATES

PAN-EUROPEAN REPORT

Fieldwork: July-August 2008

Report: October 2008

This survey was requested by Directorate General Research and coordinated by Directorate General for Communication

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Directorate General for Research

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INTRODUCTION

- **The European Commission – Directorate-General Research – has commissioned OPTEM and its partners in the 27 Member States to carry out a qualitative study among citizens, on the image of science and their perceptions and attitudes regarding the European research policy (1)**.

- The **objectives** of this study can be summarized as follows :

  - Assessing the various dimensions of perceptions relating to science (and technology) and research, and identifying factors underlying European citizens' perceptions.

  - Analyzing their perceptions and attitudes relating to research issues in various areas that are currently the object of controversy and public debate.

  - Analyzing their degree of information and knowledge about science and research and identifying information sources and channels.

  - Assessing their attitudes regarding, on the one hand, research activities at the national level and, on the other hand, the research policy at the European level – and expectations for the future in these respects.

  - Testing a number of elements of DG Research's information and communication, and collecting suggestions as to how one could make scientific questions better understood and more attractive and increase citizens' involvement in related issues.

- This study is based on 27 **group discussions**, which were organised in similar conditions in each Member State, with participants :

  - Including both men and women
  - Aged between 17 and 60 years
  - Of average social levels
  - Whose professional activities or studies (as well as those of other members of their household) have no relation with either science and research, European issues, or marketing and communication

  The discussions took place between July 14 and August 18, 2008, depending on the country.

- **This report constitutes the overall report of the study in the 27 Member States. It was produced by the coordinating institute OPTEM.**

  It includes in the Annexes :

  - The identity of the national partner institutes.

  - The composition of the discussion groups.

  - The topic guide used by the moderators of the discussions, and the texts that were presented to respondents.

(1) Study conducted under the aegis of the Framework Contract Eurobarometer "Qualitative studies", managed by Directorate-General Communication A/3.

SUMMARY OF RESULTS AND CONCLUSIONS

General attitudes towards science and questions linked to research

1. **European citizens show their grasp of science either by trying to give conceptual definitions of its purpose** (in summary, knowledge) **or more rarely by making reference to the rationality and rigour of scientific method, or frequently through the results of scientific research and the concrete benefits that can result from it.**

   They tend to categorise the sciences in the plural as "exact" sciences (sometimes referred to as "natural"), sometimes "application" or "technological" sciences, and human and social sciences – which are however not equally considered to belong to the sphere of science as such (as their results are not very tangible or "not provable").

   A notion linked to science, **technology** (which forms an application branch of it and moreover provides it with tools that enable it to progress) is firstly perceived through the products and services that it creates – this often means that it is regarded as more tangible and accessible, as it provides facilities or improvements in the living conditions of citizen consumers.

   As regards **research**, this is viewed as a component or "basis" of science. Depending on the individual, this may be a more abstract, remote notion (as it involves methods and processes more than results) or on the contrary one that is more accessible (with references to experiments, tests and the verification of hypotheses which are all areas that are easier to grasp than theory).

2. **Science is a highly valued notion and one that is intimately linked to the idea of progress.**

   At the same time, it also gives rise to some fears and reservations – that of possible misuse by mankind: deliberate manipulation for harmful purposes, risks of effects not mastered, or questionable commercial exploitation motivated only by profit.

   The interest shown in science varies from interviewee to interviewee in the countries studied, as does the main nature of the interest – which may be intellectual in character or linked to the perception of derived benefits.

   It can be held back by the fears or reservations referred to above, as well as by the image of something that is complex and difficult, which calls for prior know-how and prolonged effort, and thus appears quite remote and restricted to the initiated.

   When questioned in more depth on **the areas of science and research that respectively give rise to interest and hope or on the contrary reservations and concerns**, the citizens interviewed notably mention the following, in a quite homogeneous way throughout Europe:

   - On the plus side, the medico-pharmaceutical field, followed by research into solutions to energy, environment and climate problems, and the invention or improvement of products that help make life easier.

   - On the minus side, risks of genetic manipulation, GMOs, other concerns relating to health, preoccupations linked to the environment, and those that involve the use of science for destructive purposes (nuclear and chemical armaments, etc.).

   Here we remark that **the predominant expectations and fears are concentrated on subjects that are perceived as concretely affecting peoples' daily lives or likely to affect them**.

3. **The information sources and channels on science mentioned by citizens include the traditional media – in the first place television**, a medium which has the advantage of "not requiring any effort" and which can be well suited to the entertaining and attractive presentation of serious topics, of which a large number of respondents give examples.

   A range of written press formats are also mentioned, and more occasionally the radio.

   We note however in several countries **the expression of doubts as to the quality of the treatment of scientific questions by the media in a general way, or regrets regarding the small quantity of information available on these questions.**

   The Internet is quite often mentioned (above all by the youngest interviewees), **but more as a means of obtaining more detailed information** on a subject to which attention has already been drawn by other channels **than as an initial means of acquiring knowledge. It is thus hardly suitable as a communication tool for audiences not yet familiar with and interested in the subject.**

   School or education is logically frequently mentioned.

   Other channels occasionally referred to at this stage will give rise to subsequent developments.

Knowledge, understanding and attitudes regarding seven areas of scientific research

1. Nuclear energy

❖ **Initial opinions regarding nuclear energy are divided and often ambivalent.**

The dangers and risks of atomic power are referred to by participants in all groups: reference to military use of the atom or atomic bomb, risks of nuclear accidents, problem of storage of nuclear waste (less often spontaneously present in peoples' minds however); feelings that this is a rather mysterious area, which has not been (fully) mastered, and one that generates even more anxiety or distrust for those who think that the information on its subject or that of nuclear incidents is restricted, not covered by the media, or even manipulated.

At the same time, citizens interviewed are generally aware of the importance and utility of nuclear energy: current already substantial importance in the production of electricity in some countries, accentuated importance for the future in the context of the energy crisis and perceptions that are more or less widespread of progress in this area, either from a techno-economic or safety point of view.

The degree of openness to the development of nuclear energy varies depending on the country and the individual. The most anxious citizens tend to "bury their heads in the sand" with the hope that research is not extended in this area – **but those who avoid the debate on the utility or necessity of nuclear energy** in this way **are few and far between.**

❖ **The document presented to interviewees on nuclear energy is on the whole well understood.**

Its provision of information is unequally evaluated.

The first part of the document – assessment of the situation and the issues at stake – gives rise to few comments. On the whole, we note little criticism of the idea that renewable energies can only represent a minority share of needs, that Europe will thus consequently have to increase its production of nuclear electricity, and that this will have its advantages (cost, non-contribution to global warming).

This seems to reflect quite **a rather widespread awareness of the reality of the problems.**

Its second part – on research orientations – gives rise to more questions, comments and discussions:

- On the risks of nuclear activities – the interviewed citizens remark and acknowledge the information on research regarding safety, although there are still questions and doubts expressed by respondents in a good many countries.

- On the techno-economic evolution of electronuclear plants.

  On the one hand, more detailed educational developments will be necessary to properly explain technical notions involved which remain cloudy for a great many respondents, such as the difference between fission and fusion.

  On the other hand, while the promises of the text are in themselves welcome, whether a question of third or fourth generation plants using nuclear fission or of future plants based on the fusion process, the horizons – 2025 and 2050 – seem to many to be a long way off and consequently somewhat abstract.

- **On the whole, the document presented nonetheless serves to improve understanding of the nuclear area and of the research that is carried out within it, and attitudes in this respect.**

2. Climate change

- **The topic of the greenhouse effect, global warming and climate change is a subject familiar to all.**

  The reality of the phenomenon is a largely accepted fact – although in several countries there are reports of controversies or diverging opinions between scientists, or there is a certain tiredness faced with "excessive media coverage" which leads to a decrease in attention rather than the opposite.

  Anxiety and the degree of involvement are generally high, although they are unequally pronounced: virtually all persons interviewed seem to be sensitive to the problem, to the events already visible today and its anticipated future effects. A sign of this involvement is this awareness is often expressed of the need to change habits and behaviours among the citizens themselves, who should not content themselves with the elaboration of solutions by "specialists".

  In any case, almost everyone is agreed that there is a need to make a major research effort in order better to understand these phenomena so as to determine paths of action.

- **The document presented to interviewees does not pose any problems of understanding.**

  At the same time, the new informative content is limited – at least as regards the presentation of the general issue of climate change, which has become quite familiar over the past few years.

  The last part of the text provides precisions and new elements:

  - On the Kyoto protocol: precisions as regards its content – commitment from most of the countries to reducing their emissions (some however state that it is the biggest polluters among them who rejected the agreements, and most notably the United States).

  - On the role of carbon sinks, which can be carried out by forests and oceans.

    This is a clearly unknown or cloudy notion for a large number of respondents. The text states the essential, but only in a summary manner.

- **The interest kindled by the information contained in the document is generally lukewarm**: perceived insufficiency of the new informative content; impression that we are only just beginning to understand the detailed causes of the phenomenon, and consequently that the identification of solutions is still some way off, and doubts that there is any true political mobilisation to tackle the problem.

  To make the document more inspiring, it would probably be a good idea to accentuate and detail the final developments of research underway and its initial results.

3. Biofuels

- **The notion of biofuels is quite well known, despite some exceptions in the groups of a few countries.**

  The general objective pursued by the development of biofuels has been properly understood: to offer substitutes for oil, whose reserves are set to run out and whose price is increasing. Some also think of an interest of an ecological nature, but others consider the negative impacts (deforestation, intensive cultures, soil depletion, etc.).

Spontaneous attitudes regarding biofuels can be broken down into three categories:

- **Those who see them as a welcome development** (and do not seem to have heard of any negative impacts).

- **Those who, on the contrary, firstly express their scepticism or concerns**; scepticism as to the scale of the effect of the possible substitution of fossil fuels, and above all concerns faced with the consequences for food product prices, which are likely to rise dramatically in the event of massive-scale development.

- **Some groups are characterised by intermediate opinions**, more balanced, weighing up the pros and the cons without taking up a definitive position.

The opportunity to strengthen research in this area is more or less well viewed depending on these various attitudes.

❖ **The text of the document presented on this subject seems perfectly clear**, with a few rare exceptions.

Its provision of information is evaluated in diverse ways:

- In the groups initially open and positive, an awareness develops of the possible negative side effects of biofuels development.

- In the groups against on principle, a new element, the distinction made between food crops and non-food crops for biofuels production tends to improve the previous attitudes in some countries, but not very much in others.

- In the other groups, the text confirms and provides precisions on notions with which their participants were at least partly familiar – with effects that are also variable on attitudes.

❖ **Overall, the reading of the document made attitudes across Europe more homogeneous by establishing a common level of knowledge on the problem put forward for the attention of the citizens**.

4. Genetically modified organisms

❖ **The overwhelming majority of European citizens have heard about issues relating to GMOs and express feelings on the subject.**

For the majority, this involves **genetically modified plant organisms**, destined for agricultural use. In only a few Member States do interviewees more broadly refer to genetic manipulation of animals and even humans, the dangers of such practices and the ethical problems they pose, or on the contrary the beneficial medical applications of gene therapy.

Distrust of GMOs is rife, with:

- The general idea of "not being natural", "altering the natural" and of processes "going against nature".

- The perceived lack of appeal of products derived from processes assimilated with the stimulation or artificial orientation of production, resulting in products that are visually impeccable but devoid of flavour, leading to a levelling out of qualities and taste.

- The risks for food safety that can be caused by such deviations from the natural – risks which may be unproved but which call for the application of the "precautionary principle".

- Risks for the environment, generally poorly identified.

- To sum up, the general impression is that with GMOs we are playing "the apprentice wizard".

- More occasionally (but very strongly) the denunciation of lobbying for economic interests that develop GMOs and the practices of the companies concerned.

Those who refer to the potential advantages of GMO development are clearly in the minority – prospects for growth in food production, contribution to the fight against hunger which affects various world regions.

A need for in-depth information on the subject is spontaneously apparent for a large number of citizens – sometimes with the open suspicion that information is "biased" or has been manipulated by economic or political interests.

❖ **The text presented to interviewees does not pose any problems of understanding.**

It turns out that some participants who had already heard about "GMOs" did not truly know what the abbreviation stood for.

The text teaches a large number of respondents that GMOs can have applications in the field of medicine – this is information well received, but does not involve the essential nature of the problem, i.e. their agricultural use. Regarding this use, **the presentation of the possible benefits of GMOs only rarely modifies the initial attitudes of the citizens questioned.**

Awareness of the risks remains unchanged in the majority of cases. Some learn of the existence of harmful effects which were not present in their minds (dissemination over traditional cultures, loss of biodiversity); a large number note the recognition of the absence of proof of safety in the long term, and their distrust is strengthened or confirmed.

❖ **The citizens interviewed find in this document**, and in the last paragraph on research orientation, **the idea of an unknown field which has been little explored, and in which prudence dictates that we should not advance any further without further knowledge.**

5. Stem cells

- **Familiarity with the topic of stem cells seems highly variable from one Member State to the next** – some citizens are genuinely well informed and others find it a very perplexing subject.

  This probably reflects the state of development of the local debate on these questions and the attention that has been afforded them recently by the media.

  Attitudes regarding stem cells can be described as including the following:

  - **A strong interest** for the prospects that are offered for decisive progress in the treatment of serious diseases.

  - **A large number of considerations on the ethical problems** posed by the growth and use of stem cells (in the extreme, manipulations that are contrary to nature, risks "of human cloning", "the exchange of organs" etc.; some also mention the cost of treatments from which only the wealthiest will be able to benefit).

  In general, and particularly among those who seem the best informed, observations are made without preconceptions on the legitimate scientific and political debates that are underway, with the aim being to oversee future research and applications.

- **The document provided to interviewees poses more problems of understanding than the previous documents** – obscurity or abstract nature of some scientific terms – **without this however preventing a quite good assimilation of the general meaning of the text.**

  It is regarded as informative by the majority – totally new discovery for some or almost, provision of additional elements for others – and a large number declare their interest in receiving more information on a research area which seems to them to be highly promising for humanity.

- **The document gives rise to a high degree of interest**; scepticism (regarding the promise of medical applications) is rare.

  Among others, the reference to **legislation on ethics** which differs from one country to the next attracts attention – all are **aware of the absolute necessity of supervision and strict checks** in this area. The most anxious interviewees do not find the document entirely reassuring.

6. Nanotechnologies

- **The level of knowledge of nanotechnologies is extremely low** – it is virtually non-existent for the majority (and even the entirety) of interviewees in the majority of countries. It is only in the groups in France, and to a lesser extent those in Greece and the Czech Republic, that this topic seems more familiar.

Various applications are mentioned by those citizens who have heard about them, and are sometimes imagined by others who – lacking any precise knowledge – make suppositions by reasoning on their understanding of the prefix "nano".

In these conditions, the majority of interviewees hardly venture to express a positive or negative opinion. A few see nanotechnologies as a source of useful innovation, while a few others are anxious about the possible ethical aspects involved in medical applications.

❖ **Opinions are divided as to the clarity of the document presented.**

Its assimilation may be rendered difficult by some technical notions and by the difficulty to conceptualise phenomena at the atomic or molecular scale.

The informative content of this text is broadly acknowledged – the elements that receive the most attention are the applications mentioned for nanotechnologies (including in medicine).

❖ **Overall reactions to the text are rarely negative, but the level of interest varies.**

- Depending on the degree of understanding.
- Depending on the perceived interest for the individual of the applications that nanotechnologies may have: the more interviewees realize that they can draw concrete benefits from them, the greater their interest; and requests are made for more examples.

In addition, a quite large number of comments are observed on the absence of any drawbacks in the prospects that are suggested by the text, and particularly the absence of any problems of an ethical nature (except possibly for nanobiotechnologies).

The majority hope to see research in this area continued and strengthened.

7. Experiments on animals

- **Attitudes regarding experiments on animals show themselves to be extremely homogeneous in all the groups questioned in Europe.**

  - More or less strong emotive **reactions of compassion towards animals counterbalanced by the rational consideration of the practical impossibility of getting by without these tests: in summary, it is "a necessary evil".**
  - **A desired limitation** in the field of experiments to what is strictly indispensible (medical but not cosmetic research), development to the greatest possible extent of alternative methods, efforts to reduce the suffering of animals.

- **The document presented on this subject does not pose any problems of understanding.**

  Its informative content is limited: for the most part, it summarises the opinions of the interviewees themselves.

  A few note with interest the announcement of research for alternative solutions or to reduce the suffering of animals, as well as the existence of European legislation. Others remain sceptical or call for reassurances and more concrete information on these points.

- **The text barely changes pre-existing attitudes overall, and in general only gives rise to a moderate level of interest.**

Knowledge and opinion relative to scientific research at national and European level

1. **As a general rule, European citizens have the impression that scientific research is weak and insufficient in their country.**

   This impression is relatively less strong or unanimous (although it still exists) in some countries: three of the largest Member States – France, Germany and the United Kingdom, Ireland, the Nordic countries, and to a lesser extent the Benelux, along with Estonia and to a lesser degree Romania among the new Member States. Interviewees there refer to the existence of research and expertise capacities in their country, or to sectors in which it is innovative, performs well and is competitive.

   In the other Member States, the idea of weakness of the research effort predominates, even if it is sometimes accompanied by a reference to fields that constitute an exception.

   It often goes hand in hand with bitterness, the idea that one's country has great minds and that it has potential assets that are not used and valued (or which are used elsewhere).

   The terms of comparison with other countries are partially different – in Member States of the first category, above all with the most developed third countries, the United States and Japan, and in the others with these same countries, more advanced Member States, or "the others" in general.

   The causes and demonstrations of weakness of research are at the same time perceived in a very homogeneous manner by citizens in the various Member States.

   - **Insufficiency of research budgets** – these citizens are mainly thinking of public credits.
   - **Absence on the part of the State of political vision and will, or the poor organisation of the public research apparatus.**
   - **Low degree of appeal for careers in research** given the conditions for researchers in European countries – **this leads to brain drain**.

   These attitudes reflect **the general feeling that the development of research is an essential thing** for their country, and they show themselves to be in full agreement with the idea that **"more should be done".**

   Among the specific research areas that should be strengthened, those that spring to mind most spontaneously are medicine and energy.

   The idea of the necessity to concentrate on a limited number of fields in which assets already exist is put forward, particularly in small Member States where moreover the development of (often explicitly European) partnerships is recommended to offset the limitation of the available resources.

2. **As regards European research policy, the level of knowledge is extremely low.**

   In the groups of some of the Member States, citizens assume that a research policy exists at European level more than they are truly aware of its existence – they are more certain of its existence in Belgium, Ireland, Cyprus, Slovenia, Hungary and Latvia.
   In some countries, we find no more than "logical suppositions" that the European Union is active in this area as it is in others.

In the other Member States (half of them), the very existence of research activities organised at European level is unknown or highly uncertain, and the (very) few citizens who know or think they know something on this subject for the most part are only able to convey a few scraps of knowledge.

3. An almost complete consensus prevails in favour of the principle of European action in scientific research, and in favour of its strengthening, for reasons clearly set out:

- **The necessary gathering of means** – in terms of budget, organisation or human factors – in order to provide greater efficiency, reach more rapid results, and even enable the development of projects beyond the reach of each individual Member State, avoid the dispersion of efforts and duplication of jobs, etc.

  The awareness of the need to combine forces in this area is just as frequent as in the largest Member States and/or those that are more economically developed than the others. Explicitly or implicitly, what is at stake is Europe's capacity to invent and innovate faced with its great international competitors, including first and foremost the United States.

- **Interest in cooperation because it favours the exchange and mixing of ideas and experiences –** in other words we are "more intelligent together" than on our own.

- **Expectation of an improvement in researcher conditions and an incitation for them to stay in their country rather than watching "the brain drain".**

These attitudes are confirmed and strengthened when more precise reference is made to "the common research policy" within the European Union.

The most ardent in demanding that it be strengthened seem to be the interviewees from France, Italy, Belgium, Slovenia and Slovakia, followed by their counterparts from Ireland, Portugal, Greece, Hungary and Romania.

A few reservations are formulated: by a few respondents from the United Kingdom who have concerns about participation methods (à la carte) and financing that do not detract from their national interests; some respondents from Sweden, Finland and Lithuania regarding the bureaucratic nature of Community management; by some from Austria and the Czech Republic whose doubts concerning the efficiency of the cooperation probably partly reflect the more general prejudices towards the European Union at the current time; by some from Spain and Poland who are afraid that their country, little advanced in the area of research, would not have access to Community opportunities equal to those of the dominant Member States; also by some from France (but who are only concerned at the difficulty in obtaining the desirable agreements with the EU of 27 Member States).

Here we once again find the same fields in which research, at European level and in general, should be oriented: medicine-biology-pharmaceuticals; energy(ies) (alternative, renewable or nuclear); the environment and climate – with others being mentioned on a more occasional basis.

4. **The text of the document presenting a summary of common research policy within the European Union to those interviewed is on the whole perceived as clear,** except occasionally on some specific points.

   Its informative content is undeniable – given the considerable state of initial ignorance of the majority of citizens.

The following is **notably** observed:

- On the context in which this policy is situated: the provision of precisions on a problem sensed by interviewees, i.e. that of the gap between Europe and the United States and Japan, and the specification of the objective of making up lost ground as set down within the framework of the Lisbon Strategy, of which very few interviewees had heard anything.

- On the reasons expressed for strengthening common research in the European Union: lack of surprise, as these reasons often correspond to a great extent to the spontaneous arguments of citizens.

- On the level of organisation of Community policy: an entirely new aspect of the notion of Framework Programmes, their long-standing nature and the budgets that are allocated to them (a large number of respondents however lack references to be able to appreciate their true significance).

  Some, initially sceptical as to its efficiency, tend to see in this the sign of an organised, well structured policy; while others show themselves not to be very interested in the presentation of administrative means for policy implementation.

- Regarding the "Cooperation" component of the Framework Programme: this is new and generally well received information (with a few criticisms or questions); good level of acceptance of the 10 thematic research areas.

- On the other components of the Framework Programme – which were just as little known to begin with: sometimes very strong approval of the components "Ideas", "People" and to a lesser extent "Capacities" to make the scientific careers more attractive and avoid brain drain; few observations on the "Nuclear Research Programme" (probably due to the fact that this subject had already been discussed previously).

- On the general principle or co-financing methods: a few misunderstandings, some questions, but overall no calling into question of the well founded nature of these conditions and the sharing of the effort thereby described.

- On the final summary of the philosophy of the EU's research policy: a summary that is well understood and accepted.

Global reactions to this document are in the vast majority highly favourable – with this most strongly being the case among interviewees from France, the United Kingdom, Belgium, Ireland, Finland, Portugal, Greece, Malta, Slovenia and Hungary – and on the contrary the least clearly so in two countries (for different reasons: feeling of a lack of sufficient ambition in Germany, maintenance of scepticism in the Czech Republic).

Information and communication on the science and research policy of the European Union

1. **Logically, given their considerable lack of knowledge, European citizens for the most part acknowledge that they are incapable of identifying a single source or channel via which they may have received information.**

   Only a few rare recollections or suppositions are apparent. Often, on the contrary, interviewees think that this type of information is absent from their media (and sometimes also from speeches by political representatives).

   There are practically no recollections of any information coming from Community institutions.

2. **The suggestions made by interviewees on the ways to make these questions better known and understood involve the following:**

   - To a large extent **the traditional media.**

     In the first place, they refer to **television** – the medium which has the highest dissemination with the general public and because it is "easy" to listen to, as it does not call for any special effort, appropriate for "grasping attention" on subjects that can seem to be complex and not spontaneously attractive. A range of programme types that seem to them to be desirable are referred to.

     The written press is less systematically mentioned, or not with the same degree of importance, and in some Member States more than in others.

     The radio is occasionally mentioned.

   - **The Internet.**

     This **only** spontaneously comes to the minds of participants in the group discussions **in around one group in three** – see on this subject the observations made in the first part of this summary, on a medium that potentially offers a large wealth of information but which is less appropriate for capturing the attention of a public that is not well informed, and whose viewing is selective.

   - **Other ideas are frequently formulated and discussed for means which would make it possible to better grasp or attract the attention of the public**, including: efforts to imagine the places and circumstances for the distribution of brochures or other documents, the organisation of events or coupling with existing events, etc., which make it possible to bring science closer to basic citizens.

   - **School**, often mentioned as an important place, or one which should be important, for dissemination.

3. **With regard to the content, form and tone of the information, there is a broad consensus to insist upon the characteristics that are judged to be essential:**

- **The subjects treated and the presentation of these subjects should be as close to everyday life as possible** – we have seen that the interest for these scientific questions was very closely linked to the awareness of being concerned or the expectation of concrete benefits.

  This naturally presents a genuine difficulty for some research topics that are particularly complex or oriented towards the long term; it is nonetheless necessary to try to make citizens feel to the maximum extent possible how the research can concern them individually or collectively.

- **The concrete, accessible nature of the information** – notably making a commitment to presenting research results (or at least progress underway) more than systems or processes.

- **Clarity and conciseness** – especially as regards written information.

- **Language "of the general public",** comprehensible to all, avoiding to the maximum extent possible any overly complex scientific terms (or taking care to explain them) and "pompous" political or administrative language.

- **Character at once educational and attractive of the form.**

- **Easy access** to information.

These conditions may appear self-evident – but they are nonetheless necessary to be called to attention and must be kept in mind for each stage in the design and production of information and communication material.

4. **A few examples of such material, produced by the Directorate General for Research, were rapidly tested in the discussion groups.**

   - **Two of the brochures of the series dedicated to various research areas, "Nuclear fission and radiation protection" and "Food safety in Europe".**

     - **The first, with regard to content, gives rise to contrasting reactions**: informative content that is recognised as useful by some, but frequent criticism of a text that is overly heavy and dense, contains too much overly technical or detailed information to retain the attention of the general public; moreover virtual absence of any mention of research results, particularly on the subject of safety.

       As to the form, unfavourable or highly mitigated appraisals are numerous: general presentation or layout that is too "academic" or conventional, insufficient clarity of the document's structure; unsatisfactory balance between text and illustrations; texts overly heavy in terms of form, language requiring simplification; illustrations that are not very evocative or suitable; not very attractive typography, at least for some elements; dark and not very appealing colours; sometimes format.

       Overall, respondents have the impression of a document that is a bit inaccessible, does not spontaneously lend itself to reading and which is hardly addressed to the general public.

     - **The second, with respect to its content, leads to appraisals that are generally more favourable**.

The reasons for this are first and foremost ascribable to the subject treated, which can concern everyone in daily life (and doubtless devoid of the anxiety about nuclear energy), and the fact that the document contains useful information.

The clarity and highly understandable nature of the text also help boost its appeal.
Some reservations are nonetheless expressed in a number of countries.

With regard to the form, this is in the majority of cases better received, although some criticism remains: layout better structured, better spaced out; texts that are less heavy; fewer criticisms of typography; illustrations that may be insufficient but are more attractive although they can still be improved upon; format less often contested (even though it is the same).

Overall, such a brochure, while it is ascribed some faults or imperfections, seems in any event to be aimed at the general public.

- **A copy of the magazine "Research EU".**

The reactions to its content are highly varied in the groups gathered in the various countries and reflect the different perceptions of its attractiveness: positive towards the content which seems at once entirely professional from a scientific point of view and accessible to quite a wide audience; likewise positive but with the perception of a publication intended for a more restricted segment of "enlightened amateurs"; no fundamental criticism of content but serious doubts about the existence of a readership among the general public; rarely, perceived as lacking in interest.

From the point of view of form, evaluations are quite coherent and for the most part positive: editorial quality, well thought out form, presentation and layout receiving practically no criticism, importance and quality of illustrations (which were particularly plentiful and spectacular in the issue of the magazine which was tested in most countries).

Some citizens personally show a genuine interest; yet such a magazine will only address a minority part of the general public.

- **A video film from the Futuris series entitled "Smart cars to help reduce road fatalities".**

This film is perceived in highly positive terms by the majority of citizens interviewed, at once for:

- **Its content**: likely to interest a great many people; educational and informative, presenting concrete solutions resulting from research; clear; and for some emphasising the dimension of European cooperation.

  A few rare reservations are formulated.

- **Its form**: an audiovisual form that renders it in principle easy to access and attractive; a format that is generally well accepted (although a little long for some); a rhythm that is alert, division into sequences that give it a lively character.

For interviewees, **such a film is naturally intended for mass distribution.**

5. **Following this examination, those interviewed were invited to make their last suggestions regarding "attractive ways in which one could inform the public about science and scientific research".**

   Three elements can be retained:

   - **The importance afforded to audiovisual media** – which does not constitute a surprise.

   - **The emphasis placed on the places and means of information distribution** – with the general idea being **the necessity to reach out to the target audience** (whose spontaneous interest is too weak for it to go in search of the information itself) **by using or placing Community communication via existing formats, means, events and relay points**. Several concrete ideas are put forward by interviewees.

   - **The desirable complementarity of various types of means** – with several quite concrete suggestions also being made.

Reactions to the initiative of the Commission

Informed of the fact that this study was carried out on behalf of the Directorate General for Research of the European Commission in the 27 Member States, **the meeting participants almost unanimously react favourably,** and in a large number of cases very favourably.

These reactions involve the following aspects:

- **Personal satisfaction at learning** about matters relating to science and European activity in this area.
- **The fact that the Commission shows itself as anxious to promote a better knowledge and understanding of the problems linked to science.**
- **The fact that in this it gathers the opinions of citizens with a view to improving the relevance and efficiency of what it does.**
- **The fact, more broadly, that it wants to consult and even involve citizens – this is taken as a sign of the democratic desire to listen and consider.**

This is an element which clearly contributes – including in some groups from rather Eurosceptic countries – to an improvement in the image of the Commission and more generally of the European Union.

DETAILED RESULTS

CHAPTER I

GENERAL ATTITUDES TOWARDS SCIENCE AND QUESTIONS RELATED TO RESEARCH

I.1 EVOCATIONS AND ATTITUDES RELATING TO SCIENCE, TECHNOLOGY AND RESEARCH

❖ The introductory topic for the group discussions concerned the spontaneous notions generated by the word "science" and subsequently those generated by the terms "technology" and "research" (Theme I).

There followed (Theme II) a number of questions on the sources of knowledge and information on science – for which the results are presented at a later stage (Chapter I.2).

Interviewees were then asked to qualify their degree of interest in and attraction to science and to express their expectations and hopes, or on the contrary their concerns or fears on the subject (Theme III).

Here we will analyse the reactions of interviewees at once for discussion Themes I and III, which fundamentally address the same subjects whilst being complementary to each other.

❖ **Depending on the groups, the notion of science was spontaneously addressed from partially different angles.**

➢ **Some interviewees attempt to give conceptual definitions of the purpose of science.**

This is expressed in terms such as making progress in knowledge, the understanding of phenomena, explaining these phenomena, exploring, discovering, contributing new knowledge and even new truths…

"Research means progress; it seeks to invent, to move forward, to find solutions to problems that are so far unsolved" (Germany)

"Man's knowledge" (Luxembourg)

➢ **In a few groups** (which are however rare), **the first responses also refer to the scientific method,** based on rationality, logical study processes, rigorous approaches, control and correspondence of data, searches for proof…

"*Objective and rational approach, independent of emotions, helps to make better decisions*" *(Estonia)*

Whether explicitly or implicitly, a link is established here between science and research; a few refer to the idea of elaborating scientific theories and validating them through experimentation.

➢ **Frequently however, interviewees think of science above all in terms of the results of scientific research and the concrete benefits that may arise from them.**

This may involve (actual or potential) **individual benefits** – invention of new products or new tools which facilitate working life, medical progress is often mentioned – or **collective benefits** – for example research which may lead to new solutions to energy or environmental problems, which are currently highly sensitive areas.

"Research generally speaking is a good thing. You can go in any direction, you will always find something useful" (Belgium)

- **Science is a notion that is highly valued and linked with the idea of progress**, with, in such-and-such a group, the use of words such as future, evolution, innovations, progress, improvements for humanity, etc.

  "I think science is amazing. If I think about my own generation we will have some amazing opportunities to improve the future." (Denmark)

  "The mission of science is to serve men" (Romania)

- **At the same time, a number of fears or reservations are expressed.**

  These involve:

  - **The risk of harnessing or "abusing" science for harmful ends.**

    The examples mentioned by interviewees are above all those of armaments (sometimes explicitly nuclear weapons) and genetic manipulation (frequent references to the cloning of animals and perhaps subsequently humans – along a similar line of ideas, a few recall the "medical" experiments of the Nazi regime).

    "The arms race, chemical and nuclear weapons" (Luxembourg)

    "I feel somehow in-between: progress in medicine is certainly good, but I can't accept (that) human beings are used like lab guinea pigs" (Italy)

    The establishment of or compliance with **ethical rules** is one question which is raised on this subject.

  - **Fear of the effects of the in principle beneficial applications of scientific discoveries if they are not (or not fully) mastered.**

    Here reference is made notably to the risks linked to the operation of nuclear power plants, to genetic engineering once again (although there is recognition of the useful applications it could have for the treatment and improvement of human health), occasionally also to the damage that might be caused to the environment, or the presumed risks of using mobile phones or the "addiction" of young people to communication and IT technological tools.

    "They experiment like crazy without any regard to ethics." (Austria)

    "Also the environmental disasters that are consequences of science… technological progress to be exact" (Cyprus)

  - **The challenging of the driving force of profit or essentially commercial goals in the exploitation of scientific innovations:** development of products whose necessity and increasingly rapid speed of renewal can be contested, or which can have adverse effects, the consequences for employment of production processes that are increasingly high performance and require less and less labour, are subjects spontaneously mentioned for example by respondents from the Netherlands, Austria, the Czech Republic and Slovakia.

    "Do I really have to be up to date all the time?" (Austria)

  - **The idea, which spans these various fears, of a lack of control by man and even of more or less voluntary negligence in the use or effects of scientific discoveries.**

Here and there, group participants mention the image of "mad scientists", scientists who are blind to the dangers of what they discover, with too much confidence in science (whereas even discoveries presented as "truths" are subsequently disproved by "new truths"), insufficient foresight of the ends by scientists and more generally by society as a whole, of a reflection on the use of science which is constantly overtaken by the speed of evolution, or of potentially harmful consequences which are deliberately kept quiet or at least relegated to secondary importance in the distribution of information.

"It is not the achievements of sciences that worry me; it is their application that worries me. I am an optimist, but I am in favour of a very strict social control. Research should have in mind universal human values and not serve the sick ambitions of certain individuals." (Bulgaria)

"The scientists cannot control the results any more" (Latvia)

Such fears are spontaneously formulated in the majority of countries.

These do not call into question science in itself, but rather the possible pitfalls of its application by mankind.

"Science is a powerful tool that can be either beneficial or catastrophic; it depends on the case" (Greece)

- **Some interviewees**, in their responses to the introductory discussion topic which was suggested to them, **find it hard to talk about science in general or to give a general definition, but refer to a number of different scientific areas** (whilst moreover expressing the same types of reservations for some of them).

- Whether spontaneously or on the probing of discussion moderators, when those present are questioned on the sciences (in the plural), **interviewees refer to a more or less wide "range" of scientific areas,** and make up classifications which use a variety of terms.

  Among these references, the "exact" sciences predominate – physics, chemistry, biology (and/or genetics or medicine), less often mathematics, occasionally astronomy or geology – sometimes qualified as "natural" sciences, whereas in other cases this term (primarily) refers to biology.

  "Application" or "technological" "sciences" are sometimes also mentioned – space, electronics, mechanics, robotics, engineering, materials, environment, etc.

  As regards the human and social sciences, these are regarded as belonging to the sphere of science to varying degrees.

  - They are referred to from the start in the groups in Luxembourg, Finland, Portugal, Cyprus, Slovenia, Slovakia, Latvia and Romania: psychology, sociology, sometimes anthropology, social sciences, political science, economics, and more rarely philosophy, history, law and literary disciplines.

    Their inclusion in the field of science is explained by the fact that they are studies of mankind or of human behaviour, which also have recourse to "scientific method".

  - In a large number of countries, it is only when probed that interviewees recognise that they belong to the scientific sphere; the same disciplines are referred to here and there, and the same justification is given for their inclusion.

    "Everything concerning society, demography, human groups, the evolution of society, sociology" (France)

- Lastly, in groups within a few countries, interviewees as a majority are reluctant to regard them as sciences – due to the idea that their results are not very tangible and cannot be "proved".

  "Social sciences are elusive, they cannot create permanent results" (Hungary)

❖ **The interest declared in science varies from one Member State to the next.**

- **It is strong or quite strong** in France, Italy, Belgium, Luxembourg, Finland, Portugal, Greece, Malta, Hungary, Latvia and Romania.

- **It is less clear or ambivalent** in the other countries.

  The interest, as we have seen, **may be of an intellectual nature** (curiosity, desire to know and understand for oneself), **or may be linked to the perception or expectation of benefits derived from science.**

  "Science is also positive as an abstract knowledge, besides its application" (Portugal)

  "When one is directly affected and concerned, then of course it becomes more interesting to learn about a certain topic. My son who got diabetes is such an example. I did not know anything before about his disease, now I am almost an expert." (Sweden)

  "If it will make my life easier, I am interested" (Poland)

  Intellectual interest seems above all to be encountered in the groups within the first above-mentioned countries. On the other hand, interviewees from the United Kingdom, Spain, the Netherlands, Ireland, Slovenia and Estonia particularly underline the primary importance they afford to the concrete consequences of scientific discoveries for themselves and their fellow men and women.

The factors that can hinder an interest in science can be mainly divided into two types:

➢ **The fears and reservations mentioned above.**

➢ **The idea that it is something complex and difficult which requires protracted effort** (for scientists in their work, but also for the general public who wish to understand and be informed) **and calls for advanced prior knowledge in order to understand.**

The **qualities** required are naturally **valued** and can inspire admiration, but the feeling of not personally having them (to a sufficient degree) **can be off-putting and dissuade from taking an active personal interest in it.**

"I've always been fascinated by IQs, I do not have such an IQ, I have always respected people who are involved with that area, it's superior" (France)

In discussion we also find such expressions as "field(s) restricted to an elite", or "to the initiated", "an abstraction" which leads to science being considered as "remote".

Requests for "popularised" information are sometimes made spontaneously.

❖ **We also asked group participants to talk about the notion of technology.**

- **Technology is naturally perceived as intimately linked to science.**

  - **It either represents an "application" branch**, or "the practical part", **or it benefits from the progress of science** – these are opinions expressed by a large number of interviewees.

    "Putting the knowledge in practice" (Portugal)

    "Technologies come out from science. Science comes prior to technologies. Technologies are based on science. They cannot exist separately." (Lithuania)

  - **Or a two-way relationship is more fully perceived between science and technology:** the first, or its discoveries, assist the technological developments and inventions; in return, technology provides science with tools which aid research and enable it to progress – this is a vision clearly apparent among interviewees from France, Spain, Belgium, Portugal, Cyprus, Hungary and Romania in particular.

    "You can't make progress in science without technology, formerly one made fairly basic tests, nowadays one cannot do anything without technology any longer"
    "Technology can help science" (France)

- **Technology is first and foremost grasped through the products (or services) that it creates** – which are useful to mankind, make their life easier, and address their needs and desires.

  "It is convenient; you make use of it every day" (Netherlands)

  "Technology is all about developing new things, electronics, mechanics, and medical devices." (Finland)

  "Technology means that on the basis of new knowledge and new studies, innovations are created to help and serve mankind" (Slovenia)

  The **main areas mentioned** are those of medicine (or medical treatments, treatment equipment, pharmaceutical products) and of the "new technologies" of information and communication (electronics, computers, the Internet, mobile phones, etc.).

  "Everything accessible from home, I do everything from my computer, I avoid trips to the bank, operations…it means gaining time for me" (Spain)

  Some also refer to mechanics, the automobile sector, aerospace, energy, food, textiles and other sectors whose products are used by the general public.

  A few rarer references are made to techniques, processes and production equipment.

  Whether products or techniques are involved, respondents mainly think of "cutting edge" sectors.

- **As a result, technology often tends to be considered as "more tangible" or "closer" than science.**

- **At the same time, like science, it can also give rise to some reservations:**

  - Harmful, dangerous or risky applications of some technologies (armaments, nuclear technologies, technologies with harmful effects on the environment, or "Big Brother" which carries out continuous surveillance of citizens, mentioned in the United Kingdom, etc.).

- Negative effects on employment of innovations that increase productivity and reduce the need for a workforce – notably mentioned here in France, Germany, Spain, Austria, Greece and Slovakia.

- Overly rapid evolution, "difficult to follow" and disturbing – referred to in several countries, sometimes by older interviewees in the groups concerned.

  "I feel we should be careful: we are invaded by so many electronic products …not all of them are really necessary…did you read about that collective hysteria to purchase the new I-Phone? (Italy)

  "We all had to throw out our video tapes and buy the same films on DVD. Who did that benefit?" (Ireland)

- Risk of loss of human contact – in reference to the young "fanatics" of computer and Internet use.

➢ **Overall however, technology is valued for the contributions it makes to facilitating or improving the living conditions of citizen consumers.**

❖ **A similar question was then asked on the subject of research.**

➢ **Research is seen as a component or "basis" of science – as a driving force and factor of progress** which makes it evolve.

"Research is the way to science" (Denmark)

➢ **It is naturally intimately linked to it – firstly by its goal** which is to understand, discover, test out ideas, find answers, create and allow progress.

➢ **Depending on the individuals, it may seem more abstract and remote** (as it involves methods and processes more than the products that result from its discoveries, or because it is linked to the image of scientific researchers with levels of education and knowledge far superior to that of the average citizen) **or as more accessible** (with the notion of experiments, tests and verification of hypotheses, which is easier to grasp than theories).

"Research is less rethorical" (Finland)

➢ **Research is a respected and valued activity, but the same reservations are expressed as more generally with respect to science;** as a reminder, applications with undesirable or harmful effects (although some mention with regard to research into armaments, the technological benefits for other useful areas), risks of misuse, questions on the existence or sufficient character of "marking out" of research activities from an ethical point of view…

"Scientists will always say that they do inventions for the sake of good but their inventions can have different applications. An invention becomes an evil when it becomes a weapon for killing people." (Lithuania)

❖ **When questioned in more detail on the fields of science and research which respectively give rise to interest and hopes or on the contrary reservations and concerns, interviewees overall return to the aspects already mentioned more or less spontaneously.**

- **Interest and hopes mainly involve the following:**

  - **In the first place the medico-pharmaceutical field:** new treatments making it possible to cure scourge diseases which are currently incurable (genetic diseases) or difficult to cure (AIDS, cancers etc.).

  - **Research into solutions to energy, environmental or climate problems**: renewable energies, biofuels, new modes of transport, perfecting of less energy-consuming and less polluting engines…

  - **The invention or improvement of products which facilitate everyday life –** including those of new information and communication technologies (such as satellite communications, satellite identification, etc.).

    "*Think of what we had 10 years ago, mobile phones were like bricks in your pocket. You could not do much with them. Today it is small thing, you can have internet connection with that and do whatever you want*" *(Estonia)*

  - **A number of different specific fields** are mentioned by respondents – whether this involves technical fields (e.g. aerospace, nanotechnologies mentioned by a few respondents, etc.) or progress in the areas of psychology, criminology (to assist justice and security) , education, the economy etc.

- **Reservations or concerns mainly involve the following:**

  - **Genetics:** manipulations, cloning, eugenics, dangerous seeking of "eternal youth", abusive in vitro fertilisation, "cryogenics" etc.

    "*They conduct all kind of genome projects here but I worry whether it is all protected enough. Maybe in a couple of years I walk in the street and I meet myself. It makes me think why and for whom this is necessary and how secure it all is" (Estonia)*

  - **GMOs,** with their uncertain effects both on human health and the environment – and other innovations giving rise to **fears regarding the quality and authenticity of food products.**

  - **Other concerns in the field of health:** organ trafficking, fears of a health system in which progress will de facto be reserved for the rich, searches for scourge diseases "shelved" as they are not commercially viable for private groups, medication launched on the market without sufficient consideration for side effects or harmful long-term effects, absence of safety control for laboratories working on infectious diseases, etc.

    "I read about organ harvesting from executed Chinese." (Sweden)

    "Scientific results that are not published because the interest of different groups differs from the interests of the population" (Hungary)

  - **Concerns linked** to the effects on the environment and on the climate of innovations that are possibly beneficial in other respects.

  - **Concerns referred to above regarding research in the field of armaments** – nuclear weapons, chemical weapons etc.

  - More rarely, the fear of seeing mankind "robotised", or of robots replacing mankind.

Whilst all these examples, positive and negative, are not mentioned to an equal extent in all groups, **there nonetheless prevails quite a substantial homogeneity in the grasping of the benefits and problems linked to science and research by the European citizens interviewed.**

I.2 SOURCES AND CHANNELS OF INFORMATION AND KNOWLEDGE ON SCIENCE

❖ Meeting participants were asked "where what they know and feel about science comes from", "everything that may contribute or have contributed to how they perceive science and what they think about science" (Theme II of the discussion guide).

This question was completed with a request to search their memories for "precise examples of things they have seen or heard, what they have remembered, noticed, understood more or less clearly, etc."

❖ **In all groups, interviewees mention the classic media,** with however a variable importance and more or less considerable precision for each of them.

➢ **Television**

We know that, whatever the subject or almost, it is cited as the principal means of information for citizens, but also that such statements should be considered with caution.

Here it is mentioned by interviewees from all countries. In some of them, it is only mentioned in a general manner. In others, it is often mentioned with the expression of reservations as to the quality or degree of seriousness or depth of the information presented (for example in Belgium and Greece) whereas the citizens of other Member States on the contrary appreciate this information when they are able to weigh it up against that provided by other mass media channels ("evening" papers or "tabloids" denounced for example in the United Kingdom, Sweden and Finland), or make distinctions between types of TV channels (public television favourably opposed to commercial channels in Sweden, etc.).

"I see something on TV and search for more information on the Internet." (Finland)

"As for me I get information from newscasts. Usually I watch the news on three domestic channels, then come newspapers, magazines and sometimes Internet." (Lithuania)

Either straightaway or when they are invited to look into their memories for specific examples, **interviewees quite often mention specific programmes broadcast by general interest channels** (magazines, documentaries and reports in addition to news programmes which are also sometimes mentioned) **or specialist thematic channels** (such as the Discovery Channel and National Geographic, spontaneously referred to in several countries, Spectrum in Slovakia and Hungary, Galileo, Docukepia, Wissenaktuel and Arte in Austria, Animal Planet, Science and Viasat in Romania, etc.).

"There are documentaries about almost every subject" (Austria)

Depending on the individual, these may be programmes which they actively look out for or which they "come across" by chance and watch if the topic covered interests them.

Television clearly has the advantage of being a medium that "does not require any effort" and which is well suited to the entertaining and attractive presentation of serious subjects: the examples provided by interviewees seem to confirm this.

- **Radio**

  This is only explicitly mentioned by group participants in a few countries (France, with favourable comparisons vis-à-vis the superficial nature of television, Sweden also with positive evaluations, the United Kingdom and Austria with memories of a few specific cases, Cyprus, Slovakia, Hungary, Latvia etc.).

  "On the radio they take the time to explain things, it's more pleasant, more than on TV" (France)

  This is doubtless (according to the results of other studies more specifically focussed on the use of media for information searches on European subjects) a medium which is listened to more occasionally or in a "drifting" kind of way ("background noise" during a car journey, or while at work for some professions), and which is less spontaneously thought of.

- **The written press**

  This is mentioned as a source of information by interviewees in the majority of countries: the daily press (sometimes with the exception of devalued "popular" papers) **and above all more or less specialist magazines.** In a number of countries, reference is made to National Geographic Magazine and Geo, as well as to Science Illustrated, Science et Vie (in France), Quo (in Spain), Galileo (in Austria), Weekendavisen (in Denmark), Helsingin Sanomat and Focus (in Finland), Horizont, Tarkane Klubi and Third Eye (in Estonia), and Descopera (in Romania).

  "Sources include magazines such as Geo, National Geographic, Descopera … Next newspapers, which unfortunately offer less and less information on science and technology" (Romania)

  Consultation of specialist magazines nonetheless seems very unequal from one interviewee to the next: some specify that they only buy them if they come across a subject which particularly interests them, or admit that they do not buy them or only do so rarely (this is explicitly the case in the Czech Republic, Slovakia and Hungary where their price is put forward as an obstacle).

In a number of countries we note the expression of doubts as to the general quality of handling of scientific questions by the media – this is the case in Germany, the Netherlands, the United Kingdom (where "it is only ever discussed when there are problems"), the Netherlands (where information disseminated is "often disproved" subsequently), Greece, Lithuania (scepticism among male respondents), **or regrets as to the low amount of information on these matters** (in Austria as regards television, in Romania etc.).

- **The Internet is referred to as a source of information in the majority of the groups – but not always by a majority of group participants** (often, logically, by the youngest participants), **with the frequent idea that it is a means of obtaining greater detail on a subject to which attention has previously been drawn by other channels, or in which participants have a particular interest.**

  "On the Internet, you can go deeper into what interests you. It's more efficient, but it stimulates your interest less than television, because web pages are rather static" (Belgium)

  This confirms that the **Internet is doubtlessly an extremely powerful information searching tool, but hardly represents a means of communication to audiences who are not in principle already aware and interested;** some moreover speak of it in terms of an "additional" means.

- **The reading of books is occasionally mentioned** (by a few respondents from France, Belgium, Luxembourg, the Netherlands, Denmark, Portugal, Hungary, Latvia and Romania) but without any specific precisions.

- **School** (or "education" or "teaching") **is added to this in the groups in the majority of countries studied, and is notably mentioned by young participants** – sometimes with favourable comments (for example in Portugal and Greece), and sometimes on the contrary with the idea of "boring" teaching (in the United Kingdom and Ireland), or that it "depends on the teacher" (in Estonia).

  It is however rare that precise examples of subjects are mentioned in this regard (this is not a very surprising observation due to the fact that the majority of participants left school a long time ago).

- **More specialised educational and cultural venues and institutions are very rarely mentioned** (universities, museums, conferences etc.).

  We will however note the example – given in France – of the Cité des Sciences and the Centre Beaubourg as places of educational and entertaining popularisation and presentation of scientific matters.

- **Work is a rarely mentioned means of contact with information on science** (we remind you that the recruitment criteria excluded interviewees who themselves work in the field).

- **Lastly, "word of mouth",** with conversations between family members, friends and colleagues, **is mentioned in the majority of groups – for subjects that are in the news.**

- **As regards subjects linked to science on which the European citizens interviewed recall having recently seen or heard something, these mainly involve the following topics:**

  - **Health, medicine and medical research.**

    Subjects linked to this topic were referred to in the majority of countries: new treatments or vaccines for some types of cancer or leukaemia (including using stem cells, known in some countries), AIDS vaccines, other vaccines, treatment of the prostate, genetic treatments for muscular growth, research on embryos, surgical robots, implants, new product to replace Viagra, alternative medicine, etc.

    Also mentioned are the potentially harmful effects of some products on food (GMOs, chemical agricultural treatments, nicotine discovered in food products, questions regarding food quality and a new drink) and the effects of waves emitted by mobile phones, or "virtual drugs".

    The question of cloning and the ethical problems it poses are moreover mentioned in a few countries (notably English-speaking), whereby the cloning of a dog in the United States seems to have received a particularly high level of media coverage.

  - **Energy, climate and the environment**

A large number of references are made to programmes seen or articles read on energy problems in general, nuclear energy (including accidents in French plants), the development of alternative energy sources, research into new types of engines (electrical, hybrid, hydrogen, water, compressed air), or saving energy.

Also numerous are the subjects mentioned involving climate change, the preservation of the environment and pollution.

- **Space**

A number of items memorised involved astronomy, the solar system, black holes, the discovery of water on Mars and the existence of extraterrestrials.

Other items involved space travel – notably the prospect of space tourism in future.

- **New products or technological processes**

We find sporadic references to new television screens, a new Microsoft software package, a CD writer, self-cleaning windows, new production techniques for swimming costumes, an experimental aeroplane (Virgin), futuristic modes of transport, new construction processes, new methods of automobile design, a "Chinese" robot, etc.

- **A few subjects specific to animals** (extinct animals, white Siberian tigers, life of reptiles etc.).

- **Fundamental questions on science and research**

A few references are made to a debate in the United States on Darwin's theory, and a subject on the origin of mankind.

In another area of ideas, references are also made to the state of research in the United States, the collaboration between academics and engineers in that country, the financing of research and brain drain, and to "false scientific information" (media coverage of "the millennium bug" which turned out not to be a problem).

- **Miscellaneous subjects**

Among these are the "mystery" of electromagnetic fields in Paphos (Cyprus), the discovery of a fossil (in the same country), scientific techniques at the service of criminology, urban sociology research, the American missile shield project, etc.

CHAPTER II

KNOWLEDGE, UNDERSTANDING AND ATTITUDES REGARDING SEVEN AREAS OF SCIENTIFIC RESEARCH

❖ **The meeting participants were then invited to discuss seven areas of scientific research** (chosen from among those likely to provoke debate).

For each area, they were first asked to say what they knew and understood about it, to state its importance in their opinion, and to give their opinion on research carried out in the area and what can be expected of it (Theme IV.1).

In a second stage, they were presented with a short text summarising the issues at stake in each area and the main directions of research resulting from this (Theme IV.2).

II.1 NUCLEAR ENERGY

II.1.1 Initial attitudes

❖ **Opinion regarding nuclear energy is divided and often ambivalent.**

➢ **The dangers and risks of atomic power are referred to by participants in all groups.**

- **Mention is made of military use of atomic power or atomic bombs.**

  This is – at least in terms of explicit references – relatively rare: references to the Hiroshima and Nagasaki bombs in Sweden, more generally to nuclear armaments by some respondents from Malta, Cyprus, Poland, Latvia and Lithuania, or to the risk of a country such as Iran having them available by Czech interviewees.

  "Destruction of the world" (Cyprus)

- **References to the risk of accidents at nuclear power plants.**

  The explosion of the Chernobyl plant is spontaneously present in the memory of some interviewees (from Ireland, Austria, Cyprus, Estonia, Latvia, Bulgaria), along with the recent leaks observed in French plants (referred to not only there, but also in Germany and Italy) and a Slovenian plant (mentioned in Austria), the incidents at Sellafield (mentioned in the United Kingdom and Ireland), the anxiety recently provoked by the proximity of a Swedish plant (in Denmark), or less precisely the risk of accidents, nuclear contamination and harmful effects for mankind and/or the environment.

  "It can be very dangerous if something goes wrong in the security system" (Portugal)

- **Reference to the problem of storing nuclear waste.**

  This is expressly present in the responses of participants from Germany, Italy, Spain, Denmark, Malta and Slovakia; and the latter stages of the discussions show that others are also aware of this "unresolved" problem.

- **More or less widespread feeling that this is a somewhat mysterious area, which has not been (fully) mastered,** and for some an area that gives all the more reason for anxiety or distrust when they have the impression that information on the subject, or about incidents, is

"restricted", "not covered by the media", or even "manipulated" – this is particularly the case of interviewees in France, Germany, Italy, Portugal, Slovenia, and the Czech Republic.

"I hope that this field will not develop any further." (Slovenia)

- **At the same time, citizens interviewed are generally aware of the importance and utility of nuclear energy.**

  - **Known or presumed importance in the current production of electricity** – unequally, without doubt, depending on the country and the share nuclear power has in electricity production there: France is for example recognised as a leader in this area by her own citizens, but respondents from other Member States also refer to the substantial growth that electronuclear power is experiencing there; particularly also the United Kingdom, Ireland, the Czech Republic, Slovakia and Lithuania.

  - **Accentuated perception of the importance for the future of nuclear energy in the current context of energy crisis**.

    This is quite clearly apparent with interviewees from France, Germany (fundamental economic factors), the United Kingdom, Spain (low cost energy), Ireland, Austria (an alternative to fossil energy sources), Denmark, Greece (at least among the male interviewees, with female interviewees seeming more dominated by fears), Poland, the Czech Republic, Slovakia (where interviewees expressly see nuclear energy as a necessary condition for energy independence), Lithuania and Romania.

    "They try to develop renewable energies, but can you believe in it, as nuclear energy prevails over all these energies"
    "And how many windmills will be needed to replace it, spoiling the landscape" (France)

    "I was always against it (i.e. nuclear energy) but now I am starting to see it as a concrete solution to a concrete problem" (Denmark)

    "A tendency to come back to nuclear power plants is clearly visible, because conditions of the world economy force many countries to come back to the idea of nuclear power plants, or to rebuild the existing ones" (Poland)

    Some of them speak of nuclear energy in positive terms, describing it as the "energy of the future", while others seem to be resigned to it as to a not necessarily welcome obligation (German and Austrian interviewees, for example).

    "I have many feelings. On the one hand, Chernobyl and all the incidents which we are not told about, on the other I can see that we have a massive energy problem, which neither solar nor wind energy will be able to solve" (Germany)

    "We have no choice but accepting nuclear energy" (Austria)

  - **More or less widespread perceptions of progress made in this area, either from a techno-economic point of view or in terms of safety.**

    While a select few interviewees have heard about "third generation" plants and some others have heard of prospects of production by nuclear fusion, more numerous are those who generally speak of nuclear power plants that perform better economically and/or are safer.

    "The construction of a new nuclear plant is today different from the past, for example Chernobyl, it all depends on how it is built and maintained" (Italy)

The notion of nuclear energy as neutral with regard to global warming has also partly penetrated peoples' minds.

A few references are made in this context to alternative renewable energy sources – without an in-depth debate being triggered at this stage on their merits or limitations (briefly mentioned by some).

❖ **The interviewees whose attitudes appear to be more open to nuclear energy and its development** seem to come from the groups in the United Kingdom, Spain, Denmark, Poland, the Czech Republic, Slovakia, Lithuania and Romania, who are among those who refer to the utility of research and the results that may be expected from it.

"Research in this area has positive outcomes, but it is up to society to take safety measures" (Romania)

On the other hand, we observe among citizens who are particularly uncertain or anxious a tendency to "bury their heads in the sand" in a manner of speaking, with the hope that research is not extended in this area.

"*It frightens me; I don't even want to know*" *(Greece)*

Overall, however, **those who avoid the debate on the utility or necessity of nuclear energy** in this way **are few and far between.**

II.1.2 Reactions to the document provided

❖ **This text is generally judged to be clear.**

A partial exception involves interviewees from the United Kingdom (for the document as a whole), Denmark and Estonia (for the second part regarding the orientation of research activities), and Lithuania.

Among these interviewees, as well as among several interviewees from other Member States, questions are raised notably on the difference – insufficiently explained – between fission and fusion, on the meaning of the term "isotope" and sometimes also on the meaning of "generations" of nuclear power plants.

"What is fusion, what are isotopes, pure scientific terms, just abstraction, the last paragraph in particular. Nothing is said how human beings might be influenced." (Lithuania)

❖ **Its provision of information is unequally evaluated.**

Those who acknowledge having learnt the most new information are citizens interviewed in the United Kingdom, Belgium, Luxembourg, Finland, Portugal, Greece, Cyprus, Slovakia and Romania – without it being possible here to make a differentiation between "nuclear" and "non-nuclear" countries.

- **The first part of the document** – assessment of the energy situation and the issues at stake – **gives rise to few comments.**

  The limitation of oil and gas resources, as well as the considerable energy dependence of Europe, represent a known situation, of which all appear to be aware (this was not the case everywhere, or not to the same extent, a few years ago).

  The statement that renewable energies "will only provide a minor part of energy needs" and that Europe "will have to increase its nuclear electricity production" is only rarely criticised (notably by some Irish, Austrian, Danish, Maltese and Slovenian respondents who insist on the desirable development of these energy sources).

  The advantages of nuclear energy (relatively low cost, non-contribution to global warming) are rarely contested.

- **The second part** – on research orientations – **gives rise to lots more questions, comments and discussion** – we have seen that it is the part which includes the largest number of new elements for the group participants.

  - **The points on which discussion takes place are mainly as follows:**

    - **The risks linked to nuclear activity.**

      Frequent reference is made to research in the area of safety (or the promise of production processes that are less dangerous and produce less waste), **which is naturally viewed positively.**

      Questions and doubts nonetheless remain frequent for citizens of a large number of countries, who either ask for further explanations and more in-depth information or even tend to consider the text as "a promotional text intended to be reassuring" but "lacking objectivity" or "not very credible".

    - **The techno-economic evolution of electronuclear plants.**

      We have already seen that the difference between fission and fusion remains cloudy for many, and would benefit from more detailed educational presentation.

      In this respect, while the promises of the text are in themselves welcome (more efficient, more economic, safer and less polluting production etc.), whether a question of third or fourth generation plants using nuclear fission or of future plants based on the fusion process, **the horizons – 2025 and 2050 – seem to many to be a long way off and consequently somewhat abstract.**

      "It's remote, it's rather vague, they tell about 2050, and this paper will be obsolete in 2050, it sounds a bit like dreaming" (France)

- **On the whole, the document presented nonetheless serves to improve understanding of the nuclear area and of the research that is carried out within it, and attitudes in this respect.**

This is at least true in the United Kingdom, Luxembourg, Sweden, Finland, Portugal, Poland, Bulgaria and Romania, and less clearly or more partially in Greece, Malta, Cyprus, Slovakia, Estonia and Lithuania.

"I think it does put across a convincing case about the merits of nuclear energy, but I don't think I would pick it up to read." (United Kingdom)

"I had no idea that nuclear energy could be used in a positive way, I always thought that it is only used negatively." (Malta)

In the other Member States (even if some deny having improved their knowledge), the knowledge of these questions by interviewees was enriched or strengthened, yet the expression of scepticism remains more frequent.

"It's all very clear and I can see the benefits but still it can be dangerous" (Portugal)

II.2 CLIMATE CHANGE

II.2.1 Initial attitudes

- **The theme of the greenhouse effect, global warming and climate change is a subject familiar to all** – even if some are a little confused on the nature of the phenomenon (references to the deterioration of the ozone layer or the aerosol products that contributed to this).

- **The reality of the phenomenon is a fact that is very widely accepted.**

  In more than half of the groups, no doubts of any kind are expressed either on this reality or on the causes of the phenomenon, linked to human activity.

  In other groups, some participants talk of controversies or diverging opinions between scientists, if not on the reality of global warming, at least on what causes it: a change brought about by the increase in greenhouse gas emissions due to mankind or a natural evolution cycle as has been experienced by the Earth in the past.

  "I honestly do not know what natural variation in the climate cycle is and what is established as climate change? We are bombarded with news and comments about the future catastrophes, but at the same time scientists do not agree among themselves." (Sweden)

  This is for example the case of some respondents from the Netherlands, Ireland, Denmark, Sweden, Poland and Estonia (sometimes with the suspicion of manipulation for the benefit of political or economic groups); less clearly for respondents in Germany and Italy (who do not take on board the reservations heard on the phenomenon or consider that human activities at least contribute towards the accentuation of a possibly natural evolution).

  Others, without voicing any doubts, show a certain weariness faced with "excessive media coverage" which leads to a decrease in attention rather than the opposite (some respondents from Germany, the United Kingdom, Belgium and the Czech Republic etc.).

- **Anxiety and the degree of involvement are generally high, although they are unequally pronounced.**

  Almost all those interviewed seem to be sensitive to the problem, to the events already visible today (melting of mountain glaciers and polar ice, climate disruption causing catastrophes and storms, disappearance of the traditional course of the seasons in some countries, etc.) and its anticipated future effects.

  "It took me by surprise that you are able to see and feel the changes in the climate as we do now" (Denmark)

  "It is important, because it is in fact our future. The future of our children and of our planet" (Poland)

Among these respondents, those who express themselves in the strongest terms seem to be the interviewees in Austria, Spain, Portugal, Greece, Malta, Hungary and Bulgaria (countries situated more in the South than in the North of Europe), although the content of the responses of numerous others is of the same nature.

Only a few interviewees seem to distance themselves from this attitude because they do not see any direct and immediate consequences for their own lives (for example in the United Kingdom and the Czech Republic) or are dissuaded from becoming involved due to the absence of sufficiently detailed and reliable data on the various causes of the phenomenon, and consequently the absence of obvious solutions, or who suspect media manipulation as referred to above in favour of such and such a type of action which is not necessarily priority.

"It would also be nice to hear that there is still hope." (Finland)

A sign of this involvement is that quite a large number of interviewees spontaneously do not make do with calling for the development of solutions by "specialists", but refer to the necessity of changing habits and behaviours (energy use, consumption, destination of waste, restrictions on waste, etc.) for average citizens like them – particularly, but not only, in the countries appearing most "sensitive" as referred to above.

❖ **In any case, almost everyone is agreed that there is a need to make a major research effort to better understand the complex phenomena. This is a prerequisite for subsequent efficient actions.**

"The implications of research can only be positive, because it is supposed to reduce this negative phenomenon and it will contribute to preserving the atmosphere and life on the Earth" (Romania)

II.2.2 Reactions to the document provided

❖ **This text does not pose any problems of understanding.**

The various components and their wording are clear – except, at times, the notion of a "carbon sink", which is new for many and deserves further explanation.

❖ **The new informative content is at the same time limited** – at least as far as the presentation of the general problem of climate change is concerned, a problem that has become quite familiar over the past few years (it is however possible that the content provides precisions on the problem or clarifies it for some interviewees, even if they do not acknowledge this).

"*This is an ordinary text that can be found everywhere. It does not say much to anybody who has heard at least something about it*" *(Estonia)*

❖ **The last part of the text provides precisions and new elements.**

➢ **On the Kyoto Protocol.**

While the majority have heard about it, some are not truly aware of its content, which is explained here: commitment "of most countries" to reducing the quantities released. This is acknowledged by interviewees from several countries: France, the United Kingdom, Italy, Ireland, Finland (for whom the document underlines the importance of these agreements), Greece, Cyprus etc. – whereas Dutch respondents, for whom this matter was unclear, did not find it truly clarified by the sentence on its subject.

In this regard, other interviewees, who were more aware of the subject to start with, attach themselves to the words "most countries", observing that it is the most polluting among them who refused to sign the agreements, and chiefly the United States – comments are above all made in the groups in Italy, Austria, Malta, Cyprus and Poland (this is detrimental to the comparative competitiveness of Europe in the eyes of the latter).

A few interviewees (in Sweden) know that it is the developed States who have undertaken this commitment – some Czech interviewees moreover emphasise the need to help less developed countries to evolve.

➢ **On the role of carbon sinks, which can be carried out by forests and oceans.**

This is a clearly unknown or cloudy notion for a large number, and once it is mentioned receives particular attention from interviewees in Germany, Italy (where interviewees ask for further explanations), Belgium, Luxembourg, Ireland, the Czech Republic, Slovakia (where a few interviewees state they are openly sceptical), Latvia and Bulgaria.

"Forests affect it, we learned it at school, but oceans?" (Czech Republic)

The text states – albeit in summary fashion – the essential, i.e. the question of the capacity of forests and oceans to absorb excess greenhouse gases emitted into the atmosphere.

❖ **The interest kindled by the information contained in the document is generally lukewarm.**

Respondents recognise that it is a good synthetic summary of the problem of climate change.

"This I more or less knew, but there are details that is always good to know and to be reminded of" (Portugal)

Some also remark the positive sign that we intend to take on this challenge, or more generally that of protecting the environment, by referring to the research paths that are being followed.

Others on the other hand, more numerous, find the document insufficient.

➢ Either because the text overall seems to them to provide little new information, to be overly descriptive, and not to provide treatment of sufficiently clear research orientations.

➢ Or because what is said of these orientations suggests that we are only beginning to understand the detailed causes of the phenomenon, and consequently the identification of solutions remains some way off – which can give rise to a feeling of disenchantment.

- Or due to doubts that there is a true effort to handle a problem that is not only scientific, but also political in nature.

  This type of attitude is for example apparent in the responses heard in Germany, Austria, the Czech Republic and Hungary – in addition to the observations already made here and there on the fact that the biggest polluters on the planet did not sign up to the Kyoto agreements.

To make the document more inspiring, it would probably be a good idea to accentuate and detail the final developments for research underway and progress already made.

II.3 BIOFUELS

II.3.1 Initial attitudes

❖ **The notion of biofuels is quite familiar.**

Only in the groups gathered in Spain, Ireland, Finland, Greece and Cyprus do participants declare that they are poorly informed on a subject which, elsewhere, has been emphasised and commented notably in the media.

Quite a large number of participants refer to specific agricultural productions or to derivative products: maize or non-differentiated cereals, rapeseed, sugar cane, cannabis (in one group), ethanol, alcohol, plant oils etc. Some also cite the names of countries in which these productions have begun to spread (including several references to Brazil).

"They are made from corn or sunflower or something similar and the fermentation changes it to gas production." (Slovakia)

❖ **The general objective pursued by the development of biofuels has been properly understood.**

It is to offer substitutes for oil, or fossil fuels in general, of which the reserves are set to run out and whose prices are increasing (spectacularly at the time of the study).

Some also think of an interest of an ecological nature, either because biofuels are a renewable source of energy or (in a more confused way) because their use would produce less pollution and emit less harmful gases (comments made in a few groups). Others, on the contrary, envisage negative impacts in this respect – deforestation, intensive culture, soil depletion, etc.

"It is an alternative variant so as not to contaminate the world." "Let the air be cleaner." (Latvia)

"They're ruining everything, deforesting, it's the wrong approach" (Spain)

As regards the cost of this energy, few comments are made on this subject, and there are divergences of opinion between (a few) interviewees who think that it is high and others who think that it is or is becoming competitive.

❖ **Spontaneous attitudes in the groups regarding biofuels can be broken down into three categories of comparable size.**

➢ **Those who see biofuels as a development that is in principle positive**, as a contribution to the problem of the scarcity and rising cost of oil (and sometimes also to the reduction in polluting emissions).

This is the general tendency observed in the United Kingdom, the Netherlands, Finland, Portugal, Greece, Slovakia, Latvia and Romania. These people hardly seem to have heard about any negative

impacts of this development (on the world prices for food raw materials), except for a few who are worried about this.

"All types of alternative energies are worth researching" (Portugal)

- **Those who, on the other hand, first express their scepticism and concerns.**

  - Scepticism towards the extent of the possible substitution effect for fossil fuels (or towards such a substitution being able to take place in conditions of economic viability).

    At best, they only see a highly limited contribution, which is not likely to truly change the situation and/or only in the short term while awaiting technological developments that are as yet uncertain but are potentially more promising (hydrogen-powered engines etc.).

  - Above all, there are concerns regarding the consequences for food product prices: these major consequences have already been observed over the past few months and are likely in these group participants' opinion to become "dramatic" in the event of huge scale development.

    The terms used to qualify this prospect are often strong: "disastrous" impacts "to the detriment of food", "lack of food", "worldwide hunger" sometimes considered to be brought about by "speculation" – in addition to the negative implications for the preservation of land or the environment which are added to this by some.

  These attitudes predominate in the responses of groups in France, Germany, Austria, Malta, Poland, the Czech Republic and Hungary; they are however also characteristic of a few interviewees who in principle are better informed on these matters in countries where the average level of information is overall low.

"All alternative fuels are an important issue for the future, but biofuels have caused a sudden crisis on the world food market that nobody expected" (Poland)

- **Groups characterised by intermediate attitudes, more balanced, weighing up the pros** (new source of energy) **and cons** (impact on agro-food markets) **without taking up a definitive position.**

  In our study, these are the groups gathered in Italy, Spain, Belgium, Luxembourg, Denmark, Sweden, Slovenia, Estonia, Lithuania and Bulgaria – to which the Irish and Cypriot groups can be added in which the majority of participants hardly take up a position, believing that they have not been sufficiently informed.

- **The opportunity to strengthen research in these areas is more or less well viewed depending on these various attitudes.**

A few doubts are expressed as to the true desire to continue this research or as to the action taken by the oil lobbyists to stand in its way.

"How can I know what is true and not true, what is good or bad for the environment, when there seems to be so much money involved, and therefore also strong lobbies for each of these sides?" (Sweden)

II.1.2 Reactions to the document provided

❖ **The text of the document seems to be perfectly clear for the vast majority of citizens interviewed.**

A few rare individuals state that they do not understand the link between the production of biofuels and the rise in food prices.

Some other individuals are disconcerted by the abstract term "biomass".

❖ **Its provision of information is evaluated in diverse ways.**

➢ **In the groups that showed themselves in principle to be open and positive, there is more often than not an increased awareness of the possible adverse effects of biofuels development.**

The text clarified perceptions of the phenomenon, without fundamentally changing the attitudes in a number of the groups: in Finland, Portugal, Slovakia and Romania, participants state that they better understand the "pros and cons" whilst continuing to show an interest in biofuels – with a balance to be found between the prospects and the constraints which apply to the energy markets and the agro-food markets.

"I didn't know much about this, but what they say here that can cause the rising of food prices is a big problem" (Portugal)

In a few other countries concerned, interviewees show themselves to be less positive after having read the text on the impacts for the food markets: in the Netherlands and Greece (where a certain disenchantment is even apparent in responses).

Attitudes change little in the United Kingdom (where sarcastic comments are made on the interest for farmers of these new productions) and in Latvia (where, as we have seen, the text was not fully understood).

➢ **In the groups that are in principle sceptical, the main new aspect of information is the differentiation made between food and non-food cultures for the production of biofuels.**

This tends to improve on the pre-existing attitudes in Malta, Poland and the Czech Republic, where the interest in continuing research for the second type seems genuine.

These attitudes however change little in France, Germany and Austria, and very little in Hungary (where participants point out that the increase in non-food plant productions will not solve the problem, as they will occupy land previously dedicated to the production of food).

"It is phrased quite vaguely. Finally, the only thing to be remembered is that they have nothing to propose in concrete terms and there is still a lot of work ahead" (Germany)

➢ **In the other groups, the text confirms and provides precisions on notions with which the majority of their participants were at least partly familiar** regarding the various aspects of the issue.

Interviewees from Ireland, Cyprus and Estonia (initially among the least familiar with the subject) generally appreciate this provision of information and wonder in more concrete terms about research orientations and results (particularly for the use of non-food plants).

In Spain and Denmark, the citizens interviewed are also struck by what they have learnt from the document, but tend to have a more pessimistic vision of the prospects of biofuels.

In the other countries, attitudes change little on the presentation of facts in which the participants concerned tend not to see anything radically new vis-à-vis what they knew already.

- **Overall, the reading of the document made attitudes across Europe more homogeneous by establishing a common level of knowledge on the problem put forward for the attention of the citizens.**

II.4 GENETICALLY MODIFIED ORGANISMS

II.4.1 Initial attitudes

❖ **The overwhelming majority of persons interviewed have heard about issues relating to GMOs and express feelings on the subject.**

The majority think of – either exclusively or predominantly – **the issue of genetically modified plant organisms, destined for agricultural production.**

In only a few Member States do interviewees spontaneously extend the scope they assign to GMOs: either by mentioning more broadly genetic manipulation in animals or humans, cloning, the dangers of such practices and the ethical problems that this poses, or by thinking (in positive terms) of medical gene therapy applications – this is the case for some from Germany, Spain, the Netherlands and Sweden, and for some interviewees occasionally encountered in the groups of other Member States.

"*If it is used in a correct way … such as to find improved medicines" (Malta)*

A few also express their opinions on "artificial" agro-food production methods not linked to genetic modification (to state their concerns).

❖ **Distrust of GMOs is highly predominant in the opinions voiced in the group discussions.**

It is strongly and nearly unanimously expressed in the groups in France, Germany, Spain, Luxembourg, Greece, Cyprus, Poland, the Czech Republic, Slovakia, Hungary, Latvia, Bulgaria and Romania; and it is also frequently apparent in groups in the United Kingdom, Belgium, Ireland, Estonia and Lithuania (as well as in Malta, but interviewees there do not truly think of agricultural applications, as is also the case of Dutch interviewees, who take up a carefully balanced position).

In the other countries, either interviewees hardly venture to take up a position due to a lack of sufficient knowledge (in Austria and Portugal), or they show themselves to be divided or ambivalent, pointing out the risks at the same time as the potential benefits (which are virtually absent among the citizens of the countries cited above).

❖ **The main components of this distrust** can be summarised as follows:

- **The general idea of "going against nature"**, "altering" the natural, and "unnatural" processes, which is at the foundation of reactions often tinged with strong affectivity.

- **The perceived absence of benefits in products deriving from these processes – more or less confusedly assimilated with all those that artificially stimulate or direct production** to give higher yield and faster growth, for example fruit and vegetables with an impeccable appearance but devoid of flavour, leading to a levelling out of qualities and taste.

"For me GMO is like apples, all looking the same, put on the shelf somewhere, and they become complete crap after three days at home" (Poland)

- **The risks for food safety that may be brought about by such deviations from the natural.**

  A large number spontaneously cite the dangers or possible dangers for human health – not because they have heard of any proven cases of affected health, but for the sake of the precautionary principle (although they do not use this expression) faced with long-term effects that are as yet wholly unknown and unassessed.

  "I believe the next generations may have to deal with all sorts of problems if we start to consume genetically modified foods thoughtlessly" (Slovenia)

  From previous studies, we know that food products are an especially sensitive area for European consumers, and that concerns are already widespread amongst them as regards the "black box" that constitutes the food chain – even setting aside the question of GMOs. Specifically on the subject of GMOs, the fears expressed go as far as genetic modifications in humans due to their ingestion.

- **Risks for the environment.**

  These are generally little mentioned specifically by interviewees; they result from the same fears for health and unknown and uncontrollable effects in the long term.

  A few references are made – by persons having heard more information on the matter – to processes which, although they eliminate harmful uses (pesticides), replace them with others that could prove still more harmful, with all this seeming like "chemistry" poured into the fields.

- **To sum up, the general impression is that with GMOs we are playing "the apprentice wizard".**

  "There might be side-effects that we cannot foresee and deal with – which are dangerous." (Sweden)

- **More occasionally (but very strongly) there is a denunciation of the economic interests of those who develop GMOs and lobby in their favour, and of the practices of the companies in question.**

  This aspect is present in the responses of interviewees from France ("scandal" of the Monsanto seed supply conditions, notably to Third World farmers), Luxembourg, Italy, Slovenia (with the idea of dependency vis-à-vis American producers, the only ones able to provide "the insecticides that go with them"), Poland (possible interest for producers, but not for consumers, American interests that are politically and legally opposed to European interests), Lithuania (a few references to this opposition) and Bulgaria.

  "The problem is not research in itself, it is the capitalist mind who would do just anything to make a profit" (Luxembourg)

  "This is where the problem lies – profits are big because the issues at stake are big. Will the people who make tons of money out of GMOs will use their funds to help fix the harm they have caused? Once again we get to the issue who controls the funds and what they use them for?" (Bulgaria)

❖ **Conversely, some – clearly in the minority – refer to the potential advantages of GMO development.**

This mainly involves the prospect of increased food production, sufficient to feed the world population and fight against the hunger which prevails in several world regions (or more vaguely of an "improvement" in production and/or products).

Among those who take this line are participants in the groups in Ireland, Denmark, Sweden, Finland, Estonia and Hungary (the latter however only refer to this prospect on a theoretical level and show resolute opposition), along with a select few interviewees in other Member States.

- **A need for in-depth information on the subject is spontaneously apparent for a large number of citizens** – sometimes with the open suspicion that information is "biased" or has been manipulated by economic or political interests.

  It's quite a serious issue and we are too ignorant about it: not being properly informed makes me say I'm against GMOs" (Italy)

II.4.2 Reactions to the document provided

- **The text presented does not pose any problems of understanding** – except for some British and Danish interviewees disconcerted by the term "transgenic" which is abstract to them (a few others in Ireland and Sweden also wonder what the exact meaning is).

  "It is very technical in describing the process. It is too complicated" (Denmark)

  Incidentally, some participants who had heard about "GMOs" did not know what each of the letters of the acronym stood for and in fact were unaware of its meaning.

  The first paragraph of the text provides a definition of GMOs and clarifies what they are.

- **The text teaches a large number of respondents that GMOs can have applications in the field of medicine – this is information well received** (with requests for clarification in a few groups) **but does not involve the essential nature of the problem, i.e. the agricultural use of GMOs.**

- **With regard to this use, the presentation of the possible benefits of GMOs** (herbicide tolerance, reduction in the use of pesticides, prospects for increased agricultural production) **only exceptionally changes the initial attitudes of the citizens interviewed** – either they had more or less heard about them (without necessarily mentioning as much in their previous spontaneous responses), or this argument carries little weight in their eyes compared to the potential dangers with which they associate them.

  The level of awareness of these risks is for the most part unchanged by the reading of the document.

  Some learn of the existence of possible harmful effects which had not been in their thoughts (dissemination over traditional cultures, loss of biodiversity).

  A large number remark the absence of proof of safety in the long term, and their distrust is strengthened or confirmed.

  "As regards the positive outcomes it remains to be seen; as regards the negative implications, even people involved are not quite sure what these might actually be" (Cyprus)

"Yes, but it takes generations to see it. If we start to eat this GMO food today, we'll see the consequences in our grand and great grand children" (Poland)

Finally, as regards the last paragraph on research orientation, the idea is again present of an unknown field which has been little explored, and in which prudence dictates that we should not advance any further without further knowledge.

Some praise the honesty or integrity of the document which freely acknowledges the state of play (particularly among those from Belgium, the Netherlands, Austria, Finland, Slovakia and Romania), whereas others – more numerous – say that they are disappointed and even accuse the document of having an "overly marketing" character, "lacking objectiveness" or "insufficiently critical of the risks".

II.5 STEM CELLS

II.5.1 Initial attitudes

❖ **Familiarity with the topic of stem cells appears to vary substantially from one Member State to the next.**

- The notion is best known by participants in the groups from Italy, Ireland, Denmark, Greece, Malta, Slovenia, Hungary, Latvia, Lithuania and Romania; some participants have also heard the subject talked about in quite concrete terms in the United Kingdom, Spain, Austria, Cyprus and the Czech Republic.

  Some of them seem to be genuinely well informed and for example refer to the use, keeping and/or culture of cells taken from newborn embryos (or from the umbilical cord or the placenta) for subsequent implantation in the organism of the same human being or members of their family, so as to treat diseases, remedy handicaps or deficiencies, regenerate the skin or repair fractures, etc.

  "They make skin for burns victims" (Spain)

  "There are already medicaments that do not replace stem cells but stimulate it" (Hungary)

- On the contrary, the subject seems especially unclear for interviewees from France, Germany, Belgium, Luxembourg, Sweden, Finland, Portugal, Poland, Slovakia and Estonia (with interviewees from the latter countries having a few scraps of knowledge).

  While they generally think of medical uses, this remains highly imprecise and a few also believe that stem cells have applications in the plant world (with in addition a degree of confusion with GMOs).

  "I believe it has to do with potentially life saving treatments and techniques" (Sweden)

- These differences may of course arise from a sampling effect (given the fact that the study in each country was only based on one group, whose participants could have particular characteristics in spite of the precautions taken for recruitment), but they probably also reflect the state of development of the local public debate on these issues and the attention that has recently been given to them by the media.

❖ **Attitudes with regard to stem cells** (apart from respondents who know nothing or next to nothing about them) **can be described as including the following aspects:**

- **A lively interest in the prospects that are offered for decisive progress in the treatment of serious diseases**, currently incurable or difficult to cure (references to severe handicaps, cancer, Alzheimer's disease etc.).

  Whilst, according to a proportion of the interviewees, things are only at an "experimental" stage today, others know or think they know of applications that are already in place and large-scale.

- **A large number of considerations on the ethical problems posed by the culture and use of stem cells.**

On the extreme side, very serious reservations are expressed on "artificial" manipulations that are "contrary to nature", close to "science fiction", "human cloning", "standard exchange of organs", etc.

"I know very little about it. I never took interest in it. According to what we hear and read, it aims to create spare part stocks, just as a clone looking like the original human being … and this is what worries me. It's one step too much into creation. Some limits must be set" (Germany)

"When the research is done for diseases it is okay, otherwise it get's a bit freaky" (Netherlands)

From another point of view, and seemingly more frequently among those who seem the best informed, observations are made without preconceptions on the legitimate scientific and political debates that are underway, with the aim being to oversee future research and applications.

From another point of view, a few also cite the cost of this research and that of the therapies that will result from it, with concerns that only the wealthiest will be able to benefit from them and that privileges and inequalities will be reinforced.

"High costs lead to injustice. Differences appear between rich and poor families" (Romania)

II.5.2 Reactions to the document provided

- **This document presents more problems of understanding than those previously put forward for the attention of the meeting participants.**

  This is true both for groups that are initially relatively well informed and for those whose members discover on reading it information that is almost entirely new to them.

  The reason for this is the "technical", "scientific" or "abstract" character of some terms or concepts ("undifferentiated" cells, "specialised function", "virtually indefinite" reproduction, etc.).

  This does not however prevent a quite good understanding of the general meaning of the text, with the explicit admission that such a complex (and new) subject could hardly be presented without recourse to some scientific notions.

- **The majority consider it to be informative** through the facts, precisions and explanations that it provides.

  For some, this is a totally new discovery, or almost. Others, having partial knowledge, find the additional elements of which they knew nothing, both on the nature of stem cells and their action and on the possibilities that they open up for the treatment of serious diseases.

  A large number from both categories moreover state their interest in receiving more information on a research area that seems highly promising for humanity.

- **As it is, the document gives rise to a high degree of interest.**

Among the points that are particularly frequently referred to are:

- As a reminder, the scientific explanations in the first few paragraphs.

- The in principle very wide scope of the new treatments that can be envisaged thanks to stem cells (among which the Alzheimer's treatment is often referred to) – sometimes more numerous examples are asked for.

  With the exception of a few sceptics, interviewees truly see this as the promise of radical medical progress.

  "*It really raises hopes" (Greece)*

- The ethical questions already spontaneously mentioned – including the mentioning of different legislation from one country to the next.

  Those interviewed clearly perceive the imperative need for strict supervision and monitoring in this area. The most anxious refer once again to the risk of sliding towards "inhuman" experimentation (a few references to the experiments of the Nazi regime, the prospect of seeing "farms" of human donors, of practising cloning, etc.).

  "Well let's just remember Mr Adolf Hitler, who was already in the cloning business in 1943. Now that is a problem" (Slovenia)

II.6 NANOTECHNOLOGY

II.6.1 Initial attitudes

❖ **The level of knowledge on nanotechnologies is extremely low.**

In the majority of groups, we find one or two individuals – often among the youngest, still studying, and among male rather than female respondents – who have heard about or got wind of certain applications, with others stating they are even unsure whether they have possibly already heard the word pronounced; the extreme case in a few countries is that none of the participants seem to have the slightest information available on the subject.

It is practically only in the French group, and to a lesser extent in the Greek and Czech groups, that the topic appears more familiar – with the mention of known applications, especially in electronic products destined for the general public, and the idea of a technology in a state of constant and rapid evolution.

It is also these types of applications that are referred to first of all by the few respondents in the other Member States who have heard about nanotechnologies in a concrete way: computers, mobile phones, satellite telecommunications, cameras, recording equipment, micro robots etc.

"Hearing aids that are very small, that is extraordinary"
"Ten years ago mobile phones were like monsters, nowadays they do everything and they're very tiny" (France)

"Small nanorobots who can amend tissues or organs" (Estonia)

We also occasionally find reference to medical or surgical applications (microchips inserted into the organism) or the manufacture of new mechanical or textile materials (ultra light, more resistant) or new processes (deposit of micro-layers of matter on glasses lenses).

"Also the covering layer of glasses is made with the help of nanotechnologies" (Latvia)

The same fields are sometimes also referred to by other interviewees who – not having any precise knowledge – make suppositions by reasoning on their understanding of the prefix "nano" (meaning extremely small).

"It's about things that are invisible to the human eye" (United Kingdom)

❖ **Spontaneous attitudes towards these technologies can hardly be described in these conditions** – due to a lack of knowledge among the majority.

With the exception of a few respondents who clearly see or imagine them as a source of useful innovation, and a few others who are worried about the possible ethical aspects for medical applications, interviewees hardly venture to express a positive or negative opinion.

"I knew that nano- means something very small but ... is it written there where it can be used?" (Slovakia)

We note in passing a (logical) tendency to associate nanotechnologies with technology rather than with science or research.

II.6.2 Reactions to the document provided

❖ **Opinion is divided as to the degree of clarity of the document.**

It poses no major problems of understanding for participants in over half of the groups (in France, Italy, Belgium, Luxembourg, Sweden, Finland, Ireland, Greece, Malta except for a few respondents, Slovenia, Poland, the Czech Republic, Slovakia, Hungary, Estonia and Romania).

This is less the case in the other countries, where technical notions can render assimilation difficult – this is particularly stated by respondents from Germany, the Netherlands, Austria, Denmark, Cyprus, Latvia and Bulgaria, with some experiencing apparent difficulty in conceptualising phenomena at an atomic or molecular level.

❖ **The text's provision of information is acknowledged** – in a context where the majority suffered from substantial ignorance – despite the difficulties of understanding referred to above.

In this respect, it is above all the **applications** of nanotechnologies that have received the most attention: medical applications of nanobiotechnologies for some (who were only or mainly thinking of electronics), revolutionary materials, in addition to information technologies; sometimes respondents imagine future uses in a large number of hypothetical areas.

"Apparently there are many interesting applications, so doing research in this area is fine" (Belgium)

"It sounds extraordinary to me. Knowledge of materials is a base for all other sciences and for the development. You will see yourself, how different sciences, more or less related, are physics" (Poland)

❖ **Overall reactions to the text are rarely negative, but the degree of interest varies considerably from one group to the next.**

➢ Depending on the level of understanding: there is a clear correlation (although not absolute).

"Nanotechnologies are a very interesting thing, but the material is written in such a way that it does not cause any wish to read it." (Latvia)

➢ Depending on the perceived interest for the individual of the applications that nanotechnologies may have.

The more interviewees distinguish applications from which they are able to draw concrete advantages in everyday life, the greater the interest. In some groups, harbouring reservations in this respect, the first request is moreover to have more concrete examples.

In addition, we observe relatively numerous comments on the absence of disadvantages regarding the prospects suggested in the text – and particularly the absence of problems of an ethical nature in

the development of new applications (except, for a few, possibly on the subject of nanobiotechnologies).

"There does not seem to be a negative in nanotechnology at all, it is not harming anyone, it is just new technology." (United Kingdom)

The majority hope that research in this area is continued and accentuated – the most enthusiastic to state this being the interviewees from France, Belgium, Finland, Portugal, Malta, Poland, the Czech Republic and Hungary.

II.7 EXPERIMENTS ON ANIMALS

II.7.1 Initial attitudes

- **Attitudes regarding experiments on animals show themselves to be extremely homogeneous in all the groups questioned in Europe.**

- **They can be summarised as follows:**

  - **More or less strong emotive reactions of compassion towards animals** (in some groups, among female respondents in particular) **counterbalanced by the rational consideration of the practical impossibility of getting by without such tests**, unless they were to be performed on humans themselves.

    All or virtually all consider experiments on animals to be fundamentally "**a necessary evil**".

    "When they can find a cure for cancer that way, I am not against it." (Netherlands)

    "If you are ill, you do not refuse to take a drug that was tested on animals" (Austria)

    Only a few persons (particularly in the Polish group) state their absolute opposition to such practices for reasons of principle. A few others moreover call into question their true scientific relevance, doubting that the reactions of animals can be extrapolated onto those of humans.

  - **Desired limitation of the scope of experiments to what is strictly indispensible**: that is to say for a large number, the area of medical research, as opposed to the emblematic example of the cosmetics sector, often mentioned spontaneously.

    "Is bad when the animals are treated under bad conditions or when the propose is profit" (Portugal)

    In the same line of ideas, intentions are expressed that alternative methods should be developed to the maximum extent possible, and that the same tests should not be repeated several times, or that an effort should be made to reduce the suffering imposed upon laboratory animals.

II.7.2 Reactions to the document provided

- **The document does not pose any problems of understanding.**

- **Its informative content is limited: for the most part, it in fact summarises the opinions of the interviewees themselves.**

A few note with interest the announcement of research for alternative solutions or to reduce the suffering of animals – with others being sceptical regarding these prospects.

"It is a necessary evil and it should be kept minimal." (Czech Republic)

A few also point out as positive the existence of European legislation in this area.

Some call for reassurances and more concrete information on these points.

- **The text barely changes pre-existing attitudes, and in general only gives rise to a moderate level of interest.**

CHAPTER III

KNOWLEDGE AND OPINIONS REGARDING SCIENTIFIC RESEARCH AT NATIONAL AND EUROPEAN LEVEL

III.1 OPINIONS AND ATTITUDES REGARDING SCIENTIFIC RESEARCH AT NATIONAL LEVEL

❖ The meeting participants were invited to say what they knew and thought about scientific research in their country (Theme V.1 of the discussion guide).

They were then asked if in their opinion "more should be done" in the area of scientific research and "in what particular fields", as well as for their perception "of the limits" preventing more from being carried out (Theme V.2).

❖ **As a general rule, European citizens have the impression that scientific research is weak and insufficient in their country.**

➢ **This impression is relatively less deep-seated or less unanimous in certain Member States.**

- **Three of the largest Member States: France, Germany and the United Kingdom.**

The French mention technological areas in which France is well placed and shows herself as capable of exporting: railways, aeronautics (along with other European countries), medicine etc ; but they agree that their country is lagging behind (compared to the United States).

"One thinks of the USA, not France" (France)

The Germans show themselves as divided between those who think that German research is performing well and others who see it as less dynamic than that of great powers such as the United States, and sometimes also China, or speak of missed opportunities (hybrid engines being "left to" the Japanese).
Some refer to the greater consideration afforded to ethical concerns in Germany, which can be positive but can also constitute an obstacle to research.

In the British group a variety of opinions are also expressed, albeit with hardly any reference made to precise sectors of advance (except for some in the areas of medical research or space in association with American programmes) or backwardness of the United Kingdom. Among the optimists, the general idea tends to be that of a technologically advanced country, or of the high reputation of some of its universities.

- **Ireland, the Nordic countries, and to a lesser extent the Benelux.**

Some of the Irish interviewees cite fields in which the knowledge of their country enables them to occupy an enviable position (IT, pharmaceuticals) or mention a policy of active State support (but they show themselves to be more pessimistic as regards the future) whereas others talk of the weakness of their country compared to others such as the United States, Japan and Germany.

Those questioned from Finland tend to think that their country is ahead in a number of fields (electronics, nanotechnologies and medicine), thanks to the coexistence of reputed research institutes and of a few large high-tech companies – but that it is not ahead in others (space and alternative energies for example).

A similar trend is observed with Danish respondents: expertise in research on climate, wind energy and some areas of medicine – as opposed to nuclear energy for example (in their opinion, due to a lack of political impetus).

"A lot of people come to Denmark to see our windmills" (Denmark)

In Sweden, medicine and pharmaceuticals are cited as fields in which their country fares well, albeit with the feeling of a gradual decline in research activities.

"If there is any area of research where we can compete, it has to be in medicine" (Sweden)

Belgians believe in the strength of their country thanks to the value of its research centres and researchers, notably mentioning the pharmaceutical sector. At the same time, they consider that investment in research is weak by comparison to the United States (or Canada).

Dutch respondents show themselves to be more prudent, and suppose that a highly developed country such as theirs with a tradition of innovation should have large-scale research – for example in the sector of hydraulics and perhaps in the medical field – and they refer to the successes of Dutch universities; but these opinions show themselves to be little assured, and are combined in any case with the idea of lagging behind countries such as the United States and Japan.

"The Technical University of Delft have won the World Solar Challenge. It was broadcasted on the national news on TV and I read about it in the newspapers. Spectacular!"
"America and Japan are more advanced" (Netherlands)

As regards those from Luxembourg, whilst they do not have a well supported opinion on a large number of concrete examples, they imagine research activities in the few large industrial companies established in the country, but are well aware of the limits inherent to the country's size and generally refer to lagging behind "foreign countries".

- **Among the new Member States, Estonia and to a lesser extent Romania.**

Some Estonians believe in the assets of their country, in information technologies, astronomy, biology or medicine. Others on the contrary underline its limits, especially given its small size.

"For IT you need a computer and you can do it at home but you need much more resources for developing let us say a jet" (Estonia)

In Romania, attitudes are more divided between those (among the oldest) who think pessimistically that the research structures which existed previously have disappeared or have declined with the confusion prevailing in the country since 1990, and others who notice signs of a recovery; between the two extremes, the youngest respondents tend to praise the talents of Romanian researchers whilst deploring the fact that they are not recognised or are "looted" by foreign countries or obliged to go into exile.

➢ **In groups in the other countries, the idea of the weakness of the research effort predominates.**

- **This may be accompanied by the mentioning of fields that constitute an exception:** this is the case in Portugal for marine biology, genetics or medicine; in Malta for information technologies; in Slovenia for the involvement of national researchers in European (space) programmes (and without doubt also due to the functions of the Slovenian Commissioner, a well known figure); in the Czech Republic for areas of medical research as well as automobile technology (but these discoveries are put to use abroad); in Latvia where several interviewees

mention a range of different sectors; in Lithuania (among participants of a certain age), notably as regards lasers.

"*We are at least 20 years behind*" *(Malta)*

- **This is often tinged with bitterness, when respondents think that their country has brilliant brains who are or were at the source of important discoveries and that it has potential assets that are not put to use and backed up.**

  This is an attitude that is largely present in responses: for example in Italy (qualified professionals who are not able to work in their country due to the lack of stable contracts and sufficient salaries, with the research budget being described as "one of the lowest of the European Union"); in Spain: here too, there is the impression of a general backwardness (compared to the United States, Japan, Germany and France), brain drain due to lack of investment; in Greece (similar observations); Poland (high intellectual potential but obligation to expatriate); in the Czech Republic (brain drain and loss of ideas), etc.

  "We have excellent brains, but no funds" (Italy)

  "Brain drain takes place and our researchers become successful in other countries." (Lithuania)

- In several Member States, without attitudes being fundamentally different there, **the reference to national assets is less explicit and the feeling of lagging behind is more global**: for example in Austria, Cyprus (a "follower" country, lacking a budget and local opportunities), Slovakia (few scientists, or scientists have left to go abroad, lack of a public budget, loss of past areas of competence), Hungary (little State involvement here either), Bulgaria, etc.

❖ **Whilst the terms of comparison with other countries do partially differ, the demonstrations of the weakness of research and the perceived causes for this are broadly similar in the eyes of the citizens of the various Member States.**

➢ **In those Member States where the impression of lagging behind is nuanced, comparisons are mainly made with third party developed countries** – first and foremost the United States, and Japan.

In the other countries, the terms of reference may either be these countries, or other more advanced Member States, or are not expressly formulated (in the case of a general sense of lagging behind).

➢ **The causes and demonstrations of the weakness of research are mainly as follows:**

- **Insufficient nature of research budgets** – a topic spontaneously present in a very large number of groups, both in "more advanced" and "less advanced" Member States.

  The majority of citizens interviewed think of **public research credits.**

  "(In) the CNRS (National Scientific Research Council), credits were reduced as a result of the recent laws"
  "It does not have the share of the budget that it should have" (France)

  "It's one of the countries where things arrive last" (Spain)

"There are quite a lot of well known scientists, rather it's infrastructure that is lacking" (Belgium)

A few, although those who express it in this way are rare (among British, Greek and Maltese respondents, etc.), refer to the higher efficiency of the private sector; others on the contrary tend to question the prevalence of financial interests (in Italy and the Czech Republic) or the "refusal" of the private sector to collaborate with the public sector (in Lithuania).

The small size of some countries is naturally a limiting factor, along with their economic difficulties.

- **The absence on the part of the State of political vision and will, or the poor organisation of the public research apparatus.**

  The first of these arguments is notably voiced in Poland (lack of a well thought out plan in the long term), Slovakia, Hungary and Romania; while the second is heard in several countries (in France regarding the "partitioning" of research structures, in Belgium with reference to the complexity of the breakdown of competences between the federal level and the other decision levels, in Greece, Malta and Latvia on the subject of "bureaucracy" which is hindering the development of research).

  These impressions also crop up elsewhere in the responses of participants in the other groups.

- **The low appeal of careers in research** – whether in terms of the continuity of research posts (fixed-duration contracts) or of pay – **with these factors leading to brain drain.**

  This idea is expressed in the vast majority of the groups analysed.

  "I read somewhere that because there was not as much financial support for them in the UK, scientists are increasingly going abroad." (United Kingdom)

  "Lack of finance. No promotion, we have many very highly qualified young and old scientists" "And they do their research in the USA, not in Poland, because there are no good conditions for it here" (Poland)

  "Doctors are leaving the country" (Hungary)

  "I can work as a scientist, I would gladly do it, but I have no guarantee that I could do it for long!" (Latvia)

- A range of factors suggested occasionally here and there: legislation that fails to provide sufficient protection for intellectual property, or that is perhaps overly restrictive in terms of ethics to allow for the development of research in some areas, overly heavy tax burden for companies etc.

❖ **To sum up, the attitudes of European citizens on these questions therefore appear to be quite homogeneous.**

They reflect citizens' feeling that the development of research is an essential aspect for their country.

Indeed, when they are asked about whether or not "more should be done" in this respect, the overwhelming majority of interviewees thoroughly agree.

We note that **the awareness of the limitation of available resources leads a large number of respondents** in small and medium-sized Member States **to recommend the development of partnerships, often explicitly at European level**: this is clearly the case in Belgium, Luxembourg, Austria, Sweden, Greece, Slovenia, Slovakia, Estonia, Bulgaria, etc.

- **Lastly, as regards the specific areas of scientific research that are deserving of support**, not everyone gives an answer, doubtless owing to a lack of sufficient knowledge. The following is observed:

  - **The relatively frequent citing of two fields: medicine** and **energy** (renewable energies, nuclear energy, etc.).

  - **The idea, above all in small Member States, of the necessary concentration on a limited number of areas in which they have assets (or less backwardness).**

    This is for example the case of Irish respondents who refer to computer software and pharmaceuticals, Slovenian respondents who refer to microtechnology, Latvian respondents who refer to chemistry, Bulgarian respondents who refer to information technologies, etc.

III.2 OPINIONS AND ATTITUDES REGARDING SCIENTIFIC RESEARCH IN THE EUROPEAN UNION

❖ After the discussion phase on the state of research in their own country, the persons gathered in the groups were invited to express themselves on the subject of research in the European Union, to say "what they knew and felt about it", and then to give their opinion on the importance of "the research policy carried out in common within the European Union" for the years to come and on what its main orientations should be (Themes VI.1 and VI.2 of the discussion guide).

They were then asked to react to a document presenting a two-page summary of this policy (Theme VI.3).

III.2.1 Spontaneous opinions and attitudes

❖ **The first observation is that the degree of knowledge on European research policy is extremely low.**

➢ **In the groups of some of the Member States, the citizens interviewed presume** (rather than truly know) **that there is a research policy at European level.**

- **In a few countries, interviewees show themselves to be more convinced than elsewhere of the existence of a European policy, although they actually know very little about it.**

  This is the case in Belgium (where respondents think that the EU invests a lot in research, but cite fields that do not necessarily fall under the Community sphere: aerospace, biofuels, nuclear research at the CERN), Ireland (where respondents say they know it promotes scientific research and that it had a direct or indirect role in the development of a space programme, Ariane and Airbus, or in the development of a GSM standard adopted worldwide), Cyprus (quasi-certainty that the EU actively supports research, but with barely any precise examples), Slovenia (same impression of European investment in research, reference to space research, nuclear energy and the environment), Hungary (knowledge of the existence of an active policy, a few references to a space programme and medical research), and Latvia (more specific knowledge for some interviewees, with some citing a number of fields and referring to the existence of scientific institutes or laboratories, which are however poorly identified).

  "We know there are thousands of projects, but we do not know what they are" (Belgium)

- **In a few other countries** – France, Italy, Spain, Luxembourg, the Netherlands, Sweden, Greece and Romania – **these are merely "logical suppositions" that the European Union is active in this area** as in others, and references to specific fields of action are even less numerous.

  Some French respondents (believing this policy to be recent) speak of Galileo alongside Ariane and Airbus, a few respondents from Luxembourg mention Galileo, the CERN, or research projects on stem cells, and some Swedish respondents mention the Lisbon Strategy with a few vague recollections of its research and innovation component – interviewees from Spain, the Netherlands, Greece and Romania however prove largely incapable of citing even one specific project.

"I suppose there must be research policies, a scientific committee or something like that, but it's not something that's known about" (Spain)

- **In the groups of the other Member States, the very existence of research activities organised at European level is unknown or highly uncertain, and the (very) few citizens who know or think they know something on this subject for the most part are only able to convey a few scraps of knowledge.**

"I really do not have any idea about what is going on in this area" (Netherlands)

"Does the EU have any policy at all?" (Austria)

"It does not seem like there are any big European projects. I have not heard of any" (Denmark)

Among the fields or projects occasionally mentioned are the space programme (one reference to the European Space Agency) or astronomy (in one case), energy – especially nuclear (a few references to the CERN) – and more vaguely still the area of IT and computers.

❖ **An almost complete consensus prevails in favour of the principle of European action in scientific research, and in favour of its strengthening.**

This is spontaneously expressed in the first responses of interviewees in the majority of groups, with the following ideas:

- **The necessary gathering of means** – in terms of budget, organisation or human factors – in order to provide greater efficiency, reach more rapid results, and even enable the development of projects requiring substantial resources, beyond the reach of each individual Member State.

"It's the only way. None of the European countries can afford research on their own." (Ireland)

"There is force in unity". (Malta)

The awareness of the necessity of combining forces in this area is generally just as frequent in the most important and/or economically developed Member States as in the others; in the latter the idea is sometimes also added that this is even the very condition for access to research which would otherwise be completely closed to them or to its results.

"There are the other blocs, Japan, India, China, the USA, we need to form a fifth bloc" (France)

"The future of EU and Europe can be at stake if our research and development of technology falls behind – job opportunities and the welfare systems needs an EU in the premier league." (Sweden)

"And for us it may as well be the only chance to exist" (Poland)

Avoiding the dispersion of effort, duplication of jobs and commitment to research already carried out in another country is a similar type of objective.

"It is good to get financing from one centre and create teams, as team work is seemingly more effective. On the other hand, the facts about duplicating similar research is also evident" (Lithuania)

Explicitly in some groups, and implicitly in others, what is at stake is Europe's capacity to invent and innovate faced with its great international competitors, including first and foremost the United States.

The notion of rationalisation or coordination of projects under the guidance of the European Union is underlined immediately as a positive aspect by interviewees in a few Member States (Belgium, Ireland, Slovenia, Slovakia ...).

- **Seen from a slightly different angle, the interest in cooperating as this encourages the exchange and mixing of ideas and experiments between researchers.**

Beyond the notion of organisational and economic efficiency, in the background there is the notion that we are "more intelligent together" than individually.

"*Maybe results are more adequate then if research groups consist of different nations and different people. One could not influence them all" (Estonia)*

- **Expectation of an improvement in researcher conditions and an incitation for them to stay in their country rather than watching "the brain drain".**

This is expressly formulated at this stage by interviewees in several countries, in particular among small Member States (Portugal, Slovenia, Slovakia, Estonia etc.).

A few rare reservations are expressed: among respondents from the United Kingdom anxious for means of financing that will not be detrimental to the interests of their country; among some interviewees from Finland and Lithuania marked by the image of bureaucracy of the European Union; among Austrian and Czech respondents whose doubts as to the efficiency of cooperation doubtless reflect the more general prejudices with regard to the EU in the current period.

❖ **These attitudes are confirmed and strengthened when more precise reference is made to "the research policy carried out in the framework of the European Union" and its development in the years to come.**

- **In all countries the meeting participants – as a majority or often even unanimously – acknowledge its well founded nature and desirable character.** A large number of participants openly call for it to be bolstered.

The citizens most enthusiastic in recommending the development of Community policy seem to be the French (who show themselves to be very conscious of the stakes), the Italians (for whom "a broadened vision" is required, and who see in the management of the policy by the EU the promise of reduced risks of manipulatory orientation by the national public authorities), the Belgians (investments required for them in all areas; some think that the coordination of the policy by the Commission is a guarantee that the stakes will be taken into consideration in the long term), the Slovenians and the Slovaks (who also express their faith in the EU institutions, which for them are perfectly credible), the Irish, the Portuguese, the Greeks, the Hungarians and the Romanians (for whom this is for the benefit of all, including their own country whose own resources are limited).

"It's a good thing, research at a European level should in some way limit partisan interests" (Italy)

"In such a way, even the less privileged or smaller countries like Greece may benefit" (Greece)

- **A few reservations are also formulated here:** by some respondents from the United Kingdom (who pursue their previous reasoning, expecting "à la carte" programmes in which each country can decide whether they wish to participate depending on their own interests); by some from Sweden (who, like their Finnish counterparts, want to see "safeguards" applied to bureaucracy and regular evaluation procedures established); by some respondents from Spain and Poland (who fear that their country, little advanced in the area of research, will not have access to Community opportunities equal to that of "dominant" Member States; and also by some from France (who are only anxious about the difficulty in obtaining (the desirable) agreements with the EU 27).

  "If it were equitable then yes, but not if we're going to be at the end of the queue" (Spain)

  "Each country is trying to get benefits for itself. We're supposed to be one big Union, but in reality three countries dominate it and they decide on everything. Or at least they try" (Poland)

  They are very much in the minority.

- **As to the areas in which common European research should be oriented as a priority, we find the main fields already partially referred to above:**

  - Medicine, biology, pharmaceuticals
  - Energy(ies) (alternative, renewable or nuclear)
  - Environment and climate (topic partly linked to that of energy)

  Occasionally mentioned, we also find the areas of information technologies, agriculture and the agro-food industry, as well as "technological innovation" (without many precisions).

II.2.2 Reactions to the document provided

- **The text of the document presented does not generally pose any problems of understanding** – albeit occasionally on some specific points (what is meant by a percentage of GDP, or the notion of co-financing etc.).

  Some remarks are made in a few countries on the length of the text or the density of information it contains, which call for a certain amount of time to be assimilated, or sometimes on the use of an administrative vocabulary that is a little hard to digest: criticisms notably heard from respondents from the United Kingdom, the Netherlands, Austria, Denmark and Lithuania (i.e. in countries where general attitudes regarding European research were more lukewarm or marked with reservations than elsewhere).

- **Its informative content is undeniable** – the majority of citizens, as we have seen, were highly ignorant as regards the EU's research policy.

  The following more precise observations can be made on the main parts of the document:

  - **On the context in which this policy is situated.**

The citizens interviewed are not surprised to hear the information that there is a gulf between research efforts in Europe and those in the United States and Japan – this corresponds to an intuition they had of the situation.

The text specifies this gulf and the objective of catching up which has been set, in the framework of the Lisbon Strategy about which very few respondents have heard anything.

- **On the reasons expressed for strengthening common research in the European Union.**

There is no surprise in this respect, whether this involves the argument regarding the scale of the means required or the need to avoid losses due to the dispersion of activities.

These arguments had already been largely put forward in the previous stage of the discussions. The second reason, as it is formulated, is cited as especially striking by some interviewees – partly due to its character of "reductio ad absurdum" easy to understand, and partly also due to the example that was chosen to illustrate it, in the area of medical research to which a large number of respondents are particularly sensitive.

"The Netherlands used to invest money individually, and now the countries are investing money together. That is a good thing; more money means you can accomplish more."
"Smart that they check if not all the countries are doing the same kind of research."(Netherlands)

- **On the level of organisation of Community policy.**

The notion of Framework Programmes is entirely new to interviewees, and they have no idea of the longevity of these Programmes' existence and the budgets that are assigned to them.

While some seem only moderately interested by the presentation of administrative means for the implementation of the policy, some others seem on the contrary to see it as the sign of an organised, structured policy, whereas they initially tended to doubt its efficiency (this is the case in Austria and Finland, among other countries where this aspect is also viewed favourably).

As regards the Community research budget and its recent increase, few explicit comments are made on the subject. Some are positively struck by its size, while a few others believe it on the contrary to be low given research needs in a large number of fields; it is however likely that the majority lack the points of reference which would allow them to appreciate its true significance.

- **On the "Cooperation" component of the Framework Programme and the areas on which it is concentrated.**

This is also totally new information and is generally well received.

"*One person from a certain country could be looking at something in a certain light and someone from a different country will look at it in a different way*".*(Malta)*

A few criticisms or questions are raised on the framework presented (on the part of some Germans who regret that the EU contents itself with supporting projects rather than itself initiating specific research, some Spaniards who are concerned to see that funds are distributed to "private interests", and some Italians who ask themselves questions about the selection of projects and their supervision).

As for the 10 research themes, they seem to be generally well accepted as priority areas. A few criticisms may be noted on the insufficient concentration of efforts (notably by some Poles who generally tend to think that Europe's backwardness in the area of research does not allow her to

devote herself to such a large number of fields) or on the less essential character of a few of the fields; this type of observation is however rare.

- **On the other components of the Framework Programme.**

  These components were also unknown to the interviewees.

  The components "Ideas", "People" and to a lesser extent "Capacities" are discussed in particularly favourable terms by interviewees from France, Belgium, Ireland, Portugal, Poland, Hungary, Latvia and Romania. In their comments we also observe the preoccupation outlined above of making scientific careers more attractive and avoiding brain drain.

  Few comments are made on the "Nuclear Research" Programme – no doubt due to the fact that this subject had already been discussed previously.

- **On the general principle or co-financing methods.**

  These provisions were also unknown.

  A few respondents (see above) do not understand the principle or (in Italy) wonder about the financing of the remaining 50%, or consider the EU's financial contribution to be too low (in Latvia, given the highly limited own resources of the country). Others on the contrary have no difficulty understanding its well founded nature and consider the effort sharing thereby described as logical.

- **On the final paragraphs summing up the philosophy of the EU's research policy.**

  They form a synthesis that is well understood and accepted.

❖ **Global reactions to this document are overwhelmingly positive.**

- This is particularly strongly the case in France (with nonetheless a few questions on the reality of implementation), the United Kingdom (where interviewees seem to have found credible answers to their questions), Belgium (the presentation of the policy corresponds to expectations), Ireland (favourable presuppositions are backed up), Finland (large and credible informative content, which significantly reduces the pre-existing doubts), Portugal, Greece, Malta, Slovenia, Hungary (the precisions made are welcome, and are consistent with the hopes placed in Community research) and Romania.

  "All that is described here is fine and well designed, and if it is implemented it will be perfect" (Romania)

- This is also clearly the case in Italy and Spain (in spite of the questions referred to above), Luxembourg (confirmation of the presumed main lines of action), Austria (where interest is truly strengthened), Denmark and Sweden (more moderately), Cyprus (recognised provision of so far unknown notions), Poland (despite the sceptics in the group, either on the prevalence of priority national interests, or on the bureaucratic character and cost of the Community management of programmes), Lithuania (questions also remaining on "bureaucracy"), Slovakia (requests for more concrete examples regarding results) as well as in the Netherlands, Slovenia, Estonia, Latvia and Bulgaria.

  "They should keep up a frequent revision of the policy and the efficacy" (Sweden)

"Taking into account the bureaucracy of the EU, it may be a serious hindrance" (Poland)

- Moderately received in only two countries, but for different reasons.

The German interviewees state that they are disappointed with the European policy's excessively limited ambition in their eyes, and hope for a true merging of efforts in the various Member States – what they have learned is however "better than nothing".

"5% is not much really, if you want to do something together and compete with the largest countries" (Germany)

Those persons interviewed in the Czech Republic show little interest in a document that appears abstract to them and which devotes too much space to organisational questions which they do not feel concern them – besides their general impression of remoteness of the Union.

"The EU is rather ivory-towered" (Czech Republic)

CHAPTER IV

INFORMATION AND COMMUNICATION ON SCIENCE AND THE RESEARCH POLICY OF THE EUROPEAN UNION

IV.1 MEMORISING OF INFORMATION ON EUROPEAN RESEARCH

❖ Discussion Theme VII.1 was aimed at prompting meeting group participants to search for the origins of their knowledge on scientific research at European level, including what might have reached them from the European institutions themselves.

❖ **Given the very widespread lack of knowledge of these matters among citizens, it is not surprising that a large number of them state that they are incapable of identifying any sources or channels through which they have received information.**

"Completely unknown to me. Is it just me or is there something about Swedish media that makes European content scarce?" (Sweden)

Some remember "perhaps" or make the logical supposition of information transmitted by the classic media – television, newspapers and magazines that are more or less specialised, and sometimes radio.

The majority do not however have any recollection of a specific format or subject. The only exceptions to this general state of affairs are a few respondents from Ireland, Spain and Portugal who recall subjects in the field of aerospace (the European Space Agency, launching of rockets and the Airbus programme), with a few Lithuanians recalling information on climate problems (or the Kyoto Protocol) or perhaps experiments on animals, while a few Latvians vaguely recollect a programme on the European Union, and a few Romanians mention articles on such and such a highly specific research project.

A few mention without precision thematic television channels (such as the Discovery Channel), or public channels doubtlessly considered as more likely to broadcast information on such subjects than commercial channels, or "serious" written press formats.

The Internet is occasionally mentioned – but more as a potential source than one that is actually used (no effort is made to connect without prior motivation).

On a very exceptional basis, some interviewees in addition speak of brochures they have read of, an information office sponsored by an organisation presumed to be involved in European research, of scientific conferences co-financed by the European Union (in Latvia, where reference is also made to UNESCO) or of school (with, according to one Slovenian teacher, the impression of an information effort towards the school-going public).

Often, on the contrary**, interviewees think that this information is absent from their media** (and sometimes also from speeches by political representatives).

❖ **There are practically no recollections of any information coming from Community institutions.**

IV.2 SUGGESTIONS CONCERNING INFORMATION AND COMMUNICATION ON QUESTIONS RELATING TO SCIENCE AND RESEARCH.

❖ Explaining that "the institutions of the European Union involved in scientific research seek to inform the public in order to make scientific questions, research projects that are being carried out, and their related challenges better understood, and to arouse more interest for these questions", interviewees were asked "how this could or should be done" in their view, while asking for them to make an effort to use their imagination – Theme VII.2 of the discussion guide (naturally, not all show themselves to be capable of making the same effort).

❖ **The suggestions that are made for the most part involve the traditional media.**

➢ **First of all television** – due to the fact that it is the medium with the largest dissemination to the general public, but also – as some point out – because it is a medium that is "easy" to listen to, does not call for a special effort, and is therefore appropriate for "grasping attention" on subjects that may in principle seem to be complex and not spontaneously appealing.

This may involve, depending on the ideas put forward by individuals:

- Short slots or information "spots" in the TV news or scheduled around its broadcasting times (or more generally during peak hours).

- Sequences inserted into existing programmes combining information and entertainment.

  "If technology is to do with fuel and cars, then put the information on something like the television program Top Gear. If it is about organic food or genetically modified food then put it on the television program You Are What You Eat, because it allows you to understand it better in that day-to-day viewing context" (United Kingdom)

- Magazine-style programmes, documentaries and reports, often complemented by debates.

  A few requests are made for programmes of this type so as to allow for an interaction between the programme and citizen viewers (in Denmark where such a programme seems to exist on the topic of health).

  These programmes could be broadcast by general interest or theme-based channels.

- More rarely, there is the idea of programmes specifically dedicated to Community research (broadcast by one or other of these channel types, for example once a week), or even in a few cases the establishment of a European channel dedicated to these subjects ("Eurodiscovery") or more generally to Community information (one reference is made to Euronews).

➢ **The written press** – less systematically referred to, or not with the same degree of importance.

It is mentioned, although without any specific precisions, in Germany, Italy, the Netherlands, Austria (but here its impact is questioned), Ireland, Sweden, Malta, Slovenia, Hungary, Estonia and Bulgaria. These interviewees seem to think mainly of the daily press.

More specific ideas are conveyed in Finland (inserts in specialist sections of newspapers and magazines), Greece (the same suggestions, with specific reference to the Sunday or weekend issues), as well as in Latvia and Lithuania where respondents are more inclined to think of the more or less specialist magazine press for a public that is already aware; in Slovenia, a few respondents think of inserts in TV guides, linked to programmes soon to be shown.

"Special editions inset in Sunday newspapers" (Greece)

- **The radio** – this is rarely mentioned explicitly (by respondents from Finland, Slovakia, Latvia and a few respondents from Romania).

❖ **The Internet is a means of information that only springs into the minds of participants in approximately one in three groups.**

This is mentioned without specific precisions by respondents from France, the Netherlands and Slovakia.

In Greece and Romania, it is only or above all considered as being used by the youngest group members.

In the other countries concerned there is also an image of selectiveness: in Germany, Italy (for those "who want to go into more depth"), Poland (for "people who are interested") and Portugal (for "those who are prepared to receive an information letter by e-mail").

Several more precise suggestions may be noted (made by respondents from Latvia): a series of short films broadcast one by one, sites including a discussion forum, or the coupling of television programmes with websites.

In a general way, there is the notion of a medium that potentially has a considerable wealth of information on offer, but which is not well suited to capturing the attention of a public that is not very aware.

"Internet is a good tool to get answers, but one should first know which questions are to be asked" (Italy)

❖ **Other ideas are frequently formulated and discussed for means which would make it possible to better grasp or attract the attention of the public.**

- Brochures or leaflets, short, presented in a lively manner and possibly including references to more detailed information sources.

  These are considered with moderate interest by interviewees from Malta, Bulgaria, Romania, Austria and Germany (for those from the latter country, they are clearly directed at an already interested public).

  They give rise to more interest and debate concerning their means of dissemination, among some interviewees from Slovenia and Portugal (who think of putting them into letterboxes), others from Portugal and Slovenia, from Greece and Lithuania (who for their part think of making them available in public spaces, with kiosks in the streets and means of transport – in other words

compulsory points of passing or waiting for people who momentarily find themselves with nothing to do and doubtless more inclined then to take notice of them).

- Organised events on science and research.

  These include permanent or travelling exhibitions (or museums), a "science week", conference debates to which the public is invited, "open door days" in laboratories and research centres, discussions organised in local communities, etc.

  This type of suggestion is notably apparent in the groups in France, Italy, Belgium, Cyprus, Slovenia, Slovakia, Latvia and Romania.

  "I've recently visited a show dedicated to optical science, from the origin to the 21st century, it was quite impressing and very interesting" (Italy)

- One idea suggested (by French interviewees) is to indicate on products purchased in shops the fact that they were developed thanks to a European research programme.

❖ **School is often mentioned as an important place, or one which should be important, in the dissemination of information on science** (without the discussion moderators mentioning it themselves).

This is the case in groups in the United Kingdom, Italy, the Netherlands, Portugal, Cyprus, Slovakia, Estonia and Lithuania: distribution of brochures, educational material, short films, visits by scientists to school establishments, fun competitions organised between pupils on topics relating to science… In a similar frame of mind, respondents from Latvia add to this the idea of creative workshops (which would exist under the guidance of the public authorities), intended for children.

"Classes taught in schools so that young people are informed" (Cyprus)

❖ **With regard to the content, form and tone of the information, citizens questioned in the various Member States converge to insist upon the characteristics that are judged to be essential.**

- **The subjects dealt with and the presentation of these subjects are to relate to everyday life to the maximum extent possible** so that people feel they are concerned.

  Some interviewees here return to topics such as health, medicine and the environment which constitute preoccupations that are very widely shared.

- **The concrete, accessible nature of the information** – notably making a commitment to presenting research results rather than systems or processes.

- **Clarity and conciseness** – especially as regards written information.

- **Language "of the general public"**, comprehensible to all, avoiding to the maximum extent possible any overly complex scientific terms and "pompous" political or administrative language.

  "The main thing is to provide information in a clear language, so that it would be interesting for a person not involved in science. Now, if we take some of those scientific articles, we see every other word as a foreign word and you just want to drop it then." (Latvia)

- **Character at once educational and attractive of the form and tone.**

  Citizens are expecting to learn new things, but also for the material to be presented in a lively and even fun and humorous manner.

  This is clearly one of the reasons for the specific accent placed on the recourse to audiovisual formats or the desires sometimes expressed for interactivity – but this consideration has a broader scope (written documents pleasantly presented, well spaced out, coloured and illustrated etc.).

- **As a reminder, easy access to information** – see the previous observations on this subject.

IV.3 REACTIONS TO EXAMPLES OF DG RESEARCH COMMUNICATION MATERIAL

❖ The final part of the meetings was dedicated to the examination, by their participants, of a few examples of communication material produced by DG Research (Theme VIII of the discussion guide).

- Two of the brochures of the series dedicated to various fields of research, "Nuclear fission and radiation protection" and "Food safety in Europe" – a choice dictated at once by the desire to present two very different subjects (one very technical, the other closer to daily life) and the availability of documents in the maximum number of Community languages (virtually all languages in this case for the chosen subjects).

- A copy of the magazine "Research EU", in the majority of cases the issue "Satellite – the Earth, a work of art" (unless it was unavailable in a given language, in which case it was replaced by another).

  As the magazine was only published in a limited number of languages, it was only able to be fully tested in the corresponding Member States; in the others, it was able to be partially evaluated by those in the group with a knowledge of English (or French).

- A video film from the Futuris series, shown by Euronews, "Smart cars to help reduce road fatalities".

  These films were also produced in only a few Community languages, while the same observation applies as for the magazine "Research EU" (presentation in English or in French to citizens of another mother tongue, with a translated summary of the main elements by the discussion leaders).

  It should be noted that no detailed examination was carried out of the informative content of these documents, as time constraints made this impossible. A few useful elements are however drawn from the material, alongside a number of observations that can be made from the point of view of form.

IV.3.1 Reactions to the brochure "Nuclear fission and radiation protection"

❖ **On the content of the document, impressions are mixed.**

Some of the interviewees feel that the informative content is useful and rather easily understandable (given the complex nature of the subject dealt with). This is first of all the case of some respondents from France, Finland, Portugal, Hungary and Romania, and then of some from Spain, Luxembourg, Greece, Cyprus, Slovakia and Estonia: they have retained elements of information they did not know and which they consider to be important.

"When I find it in my mail box, I will think that the EU knows about me and also wants to know my opinion, OK, I accept it." (Slovakia)

More neutral, ambivalent or divided impressions are found in the majority of the other groups. The credibility of the content is not called into question, but it is clearly perceived as overly heavy and

dense, and as containing too much overly technical and detailed information to attract and maintain the interest of the general public.

This is not a brochure for me; you have to have a master degree in order to understand this." (Netherlands)

"It is vital to reach more people, but this is not the way to do it. 80% of the population would not want to take a look at it. Our culture glorifies ignorance. In the past there were more scientific magazines, on the other hand one can find everything online now." (Bulgaria)

In reality, even in the first Member States cited where the reactions are the most favourable, it is often considered that such a brochure is not addressed to the average citizen, but to "scientists", "specialists" and "students" in these subjects, or at the least to an audience of persons "aware" and already "interested in science".

"It is not really meant for us, even if we are able to understand the text" (Belgium)

"Interesting, would be even more interesting if I understood what's been said." (Finland)

We note some more precise observations formulated by a few people, according to whom this text is intended "for everyone and no one" – or in other words is "too advanced" to educate basic citizens yet insufficiently technical and precise for specialist audiences. The idea of redundancy between several parts of the document is also sometimes present.

In the groups of a few countries, we moreover note criticisms as to the objectiveness of the content, "overly positive", "partisan", seemingly produced by "pro-nuclear campaigners" and "underplaying the risks": this is notably the case in Italy, Ireland and Denmark.

"It doesn't answer anything. It gives a real PR presentation of the issues." (Ireland)

In such and such a country, we also note the comment that the text specifies the objectives but hardly mentions the results already achieved by research, especially in the field of safety.

❖ **In terms of form, unfavourable or highly mitigated appraisals are numerous.**

Only interviewees from Hungary and Romania give a judgement that is favourable in the majority (clear structure, aesthetic and attractive form, with graphs, photos, colours etc.).

Others also acknowledge positive points – among respondents from Luxembourg, Ireland, Portugal, Greece, Cyprus, Poland, Slovakia, Latvia and Bulgaria (convenient format, quality of paper and printing, presence of illustrations which space out the general presentation etc.) – without however considering the brochure as particularly attractive.

"One would get easily bored while reading it, I don't think that people would continue reading it to the last page" (Greece)

Elsewhere criticism (which was not absent with the interviewees referred to above) is quite commonplace, and involves a number of different points:

- General presentation or layout that is too "academic" or conventional, sometimes judged to be muddled (key points insufficiently emphasised, titles sometimes seen as not very eye-catching, etc.).

"The spread of the brochure is not good, it looks like in the 60-ies" (Latvia)

- Unsatisfactory balance between text and illustrations.
- Texts overly heavy in terms of form (and language that should be simplified).
- Illustrations that are not very evocative or which are poorly matched to the texts.
- Typography that is not very attractive, at least for some elements (use of fonts which are too small, confusion in the middle of colour ranges).

  "These letters on a pink background, it looks strange, you want bigger print" (France)

- Dark and not very appealing colours.

  "Dark covers are a bad style – the touch of death" (Latvia)

- Sometimes the format (opinions nonetheless diverge on this point: convenience of a small format; risk of assimilation with an advertising leaflet etc.).

❖ **Overall, respondents have the impression of a document that is a bit inaccessible and does not spontaneously lend itself to reading – the content and the form both contribute to this.**

IV.3.2 Reactions to the brochure "Food safety in Europe"

❖ **The evaluations of this document's content are generally more favourable than was the case for the previous brochure.**

With a few rare exceptions, the citizens whose judgement of the first brochure was (more or less strongly) positive also react favourably to this one; in the groups of some of the countries concerned, the interest is clearly higher (Spain, Luxembourg, Finland, Portugal, Greece, Cyprus and Hungary).

The same improvement is observed in the groups in other Member States which harboured reservations or were sceptical regarding the content of the document on nuclear energy (Germany, Malta, Slovenia, Lithuania, Bulgaria) – even if this is not the case everywhere.

The reasons firstly relate to the subject dealt with, which may concern everyone in daily life (and which probably – although this is not expressed – generates less anxiety than that of nuclear power). In several groups we find the idea expressed that the document contains useful information for consumers, and can even guide them in their food purchases.

"This topic is more accessible for people." (Bulgaria)

"Such brochures should be available at retail outlets, supermarkets where a lot people come everyday. Information of this kind concerns everybody." (Lithuania)

The references to links to websites on which more detailed information can be obtained if desired contribute to the impression of useful informative content (here we note that these references, also present in the other brochure, were mentioned much less often for it).

The clarity and highly understandable nature of the text also help boost its appeal.

Reservations nonetheless appear in some groups (particularly in Italy, Austria, Denmark, the Czech Republic, Poland and Lithuania): content is too general and goes into little depth; questions on the very subject of the document and its practical utility ("recommendations for your diet?"); a presentation that is overly focused on the more or less long-term objectives and not sufficiently focused on current concrete questions in the life of ordinary people.

We observe that the credibility of the document is practically not called into question (a few doubts as to the efficiency of systems put in place for food safety).

We also note the various appraisals of the title – or rather the subtitle – of the brochure: positive for some who appreciate the image "Fork to farm", reservations on the contrary for others who find this "popular" formula tends to undermine the seriousness and scientific credibility of the text.

- **With regard to the form, this is in the majority of cases better received, although some criticism remains** (notably among respondents from the United Kingdom, the Netherlands, Denmark and the Czech Republic).

  - Better layout and structure, more spaced out: the main topics are more clearly – although not perfectly well – conveyed.

    "The subtitles are very intriguing, they certainly draw my attention." (Bulgaria)

    "If you want everyone to read it, they should use an easier format, larger letters, links, PowerPoint" (Spain)

  - Texts and tables less heavy (although the excessive space allocated to those is still sensed by interviewees in several countries – Austria, Denmark and Malta).

    "It is clearer for a simple man, like me, who does not know much about it, and here is the information, because if this man sees a lot of diagrams, he may be discouraged" (Poland)

  - Less criticism of typography.

  - More attractive illustrations that are more in keeping with the subject for discussion – although a large number of respondents would also like to see more space devoted to photos, or regret the absence of diagrams and graphs.

  - Colours tend to be seen as more pleasant, but remain unattractive for some – including for the cover page, which is also dark and doesn't feature many images.

  - The format is on the whole favourably received – which is perhaps surprising as it does not differ from that of the previous brochure; there is probably the impression that it is better suited to a less heavy, less dense document.

- **Overall, in contrast to the first, such a brochure, while it may still require improvements, seems in any case to be aimed at the general public.**

IV.3.3 Reactions to the "Research EU" magazine

❖ **On the content of this document,** it should be noted that the evaluations made here should be considered with caution: interviewees were even less able to take stock of the issue in detail than was the case for the brochures and in a large number of countries the unavailability of the magazine in their own language meant many respondents were unable to have anything better than a very general impression – this was naturally heavily influenced by presentation and form.

That said, **we observe four types of reaction:**

- Positive reactions to a content that seems at once perfectly professional from a scientific point of view and accessible to quite a wide audience.

  This is the trend observed in Germany (with a variety of topics interesting the various readers, well produced "shorts", general impression of the popularisation of science in the positive sense of the term), Luxembourg (where the useful references to websites are also pointed out), Italy (interest in both young people and adults), Spain (comments of the same type), Portugal (texts are clear and explanatory), in the Czech Republic (interest expressed in a genuine contribution of knowledge), Latvia and Romania (easy understanding of articles that in principle are interesting to all).

  "The topics are interesting" (Spain)

- Reactions also positive and of the same kind, but perceptions of a publication addressed to a more restrictive segment "of enlightened amateurs" with a special interest in science, for example readers of magazines such as National Geographic, Galileo and Science Illustrated, or more "more scientific" magazines than Science et Vie (French comment).

  They are expressed by interviewees from France, the United Kingdom, Austria, Sweden and Slovenia, as well as by some from Slovakia, Hungary, Estonia, Lithuania and Bulgaria.

- Reactions devoid of criticism regarding the informative and genuinely scientific nature of the content, but doubts as to the existence of a readership among the general public.

  "*The layout is attractive, nice photos, maybe I would read parts if it was in Estonian. I would definitely read if it was a topic that is interesting for me. In this case I would maybe read some subtitles or explanations of photos or shorter passages. So it attracts interest a bit but I would not read everything through*" *(Estonia)*

  This type of reactions is mainly found among respondents from Belgium, the Netherlands (although some of them seem to fall into the preceding category), Ireland, Finland (publication "for researchers or professional readers"), Greece and Poland (impression of a genuine "scientific magazine").

  "This looks like specialist literature for scientific researchers." (Netherlands)

- Reactions seem to lack appeal in a few countries where the reading of the magazine is judged as being in principle difficult and even off-putting: Malta and Cyprus (in Denmark, the magazine was not able to be tested).

Nowhere was the quality of the content called into question in principle; the various attitudes reflect the different perceptions of its appeal to the public.

❖ **From the point of view of form, evaluations are quite coherent and for the most part positive.**

- High quality of writing, very well polished form, top-of-the range and even "prestigious": this is a "true" magazine (but that may however lead to the impression that the target is not a wide audience, especially when a paid-for magazine is considered – or lead respondents to ask questions regarding the cost of this magazine in terms of public money spent).

  "A professional journal, qualitatively made, very well grouped according to the themes." (Latvia)

- Presentation and layout are practically devoid of criticism (although some French interviewees find that the photos do not stand out sufficiently in the layout they are given and that the layout is formal and perhaps lacks modernity; for some Finns, the layout is "repetitive" and even boring; comments are again made on the "excessive amount of text" by a few interviewees in several countries).

  "It is better than the previous brochures, because the format is more serious and with very interesting images." (Sweden)

- The quality of the photos is unanimously acknowledged, and is appreciated by the vast majority – with even some comments that they arouse curiosity and incite readers to "then plunge into the text".

  "Magnificent photos which help understand the text" (Luxembourg)

  Some on the contrary wonder whether this high quality and appeal does not on the contrary risk monopolising attention and distracting it from reading (a comment made by respondents from Sweden, Malta and Cyprus).

  "You might look at it for the pictures alone." (Ireland)

❖ **Overall, we can conclude that there is a good degree of receptiveness for this communication format by a minority segment of the general public** – a few openly declare that they would buy it if it were sold in the press distribution channels.

IV.3.4 Reactions to the video film "Smart cars to help reduce road fatalities"

❖ **This film is viewed very positively by the majority of the citizens questioned, at once in terms of its content and its form.**

Concerning content:

- It is liable to interest the largest number, with the majority of citizens being drivers.
- It is judged as educational and providing concrete credible and useful information: after the presentation of problems, there is the presentation of new solutions, but which have already been developed and are opening onto practical results.

  "It was good, in my opinion. They showed in what direction the automotive industry moves to decrease the number of accidents, so that the car serves the safety of people better." (Slovakia)

  "It showed very realistically how it all happens in a car. It is not so obvious when somebody just describes it in a brochure. In this film you see the benefits of those smart cars and it actually creates interest" (Estonia)

- It is perfectly clear and well explained.

  "The language is clear for everybody, even a small child" (Latvia)

- For some, it focuses well on the dimension of European cooperation (situations, varied interviews).
- A few however find it a little outdated (technologies now known and even widely used): German and Austrian respondents.

  "It needs to be constantly updated, otherwise you lose interest" (Germany)

❖ **On the form of the document:**

- Recourse to the audiovisual form makes it in principle easily accessible and attractive.

  "I think it [the movie] was much more fun. It is much easier to catch and to relate to what is going on" (Denmark)

  "5 minutes on TV is a lot more effective way to present something new" (Finland)

- In terms of length, its format is generally well appreciated.

  A minority nonetheless judge it to be "a little on the long side" (for respondents from Ireland, Austria and Denmark who moreover find it a little muddled, and also for respondents from Portugal).

- The articulation between its various parts is also viewed as favourable: the film has an alert rhythm, divided up into sequences which help avoid boredom and maintain interest.

"It is very interesting and very well-made. I like the music, it's catching; it's fast paced and fixes your attention to the screen." (Bulgaria)

- **This film is clearly intended for large-scale distribution**: by general interest or specific themed television channels, in the form of DVDs sold separately or inserted into specialist magazines, or even in a school environment or through driving schools.

IV.4 FURTHER SUGGESTIONS REGARDING INFORMATION AND COMMUNICATION

❖ After an examination of these various formats, the group participants were asked whether any other ideas came to mind regarding "attractive ways in which one could inform the public about science and scientific research" (Theme VIII.4).

❖ **A variety of suggestions are made which partly summarise opinions and suggestions which have already been formulated.**

Here we note three elements which seem to emerge more strongly from this conclusive discussion phase:

➢ **The importance afforded to the audiovisual media** – for the reasons already presented, which are confirmed by the viewing of the video film.

➢ **The emphasis placed by the citizens interviewed on places and the means of distributing the information – with the general idea** (whether explicitly expressed or not) **being the necessity to reach out to the target audience** (whose spontaneous interest is in the majority of cases too moderate for it to go in search of the information itself) **by using or placing Community communication via existing formats, means, events and relay points.**

- Broadcasting to the maximum extent possible of audiovisual content via existing general interest or thematic channels, but also distribution of the DVD free of charge or in combination with written formats, possible downloading from websites, etc.

  "Reports of this kind on websites like You Tube, or DVDs distributed free of charge in magazines" (Belgium)

- Distribution of written material inserted into the press or adapted to its written content.

- Dissemination in points of passing or waiting – public places and transport – both for written and audiovisual documents (using screens installed in transport infrastructure or elsewhere).

  "In the trains they put videos with movies or documentaries, so this type will fit perfectly" (Portugal)

  "You'll receive a booklet, but you will not have time and you will leave it at the same place; but, if you need to wait for something, then you will watch the same film 25 times anyway, because you will have nothing better to do." (Latvia)

- Capitalisation on events (exhibitions, events of all kinds) to disseminate and communicate messages.

- Privileged emphasis to be placed on the school and university environment (or public libraries).

- **Desirable complementarity of the various types of means.**

  - The Internet is one example of this. Very rarely spontaneously mentioned at the start of the discussions, here it is clearly more widely viewed as a usable tool that can be coupled to other formats whose primary purpose is to attract attention, and as a means allowing for greater depth.

  - Other suggested complementarities: DVD and written formats, inserts, announcements of events or places at which additional information can be obtained.

    These are merely hinted at by interviewees in the few minutes they devoted to this question, but doubtless deserve to be taken up.

CHAPTER V
REACTIONS TO THE INITIATIVE OF THE COMMISSION

- Before closing the meetings, the people who took part were informed of the fact that this study was performed for the account of the Directorate General for Research of the European Commission in the 27 EU Member States (Theme IX of the discussion guide), and they were asked what they thought about this.

- **Reactions to this announcement are almost unanimously positive.**

  They seem particularly positive and without any reservations in some countries: France, the United Kingdom, Spain, Belgium, the Netherlands, Portugal, Greece, Cyprus, Poland, Hungary, Latvia, Bulgaria and Romania – i.e. both in Member States where opinions in favour of the European Union generally prevail and others where Euroscepticism is more widespread.

  Questions are asked in a few Member States: on the true taking into consideration of the results of the study and their translation to improve the efficiency of communication on the subject handled – in Germany, Estonia, and in a more marked way in Finland, Denmark, Lithuania and above all the Czech Republic; these questions do not however prevent a good rate of approval for the exercise on the whole.

- **They mainly involve the following aspects:**

  - **Personal satisfaction at having learned** (and sometimes learned "a lot") about questions regarding science, research and European activity in this area.

    "I am very much satisfied with the information I received today and the initiative of the EC and I think that either through brochures or TV movies if we get used to having this information everyone will take what they need from it." (Bulgaria)

    "This debate concerning science and research has enriched my knowledge of this subject" (Romania)

    Some add that of being able to exchange and debate with others – and even suggest that this type of discussion be used as an example to design interactive forms of communication so as to enable citizens to get involved.

  - **The fact that the Commission is anxious to promote a better knowledge and understanding of the problems linked to science.**

    "Really good that they make time for these things" (Netherlands)

    "It may not have direct impact to us, but it certainly is a sign of the EU acting in order to become a stronger union." (Greece)

    Although not all have the same degree of spontaneous interest for this type of often complex problems, all acknowledge the necessity.

  - **The fact that for this it takes on board the opinion of citizens with a view to improving the relevance and efficiency of what it does – interpreted as the quest for good management** of its communication activity.

    "It is great that the EU Commission wants to listen to what we think." (Sweden)

- **More generally, the fact that it wishes to consult and even involve citizens – this is taken as a sign of the democratic desire to listen and consider**, which can also be applied to fields other than science and research.

  "I feel proud, I do. I come from a small town called Hoče and it feels good to have been discussing such an important theme as science and research on the European level." (Slovenia)

  "The Commission's initiative to involve average citizens in debates over scientific research is excellent. That was missing …" (Romania)

This is an element which clearly contributes – in some groups from rather Eurosceptic countries – to a definite improvement in the image of the Commission and more generally of the European Union.

ANNEXES

ANNEX I

PARTNER INSTITUTES

Belgium	EADC – Yellow Window (Antwerp)
Bulgaria	Alpha Research (Sofia)
Czech Republic	MARECO (Prague)
Denmark	Ulveman Explorative (Copenhagen)
Germany	Echanges Marktforschung (Cologne)
Estonia	TNS EMOR (Tallinn)
Greece	FOCUS (Athens)
Spain	Advira/Escario Research (Madrid)
France	CSA (Paris)
Ireland	TNS – MRBI (Dublin)
Italy	Market Dynamics International (Milan)
Cyprus	Synovate – Cyprus (Nicosia)
Latvia	TNS Latvia (Riga)
Lithuania	Baltic Surveys (Vilnius)
Luxembourg	Ilres (Luxembourg)
Hungary	Ad Hoc Plus Research (Budapest)
Malta	MISCO (Valletta)
Netherlands	PQR (Amsterdam)
Austria	Karmasin Motivforschung (Vienna)
Poland	BSM (Warsaw)
Portugal	TNS Euroteste (Lisbon)
Romania	Data Media (Bucharest)
Slovenia	RM Plus (Maribor)
Slovakia	Psymareco (Bratislava), in cooperation with MARECO
Finland	Marketing Radar (Helsinki)
Sweden	Kommunicera (Stockholm)
United Kingdom	Andrew Irving Associates (London)

ANNEX II

SOCIO-DEMOGRAPHIC COMPOSITION OF THE GROUPS

SOCIO-DEMOGRAPHIC COMPOSITION OF THE GROUPS

	Sex		Age				Socio-professional category			
	M	**W**	**17-18 years**	**19-29 years**	**30-49 years**	**50-60 years**	**Middle level managers**	**Self employed**	**Office employees**	**Manual workers**
Belgium										
Brussels, 05/08/08	3	5	1	2	3	2	3	1	2	2
Bulgaria										
Sofia, 26/07/08	4	4	1	2	3	2	2	2	3	1
Czech Rep.										
Prague, 06/08/08	4	4	2	2	2	2	2	2	2	2
Denmark										
Copenhagen, 18/08/08	4	3	1	1	2	3	3	1	2	1
Germany										
Cologne, 14/07/08	4	4	2	2	2	2	2	2	3	1
Estonia										
Tallinn, 05/08/08	3	5	2	3	2	1	2	1	3	2
Greece										
Athens, 24/07/08	4	4	2	2	2	2	2	2	2	2
Spain										
Madrid, 29/07/08	5	3	1	2	2	3	2	2	2	2
France										
Paris, 29/07/08	4	5	2	2	3	2	1	2	4	2
Ireland										
Dublin, 06/08/08	4	4	1	2	3	2	2	2	2	2
Italy										
Milan, 24/07/08	4	4	2	2	2	2	2	2	2	2
Cyprus										
Nicosia, 31/07/08	4	4	2	2	2	2	2	2	2	2
Latvia										
Riga, 29/07/08	4	4	2	2	2	2	2	2	2	2
Lithuania										
Vilnius, 29/07/08	6	4	2	4	2	2	3	3	2	2
Luxembourg										
Luxembourg, 13/08/08	4	4	2	2	3	1	2	1	3	2
Hungary										
Budapest, 05/08/08	4	4	2	2	2	2	2	2	2	2
Malta										
Mriehel, 06/08/08	4	4	2	2	2	2	2	2	2	2
Netherlands										
Amsterdam, 31/07/08	4	4	2	2	2	2	2	2	2	2
Autria										
Vienna, 30/07/08	5	4	2	2	2	3	2	2	2	3
Poland										
Warsaw, 21/07/08	4	4	1	4	1	2	1	3	2	2
Portugal										
Lisbon, 31/07/08	5	3	2	2	2	2	2	2	2	2
Romania										
Bucharest, 29/07/08	4	4	2	2	2	2	2	2	3	1
Slovakia										
Bratislava, 13/08/08	4	4	2	2	2	2	2	2	2	2
Slovenia										
Maribor, 24/07/08	4	5	2	2	3	2	2	2	3	2
Finland										
Espoo, 11/08/08	3	5	2	2	1	3	2	2	2	2
Sweden										
Stockholm, 14/08/08	4	4	2	2	2	2	3	2	2	1
United Kingdom										
London, 22/07/08	4	4	2	2	2	2	2	2	2	2

ANNEX III

DISCUSSION GUIDE
DOCUMENTS PRESENTED TO THE PARTICIPANTS

74, Chemin de la Ferme des Bois
78950 Gambais

QUALITATIVE STUDY ON THE IMAGE OF SCIENCE

DISCUSSION GUIDE

INTRODUCTION

Hello, I am…, and I work with the research institute …. which is in charge of the study which brings us here together today.

Before starting, may I ask each of you to introduce him/herself with a few words: who you are, if you live alone or together with someone else, if you have children, what your job is or what your occupations are otherwise, and what kind of training or degree you have – or alternatively, for some of you, what you are still studying.

THEME I

I.1A Our discussion will be about science.
What does this word mean to you, what comes to mind right away when hearing about science?

- Spontaneous reactions.
- Probe:
  Definitions of science given by the respondents and/or ideas associated with science.
  (Possible) positive or negative connotations of science.
  Expression of interest/attraction or of lack of interest/distance.

I.1B We hear about science in the singular, or sciences in the plural.
When hearing about sciences in the plural, which are the different sciences that come to mind?

- Spontaneous reactions.
- Probe:
  Remarks and comments on the various sciences mentioned by the respondents
  Inclusion or non-inclusion of social sciences and the humanities
  (If not quoted spontaneously: ask and probe their meaning)

I.2 We also hear about technology.
What does the word technology mean to you, what in particular comes to mind when you hear about technology?

- Spontaneous reactions.
- Probe:
  Definitions of technology given by the respondents and/or ideas associated with technology.
  - Any references to various technologies.

- (Possible) positive or negative connotations of technology.
- Expression of interest/attraction or of lack of interest/distance.
- Similarities and differences in the respective perceptions of science and of technology.

I.3 Now, if I tell you about research, what does that mean to you?

- Spontaneous reactions.
- Probe:
  Definitions of (scientific) research given by the respondents and/or ideas associated with research.
  - Any references to various areas of research.
  - (Possible) positive or negative connotations of research.
  - Expression of interest/attraction or of lack of interest/distance.

THEME II

II.1 One may have heard about science in many various ways, in various terms, and from many sources. As far as you are concerned, thinking of what you know and feel about science, where does that come from? – I am interested in everything that may contribute or may have contributed to how you perceive science and what you think about science.

- Spontaneous reactions.
- Probe:
  Nature of the sources or channels : from school and training to media (which ones) through family, word of mouth, reading, etc.
  - Impact of each source/channel on perceptions of science.

II.2 In what we hear about science, there are aspects which we understand more or less clearly, that we remember more or less easily, which attract attention to a greater or lesser extent. Thinking of the different sources and channels we have just been discussing, what has particular attracted your attention lately ? – I would like you to dig into your memory and come up with precise examples of things you have seen or heard, what you have remembered, noticed, understood more or less clearly, … etc.

- Spontaneous reactions.
- Probe:
  Ask each participant to quote 2 or 3 examples of things seen or heard on science, and for each case to mention as clearly as possible the information channel, the terms in which the subject was presented, and the impressions left.

THEME III

III.2 Science and scientific research may generate more or less interest and more or less attraction, it may arouse positive expectations and hopes or on the contrary worries or fears.
Could you please give me your personal feelings in this respect?

- Spontaneous reactions.
- Probe:
  Degree of interest/attraction for science and research, and reasons thereof.
  Nature and degree of expectations/hopes or worries/fears.
  Nature of interest : intellectual interest in terms of knowledge and/or expectations of concrete benefits (which ones).
  (Possible) spontaneous expression of varying attitudes depending on areas of science/research.

III.2 One may have differing attitudes and impressions depending on the field of science and research. Are there any areas which you consider with more interest or more hope, and conversely other areas which you look upon with more reluctance or more worries ?

- Spontaneous reactions.
- Probe:
  Scientific/research fields generating interest or hopes. Why?
  Scientific/research fields generating reluctance or worries. Why?

THEME IV

IV.1 Let us now discuss a few current scientific research fields.
For each one, please tell me what you know about it, what you understand, how important you consider this field to be, and what you think overall, either in positive or negative terms, of research being carried out in this field, including what can be expected of it.

- For each field, probe:
  Degree of knowledge and understanding of what the research field is about.
  Perceived importance, and reasons thereof.
  Positive or negative implications of research in this field, as foreseen or assumed by the respondents.

  A – Nuclear energy
  B – Climate change
  C – Biofuels
  D – Genetically modified organisms (GMOs)
  E – Stem cells from biotechnologies
  F – Nanotechnology
  G – Experiments on animals

IV.2 Let me give you a little bit of information on each of these fields and the research objectives that are being pursued.
Please tell me how you feel and think about it.

- For each field, hand out copies of the text, and probe:
  Understanding.
  Novelty of the information/or information already familiar.
  Interest aroused.
  Positive or negative attitudes to the information items in the text.
  Any evolution from preexisting attitudes as recorded in IV.1

  A – Nuclear energy
  B – Climate change
  C – Biofuels
  D – Genetically modified organisms (GMOs)
  E – Stem cells
  F – Nanotechnology
  G – Experiments on animals

THEME V

V.1 Let us now talk about scientific research in our country.
What do you know and how do you feel about it?

- Spontaneous reactions
- Probe:
  - Impressions of the country being advanced/late in scientific research.
  - Impressions, or not, of active research policies – including public research/private companies' research activities.
  - Areas in which the country is felt to be in advance/active or on the contrary late/little active.
  - Reasons and origins of these impressions.

V.2 Do you think more should be done in our country concerning scientific research ? Why ? In which fields in particular ? And what do you think are the limits to doing more ?

- Spontaneous reactions
- Probe:
  Degree of strength or weakness of the respondents' expectations of more active research.
  Areas perceived as priority areas for the country, and reasons thereof.
  Nature of the limits perceived by the respondents, and solutions/actions possible to overcome those limits.

THEME VI

VI.1 Let us now deal with the subject of scientific research in the European Union.
Please tell me what you know about it generally speaking, if you have any particular examples in mind, and how you feel about it.

- Spontaneous reactions
- Probe:
  Degree of knowledge of the existence of a research policy at European level.
  Known examples of research at European level – particular fields, programmes, institutions involved in research policy, known results and achievements …
  Impressions (or not) of an active policy at European level.
  Perceived importance of common European actions compared with Member States' own individual actions.

VI .2 Now, looking forward, how important do you think the research policy carried out in common within the European Union should become, and what main directions do you think it should take ?

- Spontaneous reactions
- Probe:
  Perceived importance of, and wishes (or not) for strengthening research actions within common programmes in the European Union.
  Priority fields for research carried out in common.
  Perceptions of the "added value" of common action within programmes managed by the European Union, compared with the action of each Member State individually.
  Reasons for these opinions.

VI.3 Here is a short document, summarizing the principles and the directions of the research policy carried out in the framework of the European Union.
Please tell me what you think about it.

- Ask the respondents to read the text, and probe :
  Understanding.
  Novelty of the information content, or on the contrary information already familiar ; aspects already known or suspected/ new aspects.
  Positive or negative reactions to the different sections of the text, and reasons thereof.

THEME VII

VII.1 Earlier on, you mentioned some points that you know about scientific research at European level. Where did your knowledge come from ? More precisely, do you remember seeing or hearing information coming from the European institutions on these subjects ?

- Spontaneous reactions
- Probe:
  Sources of the information received on research at European level.
  Any rememberances, even if confused, of information stemming from the institutions of the European Union.

VII.2 The institutions of the European Union involved in scientific research seek to inform the public in order to make scientific questions, research projects that are being carried out, and their related challenges better understood, and to arouse more interest for these questions.

In your view, how could or should that be done ? Please use your imagination freely and try to think of all the means that may come to your mind for communicating on these subjects – whether as regards the information content, the format, the places, the circumstances or the channels in/through which it could be spread, etc. – without limiting yourselves to whatever is already done currently.

- Spontaneous reactions
- Probe, by asking each respondent in turn to tell how he/she would imagine “messages” on science and research.
  Contents.
  Formats.
  Places, circumstances, channels.

THEME VIII

VIII.1 The European Commission publishes a series of brochures on research subjects such as those we have been discussing. I will show you two examples of these brochures. Please have a look at them, and then tell me how you feel about them.

VIII.1A Hand out the brochure "Nuclear fission and radiation protection" and leave the respondents a few minutes to have a look at it.

- Spontaneous reactions
- Probe:
  Interest of the content.
  Clarity/understandability.
  Judgements on format.
  Feelings regarding the kinds of publics for whom this brochure may be addressed.
  Suggestions of changes or improvements.

VIII.1B Hand out the brochure "Food safety in Europe" and leave the respondents a few minutes to have a look at it.

- Spontaneous reactions
- Probe:
  Interest of the content.
  Clarity/understandability.
  Judgements on format.
  Feelings regarding the kinds of publics for whom this brochure may be addressed.
  Suggestions of changes or improvements.

VIII.2 Now, here is a magazine, which is also published by the European Commission – each issue deals primarily with one main topic.
Could you please do the same thing as for the brochures, that is, have a quick look at it, and tell me how you feel about it.

- Hand out the copy of the "Research EU" magazine, and leave the respondents a few minutes to have a look at it.
- Spontaneous reactions
- Probe:
  Interest of the content.
  Clarity/understandability.
  Judgements on format.
  Feelings regarding the kinds of publics for whom this magazine may be addressed.
  Suggestions of changes or improvements.

VIII.3 The European Commission also issues short films on scientific questions ; these films are broadcasted on the information TV channel Euronews. We will have a look at one of them, and you will tell me how you feel about it.

- Show the "Futuris" video "Smart cars to help reduce road fatalities".
- Spontaneous reactions
- Probe:
  Interest of the content.
  Clarity/understandability.
  Judgements on format.
  Feelings regarding the kinds of publics for whom this film may be addressed.
  Suggestions of changes or improvements.

VIII.4 After seeing these brochures, this magazine and this short film, are there any ideas that come to your mind about attractive ways in which one could inform the public about science and scientific research ?

- Spontaneous reactions
- Probe, for the various ways imagined by the respondents :
  Contents.
  Formats.
  Places, circumstances, channels.

THEME IX

We are carrying out this study on behalf of the European Commission' s Directorate General for Research, together with colleagues in the 27 Member States of the European Union.
What do you think of this initiative of the European Commission ?

- Spontaneous reactions

A – Nuclear energy

The demand for energy grows. World oil and gas resources are limited ; prices rise. The European countries have scarce energy resources and are particularly dependent on external supply sources.

New renewable energy sources are developing, but they will only provide a minor part of energy needs. Europe will have to increase its nuclear electricity production.

Nuclear energy is comparatively cheap to produce, there are no greenhouse gas emissions, and it does not contribute to climate change. But there is still public controversy about its dangers.

Research in this area is mainly focused on :

- Nuclear fission – the process used in present day nuclear plants.

  Research is carried out to improve the so-called third generation power plants (the first ones of this type are currently being built) and, in the medium term (2025), to develop fourth generation power plants, which will be much more efficient and competitive, and will substantially reduce nuclear waste quantities.

- Safety : both to improve nuclear power plant safety further and to find solutions to the problems of radioactive waste recycling and storage.

- Nuclear fusion : a radically different process, which will provide very large scale electricity production from hydrogen isotopes, and will be extremely safe – as there will be no risk of chain reactions, very little transport of radioactive materials, and a considerable reduction of waste. Mastering nuclear fusion, aiming to have plants operating around 2050, requires considerable research resources. World-wide cooperation has been engaged, in which Europe has a leading role.

B – Climate change

The greenhouse effect is due to gases that are contained in the atmosphere, primarily carbon dioxide, forming a transparent layer that acts like the glass in a giant greenhouse.

This phenomenon makes it possible for the earth to keep the warmth it receives from the sun, without which life would be impossible.

But, since the industrial revolution, we have burned considerable amounts of coal, oil and natural gas and released into the atmosphere, notably, enormous quantities of carbon dioxide, thus increasing the greenhouse effect.

Most scientists believe that this is raising and will increasingly be raising the temperature of the planet, which can have disastrous consequences : climate instability, areas of the world turning into deserts, ice melting, sea levels rising and submerging whole cities and regions, etc.

This threat gave rise to the Kyoto agreements, by which most of the world's countries committed themselves to reducing the quantities released.

But we do not yet understand enough about the natural processes that release, absorb and store these greenhouse gases. Besides developing renewable energies, research aims to learn more about these processes, in order to be able to choose the best methods for reducing these releases as well as deal with excess greenhouse gases – for example by studying how the forests and oceans can be used as "carbon sinks" to absorb them.

C – Biofuels

Renewable energy sources started to be developed when the oil crisis of the 1970s made us aware of the fact that fossil energy resources would run out one day.

These energies include hydroelectric power, wind energy, solar energy, geothermal energy, and also biomass.

Biomass, that is to say energy from plants, can become a substantial source of energy, either for producing heat or for producing fuels. At the same time it can open new markets for farming.

Biofuels (or agrifuels) are already being produced and are used as partial substitutes for petrol or Diesel fuel.

The development of these biofuels currently creates problems by contributing to rising food prices, as some producers have massively turned themselves to this new market, thus reducing the supply of foodstuffs and creating tensions on world prices.

It is an important issue for agronomic research – e.g. finding non-food plants that are suitable for producing biofuels.

Another area of research is about improving industrial processes for converting biomass into biofuels, to make this new source of energy more competitive and to develop new applications.

D – Genetically modified organisms

GMOs are living organisms whose genetic material has been altered, using genetic engineering techniques to add one or several genes that do not exist in the original organism.

GMOs can be used in the medical field – for example bacteriae that are altered to produce new types of drugs.

In the vegetal field, they make it possible to produce genetically modified plants and increase farming production – for example by adding a new gene that will make the plant more tolerant to herbicides, or more resistant to insects (involving reduced usage of insecticides).

The debate about GMOs concerns two major points :

- The potential dangers of GMOs for human health. At the time being, no study has proved that there are any dangers – but the absence of longer term risks has not been proved either.

- Environmental risks stemming from the potential dissemination of transgenic plants on conventional crops (including organic farming) and risks for biodiversity.

Scientific research aims to provide answers to these questions.

E – Stem cells

In biology, stem cells are “undifferentiated” cells, that is to say cells that do not have a specialised function in a living organism. Through cell differentiation, they can produce specialised cells : ova fertilized by spermatozoa at the starting stage of procreation are the perfect example of a totally undifferentiated stem cell, from which all of the body’s cells will be created in the embryo.

Stem cells are also present in adult organisms, although they are less undifferentiated : for example blood stem cells that can create all types of blood cells, but only blood cells.

Stem cells can be grown in laboratories, and they have the ability to reproduce themselves virtually indefinitely : which opens up immense perspectives notable for medicine.

Growing stem cells in laboratories gives rise to very delicate ethical problems, in particular when they originate in the human embryo. Different countries have different legislations, controlling their use for research more or less strictly.

Research in this area is only beginning. The range of potential applications is considerable, as stem cells can be used to regenerate tissues that have been damaged or have degenerated. Taking just one example, they could enable us to cure such diseases as the Alzheimer disease, for which there is currently no treatment available.

F – Nanotechnology

The prefix “nano” means one billionth : it indicates extreme smallness. Nanotechnology refers to technologies in which matter is manipulated on the atomic and molecular scale to create novel materials and processes.

Changes in the molecular properties of a material at the nanoscale can considerably alter its physical and chemical properties.

Potential applications of nanotechnology can be found in three main sectors.

- Naonoelectronics : continuing the development of microelectronics, but at significantly smaller size scales, to create electronic components that are immensely smaller and much more powerful.

- Nanobiotechnology, among others to build biologically inspired materials, with the ability to alter their characteristics : for example producing either tissue materials with extremely low stickiness for medical equipment such as catheters, or on the contrary super-adhesive materials for repairing damaged tissues such as broken bones.

- Nanomaterials : for example, it will be possible to produce perfectly cylindrical holes of only a few dozen nanometers in polymer sheets. These holes can then be filled with other materials to form “nanocables”, with a wide range of applications in numerous industrial sectors, including telecommunications.

Research aims to understand these so far not very well known phenomena, and extend nanoproduction methods at industrial production scale in order fully to use their potential.

G – Experiments on animals

Experiments on animals are part of the work of biologists to understand life and notably to test and develop new drugs.

Scientists defend the practice saying it is the only way to test the safety of new pharmaceutical substances. Conversely, militant activists of the cause of animals consider that animal testing can be justified in no circumstances.

In Europe notably, legislation has been introduced dealing with animal welfare, ranging from their treatment on farms and during transportation to the question of animal testing.

In this area, research seeks to find methods that can cause less pain to animals in laboratories, as well as develop and validate alternative ways of reducing animal testing as much as possible.

The common research policy in the European Union

- Scientific and technological research is a key factor for European countries' future and the competitiveness of their economies.

  The European countries currently invest a substantially lower share of their Gross Domestic Product in research than major competitors like the United States and Japan (roughly 2 %, against 3 %) – and new emerging countries like China and India are also beginning to increase their research efforts.

  The "Lisbon Strategy" which was decided of at European Union level highlights the essential importance of education, research and innovation. Its aim is to reach the 3 % target in terms of Member States' GDP devoted to research activities.

- Enhancing research carried out in common within the European Union is a key component of this strategy.

  - Because research requires considerable resources, which generally exceed those of any single Member State.

  - To avoid the waste of resources stemming from the fragmentation of research activities (as, for example, when a team of scientists in one member State makes a medical discovery likely to lead to new treatments for a serious disease, and spends a lot of time and money on it, only to discover that another team in another country has reached similar conclusions after devoting important resources to it as well).

- The existence of a policy for carrying out research in common at European level is not new. Since 1984, "Framework Programmes for Research and Technological Development" are implemented; the 7th Framework Programme has started recently.

  This Framework Programme, covering the period 2007-2013, has had its resources increased to a large extent – plus 63 % compared with the previous Framework Programme, now reaching a budget of over 50 billion euros.

- In budget terms, the most important component of the 7th Framework Programme (two thirds of the total) is the "Cooperation" component.

  It fosters collaborative research across the European Union (and some other partner countries who are associated with the EU) through research projects led by "consortia" regrouping several partners, which can involve business enterprises, universities and public and private research laboratories.

  One condition for eligibility is the transnational character of these groups, namely they must include at least 3 partners from 3 different countries.

  It is focussed on 10 key thematic areas, which are:

  - Health
  - Food, agriculture and biotechnology
  - Information and communication technology
  - Nanosciences, nanotechnology, materials and new production technologies
  - Energy

- Environment (and climate change)
- Transport (including aeronautics)
- Socio-economic sciences and the humanities
- Space
- Security

❖ The other components of the Framework Programme are the following :

- The "Ideas" Programme supports investigative research on the only basis of scientific excellence, through a system of research fellowships aiming to attract and keep in Europe the most talented scientists, while enhancing pure research.
  The programme is implemented by the new "European Research Council".

- The "People" Programme aims at encouraging people to engage in scientific careers and to avoid a brain drain – it includes support for initial researcher training, lifelong training and career development, as well as the creation of a real European labour market for researchers.

- The "Capacities" Programme aims to strengthen and optimise the research capacities that Europe needs : strengthening research infrastructures, including at regional levels, networking, involvement of SMEs, improved policy coordination, etc.

- The "Nuclear Research" Programme is a specific programme under the Euratom Treaty (signed in 1957 at the same time as the Treaty of Rome which gave birth to the European Community – now the European Union). The main research areas are nuclear fission and radioprotection, and nuclear fusion.

❖ As regards funding, the general principle is co-financing.

This means, as a general rule, that the Union does not "buy" research services, rather it subsidises projects, that have been selected as a result of calls for tenders on the basis of their interest at European level.

The rate of co-financing is normally 50 % of the costs of the project ; it can be higher for specific actions or in some particular cases.

In return (for the 'Cooperation" component), selected projects have an obligation to implement or to publish research results.

❖ In summary :

- The research policy at European level is not meant to monopolise research activities nor to replace national policies.

  The European policy's budget actually represents only about 5 % of the European countries' aggregate research budgets.

- It aims to stimulate research efforts in key areas.

- It aims to foster cross-border cooperation and reduce the prevailing fragmentation of research activities.

- On a more general level, it seeks to contribute to a more favourable environment for European researchers and European research, within the so-called "European Research Area".