



The Association of Geological Surveys of the European Union
(EuroGeoSurveys)
in their position as
custodians to their national natural resources
and
guardians of their terrestrial environment

present their contribution to
the Commission Communication COM(2000)6 of 18 January 2000:
'Towards a European research area.'

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A. General

EuroGeoSurveys is a non-profit association of 17 members (the EU 15 plus Iceland and Norway) and its aims and objectives are briefly profiled in Annex A.

EuroGeoSurveys welcomes the paper and feels that the EU should make an active mobilisation of the considerable public service research forces already available at national level. It believes that expert networks linked through Internet gateways should provide decision makers with rapid access to information relevant to European policy issues.

The document seems to seek rather short-term solutions for European research. It is obviously important for innovation to take place and for Europe to raise its international R&D profile.

Innovation means 'the successful exploitation of new ideas.' There is no shortage of good ideas in Europe. However researchers need to develop vision and well targeted marketing plans; funders need to develop vision and a more favourable financial environment.

B. Specific

SITUATION AND OBJECTIVES

1. Research in Europe

The statistics cited in the document present a negative picture. We suggest that they stem from two interrelated long-term problems rooted in cultural and organisational attitudes:

- i) European researchers seem unwilling to explain why society needs their research and results and the benefits which accrue from them. They apparently prefer to carry out 'curiosity-driven', 'blue-sky' research as a means of achieving academic eminence within their own fields. They object to explain what they do in concise, every day language to non-specialists or laymen or to engage in the 'boring' work of targeted applied research and its management.
- ii) The pattern of science funding in Europe is inconsistent. Most European financiers are cautious and unwilling to advance risk capital for new research ventures. The overall underfunding of European research does reflect society's distrust of scientific research which does have a poor public image. European societies in many cases connect research results more with problems to come than with positive aspects. Many people for example, connect the high unemployment numbers in some European countries with scientific progress. However, some economically successful countries such as Finland and Sweden spend similar proportions of their GNP to the US on R&D. What Europe needs is a clear picture of the causality of European wealth with the progress in European science.

Change can only be initiated very slowly within individual countries and it is doubtful that positive change can be imposed by the EU institutions only on a top-down basis. Problems exist at Union, national, regional, local and individual levels and those involved have to find a working solution at the appropriate level using the subsidiarity principle.

The cultural and linguistic diversity of Europe also has the potential to lower efficiency and cause confusion but experience suggests that perseverance brings scientific and human gains.

2. Better investment in knowledge

We do not feel that this section addresses the issues of better investment in knowledge very well.

- i) The acquisition of new data is always necessary. Europe however, already possesses huge stocks of data and information from decades of previous research work in all fields of science. These can be transformed in knowledge baselines using the relation proven in our GEIXS (1) project:

data + context = information
information + expertise = knowledge

However many of the results of 'past research' in Europe have been discarded, inefficiently archived or even hoarded so that they can no longer be retrieved for reinterpretation and modelling using modern theory and methods. For example, few European countries can retrieve the old 'big bang' geophysical data which is essential to interpreting the deep structure of the Earth. Outside the former Soviet Union no European country can replicate such data with modern experiments because of environmental and societal restrictions on the size of controlled explosions allowed. A modern reactivation of old data can have the same striking effect on research in certain fields (e.g. earth sciences, environment, raw materials) as large new programmes.

ii) Unlike the USA, Europe has no systematic strategic overview of the Earth's resources (water, land, soils, energy resources and mineral raw materials) nor of the environment on which its inhabitants depend. Natural hazards such as earthquakes, landslides and floods continue to exact unnecessarily high losses in European life and property because there is no readily accessible, harmonised public knowledge system to provide timely alerts or protect the population. The USA and Japan have learned from their losses and are better able to limit such damage in the public interest. We could provide many other examples of such knowledge gaps, particularly in the environmental field. The USA is currently launching a 20-year publicly-funded programme to model the internal structure of its entire territory down to a depth of 500 km in order to increase its ability to act on issues including Earth resources, natural hazards and environmental processes.

3. Public research effort

We agree that European-level support for public research has a tradition of rigorous and quality-controlled objectivity and neutrality. In addition, these results of the work must be free (as in the case of federal bodies such as the US Environmental Protection Agency or the US Geological Survey) and sufficient funds must be provided to ensure that such organisations act as politically and economically independent 'services of general interest' (2) which can investigate and report objectively and independently to present the facts regarding the risks and remediation of hazards such as BSE, earthquakes, nuclear accidents and land contamination. This is essential to create public confidence in science and the political system.

4. Private investment

The pattern of science funding by the European private sector is inconsistent. Many European business operations are headed by people with no science and engineering background but by financiers and accountants who are cautious and unwilling to advance risk capital for new long-term research ventures. It is also true that many SMEs are too involved with the practicalities of their day to day business obligations to be able to experiment with new technology.

5. Organisation of research in Europe

It is true that a 'more dynamic configuration' than 15+1 in paragraph 5 is obviously desirable and that the European Research Framework Programmes give a strong incentive to Europe wide research efforts. However the general experience is that the present application, evaluation and management procedures for European research proposals take far too much work and time to complete. It is not practical for industries and research institutes to spend 6-12 months assembling a Framework Programme project team and writing a proposal, waiting a further 6 - 9 months for it to be reviewed and then negotiating it and redrafting it into a technical annex document (for no financial recompense) before being funded. In many cases prepossess run the risk of their plans being superseded by new market or technological developments in the 12-24 months it takes to

approve and provide funding for a European project. It is not surprising that many European researchers and the industry do not participate in the European research initiative and look for funding outside European programmes.

6. A real European Policy: towards a European research area

EuroGeosurveys supports the concepts outlined in this section, with particular mention of the following points:

Page 8: Indent 1: We agree that networking of existing centres of excellence in Europe and the creation of virtual centres should be increased through the use of new interactive communication tools. Our own organisation was established in 1995 with this concept in mind and has benefited from this mode of operation.

Indent 3: We also agree that there should be more coherence between national and European research activities.

Indent 5: We support this point, which is very well defined in the 1999 EU Scientific Committee paper 'On the future of scientific advice' (3).

Indent 6: We agree that young people must be stimulated to take up careers in science rather than going for short term material gains in ephemeral service occupations. This issue is the key to producing new generations of European citizens who are alert to responsible use of the environment. However the societal status of scientists and their financial rewards must also be enhanced if this is to be realized. This is especially true since studies in science normally are considered more difficult and more time consuming than in other fields

Indent 8: We strongly support this ideal which our members have now operated since the Second World War.

A EUROPEAN RESEARCH AREA

1. A stock of material resources and facilities optimised at the European level

1.1 Networking of centres of excellence and creation of virtual centres

Networking of specialist centres to make virtual centres of excellence will be very cost-effective where the component organisations combine well-balanced abilities and common objectives. However many currently existing EU networks lack clear focus or effectively standardised databases (e.g. European Environment Agency European Topic Centres) and their contacts may be too infrequent for them to produce effective results. More EU funding is needed to sustain networks which have proved to be successful: little can be achieved with 2- 3 years funding and terms of up to 10 years should be considered. It may be correct to locate certain centres of excellence in specific countries or regions where there is notable attainment in a particular field, for example, natural disaster response systems.

It is not realistic for all networks to be based on public versus private sector competition. As we pointed out in a response to the DG XIII Green Paper of 1998 (3) private corporations (e.g. resource companies) see no economic interest in areas such as databasing (e.g. for geoscience, environmental and natural resource parameters, meteorology, etc.). Such activities can be run most efficiently by making them 'services of general interest' (2) maintained by public funding and open and transparent for use by all sectors and citizens. Our own members' GEIXS-ESPRIT project (1: Internet exchange of geoscience metadata) is a virtual centre established in 1999 by 16 European national public sector organisations. It is now supported at European level by our association and its member's national funding. GEIXS receives over 20,000 on-line enquiries each month (from universities, industry, consultants and the public) for geoscience data and provides a neutral gateway to the detailed information available to customers from its 16 member organisations (EU15 plus Norway). In 1999 it was extended to include 8 central and eastern European countries.

1.2 Defining a European approach to research infrastructures

EuroGeoSurveys supports the proposed plan for development of a European approach to supporting infrastructures and will be interested to contribute to the Strasbourg 2000 conference on this topic.

1.3 Better use of the potential offered by electronic networks

EuroGeoSurveys can confirm from its own experience in the GEIXS project (1) the value of providing access to complex databases of public domain information. Our experience is that such network linkages greatly increase our own researchers' awareness and ability to establish new research-industry partnerships.

2. More coherent use of public instruments and resources

2.1 More co-ordinated implementation of national and European research programmes

R&D activity in the EU is dominantly national and some countries have better funding and administrative arrangements than others. Researchers are familiar with the workings of their national systems but find that existing EU research administration procedures are bureaucratic and difficult to understand. To work with these requires continual explanation.

We agree that it would be valuable for the Commission to provide the logistical means and legal instruments best suited to co-ordinating research activities in Europe. However the existing systems and procedures need to be simplified and coordination between Commission DGs must be improved. For example, many researchers pursuing applied S&T issues (environment, raw materials, energy etc.) find that they need to talk to four to five different DGs before they can understand how to develop a specific issue.

2.2 Closer relations between European organisations for S&T co-operation

We do not see great value in establishing generally closer executive cooperation between large European science and technology organisations because this could lead to increased bureaucracy likely to slow down or dilute effective research work. However, closer cooperation in the scientific area between national organisations working in the same field is necessary to establish Europe-wide research programmes with a common structure, e.g. hydrogeological research in river systems belonging to different countries (the Rhine, the Danube). EuroGeoSurveys, combining 17 different national organisations, is a positive example for an approach to cooperation across borders.

3. More dynamic private investment

3.2 Development of effective tools for the protection of intellectual property

A European patent system would be very desirable if it simplified the current complications of operating with different national systems. However in view of the complex legal negotiations likely to be involved between Member States it should be a medium to long-term objective.

3.3 Encouragement of risk capital investment and company start-ups

We have already commented (1 ii and B.4 above) that the pattern of science funding by the European private sector is inconsistent. Also with the global market companies tend to put their research dollars where they assume they can get the best reward, whether it is in the USA, Australia or elsewhere.

Few European science parks seem to have been successful in bringing scientists, industrialists and financiers at all levels into contact and such ventures do not seem to exist in the more entrepreneurial business culture of North America. Perhaps what is needed (in addition to developing more adventurous financing systems) is to stimulate the growth of a new European research culture in which (as in North America) researchers find value in moving from academic to government and industrial positions several times during their career in order to foster new working experiences and perspectives. In Europe it seems that most researchers 'stay put' in the academic, government or industrial sector for their entire career's span. In the academic and government sectors their performance still tends to be measured in terms of 'papers published' rather than 'patents obtained.'

4. A common system of scientific reference for policy implementation

4.1 Developing the research needed for political decision

We agree that research funded by the EU to add value at European level should be designed for decision support and should address policy concerns. This issue is particularly important for issues such as environmental protection, natural resource management, natural hazard mitigation and information banks. Our experience is that few Framework Programme projects lead to sustainable activity in such topics and that the Commission policy DGs do not support such large-scale programmes. We would welcome the support of centres of excellence in the above fields networked for more efficient activity at the European to global level.

4.2 Establishment of a common system of scientific and technical reference

We agree that selected common, rapidly reacting, systems of reference need to be set up in Europe in order to deal with emergency situations – such as earthquakes, landslides, flooding and toxic chemical spills. However we feel that the JRC, while providing valuable logistic support, should not take the sole lead in such work but should work with teams of outside scientists who are more actively and more internationally involved with leading-edge R&D issues. We agree that any such bodies should be free of industrial and political interests, follow best scientific practice and be open to public scrutiny.

5. More abundant and more mobile human resources

5.1 Greater mobility of researchers in Europe

As already stated in 3.3 we agree that European researchers should be more mobile between the academic, government and commercial sectors.

An important point is also that the active career of scientists in many European countries does start too late. This means the time for education at schools and universities has to be shortened. Young people without families normally are more mobile.

Another precondition for the mobility of scientists between industry, universities and governmental agencies is that payment and pensions are based on identical rules. In Germany for example years of employment with private companies do not count for pension payments of civil servants.

5.2 Introduction of a European dimension into scientific careers

We agree that there is great value in building a European, multi-cultural dimension into researchers' careers. The managers of researchers should make it worthwhile for them to develop careers in Europe. However many researchers prefer to build up national teams and positions in the long term. The presently perceived administrative difficulties in moving families and households from one country to another as well as language barriers within the EU also discourage mobility.

5.3 Greater place and role for women in research

Women play a key part in all research and management activities (field, office and laboratory) in our 17 member organisations and we support the European aim of increasing their involvement. This will not only increase the number of researchers but will also help to increase the incentive for young people to study science.

5.4 Giving the young a taste for research and careers in science

The European 'Young Scientist' competition is one of a number of useful EU measures but it is not well publicised or promoted to schools – for example, some of the major international schools in Brussels are unaware of its existence. We agree that relevant, well taught science must be built into all levels of pre-university education in order to promote the development of future citizens who are as well-informed on (for example) the science behind current environmental and life science issues as they are on other more traditional subjects.

Our member organisations regularly organise 'Science Weeks', Open Days, special exhibits and guided tours at their laboratories and museums, and lead field excursions to sites of scientific interest for schools. These activities are valued and popular. Our members also publish a wide range of informational brochures for schools and the general public, together with Internet sites including educational features on resource and environmental issues and planetary science.

6. A dynamic European landscape

6.1 A reinforced role for the regions

We agree that research should use 'prime regional movers' to develop science and technology and our members are already active in this field, with or without ERDF funding. Many of our members operate in projects of active multidisciplinary collaboration led by regional, local and municipal authorities or national private sector organisations to improve (for example) water resource and mineral resource management, the planning of remedial measures for pollution and contamination, GIS-aided city infrastructure management and heritage preservation, land use, civil protection against natural hazards and many other topics.

6.2 Integration of the scientific communities of western and eastern Europe

Our members have carried out cooperative research with eastern European and NIS partners for many decades. As our members' knowledge and procedures have generic applicability and often deal with problems of trans-continental geographic extent (e.g. earthquake zones and deep Earth structure, industrial pollution streams and waste disposal) we collaborate with eastern European partners in order to obtain a pan-European context for major research issues. Since 1971 our

cooperation with eastern Europe has been formalised through an annual Forum of Directors of the European Geological Surveys (FOREGS) at which all the 41 Council of Europe countries are welcome to exchange views and to plan collaborative projects.

Within EuroGeoSurveys, EU-funded collaboration in Internet metadata exchange began with 8 eastern European countries in 1998 and many other collaborative projects have developed with applicant countries within the Framework Programmes. By invitation of applicant country ministries our members have carried out evaluations on how national geoscience and environmental and natural resource programmes and management systems should be adapted for use at the European scale.

6.3 Making Europe attractive to researchers from the rest of the world

Europe has excellent laboratories and equipment for research but immigration procedures can be difficult for third country researchers. The EU bilateral agreements should be used to set up reciprocal arrangements with third countries in order to promote freer movements for research exchanges.

7. An area of shared values

7.1 Tackling the questions of science and society in their European dimension

We agree that consistent and openly advertised pan-European foresight exercises, related reviews and 'consensus conferences' should be held at regular intervals to monitor forward strategic planning and progress. A clearly accessible platform for exchange of viewpoints and information needs to be set up. An improved version of the JRC-IPTS 'Futures Project' would be valuable: we feel that the present 'Futures Project' synthesis is focused on a narrow range of disciplines and lacks scientific balance in important environmental matters. However it is a good first attempt which could be greatly improved by a wider, more transparent trawl for opinions and contributors. We agree that the collection and standardisation of data, statistics and indicators is of paramount importance and must be improved in the EU.

7.2 Development of a shared vision of the ethical issues of science and technology

We regard this as an important issue, the key to which is improved public access to quality information. We believe that it is important to use long term, objective contexts to communicate key perspectives on future best practice scenarios relevant to citizens, such as environmentally responsible waste disposal, the mitigation of natural hazards and the remediation of pollution, contamination and degradation of soils, land water, the coastal zone and the marine environment.

CONDITIONS FOR ACTION

1. Lines and means of action

We would be interested to contribute a European view based on EuroGeoSurveys experience, which extends backward in time for 120 years, to benchmarking exercises on 'situations and efforts' and the research issues to be tackled at European level in the Sixth Framework Programme.

2. Need for a broad-based debate and

3. Next stages

We support the idea of organising a broad based debate on the analyses and issues set out in the document and will be willing to contribute to an electronic forum, particularly if this contributes to the formulation of the EU Sixth Framework Programme. We maintain contacts with the Commission, Parliament, European Environment Agency and other EU bodies and our individual members contribute to Council work through their own national programmes.

References:

- 1) GEIXS-ESPRIT project: A geological electronic information exchange system. 1997- 1999.
- 2) European Commission Communication. 'Services of general interest in Europe.' 26.09.1996.

- 3) James, Kemper and Pascal, 1999. 'A European Food and Public Health Authority: on the future of scientific advice in the EU.' DG SANCO paper, 8.12.1999.
- 4) European Commission DG XIII, 1998. Green Paper: 'Public sector information: a key resource for Europe.' COM(1998)585.

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ANNEX A

EuroGeoSurveys: “Earth Science in the Service of Europe for sustainable development”

EuroGeoSurveys is the dynamic consortium that involves seventeen of western Europe’s national geological survey organisations (GSOs) – the fifteen EU Member States, Iceland and Norway. Within each member country and through the principle of subsidiarity, each partner GSO provides for its own community’s needs for geoscientific information and advice, addressing such issues as sustainable land and resource utilisation and natural geohazard mitigation, thus contributing to the policy agenda of the Council of Ministers.

EuroGeoSurveys is committed to acting as a unified neutral body of opinion, adding value by addressing these same needs in a pan-European dimension as a pre-competent, “virtual institute”* which represents no business interests and can thus act as a true “service of general interest” in Europe. EuroGeoSurveys can cooperate with the European Environment Agency, EUROSTAT, and networks of mapping institutes (e.g. MEGRIN) to provide optimum support for specific policy formulation by the European Parliament and European Commission and their agencies through its contacts with the different spheres of responsibility and expertise within the Community.

EuroGeoSurveys recognises that the European Communities face major challenges in relation to: information and knowledge transfer; sustainable land use planning; energy and resource demand; natural geohazards (including earthquakes); clean water, urbanisation, pollution and waste management; quality of the coastal and marine environment; land instability; impacts of climate change; and effective international cooperation in the Developing World, PHARE and TACIS programmes. The partner organisations of EuroGeoSurveys are therefore establishing a new network of “policy sectors” in which geoscience plays a significant role for sustainable development. This new structure will ensure that the European Commission and Parliament and supporting European institutions receive prompt, expert advice and reliable services that directly address these transnational challenges.

In order to meet the major challenges the new EuroGeoSurveys network will involve eleven policy sector teams, each consisting of a group of experts drawn from across the more than 6000 geoscientists and technical support staff within the EuroGeoSurveys partnership. The policy sector teams will address the following areas:

- Information technology and communication of geodata
- Soils and land use planning
- Groundwater resources
- Mineral resources
- Natural geohazards
- Earth energy resources
- Urban development
- Coastal and marine geoenvironments
- Geological aspects of climate change
- Research, innovation and technology foresight in geoscience
- International cooperation

Multi-sector teams can and will be assembled to meet other specific needs that arise in future. The policy sector teams identified above will be available for direct consultation and advice, and will develop EuroGeoSurveys-wide Opinions and advisory services.

The basic resource of EuroGeoSurveys is up to date information derived from its members’ activities and this information needs a fluid, transnational means of exchange to be of use. In 1999 EuroGeoSurveys delivered a sustainable EU-wide Internet system (named GEIXS) for the public exchange of geoscience information

between all sectors. GEIXS involves sixteen Surveys and was developed with EU ESPRIT funds as a specific response to a 1993 Council requirement for “improving access to, and updating of, information, both on geological and mining data ... and by increased cooperation between Member States’ geological departments, and the use of their knowledge by the Commission.” GEIXS activities now extend to eight additional Central and Eastern European countries and provide a long-needed standard system for the exchange of public-domain information to support environmental or earth resource policy and research. GEIXS is complimented by a second EuroGeoSurveys electronic network (named EUMARSIN) which from 2001 will enable all sectors to access public-domain European seafloor sediment information.

EuroGeoSurveys is adding value to European Union policy-making by working as a “service of general interest” which can provide information of guaranteed quality to cover the whole European landmass, thus supporting major policy initiatives such as the European Spatial Development Perspective (ESDP) and the extension of proven resource and environmental information and methods which will benefit the new candidate countries and the Developing World.

EuroGeoSurveys intends to contribute Opinions on the planning of the Sixth RTD Framework Programme and other future EU programmes. It is contributing to actions in the Urban Agenda; the safe disposal of carbon dioxide and radioactive wastes; environmentally responsible recycling of mine-site waste; the monitoring of groundwater and natural geohazards; the role of geology in sustainable city planning and the prediction of future climatic change

* As defined in Objective 7.2, 3.4 Support for Research Infrastructures, in Activity 1, Theme 3 “Competitive and Sustainable Growth” of the EU RTD Fifth Framework Programme.

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Annex B

Towards a European Research Area (COM(2000)6 of 18.01.2000).

Answers to the 5 questions

by EuroGeoSurveys

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Question 1: Are the national public research efforts too compartmentalised between Member States.....?

Multinational research programming in Europe is still in its infancy. Research programming is still based on the national frameworks, often as a result of limited overview in the definition research topics, or the lack of synergy between different topics.

In the late 20th century, parallel research investments have often been made in many of the member countries of the EU. However keeping this infrastructure operational has proven to be a costly experiment.

At the same time, in some EU countries research projects were seen as a scheme for reducing unemployment (e.g. for young post-doctoral staff or laboratory technicians) in the lesser developed regions within countries. A transnational policy of investment is needed to remedy this situation and should be based on the following principles:

- Basic infrastructure is needed at a national scale to provide 'breeding grounds' for young researchers, especially in the field of basic research;
- The more sophisticated research infrastructures should be planned and organised through the EU in centres of excellence where the cost involved will need support from the European Union;
- Good planning will provide opportunities for nationals to work in these centres based on a balance of national quotas and excellence in research;
- The centres of excellence should be managed by experienced research managers contracted competitively by the EU;
- Communication between the EU centres of excellence and national research institutes should be organised openly and facilitated by modern networking techniques;
- Communication between the different centres of excellence will help to build bridges between different scientific disciplines.

Question 2: Why do European firms spend so much less on R&D than US firms? What can public authorities do to stimulate private R&D investments?

a) The European economy has been concentrated for decades around 'classical' and heavy industries requiring much manpower: steel, manufacturing, agriculture, etc. At the same time, progress in science was rather slow and needed only small amounts of research to stay in the front line. This attitude has resulted in an atmosphere of tradition which is not conducive to the generation of modern, innovative research. However the development of global competition and global markets now forces the industry to spend more money: the transition, however, is a slow process which is further retarded because it also costs money.

b) The gap between industry and research must be reduced by creating centres of excellence combining both basic and applied (issue-driven) research. These centres could form nuclei for industrial involvement and the attainment of a critical mass which could give rise to innovative products.

Industries operate typically with short term research cycles (low risk, problem solving with a typical turn around time of 2 to 3 years) and a smaller requirement for long term research projects (innovative, high risk). In order to keep centres of excellence for basic research abreast of these changes in interest, public funding of these centres could help a lot. Additionally researchers should be encouraged to move between public research centres and industrial research for a fast transfer of results and methodology.

In order for the industry to gain confidence in publicly funded research, results should be made easily and quickly available, even to industries based outside the EU.

Present-day technology develops so quickly that a scientific lead over the opposition can be maintained for only a short period of time. It is therefore important to avoid any delays in bringing research to the market.

One additional stimulus governments always can and should give to successful industrial research is a tax concession. This will help to increase the percentage of industrial research which, with the creation of additional GDP will give near future paybacks.

Question 3: The communication on a European Research Area highlights the lack of mobility for researchers in Europe....

Mobility across the EU is still difficult for researchers. National authorities still invest first and foremost in their own human resources, rather than in exchanges of ideas. There is no such thing as a recognised European career scheme and research careers are built only at national level.

Other limiting factors are the variation in the standard of comparable degrees obtained in different universities across the EU and the uneven social conditions involved in moving researchers' families between EU member states.

Data pools in Europe are not standardised and this can hamper the mobility of researchers if they need a long familiarisation period to get used to new data formats. Data standardisation throughout Europe is a must. It will enhance mobility, facilitate cross-border cooperation and generate new applications, thus accelerating research.

Question 4: How can we measure success in R&D. What are indicators of a successful R&D policy?

It is difficult to measure success in R&D but the following indicators are useful guides:

- The number of R&D products taken up and registered with patents;
- Industrial research can easily be evaluated by the commercial success of the company and the aim of such research will always be improving the company's financial situation;
- In fundamental and applied fields of research the best indicator of success is the ability of a research institution to attract distinguished researchers from other countries.

If we apply these criteria the JRC it is likely that the lack of mobility of researchers is not so much a problem of nationality or bureaucratic problems but of a lack of institutional success. Most of the EU research centres are less attractive to researchers than national institutions. Why make the effort to learn a new language and adapt to a new culture if no personal profit is to be gained from the exercise? Only if working at one of these centres results in an additional qualification for a researcher will their attractiveness grow.

Question 5: Should public R&D be concentrated on areas which the private sector will not cover,.....

Public research should be focused on the objective generation of knowledge, while industrial development should be aimed at the application of research to new products. Jobs will automatically follow if research and development are carried out successfully.

There is no doubt that clear, openly available results are the only acceptable product of any type of publicly funded research. This is especially important in the field of fundamental research, where success or failure will only be detected in the long term. In the more issue-oriented research success can easily be seen in the commercial success of the company.

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