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Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)

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30.12.2006 EN Official Journal of the European Union L 412/1

DECISION No 1982/2006/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 18 December 2006

concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 166(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Economic and Social Committee ([1]),

Having regard to the Opinion of the Committee of the Regions ([2]),

Acting in accordance with the procedure laid down in Article 251 of the Treaty ([3]),

Whereas:

(1) The Community has the objective, set out in the Treaty, of strengthening the scientific and technological bases of Community industry, thereby ensuring a high level of competitiveness at international level. To this end, the Community is to promote all the research activities deemed necessary, in particular by encouraging undertakings, including small and medium-sized enterprises (‘SMEs’), research centres and universities in their research and technological development activities. In this context, priority should be given to those areas and projects where European funding and cooperation is of particular importance and provides added value. Through its support for research at the frontiers of knowledge, applied research and innovation, the Community seeks to promote synergies in European research and thus provide a more stable foundation for the European Research Area. This will make a positive contribution to the social, cultural and economic progress of all Member States.

(2) The central role of research was recognised by the Lisbon European Council of 23-24 March 2000 which set the European Union a new strategic goal for the next decade: to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. The triangle of knowledge — education, research and innovation — is essential for achieving this goal, to which effect the Community aims to mobilise and strengthen the necessary research and innovation capacities. The Seventh Framework Programme is a central Community instrument in this respect, complementing the efforts of Member States and European industry.

(3) In line with the Lisbon strategy, the Barcelona European Council of 15-16 March 2002 agreed that overall spending on research and development ('RTD') and innovation in the Union should be increased with the aim of approaching 3 % of GDP by 2010, two-thirds of which should come from the private sector.

(4) The overriding aim of the Seventh Framework Programme is to contribute to the Union becoming the world's leading research area. This requires the Framework Programme to be strongly focused on promoting and investing in world-class state-of-the-art research, based primarily upon the principle of excellence in research.

(5) The European Parliament has repeatedly stressed the importance of research, technological development and the increased role of knowledge for economic growth and social and environmental well-being, in particular in its resolution of 10 March 2005 on science and technology — Guidelines for future European Union policy to support research ([4]).

(6) Taking into account the research needs of all Community policies and building upon widespread support from European industry, the scientific community, universities, and other interested circles, the Community should establish the scientific and technological objectives to be achieved under its Seventh Framework Programme in the period from 2007 to 2013.

(7) European Technology Platforms (ETPs) and the envisaged Joint Technology Initiatives (JTIs) are particularly relevant for industrial research. In this context, SMEs should be actively involved in their operation. ETPs help the stakeholders establish long-term strategic research agendas and can further evolve to represent an important mechanism for fostering European competitiveness.

(8) The objectives of the Seventh Framework Programme should be chosen with a view to building upon the achievements of the Sixth Framework Programme towards the creation of the European Research Area and carrying them further towards the development of a knowledge-based economy and society in Europe which will meet the goals of the Lisbon strategy in Community policies. Among the objectives of the Seventh Framework Programme the following are particularly important:

— trans-national cooperation at every scale across the EU should be supported,

— the dynamism, creativity and excellence of European research at the frontier of knowledge should be enhanced, recognising the responsibility and independence of scientists in the definition of broad lines of research in this area. With this in mind, investigator-driven basic research based on excellence should play an essential role within the Seventh Framework Programme,

— human potential in research and technology in Europe should be strengthened, both quantitatively and qualitatively; better education and research training, easier access to research opportunities as well as the recognition of the 'profession' of researcher are principal tools for achieving this goal, not least through a significant increase in the presence of women in research, encouraging researchers' mobility and career development. The general principles reflected in the European Charter for Researchers and in the Code of Conduct for the Recruitment of Researchers could help to establish a genuine European labour market for researchers, while respecting their voluntary nature. In addition, the excellence of European research institutions and universities should be developed and enhanced.

(9) In addition, the dialogue between science and society in Europe should be intensified in order to develop a science and research agenda that meets citizens' concerns, including by fostering critical reflection, and is aimed at reinforcing public confidence in science.

(10) Special attention should be paid to facilitating the scientific career of researchers in the most productive period of life. Early-stage researchers can be a driving force of science in Europe.

(11) The research and innovation capacities throughout Europe should be strengthened, both quantitatively and qualitatively.

(12) A wide use and dissemination of the knowledge generated by publicly funded research activity should be supported.

(13) In order to realise these objectives it is necessary to promote four types of activities: trans-national cooperation on policy-defined themes (the 'Cooperation' programme), investigator-driven research based on the initiative of the research community (the 'Ideas' programme), support for individual researchers (the 'People' programme), and support for research capacities (the 'Capacities' programme).

(14) Under the 'Cooperation' programme, support should be provided for trans-national cooperation at an appropriate scale across the Union and beyond, in a number of thematic areas corresponding to major fields of the progress of knowledge and technology, where research should be supported and strengthened to address European social, economic, environmental, public health and industrial challenges, serve the public good and support developing countries. Where possible, this programme will allow flexibility for mission-orientated schemes which cut across the thematic priorities.

(15) Under the 'Ideas' programme, activities should be implemented by a European Research Council ('ERC'), which should enjoy a high degree of autonomy to develop very high-level frontier research at European level, building on excellence in Europe and raising its profile at international level. The ERC should maintain regular contact with the scientific community and European Institutions. As regards the ERC structures, the mid-term review of the Seventh Framework Programme may show the need for further improvements necessitating appropriate amendments.

(16) Under the 'People' programme, individuals should be stimulated to enter into the profession of researcher, European researchers should be encouraged to stay in Europe, researchers from the entire world should be attracted to Europe and Europe should be made more attractive to the best researchers. Building on the positive experiences with the 'Marie Curie Actions' under previous Framework Programmes, the 'People' programme should encourage individuals to enter the profession of researcher; structure the research training offer and options; encourage European researchers to stay in, or return to, Europe; encourage intersectoral mobility, and attract researchers from all over the world to Europe. The mobility of researchers is key not only to the career development of researchers but also to the sharing and transfer of knowledge between countries and sectors and to ensuring that innovative frontier research in various disciplines benefits from dedicated and competent researchers, as well as increased financial resources.

(17) Under the ‘Capacities’ programme, the use and development of research infrastructures should be optimised; innovative capacities of SMEs and their ability to benefit from research should be strengthened; the development of regional research-driven clusters should be supported; the research potential in the Union's convergence and outermost regions should be unlocked; science and society should be brought closer together in European society; support should be given to the coherent development of research policies at national and Community level and horizontal actions and measures in support of international cooperation should be undertaken.

(18) The Joint Research Centre (JRC) should contribute to providing customer-driven scientific and technological support for the conception, development, implementation and monitoring of Community policies. In this regard, it is useful that the JRC continues to function as an independent reference centre for science and technology in the Union in the areas of its specific competence.

(19) The regions have an important part to play in implementing the European Research Area. Unlocking the development potential of regions and wide dissemination of the results of research and technological development help to bridge the technological divide and contribute to European competitiveness.

(20) The Seventh Framework Programme complements the activities carried out in the Member States as well as other Community actions that are necessary for the overall strategic effort to achieve the Lisbon goals, alongside in particular those under the structural funds and those relating to agriculture, fisheries, education, training, competitiveness and innovation, industry, employment and environment.

(21) Mutual synergies and complementarity should be assured with Community policies and programmes, while also addressing the need for a strengthened and simplified approach to research funding, which is particularly important for SMEs.

(22) The Seventh Framework Programme should aim, in particular, to secure the appropriate involvement of SMEs through concrete measures and specific actions for their benefit. Innovation and SME-related activities supported under this Framework Programme should be complementary to those undertaken under the Competitiveness and Innovation Framework Programme.

(23) Participation in the activities of the Seventh Framework Programme should be facilitated through the publication of all relevant information, to be made available in a timely and user-friendly manner to all potential participants and the appropriate use of simple and quick procedures, free of unduly complex financial conditions and unnecessary reporting, in accordance with the Rules for Participation applicable to this Framework Programme, laid down in Regulation (EC) No 1906/2006 of the European Parliament and of the Council of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013) ([5]).

(24) Taking into account the mid-term review of the use of new instruments under the Sixth Framework Programme and the Five Year Assessment of the Framework Programme, a new approach has been defined which should allow the political objectives of Community research policy to be reached more easily, more efficiently and in a more flexible way. To this end, a smaller set of simpler ‘funding schemes’ should be used, alone or in combination, with more flexibility and freedom, to support the different actions, and stronger management autonomy should be granted to participants.

(25) Given the broad interest in the Framework Programme actions, the leverage effect of funding in national and private investments, the need to enable the Community to meet new scientific and technological challenges and to make full use of its researchers' potential without discrimination, the vital role the Community intervention plays in making the European research system more efficient and effective, and the possible contribution of the Framework Programme to the efforts towards, inter alia, finding solutions to climate change and sustainability, the health of Europe's population and the reinvigoration of the Lisbon strategy, there is a need for Community research activities.

(26) Implementation of the Seventh Framework Programme may give rise to supplementary programmes involving the participation of certain Member States only, the participation of the Community in programmes undertaken by several Member States, or the setting up of joint undertakings or other arrangements within the meaning of Articles 168, 169 and 171 of the Treaty.

(27) The Community has concluded a number of international agreements in the field of research and efforts should be made to strengthen international research cooperation with a view to reaping the full benefits of internationalisation of RTD, to contributing to the production of global public goods and to further integrating the Community into the world-wide research community.

(28) There is already a significant body of scientific knowledge capable of drastically improving the lives of those who live in developing countries; where possible, the Framework Programme will — in the framework of the activities described above — contribute to meeting the Millennium Development Goals by 2010.

(29) The Seventh Framework Programme should contribute towards promoting growth, sustainable development and environmental protection, including by addressing the problem of climate change.

(30) Research activities supported by the Seventh Framework Programme should respect fundamental ethical principles, including those reflected in the Charter of Fundamental Rights of the European Union. The opinions of the European Group on Ethics in Science and New Technologies are and will be taken into account. Research activities should also take into account the Protocol on the Protection and Welfare of Animals and reduce the use of animals in research and testing, with a view ultimately to replacing animal use.

(31) Under the Seventh Framework Programme the role of women in science and research will be actively promoted by appropriate measures with a view to encouraging greater numbers to become involved in this domain and further enhancing their active role in research.

(32) This Decision lays down, for the entire duration of the Seventh Framework Programme, a financial envelope constituting the prime reference, within the meaning of point 37 of the Interinstitutional Agreement of 17 May 2006 between the European Parliament, the Council and the Commission on budgetary discipline and sound financial management (6), for the budgetary authority during the annual budgetary procedure.

(33) Appropriate measures — proportionate to the European Communities' financial interests — should also be taken to monitor both the effectiveness of the financial support granted and the effectiveness of the utilisation of these funds in order to prevent irregularities and fraud, and the necessary steps should be taken to recover funds lost, wrongly paid or incorrectly used in accordance with Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests ([7]), Council Regulation (Euratom, EC) No 2185/96 of 11 November 1996 concerning on-the-spot checks and inspections carried out by the Commission in order to protect the European Communities' financial interests against fraud and other irregularities ([8]) and Regulation (EC) No 1073/1999 of the European Parliament and of the Council of 25 May 1999 concerning investigations conducted by the European Anti-Fraud Office (OLAF) ([9]).

(34) It is important to ensure sound financial management of the Seventh Framework Programme and its implementation in the most effective and user-friendly manner possible, while also ensuring legal certainty and the accessibility of the programme to all participants. It is necessary to ensure compliance with Council Regulation (EC, Euratom) No 1605/2002 of 25 June 2002 on the Financial Regulation applicable to the general budget of the European Communities ([10]), and with the requirements of simplification and better regulation.

(35) Since the objective of the actions to be taken in accordance with Article 163 of the Treaty, namely contributing towards the creation of a knowledge-based society and economy in Europe, cannot be sufficiently achieved by the Member States and can therefore be better achieved at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, the Seventh Framework Programme does not go beyond what is necessary in order to achieve this objective,

HAVE DECIDED AS FOLLOWS:

Article 1

Adoption of the Seventh Framework Programme

The Framework Programme for Community activities in the area of research and technological development (‘RTD’), including demonstration activities (‘the Seventh Framework Programme’) is hereby adopted for the period from 1 January 2007 to 31 December 2013.

Article 2

Objectives and activities

1. The Seventh Framework Programme shall support the activities set out in points (i) to (iv). The objectives and the broad lines of those activities are set out in Annex I.

(i) Cooperation: supporting the whole range of research actions carried out in trans-national cooperation in the following thematic areas:

(a) Health;

(b) Food, Agriculture and Fisheries, and Biotechnology;

(c) Information and Communication Technologies;

(d) Nano-sciences, Nano-technologies, Materials and New Production Technologies;

(e) Energy;

(f) Environment (including Climate Change);

(g) Transport (including Aeronautics);

(h) Socio-economic Sciences and Humanities;

(i) Space;

(j) Security.

(ii) Ideas: supporting 'investigator-driven' research carried out across all fields by individual national or transnational teams in competition at the European level.

(iii) People: strengthening, quantitatively and qualitatively, the human potential in research and technological development in Europe, as well as encouraging mobility.

(iv) Capacities: supporting key aspects of European research and innovation capacities such as research infrastructures; regional research driven clusters; the development of a full research potential in the Community's convergence and outermost regions; research for the benefit of small and medium-sized enterprises ('SMEs') ([11]); 'Science in Society' issues; support to coherent development of policies; horizontal activities of international cooperation.

2. The Seventh Framework Programme shall also support the non-nuclear direct scientific and technical actions carried out by the Joint Research Centre ('JRC') as defined in Annex I.

Article 3

Specific programmes

The Seventh Framework Programme shall be implemented through specific programmes. These programmes shall specify precise objectives and the detailed rules for implementation.

Article 4

Maximum overall amount and shares assigned to each programme

1. The maximum overall amount for Community financial participation in this Seventh Framework Programme shall be EUR 50 521 million. That amount shall be distributed among the activities and actions referred to in paragraphs 1 and 2 of Article 2 as follows (in EUR million):

Cooperation	32 413
Ideas	7 510
People	4 750
Capacities	4 097
Non-nuclear actions of the Joint Research Centre	1 751

2. The indicative breakdown among the thematic areas of each activity referred to in paragraph 1 is set out in Annex II.

3. The detailed rules for Community financial participation in this Framework Programme are set out in Annex III.

Article 5

Protection of the Communities' financial interests

For the Community actions financed under this Decision, Regulation (EC, Euratom) No 2988/95 and Regulation (Euratom, EC) No 2185/96 shall apply to any infringement of a provision of Community law, including infringements of a contractual obligation stipulated on the basis of the programme, resulting from an act or omission by an economic operator, which has, or would have, the effect of prejudicing the general budget of the European Union or budgets managed by it, by an unjustified item of expenditure.

Article 6

Ethical principles

1. All the research activities carried out under the Seventh Framework Programme shall be carried out in compliance with fundamental ethical principles.

2. The following fields of research shall not be financed under this Framework Programme:

— research activity aiming at human cloning for reproductive purposes,

— research activity intended to modify the genetic heritage of human beings which could make such changes heritable ([12]),

— research activities intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

3. Research on human stem cells, both adult and embryonic, may be financed, depending both on the contents of the scientific proposal and the legal framework of the Member State(s) involved.

Any application for financing for research on human embryonic stem cells shall include, as appropriate, details of licensing and control measures that will be taken by the competent authorities of the Member States as well as

details of the ethical approval(s) that will be provided.

As regards the derivation of human embryonic stem cells, institutions, organisations and researchers shall be subject to strict licensing and control in accordance with the legal framework of the Member State(s) involved.

4. The fields of research set out above shall be reviewed for the second phase of this programme (2010-2013) in the light of scientific advances.

Article 7

Monitoring, evaluation and review

1. The Commission shall continually and systematically monitor the implementation of the Seventh Framework Programme and its specific programmes and regularly report and disseminate the results of this monitoring.

2. No later than 2010, the Commission shall carry out, with the assistance of external experts, an evidence-based interim evaluation of this Framework Programme and its specific programmes building upon the ex-post evaluation of the Sixth Framework Programme. This evaluation shall cover the quality of the research activities under way, as well as the quality of implementation and management, and progress towards the objectives set.

The Commission shall communicate the conclusions thereof, accompanied by its observations and, where appropriate, proposals for the adaptation of this Framework Programme, to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

The interim evaluation shall be preceded by a progress report as soon as enough data becomes available, giving initial findings on the effectiveness of the new actions initiated under the Seventh Framework Programme and of the efforts made with regard to simplification.

3. Two years following the completion of this Framework Programme, the Commission shall carry out an external evaluation by independent experts of its rationale, implementation and achievements.

The Commission shall communicate the conclusions thereof, accompanied by its observations, to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

Article 8

Entry into force

This Decision shall enter into force on the third day following its publication in the *Official Journal of the European Union*.

Done at Brussels, 18 December 2006.

For the European Parliament

The President

J. BORREL FONTELLES

For the Council

The President

M. VANHANEN

([1]) OJ C 65, 17.3.2006, p. 9.

([2]) OJ C 115, 16.5.2006, p. 20.

([3]) Opinion of the European Parliament of 15 June 2006 (not yet published in the Official Journal), Council Common Position of 25 September 2006 (not yet published in the Official Journal) and Position of the European Parliament of 30 November 2006 (not yet published in the Official Journal). Council Decision of 18 December 2006.

([4]) OJ C 320 E, 15.12.2005, p. 259.

([5]) See page 1 of this OJ.

([6]) OJ C 139, 14.6.2006, p. 1.

([7]) OJ L 312, 23.12.1995, p. 1.

([8]) OJ L 292, 15.11.1996, p. 2.

([9]) OJ L 136, 31.5.1999, p. 1.

([10]) OJ L 248, 16.9.2002, p. 1.

([11]) Throughout the Seventh Framework Programme, 'SMEs' are understood to include microenterprises.

([12]) Research relating to cancer treatment of the gonads can be financed.

ANNEX I

SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES, BROAD LINES OF THE THEMES AND ACTIVITIES

The Seventh Framework Programme will be carried out to pursue the general objectives described in Article 163 of the Treaty, to strengthen industrial competitiveness and to meet the research needs of other Community policies, thereby contributing to the creation of a knowledge-based society, building on a European Research Area and complementing activities at a national and regional level. It will promote excellence in scientific and technological research, development and demonstration through the following four programmes: cooperation, ideas, people and capacities.

I. COOPERATION

In this part of the Seventh Framework Programme, support will be provided to transnational cooperation in different forms across the Union and beyond, in a number of thematic areas corresponding to major fields of knowledge and technology, where the highest quality research must be supported and strengthened to address European social, economic, environmental and industrial challenges. The bulk of this effort will be directed towards improving industrial competitiveness, with a research agenda that reflects the needs of users throughout Europe.

The overarching aim is to contribute to sustainable development.

The ten themes determined for Community action are the following:

1) Health;

2) Food, Agriculture and Fisheries, and Biotechnology;

3) Information and Communication Technologies;

4) Nano-sciences, Nano-technologies, Materials and new Production Technologies;

5) Energy;

6) Environment (including Climate Change);

7) Transport (including Aeronautics);

8) Socio-economic Sciences and the Humanities;

9) Space;

10) Security.

These themes are broadly defined at relatively high level, such that they can adapt to evolving needs and opportunities that may arise during the lifetime of the Seventh Framework Programme. For each of them, a series of activities has been identified which indicates the broad lines envisaged for Community support. These activities have been identified on the basis of their contribution to Community objectives, including the transition to a knowledge-based society, the relevant European research potential and the added value of Community level intervention for these subjects.

Special attention will be paid to ensuring there is effective coordination between the thematic areas and to priority scientific areas which cut across themes, such as forestry research, cultural heritage, marine sciences and technologies.

Multidisciplinarity will be encouraged by joint cross-thematic approaches to research and technology subjects relevant to more than one theme, with joint calls being an important inter-thematic form of cooperation.

In the case of subjects of industrial relevance in particular, the topics have been identified relying, among other sources, on the work of different 'European Technology Platforms' set up in fields where Eur^{o}pe's competitiveness, economic growth and welfare depend on important research and technological progress in the medium to long term. European Technology Platforms bring together stakeholders, under industrial leadership, to define and implement a Strategic Research Agenda. This Framework Programme will contribute to the realisation of these Strategic Research Agendas where these present true European added value. European Technology Platforms, with the possible participation of regional research driven clusters, can play a role in facilitating and organising the participation of industry, including SMEs, in research projects relating to their specific field, including projects eligible for funding under the Framework Programme.

The ten themes also include research needed to underpin the formulation, implementation and assessment of Community policies, in areas such as health, safety, consumer protection, energy, the environment, development aid, fisheries, maritime affairs, agriculture, animal welfare, transport, education and training, employment, social affairs, cohesion, and the creation of an Area of Freedom, Security and Justice, along with pre-normative and co-normative research relevant to improving interoperability and the quality of standards and their implementation, thereby also enhancing European competitiveness. Special attention will be devoted to the coordination of aspects linked to rational and efficient use of energy within the Framework Programme and coordination with other Community policies and programmes.

Under each theme, beside these activities, two types of opportunities will be addressed in an open and flexible way:

— Future and Emerging Technologies: to support research aiming at identifying or further exploring new scientific and technological opportunities in a given field and/or in their combination with other relevant areas and disciplines through specific support for spontaneous research proposals, including by joint calls; to nurture novel ideas and radically new uses and to explore new options in research roadmaps, in particular those with a potential for significant breakthroughs; adequate coordination with the activities carried out under the Ideas programme will be guaranteed in order to avoid overlap and ensure an optimum use of funding.

— Unforeseen policy needs: to respond in a flexible way to new policy needs that arise during the course of the Framework Programme, such as unforeseen developments or events requiring a quick reaction, for example, the new epidemics, emerging concerns in food safety or natural disaster response.

The dissemination and transfer of knowledge is a key added value of European research actions, and measures will be taken to increase the use of results by industry, policy makers and society. Intellectual property rights must also be safeguarded, including in the context of support to combat counterfeiting. Dissemination will be considered an integral task under all thematic areas, with appropriate restrictions for the security theme due to the confidentiality aspects of the activities, including through the funding of networking initiatives, seminars and events, assistance by external experts and information and electronic services in particular CORDIS.

Complementarity and synergy between this programme and other Community programmes will be ensured. Actions to support innovation will be taken under the Competitiveness and Innovation Framework Programme.

Particular attention should be paid to ensuring the adequate participation of SMEs ([1]), in particular knowledge-intensive SME in transnational cooperation. Concrete measures, including support actions to facilitate SME participation, will be taken throughout the 'Cooperation' part of the programme in the framework of a strategy to be developed under each theme. These strategies will be accompanied by quantitative and qualitative monitoring against the objectives set. The aim will be to enable at least 15 % of the funding available under the 'Cooperation' part of the programme to go to SMEs.

Support will also be provided to initiatives aimed at engaging the broadest possible public beyond the research community in the debate on scientific issues and research results, and to initiatives in the field of scientific communication and education, including the involvement, where appropriate, of civil society organisations or networks of such organisations. The integration of the gender dimension and gender equality will be addressed in all areas of research.

Raising the competitiveness of European research requires that the potential across the whole European Research Area is fully unlocked. Projects, aiming at providing scientific excellence, should be managed optimally with particular regard to the use of resources.

Across all these themes, support for trans-national cooperation will be implemented through:

— Collaborative research,

— Joint Technology Initiatives,

— Coordination of non-Community research programmes,

— International cooperation.

Collaborative Research

Collaborative research will constitute the bulk and the core of Community research funding. The objective is to establish, in the major fields of advancement of knowledge, excellent research projects and networks able to attract researchers and investments from Europe and the entire world.

This will be achieved by supporting collaborative research through a range of funding schemes: collaborative projects, networks of excellence, coordination/support actions (see Annex III).

Joint Technology Initiatives

In a very limited number of cases, the scope of an RTD objective and the scale of the resources involved could justify setting up long term public private partnerships in the form of Joint Technology Initiatives. These

initiatives, mainly resulting from the work of European Technology Platforms and covering one or a small number of selected aspects of research in their field, will combine private sector investment and national and European public funding, including grant funding from the Seventh Framework Programme and loan and guarantee finance from the European Investment Bank. Each Joint Technology Initiative will be decided upon individually, either on the basis of Article 171 of the Treaty (this may include the creation of a joint undertaking) or on the basis of Specific Programme Decisions in accordance with Article 166(3) of the Treaty.

Potential Joint Technology Initiatives will be identified in an open and transparent way on the basis of an evaluation using a series of criteria:

— inability of existing instruments to achieve the objective,

— scale of the impact on industrial competitiveness and growth,

— added value of European-level intervention,

— the degree and clarity of definition of the objective and deliverables to be pursued,

— strength of the financial and resource commitment from industry,

— importance of the contribution to broader policy objectives including benefit to society,

— capacity to attract additional national support and leverage current and future industry funding.

The nature of the Joint Technology Initiatives must be clearly defined, in particular with regard to matters concerning:

— financial commitments,

— duration of the commitment of the participants,

— rules for entering and exiting the contract,

— intellectual property rights.

Considering the particular scope and complexity of the Joint Technology Initiatives, strong efforts will be made to ensure their transparent operation and to ensure that any allocation of Community funding by the Joint Technology Initiatives takes place on the basis of the Framework Programme principles of excellence and competition.

Particular attention will be paid to the overall coherence and coordination between Joint Technology Initiatives and programmes and projects in the same fields ([2]), while respecting their existing implementation procedures, as well as to ensuring that participation in their projects is open to a wide range of participants throughout Europe, in particular SMEs.

Coordination of Non-Community Research Programmes

The action undertaken in this field will make use of two main tools: the ERA-NET scheme and the participation of the Community in jointly implemented national research programmes (under Article 169 of the Treaty). The

action may cover subjects not directly linked to the ten themes in so far as they have sufficient European added value. The action will also be used to enhance the complementarity and synergy between the Seventh Framework Programme and activities carried out in the framework of intergovernmental structures such as EUREKA and COST ([3]).

The ERA-NET scheme will develop and strengthen the coordination of national and regional research activities by:

— providing a framework for actors implementing public research programmes to step up the coordination of their activities. This will include support for new ERA-NETs as well as for the broadening and deepening of the scope of existing ERA-NETs, e.g. by extending their partnership, as well as mutually opening their programmes. Where appropriate, ERA-NETs could be used for programme coordination between European regions and Member States to enable their cooperation with large-scale initiatives,

— in a limited number of cases, providing additional Community financial support to those participants that pool resources for the purpose of joint calls for proposals between their respective national and regional programmes (‘ERA-NET PLUS’).

The participation of the Community in research programmes jointly implemented on the basis of Article 169 of the Treaty is especially relevant to European cooperation on a large scale in ‘variable geometry’ between Member States sharing common needs and/or interests. In well-identified cases such Article 169 initiatives could be launched in areas to be identified in close association with the Member States, including the possible cooperation with intergovernmental programmes, on the basis of a series of criteria:

— relevance to Community objectives,

— the clear definition of the objective to be pursued and its relevance to the objectives of this Framework Programme,

— presence of a pre-existing basis (existing or envisaged research programmes),

— European added value,

— critical mass, with regard to the size and the number of programmes involved and the similarity of activities they cover,

— efficiency of Article 169 as the most appropriate means for achieving the objectives.

International Cooperation

International cooperation actions, showing European added value and being of mutual interest, under this part of the Seventh Framework Programme will be:

— actions designed to enhance participation of researchers and research institutions from third countries in the thematic areas, with appropriate restrictions for the security theme due to the confidentiality aspects, accompanied by strong efforts to encourage them to seize this opportunity.

— Specific cooperation actions in each thematic area dedicated to third countries where there is mutual interest in co-operating on particular topics selected on the basis of the scientific and technological level and needs of the countries concerned. Closely associated with the bilateral cooperation agreements or multilateral dialogues between the EU and these countries or groups of countries, these actions will serve as privileged tools for implementing the cooperation between the EU and these countries. Such actions are, in particular, actions aiming at reinforcing the research capacities of candidate countries as well as neighbourhood countries and cooperative activities targeted at developing and emerging countries, focusing on their particular needs in fields such as health, including research into neglected diseases, agriculture, fisheries and environment, and implemented in financial conditions adapted to their capacities.

This part of the Framework Programme covers the international cooperation actions in each thematic area and across themes. Such actions will be implemented in coordination with those under the 'People' and the 'Capacities' programmes. An overall strategy for international cooperation within the Seventh Framework Programme will underpin this activity.

THEMES

1. Health

Objective

Improving the health of European citizens and increasing the competitiveness and boosting the innovative capacity of European health-related industries and businesses, while addressing global health issues including emerging epidemics. Emphasis will be put on translational research (translation of basic discoveries into clinical applications including scientific validation of experimental results), the development and validation of new therapies, methods for health promotion and prevention, including promotion of child health, healthy ageing, diagnostic tools and medical technologies, as well as sustainable and efficient healthcare systems.

Rationale

The sequencing of the human genome and the recent advances in post-genomics have revolutionised research into human health and diseases. Integrating the vast amounts of data, understanding underlying biological processes and developing key technologies for health-related bio-industries requires the bringing together of critical masses of various expertise and resources that are not available at a national level, with a view to developing knowledge and capacity for intervention.

Significant advances in translational health research, which is essential to ensure that biomedical research provides practical benefits and improves life quality, also require multidisciplinary and pan-European approaches involving different stakeholders. Such approaches allow Europe to contribute more effectively to international efforts to combat diseases of global importance.

Clinical research on many diseases (e.g. cancer, cardiovascular and infectious diseases, mental and neurological diseases, in particular those linked with ageing, such as Alzheimer and Parkinson diseases) relies on international multi-centre trials to achieve the required number of patients in a short time-frame.

Epidemiological research requires a large diversity of populations and international networks to reach significant conclusions. Developing new diagnostics and treatments for rare disorders, as well as performing epidemiological research on those disorders, also requires multi-country approaches to increase the number of patients for each study. In addition, performing health policy-driven research at the European level enables comparisons to be made of the models, systems, data, and patient material held in national databases and biobanks.

Strong EU-based biomedical research will help strengthen the competitiveness of the European healthcare biotechnology, medical technology and pharmaceutical industries. EU collaboration with developing countries will allow those countries to develop research capacities. The EU must also play an active role in creating an environment conducive to innovation in public and pharmaceutical sectors which address public health needs, in

particular to maximise the success of clinical research. Research-based SMEs are the main economic drivers of the healthcare biotechnology and medical technology industries. Although Europe now has more biotechnology companies than the US, most of them are small and less mature than their competitors. Public-private research efforts at the EU level will facilitate their development. EU research will also contribute to the development of new norms and standards to set up an appropriate legislative framework for new medical technologies (e.g. regenerative medicine). The global leadership of European research and innovation in the field of alternative testing strategies, in particular non-animal methods, should be ensured.

The activities that will be addressed, which include research essential to policy requirements, are set out below. Long-term research agendas such as those established by European Technology Platforms, such as the one on innovative medicines, will be supported where relevant. To respond to new policy needs, additional actions may be supported in, for example, the areas of health policy issues and occupational health and safety.

The strategic issues of child health and paediatric diseases as well as of the health of the ageing population will receive specific attention and will have to be taken into account whenever appropriate across all activities in this theme.

Ethical, legal and socio-economic issues will be taken into account within each of the following activities.

Activities

— Biotechnology, generic tools and medical technologies for human health

  — High-throughput research: to catalyse progress in fundamental genomics (genome and post-genome) and biomedical research by enhancing data generation, standardisation, acquisition and analysis.

  — Detection, diagnosis and monitoring: with emphasis on non-invasive or minimally invasive approaches and technologies such as new preventive tools for regenerative medicine (e.g. through molecular imaging and diagnostics).

  — Predicting suitability, safety and efficacy of therapies: to develop and validate biological markers, in vivo and in vitro methods and models, including simulation, pharmacogenomics, targeting and delivery approaches and alternatives to animal testing.

  — Innovative therapeutic approaches and intervention: to research, consolidate and ensure further developments in advanced therapies and technologies with potential application in many diseases and disorders such as new therapeutic tools for regenerative medicine.

— Translating research for human health

  — Integrating biological data and processes — large-scale data gathering, systems biology (including modelling of complex systems): to generate and analyse the vast amount of data needed to understand better the complex regulatory networks of thousands of genes and gene-products controlling important biological processes in all relevant organisms and at all levels of organisation.

  — Research on the brain and related diseases, human development and ageing: to explore the process of healthy ageing and the way genes and environment interact with brain activity both under normal conditions and in brain diseases and relevant age-related illness (e.g. dementia).

  — Translational research in infectious diseases: to address drug resistance, the global threats of HIV/AIDS, malaria and tuberculosis, as well as hepatitis and potentially new and re-emerging epidemics (e.g. SARS and highly pathogenic influenza).

  — Translational research in major diseases — cancer, cardiovascular disease, diabetes/obesity; rare diseases; other chronic diseases including arthritis, rheumatic and musculo-skeletal diseases and respiratory diseases, including those induced by allergies: to develop patient-oriented strategies from prevention to diagnosis with particular emphasis on treatment, including clinical research and the use of active ingredients. Aspects of palliative medicine will be taken into account.

— Optimising the delivery of health care to European citizens

  — Translating clinical outcome into clinical practice: to create the knowledge bases for clinical decision-making and to address the translation of outcomes of clinical research into clinical practice, especially addressing patient safety and the better use of medicines (including some aspects of pharmacovigilance and scientifically tested complementary and alternative medicines) as well as the specificities of children, women and the elderly population.

  — Quality, efficiency and solidarity of health care systems including transitional health care systems and home-care strategies: to translate effective interventions into management decisions, to assess the cost, efficiency and benefits of different interventions including with regard to patient safety, to define the needs and conditions for an adequate supply of human resources, to analyse factors influencing equity of access to high-quality health care (also by disadvantaged groups), including analyses of changes in population (e.g. ageing, mobility and migration, and the changing workplace).

  — Enhanced disease prevention and better use of medicines: to develop efficient public health interventions addressing wider determinants of health (such as stress, diet, lifestyle or environmental factors and their interaction with medication); to identify successful interventions in different health care settings to improve the prescription of medicines and their use by patients (including pharmacovigilance aspects and interactions of medicines).

  — Appropriate use of new health therapies and technologies: long-term safety and effectiveness assessment and monitoring of large-scale use of new medical technologies (including devices) and advanced therapies to ensure a high level of protection and benefit for public health.

2. Food, Agriculture and Fisheries, and Biotechnology

Objective

Building a European knowledge-based bio-economy ([4]) by bringing together science, industry and other stakeholders, to exploit new and emerging research opportunities that address social, environmental and economic challenges: the growing demand for safer, healthier, higher quality food and for sustainable use and production of renewable bio-resources; the increasing risk of epizootic and zoonotic diseases and food related disorders; threats to the sustainability and security of agricultural, aquaculture and fisheries production; and the increasing demand for high quality food, taking into account animal welfare and rural and coastal contexts and response to specific dietary needs of consumers.

Rationale

Innovations and advancement of knowledge in the sustainable management, production and use of biological resources (micro-organisms, plants, animals), will provide the basis for new, sustainable, safe, eco-efficient and competitive products for agriculture, fisheries, feed, food, health, forest-based and related industries. In line with the European strategy on life sciences and biotechnology ([5]), this will help increase the competitiveness of European agriculture and biotechnology, seed and food companies, in particular high-tech SMEs, while improving social welfare and well-being.

Research into the safety of food and feed chains, diet-related diseases, food choices and the impact of food and nutrition on health will help to fight food-related disorders (e.g. obesity, allergies) and infectious diseases (e.g. transmissible spongiform encephalopathies, avian flu), while making an important contribution to the implementation of existing and the formulation of future policies and regulations in the areas of public, animal and plant health and consumer protection.

The diversity and mainly small size of the European industries in these areas, while being one of the Union's strengths and an opportunity, leads to fragmented approaches to similar problems. These are better addressed by increased collaboration and sharing of expertise, for example on new methodologies, technologies, processes and standards that result from changing Community legislation.

Several European Technology Platforms contribute to setting common research priorities, in fields such as plant genomics and biotechnology, forestry and forest based industries, global animal health, farm animal breeding, food and industrial biotechnology. The research carried out will provide the knowledge base needed to support the Common Agricultural Policy and European Forest Strategy; agriculture and trade issues; safety aspects of genetically modified organisms (‘GMOs’); food safety regulations; Community animal health, disease control and welfare standards; and the Common Fisheries Policy reform aiming to provide sustainable development of fishing and aquaculture and the safety of seafood products ([6]): With a view to ensuring social relevance, a flexible response to new policy needs is also foreseen, in particular with respect to new risks and social or economic trends and needs.

Activities

— Sustainable production and management of biological resources from land, forest, and aquatic environments: enabling research, including ‘omics’ technologies, such as genomics, proteomics, metabolomics, systems biology, bioinformatics and converging technologies for micro-organisms, plants and animals, including research on the exploitation and sustainable use of their biodiversity.

  For land-based biological resources, research will focus on: soil fertility, improved crops and production systems in all their diversity, including organic farming, quality production schemes and monitoring and assessment of the impact of GMOs on the environment and humans; plant health, sustainable, competitive and multifunctional agriculture, and forestry; rural development; animal health and welfare, breeding and production; infectious diseases in animals, including epidemiological studies, zoonoses and their pathogenic mechanisms, and diseases linked to animal feedstuffs; other threats to the sustainability and security of food production, including climate change; safe disposal of animal waste.

  For biological resources from aquatic environments, research will support sustainability and competitiveness of fisheries, provide the scientific and technical basis of fisheries management and support the sustainable development of aquaculture, including breeding and welfare.

  Development of tools (including ICT tools) needed by policy makers and other actors in areas such as agriculture, fisheries and aquaculture, and rural development (landscape, land management practices etc.); socio-economic and ethical contexts of production.

— ‘Fork to farm’ — food (including seafood), health and well being: Consumer, societal, cultural, industrial and health as well as traditional aspects of food and feed, including behavioural and cognitive sciences; nutrition, diet-related diseases and disorders, including childhood and adult obesity and allergies; nutrition in relation to the prevention of diseases (including increased knowledge of the health bringing compounds and properties of food); innovative food and feed processing technologies (including packaging and technologies from non-food fields); improved quality and safety, both chemical and biological, of food, beverages and feed; enhanced food safety assurance methodologies; integrity (and control) of the food chain; physical and biological environmental impacts on and of food/feed chains; impact on, and resistance of, food chains to global changes; total food chain concept (including seafood and other food raw materials and components); traceability and its further development; authenticity of food; development of new ingredients and products.

— Life sciences, biotechnology and biochemistry for sustainable non-food products and processes: improved crops and forest resources, feed-stocks, marine products and biomass (including marine resources) for energy, environment, and products with high added value such as materials and chemicals (including biological resources utilisable in pharmaceutical industry and medicine), including novel farming systems, bio-processes and bio-refinery concepts; bio-catalysis; new and improved micro-organisms and enzymes; forestry and forest based products and processes; environmental bio-remediation and cleaner bio-processing, the utilisation of agro-industrial wastes and by-products.

3. Information and Communication Technologies (ICT)

Objective

Improving the competitiveness of European industry and enabling Europe to master and shape future developments in ICT so that the demands of its society and economy are met. ICT is at the very core of the knowledge-based society. Activities will strengthen Eur^{o}pe's scientific and technology base and ensure its global leadership in ICT, help drive and stimulate product, service and process innovation and creativity through ICT use and ensure that ICT progress is rapidly transformed into benefits for Eur^{o}pe's citizens, businesses, industry and governments. These activities will also help reduce the digital divide and social exclusion.

Rationale

ICT is critical to Eur^{o}pe's future and underpins the realisation of the Lisbon agenda. It has a catalytic impact in three key areas: productivity and innovation, modernisation of public services and advances in science and technology. Half of the productivity gains in our economies are explained by the impact of ICT on products, services and business processes. ICT is the leading factor in boosting innovation and creativity and in mastering change in value chains across industry and service sectors.

ICT is essential to meeting the rise in demand for health and social care, in particular for people with special needs, including the ageing population, to modernising services in domains of public interest such as education, cultural heritage, security, energy, transport and the environment and to promoting accessibility and transparency of governance and policy development processes. ICT plays an important role in RTD management and communication and is catalytic in the advance of other fields of science and technology as it transforms the way researchers conduct their research, cooperate and innovate.

The escalating economic and societal demands, together with the continued mainstreaming of ICT and the need to push further the limits of technology as well as to develop innovative high-value ICT-based products and services set a growing agenda for research. To bring technology closer to people and organisational needs means: hiding technology complexity and revealing functionality on demand; making technology functional, very simple to use, available and affordable; providing new ICT-based applications, solutions and services that are trusted, reliable, and adaptable to the users' context and preferences. Driven by the demand of more-for-less, ICT researchers are involved in a global race focussing on miniaturisation, mastering the convergence of computing, communications and media technologies, including further interoperability between systems and the convergence with other relevant sciences and disciplines, and building systems that are able to learn and evolve.

From these diverse efforts a new wave of technologies is emerging. ICT research activities will also draw on a broader range of scientific and technological disciplines including bio- and life sciences, chemistry, psychology, pedagogy, cognitive and social sciences and the humanities.

ICT is one the most research intensive sectors. The ICT research effort, public and private, represents a third of the total research effort in all major economies. Although Europe already enjoys industrial and technological leadership in key ICT fields it lags behind its major competitors in investment in ICT research. Only through a renewed and more intensive pooling of the effort at European level will we be able to make the most of the opportunities that progress in ICT can offer. ICT research activity based on the ‘open source’ development model is proving its utility as a source of innovation and increasing collaboration. The results of ICT research can take various exploitation paths and lead to various business models.

The ICT research activities will be closely articulated with policy actions for ICT deployment and with regulatory measures within a comprehensive and holistic strategy. Priorities have been set following extensive consultations that included input from a series of European Technology Platforms and industrial initiatives in areas such as nano-electronics, microsystems, embedded systems, mobile and wireless communications, electronic media, photonics, robotics and software, services and grids, including Free, Libre and Open Source Software (FLOSS). Sustainability issues will also be taken into account, particularly in the field of electronics.

Activities

The role of research into Future and Emerging Technologies is particularly relevant under this theme in order to support research at the frontier of knowledge in core ICTs and in their combination with other relevant areas and disciplines; to nurture novel ideas and radically new uses and to explore new options in ICT research roadmaps, including the exploitation of quantum effects, system integration and smart systems.

— ICT Technology Pillars:

  — Nano-electronics, photonics and integrated micro/nano-systems: pushing the limits of miniaturisation, integration, variety, storage and density; increasing performance and manufacturability at lower cost; facilitating incorporation of ICT in a range of applications; interfaces; upstream research requiring exploration of new concepts.

  — Ubiquitous and unlimited capacity communication networks: ubiquitous access over heterogeneous networks — fixed, mobile, wireless and broadcasting networks spanning from the personal area to the regional and global area — allowing the seamless delivery of ever higher volumes of data and services anywhere and at any time.

  — Embedded systems, computing and control: powerful, secure and distributed, reliable and efficient computing, storage and communication systems and products that are embedded in objects and physical infrastructures and that can sense, control and adapt to their environment; interoperability of discrete and continuous systems.

  — Software, Grids, security and dependability: dynamic, adaptive, dependable and trusted software and services, platforms for software and services, complex systems and new processing architectures, including their provision as a utility.

  — Knowledge, cognitive and learning systems: semantic systems; capturing and exploiting knowledge embedded in web and multimedia content; bio-inspired artificial systems that perceive, understand, learn and evolve, and act autonomously; learning by convivial machines and humans based on a better understanding of human cognition.

  — Simulation, visualisation, interaction and mixed realities: tools for innovative design, and creativity in products, services and digital media, and for natural, language-enabled and context-rich interaction and communication.

  — New perspectives in ICT drawing on other science and technology disciplines, including insights from mathematics and physics, biotechnologies, material and life-sciences, for miniaturisation of ICT devices to sizes compatible and interacting with living organisms, to increase performance and user-friendliness of systems engineering and information processing, and for modelling and simulation of the living world.

— Integration of Technologies:

  — Personal environments: personal communication and computing devices, accessories, wearables, implants; their interfaces and interconnections to services and resources.

  — Home environments: communication, monitoring, control, assistance; seamless interoperability and use of all devices; interactive digital content and services.

  — Robotic systems: advanced autonomous systems; cognition, control, action skills, natural interaction and cooperation; miniaturisation, humanoid technologies.

  — Intelligent infrastructures: tools making infrastructures that are critical to everyday life more efficient and user-friendly, easier to adapt and maintain, and more robust to usage and resistant to failures.

— Applications Research:

  — ICT meeting societal challenges: new systems, novel materials, structures, technologies and services in areas of public interest, improving quality, efficiency, access and inclusiveness, including accessibility for the disabled; user friendly applications, integration of new technologies and initiatives such as ambient assisted living,

    — for health, improving disease prevention and health care provisions, early diagnosis, treatment and personalisation; autonomy, safety, monitoring and mobility of patients; health information space for knowledge discovery and management,

    — to improve inclusion and equal participation and prevent digital divides; assistive technology for the elderly and for disabled people; design-for-all,

    — for mobility; intelligent ICT-based transportation systems, vehicles and intelligent service solutions for tourism enabling people and goods to move safely, ecologically, comfortably and efficiently,

    — in support of the environment, risk management and sustainable development, to prevent or reduce vulnerability and to mitigate the consequences of natural disasters, industrial accidents and human activities related to economic development,

    — for governments at all levels: efficiency, openness and accountability, for a world-class public administration and links to citizens and businesses, supporting democracy, allowing access to information to all.

  — ICT for content, creativity and personal development:

    — new media paradigms and new forms of content, including entertainment; creation of and access to interactive digital content; enriched user experiences; cost-effective content delivery; digital rights management; hybrid media,

    — technology-enhanced learning; adaptive and contextualised learning solutions; active learning,

    — ICT-based systems to support accessibility and use over time of digital cultural and scientific resources and assets, in a multilingual/multicultural environment, and including with regard to cultural heritage.

— ICT supporting businesses and industry:

  — new forms of dynamic networked cooperative business processes, digital eco-systems including for empowering small and medium-sized organisations and communities; optimised work organisation and collaborative work environments such as knowledge sharing and interactive services (e.g. for tourism),

  — manufacturing, including traditional industries: rapid and adaptive design, production and delivery of highly customised goods; digital and virtual production; modelling, simulation, optimisation and presentation tools; miniature and integrated ICT products,

— ICT for trust and confidence: identity management; authentication and authorisation; privacy enhancing technologies; rights and asset management; protection against cyber threats, in coordination with other themes, in particular the ‘Security’ theme.

4. Nano-sciences, Nano-technologies, Materials and new Production Technologies

Objective

Improving the competitiveness of European industry and generate knowledge to ensure its transformation from a resource-intensive to a knowledge-intensive industry, by generating step changes in knowledge and implementing decisive knowledge for new applications at the crossroads between different technologies and disciplines. This will benefit both new, high-tech industries and higher-value, knowledge-based traditional industries, with a special focus on the appropriate dissemination of RTD results to SMEs. These activities are primarily concerned with enabling technologies which impact all industrial sectors and many other Seventh Framework Programme themes.

Rationale

The increasing difficulties affecting many industrial activities appear no longer to be limited to traditional sectors with a high labour intensity, but are beginning to be observed in intermediate sectors — which constitute the established strengths of European industry — and even in some high-technology sectors. A strong industrial base must be maintained by strengthening the knowledge content in the existing industry as well as building, in Europe, a strong knowledge-based, knowledge intensive industry, stressing the exploitation of basic research for industrial applications. This will include the modernisation of the existing SME base and the creation and subsequent growth of new knowledge-driven SMEs, from the dissemination of knowledge and expertise through collaborative programmes.

The competitiveness of industry in the future will largely depend on nano-technologies and their applications. RTD in nano-sciences and nano-technologies taken up in several areas can accelerate European industry's transformation. The EU has recognised leadership in fields such as nano-sciences, nano-technologies, materials and production technologies, which must be strengthened in order to secure and increase the EU position in a highly competitive global context.

Materials with new properties are key to the future competitiveness of European industry and the basis for technical progress in many areas.

Industry-relevant priorities and their integration for sectoral applications can be established through activities like the European Technology Platforms in fields such as nano-electronics, manufacturing, power generation, steel, chemistry, energy, the transport industry, construction, industrial safety, textiles, ceramics, forest-based industry and nano-medicine. This will help establish common research priorities and targets. In addition by

responding flexibly to new policy needs that arise during the lifetime of the Seventh Framework Programme, the relevant policy, regulatory and standardisation, and impact issues will be addressed.

Activities

— Nano-sciences, Nano-technologies

  — Generating new knowledge of interface and size dependent phenomena; nano-scale control of material properties for new applications; integration of technologies at the nano-scale including monitoring and sensing; self-assembling properties; nano-motors; nano-machines and nano-systems; methods and tools for characterisation and manipulation at nano-dimensions; nano- and high-precision technologies in chemistry for the manufacture of basic materials and components; the study and production of nano-metre precise components; impact on human safety, health and the environment; metrology, monitoring and sensing, nomenclature and standards; exploration of new concepts and approaches for sectoral applications, including the integration and convergence of emerging technologies. Activities will also investigate the impact of nano-technology on society and the relevance of nano-science and technology for the solution of societal problems.

— Materials

  — Generating new knowledge of high-performance surfaces and materials for new products and processes as well as for their repair; knowledge-based materials with tailored properties and predictable performance; more reliable design and simulation; computational modelling; higher complexity; environmental compatibility; integration of nano-micro-macro functionality in the chemical technology and materials processing industries; new nano-materials including nano-composites, bio-materials, and hybrid materials, including design and control of their processing, properties and performance.

— New Production

  — Creating conditions and assets for sustainable knowledge-intensive production, including construction, development and validation of new paradigms responding to emerging industrial needs and fostering the modernisation of the European industry base; development of generic production assets for adaptive, networked and knowledge-based production; development of new engineering concepts exploiting the convergence of technologies (e.g. nano, micro, bio, geo, info, optical, cognitive technologies and their engineering requirements) for the next generation of high value-added new or renewed products and services, and adaptation to changing needs; engaging high-throughput production technologies.

— Integration of technologies for industrial applications

  — Integrating new knowledge, nano- and micro-technologies, materials and production in sectoral and cross sectoral applications, in areas such as health, food, construction and buildings, transport, energy, information and communication, chemistry, environment, textiles and clothing, footwear, forest-based industry, steel, mechanical engineering.

5. Energy

Objective

Adapting the current energy system into a more sustainable one, less dependent on imported fuels and based on a diverse mix of energy sources, in particular renewables, energy carriers and non-polluting sources; enhancing energy efficiency, including by rationalising use and storage of energy; addressing the pressing challenges of security of supply and climate change, whilst increasing the competitiveness of Eur°pe's industries.

Rationale

Energy systems are confronted with major challenges. There is an urgent need to identify and develop adequate and timely solutions given the alarming trends in global energy demand, the finite nature of conventional oil and natural gas reserves, the need to curb dramatically emissions of greenhouse gases in order to mitigate the devastating consequences of climate change, the damaging volatility of oil prices (in particular for the transport sector which is heavily oil dependent) and geopolitical instability in supplier regions. Energy research is an important contribution towards ensuring affordable energy costs for our citizens and industries. Research and demonstration are necessary in order to provide the most environmentally sound and cost-effective technologies and measures enabling the EU to meet its targets under the Kyoto Protocol and beyond and to implement its energy policy commitments, as described in the 2000 Green Paper on the security of energy supply ([7]), the 2005 Green Paper on Energy Efficiency ([8]) and the 2006 Green Paper on a European strategy for sustainable competitive and secure energy ([9]).

Europe has developed world leadership in a number of energy generation and energy efficiency technologies. It is the pioneer in modern renewable energy technologies, such as solar energy, bio- and wind energy. The EU is also a global competitor in power generation and distribution technologies and has a strong research capability in the area of carbon capture and sequestration. These positions, however, are now facing severe competition (in particular from the US and Japan). Therefore Europe must maintain and develop its leading position which requires substantial efforts and international collaboration.

Radically transforming the energy system into a less- or non-CO2-emitting, reliable, competitive and sustainable energy system requires new technologies and new materials with risks that are too high and profits too uncertain for private firms to provide all the investment needed for research, development, demonstration and deployment. Public support should therefore play a key role in mobilising private investment and European efforts and resources should be combined in a coherent and more effective manner, to compete with economies that are investing heavily and consistently in similar technologies. European technology platforms play an important role in this regard, by mobilising the necessary research effort in a coordinated manner. The activities to meet the objective are set out below. Increasing efficiency throughout the energy system, from source to user, is essential and underpins the whole of the Energy Theme. Given their important contribution to future sustainable energy systems, renewables and end-use energy efficiency will be the major part of this Theme. Particular attention will be paid to stimulating research, development and demonstration and promoting capacity building in this area. Synergies with the Intelligent Energy-Europe Programme component of the Competitiveness and Innovation Framework Programme will be fully exploited in this regard. The potential for future large-scale initiatives integrating funding from various sources (e.g. JTI) will also be explored.

A specific activity on knowledge for energy policy making is included which may also provide support to new policy needs that emerge relating, for example, to the role of European energy policy in the development of international climate change actions, and instabilities or disruptions in energy supply and price.

Activities

— Hydrogen and fuel cells

  Integrated action to provide a strong technological foundation for competitive EU fuel cell and hydrogen industries, for stationary, portable and transport applications. The Hydrogen and Fuel Cells European Technology Platform contributes to this activity by proposing an integrated research and deployment strategy.

— Renewable electricity generation

Technologies to increase overall conversion efficiency, cost efficiency and reliability, driving down the cost of electricity production from indigenous renewable energy sources, including wastes, and the development and the demonstration of technologies suited to different regional conditions.

— Renewable fuel production

Integrated fuel production systems and conversion technologies: to develop and drive down the unit cost of solid, liquid and gaseous (including hydrogen) fuels produced from renewable energy sources including biomass and wastes, aiming at the cost-effective production, storage, distribution and use of carbon-neutral fuels, in particular biofuels for transport and electricity generation.

— Renewables for heating and cooling

Research, development and demonstration of technologies and devices including storage technologies to increase efficiencies and drive down the costs of active and passive heating and cooling from renewable energy sources, ensuring their use in different regional conditions where sufficient potential can be identified.

— CO2 capture and storage technologies for zero emission power generation

Research, development and demonstration of technologies to drastically reduce the environmental impact of fossil fuel use aiming at highly efficient and cost effective power and/or heat generation plants with near zero emissions, based on CO2 capture and storage technologies, in particular underground storage.

— Clean coal technologies

Research, development and demonstration of technologies to substantially improve plant efficiency, reliability and cost through development and demonstration of clean coal and other solid fuel conversion technologies, including chemical processes, producing also secondary energy carriers (including hydrogen) and liquid or gaseous fuels. Activities will be linked as appropriate to CO2 capture and storage technologies or co-utilisation of biomass.

— Smart energy networks

Research, development and demonstration on how to increase the efficiency, safety, reliability and quality of the European electricity and gas systems and networks, notably within the context of a more integrated European energy market, e.g. by transforming the current electricity grids into an interactive (customers/operators) service network, developing energy storage options and removing obstacles to the large-scale deployment and effective integration of distributed and renewable energy sources.

— Energy efficiency and savings

Research, development and demonstration of new concepts, optimisation of proven concepts and technologies to improve energy efficiency and to enable further final and primary energy consumption savings, over their life cycle, for buildings (including in lighting), transport, services and industry. This includes the integration of strategies and technologies for energy efficiency (including co- and polygeneration), the use of new and renewable energy technologies and energy demand management measures and devices, and the demonstration of minimum climate impact buildings.

— Knowledge for energy policy making

Development of tools, methods and models to assess the main economic and social issues related to energy technologies and to provide quantifiable targets and scenarios for medium- and long-term horizons (including providing scientific support for policy development).

6. Environment (including climate change)

Objective

Sustainable management of the environment and its resources through the advancement of knowledge on the interaction between the climate, biosphere, ecosystems and human activities, and the development of new technologies, tools and services, in order to address global environmental issues in an integrated way. Emphasis will be placed on prediction of climate, ecological, earth and ocean systems changes, on tools and technologies for monitoring, prevention, mitigation and adaptation of environmental pressures and risks, including risks to health, and on tools and technologies for the sustainability of the natural and man-made environment.

Rationale

Environmental problems extend beyond national frontiers and require a coordinated approach at a pan-European and, often, global level. Earth's natural resources and the man-made environment are under intense pressure from a growing population, urbanisation, construction, continuous expansion of the agriculture, aquaculture, fisheries, transport, and energy sectors, and climate variability and warming at local, regional and global scales. Europe needs to engage in a new sustainable relationship with the environment while improving competitiveness and strengthening European industry. EU-wide cooperation is needed in order to attain critical mass, given the scale, scope and high level of complexity of environmental research. This will facilitate common planning, the use of connected and inter-operable databases, and the development of coherent and large scale observation and forecasting systems. Research should address the need for data management and information services and problems related to data transfer, integration, mapping.

Research is needed at EU level for the implementation of international commitments such as the UN Framework Convention on Climate Change (UNFCC) and its Kyoto protocol, the UN Convention on Biological Diversity, the UN Convention to Combat Desertification, the Stockholm Convention on Persistent Organic Pollutants, the objectives of the World Summit on Sustainable Development 2002, including the EU Water Initiative, and contributions to the Intergovernmental Panel on Climate Change and the Earth Observation initiative.

In addition, there are significant research needs arising from existing and emerging EU level policies, the implementation of the 6th Environmental Action Plan and associated thematic strategies (e.g. the EU marine strategy), the action plans, programmes and directives on Environmental Technologies and Environment and Health, the Water Framework and NATURA 2000.

The EU needs to strengthen its position in world markets for environmental technologies. Such technologies contribute to sustainable consumption and production, helping to deliver sustainable growth providing eco-efficient solutions to environmental problems at different scales and protecting our cultural and natural heritage. Environmental requirements act as a stimulus for innovation and can provide business opportunities and higher competitiveness while at the same time ensuring a more sustainable future for next generations. European Technology Platforms on water supply and sanitation and on sustainable chemistry confirm the need for EU level action and their research agendas are taken into consideration in the activities below. Other platforms (e.g. on construction and on forestry) partially deal with environmental technology issues and are taken into consideration as well. Socio-economic issues have a particularly strong influence on the development of environmental technologies and their introduction to the market and subsequent application, as, for example, is the case with water resources management. Activities must consider the socio-economic aspects of policies and technological developments, whenever relevant to the topic.

A series of activities are listed below ([10]) many of which are directly relevant to policy needs. However, additional support may be provided to new policy needs that emerge, for example, in relation to sustainability impact assessments of EU policies; the follow up to the post-Kyoto action on climate change; and new environmental policies such as those in the European Soil Strategy and relating to maritime policy, standards and regulations.

Activities

- Climate change, pollution and risks
  - Pressures on the environment and climate: functioning of climate and the earth and marine system including the polar regions; adaptation and mitigation measures; pollution in air, soil and water; changes in atmospheric composition and water cycle; global and regional interactions between climate and atmosphere, land surface, ice and the ocean; and impacts on biodiversity and ecosystems, including the effects of the sea level rise on coastal zones and impacts on particularly sensitive areas.
  - Environment and health: interaction of environmental stressors with human health including identification of sources, biomonitoring research for environment related health, indoor air quality and links to indoor environment, urban environment, car emissions and impact and emerging risk factors; integrated risk assessment methods for hazardous substances including alternatives to animal testing; quantification and cost-benefit analysis of environmental health risks and indicators for prevention strategies.
  - Natural hazards: improvement of forecasting and integrated hazards — vulnerability — and risk assessments for disasters related to geological hazards (such as earthquakes, volcanoes, tsunamis) and climate (such as storms, droughts, floods, forest fires, landslides, avalanches and other extreme events) and their impact; development of early warning systems and improve prevention, mitigation and management strategies, also within a multi-risk approach.
- Sustainable Management of Resources
  - Conservation and sustainable management of natural and man-made resources and biodiversity: ecosystems; water resources management; waste management and prevention; protection and management of biodiversity, including control of invasive alien species, soil, seabed, lagoons and coastal areas protection, approaches against desertification and land degradation, preservation of landscape; sustainable use and management of forests; sustainable management and planning of urban environment, including post-industrialized zones; data management and information services; assessment and foresight relating to natural processes.
  - Management of marine environments: impact of human activities on the marine environment and its resources; pollution and eutrophication in regional seas and coastal areas; deep sea ecosystems; assessment of marine biodiversity trends, of ecosystem processes and of ocean circulation; seabed geology; development of strategies, concepts and tools for a sustainable use of the ocean and its resources.

— Environmental Technologies

  — Environmental technologies for observation, simulation, prevention, mitigation, adaptation, remediation and restoration of the natural and man-made environment: related to water, climate, air, marine, urban and rural environment, soil, waste treatment, recycling, clean production processes and sustainable products, chemicals safety.

  — Protection, conservation and enhancement of cultural heritage, including human habitat: improved damage assessment on cultural heritage; development of innovative conservation strategies; fostering of the integration of cultural heritage in the urban setting.

  — Technology assessment, verification and testing: methods and tools for environmental risk and lifecycle assessment of processes, technologies and products, including alternative testing strategies and in particular non-animal methods for industrial chemicals; support for sustainable chemistry, forest-based sector technology, water supply and sanitation platforms ([11]); scientific and technological aspects of a future European environmental technologies verification and testing programme, complementing third party assessment instruments.

— Earth observation and assessment tools

  — Earth and ocean observation systems and monitoring methods for the environment and sustainable development: contribute to the development and integration of observation systems for environmental and sustainability issues in the framework of GEOSS (to which GMES is complementary); interoperability between systems and optimisation of information for understanding, modelling and predicating environmental phenomena, for assessing, exploring and managing natural resources.

  — Forecasting methods and assessment tools for sustainable development taking into account differing scales of observation: modelling links between economy/environment/society including market based instruments, externalities, thresholds and developing the knowledge base and methodologies for sustainability impact assessment on key issues such as land use and marine issues; urban development, social and economic tensions related to climate change.

7. Transport (including aeronautics)

Objective

Based on technological and operational advances and on the European transport policy, developing integrated, safer, ‘greener’ and ‘smarter’ pan-European transport systems for the benefit of all citizens, society and climate policy, respecting the environment and natural resources; and securing and further developing the competitiveness attained by the European industries in the global market.

Rationale

Transport is one of Europe's strengths — the air transport sector contributes to 2,6 % of the EU GDP (with 3,1 million jobs) and the surface transport field generates 11 % of the EU GDP (employing some 16 million persons). However, transport is responsible for 25 % of all the EU emissions of CO2, hence the absolute need for a ‘greening’ of the system to ensure more sustainable transport patterns and compatibility with growth rates, as developed in the White Paper on ‘European Transport Policy for 2010: time to decide’ ([12]).

The enlargement (increasing land surface by 25 % and population by 20 %) and economic development of the EU present new challenges for transporting people and goods efficiently, cost-effectively and in a sustainable manner. Transport also has direct relevance for other major policies such as trade, competition, employment, environment, cohesion, energy, security and the internal market.

Investment in RTD in EU transport industries is a prerequisite for ensuring a technological competitive advantage in global markets ([13]). Activities at European level will also stimulate the restructuring of the industry, including the integration of the supply chain and, in particular, SMEs.

The research agendas developed by European Technology Platforms ([14]) support the need to take a new 'transport systems' perspective that considers the interactions of vehicles or vessels, transport networks or infrastructures and the use of transport services, which can only be developed at European level. RTD costs in all these fields are rising substantially, and collaborative activity at EU-level is essential to enable a 'critical mass' of diverse RTD providers to address the scale and multi-disciplinary challenges in a cost-effective way, as well as meeting the political, technological and socio-economic challenges of issues such as the 'clean and safe vehicle' of the future, interoperability and intermodality with particular reference to waterborne and rail transport, affordability, safety, capacity, security and environmental impacts in an enlarged Union. Also, developing technologies in support of the Galileo system and its applications will be essential in implementing European policies.

As well as the strong industry relevance of the themes and activities set out below, the needs of policy makers will be addressed in an integrated way covering economic, social and environmental aspects of transport policy. In addition, support will be provided to respond to existing as well as new policy needs, for example relating to developments in maritime policy or implementation of the European Single Sky.

Activities

— Aeronautics and air transport

  — The greening of air transport: reduction of emissions, including green house gases and noise disturbance, incorporating work on engines and alternative fuels, structures and new aircraft designs including rotorcraft (including helicopters and tiltrotors), airport operations and traffic management.

  — Increasing time efficiency: improvement of the efficiency of operating schedules focusing on innovative air traffic management systems in line with the effective implementation of Single Sky policy which integrate air, ground and space components, including traffic flow and more aircraft autonomy.

  — Ensuring customer satisfaction and safety: improvement of passenger comfort, innovative in-flight services and more efficient passenger handling; improvement of all safety aspects of air transport; wider choice of aircraft ranging from wide body to smaller size vehicles suitable for different applications (including regional applications).

  — Improving cost efficiency: reduction of costs associated with product development, manufacturing and operating costs focusing on innovative and zero maintenance, repair and overhaul, aircraft, increased use of automation and simulation.

  — Protection of aircraft and passengers: enhancement of protection measures for the traveller, crew, aircraft and air transport system, such as improved data and identification methods, protecting the aircraft against attack, improved security design of aircraft.

  — Pioneering the air transport of the future: addressing the longer term challenges of aviation with more radical, environmentally efficient, accessible and innovative combinations of technologies which would lead to significant steps forward in air transport.

— Sustainable surface transport (rail, road and waterborne)

  — The greening of surface transport: reduction of environmental and noise pollution, including green house gases; reducing the impact of transport on climate change by reducing emissions through technological and socio-economic means as well as user training; development of clean and efficient engines and power-trains, including hybrid technology and the use of alternative fuels for transport applications such as hydrogen and fuel cells, taking account of cost-efficiency and energy-efficiency considerations; end of life strategies for vehicles and vessels.

  — Encouraging and increasing modal shift and decongesting transport corridors: development of sustainable innovative, intermodal and interoperable regional and national transport and logistics networks, infrastructures and systems in Europe; cost internalisation; information exchange between vehicle/vessel and transport infrastructure; optimisation of infrastructure capacity; modal shift strategies to encourage energy efficient means of transport.

  — Ensuring sustainable urban mobility for all citizens including the disadvantaged: innovative organisation schemes, including clean and safe vehicles and means of transport with lower levels of pollution, new high quality public transportation modes and rationalisation of private transport, communication infrastructure, integrated town planning and transport taking into account their relationship with growth and employment.

  — Improving safety and security as inherent to the transport system: in transport operations for drivers, passengers, crew, cyclists and pedestrians, as well as for freight, in the design and operation of vehicles, vessels, infrastructures, and within the total transport system.

  — Strengthening competitiveness: improvement of design processes; development of advanced power-train and vehicle and vessel technologies; innovative and cost-effective production systems and infrastructure construction and maintenance; integrative architectures.

— Support for the European global satellite navigation system (Galileo and EGNOS): precise navigation and timing services for use in a range of sectors; efficient use of satellite navigation and support for the definition of second generation technologies and applications.

8. Socio-Economic Sciences and the Humanities

Objective

Generating an in-depth, shared understanding of the complex and interrelated socio-economic challenges Europe is confronted with, such as growth, employment and competitiveness, social cohesion, social, cultural and educational challenges in an enlarged EU and sustainability, environmental challenges, demographic change, migration and integration, quality of life and global interdependence, in particular with the view to providing an improved knowledge base for policies in the fields concerned.

Rationale

Europe has a strong and high quality research base in socio-economic and socio-cultural sciences and the humanities fields. The diversity of approaches within the EU in the economic, social, political and cultural domains provides a highly fertile ground for research in these fields at EU level. There is much European added value in collaborative research addressing European socio-economic and socio-cultural issues in the areas mentioned. First, the issues and challenges concerned are of high priority at the European level and are addressed

by Community policies. Second, comparative research across the EU or other countries offers a particularly effective tool as well as important learning opportunities across countries and regions.

Third, EU-level research has particular advantages in being able to develop Europe-wide data collection and to employ the multiple perspectives needed to understand complex issues. Finally, the development of a genuinely European socio-economic knowledge base on these key challenges will make an essential contribution to promoting their shared understanding across the European Union and, most significantly, by European citizens.

The activities to be supported are listed below and are expected to contribute significantly to improving the formulation, implementation, impacts and assessments of policy and the definition of regulatory measures in a wide range of areas such as the economic, social, cultural, education and training, gender equality, enterprise, international trade, consumer, external relations, and scientific and technological spheres, official statistics policies and the creation of the area of freedom, security and justice. In addition, opportunities will be provided to address emerging socio-economic challenges as well as to undertake research on new or unforeseen policy needs. Use may also be made of social platforms to discuss future research agendas.

Activities

— Growth, employment and competitiveness in a knowledge society: developing and integrating research on the issues affecting growth, socio-economic stability, employment and competitiveness, covering topics such as innovation, education including life-long learning and the role of scientific and other knowledge and intangible goods on a global scale, youth and youth policy, adaptation of labour market policies, and national institutional contexts.

— Combining economic, social and environmental objectives in a European perspective: by addressing the two key and highly interrelated issues of continuing evolution of European socio-economic models and economic and social and regional cohesion in an enlarged EU, taking into account sustainability and the protection of the environment, sustainable urban planning, the interaction between environment, energy and society, the role of cities and metropolitan regions, and the socio-economic impact of European policies and legislation.

— Major trends in society and their implications: such as demographic change including ageing and its effects on pension systems, migration and integration, analysing the implications of the demographic change for urban development; lifestyles, work, families, reconciling professional and family life, gender issues, disabilities issues, health and quality of life; economic consumer protection; inequalities; criminality; the role of business in society and population diversity, ethnicity, religious pluralism, cultural interactions multicultural issues and issues related to protection of fundamental rights and the fight against discrimination of any kind.

— Europe in the world: understanding changing interactions, cross cultural relations and interdependencies between world regions, including developing regions, and their implications; addressing emerging threats and risks without undermining human rights, freedom and well-being, and fostering peace.

— The citizen in the European Union: in the context of the future development of the enlarged EU, addressing the issues of achieving a sense of democratic ‘ownership’ and active participation by the peoples of Europe; effective and democratic governance at all levels including economic and legal governance and the role of civil society as well as innovative governance processes intended to enhance citizen's participation and the cooperation between public and private actors; research for building a shared understanding and respect for Eur^{o}pe's diversities and commonalities in terms of culture, religions, cultural heritage, institutions and legal systems, history, languages and values as building elements of our European multi-cultural identity and heritage.

— Socio-economic and scientific indicators: their use in policy and its implementation and monitoring, the improvement of existing indicators, techniques to analyse them and the development of new ones for this purpose and for the evaluation of research programmes, including indicators based on official statistics.

— Foresight activities relating to major science, technology and related socio-economic issues such as future demographic trends and the globalization of knowledge, the dissemination of knowledge, and evolution of research systems and of the future developments in and across major research domains and scientific disciplines.

9. Space

Objective

Supporting a European Space Programme focusing on applications such as GMES (Global Monitoring for Environment and Security) with benefits for citizens and for the competitiveness of the European space industry. This will contribute to the development of a European space policy, complementing efforts by Member States and by other key players, including the European Space Agency (ESA).

Rationale

The Community can contribute in this field to the better definition of common objectives based on user requirements and policy objectives; to the coordination of activities in order to avoid duplications and maximise interoperability; to improving cost-effectiveness and to the definition of standards. Public authorities and decision-makers represent important potential users and the European industry will also benefit from a well defined European Space policy implemented through a European Space Programme, supported in part by the proposed research and technological development actions. European level actions are also needed to support Community policy objectives, for example in the fields of agriculture, forestry, fisheries, environment, health, telecommunications, security, transport as well as ensuring that Europe is a respected partner in regional and international cooperation.

In the last 40 years, excellent technological competence has been built up in Europe, both nationally and through ESA. Sustaining a competitive industry (including manufacturers, service providers and operators) requires new research and technologies. Space applications bring important benefits to citizens by virtue of technological spin-off effects and are indispensable in a high-tech society.

With particular focus on the use of existing capabilities in Europe, the activities set out below aim at: the efficient exploitation of space assets (in coordination with in-situ assets, including airborne assets) for the implementation of applications, namely GMES and their contribution to law enforcement in Community policies; space exploration, allowing international cooperation opportunities and dramatic technological breakthroughs as well as cost-effective missions; exploitation and exploration of space supported through enabling activities guaranteeing the strategic role of the European Union. These activities will be complemented by other actions under the Competitiveness and Innovation Framework Programme and in the Education and Training Programme. The public policy benefits of the below activities will also be maximised, including by the provision of additional support for new policy needs that may arise, for example: space-based solutions in support of developing countries and use of space-observation tools and methods to support developments in Community policies.

Activities

— Space-based applications at the service of European society

  — GMES: development of satellite-based and in-situ monitoring and early-warning systems, including for the safety of citizens, and techniques relating to the management of the environment and security (including the management of natural disasters) and their integration with ground-based, ship-borne and airborne components; support for the integration, harmonisation, use and delivery of GMES data (both satellite-based and in-situ, including ground-based, shipborne and airborne) and services.

  — Innovative satellite communication services, seamlessly integrated in the global electronic communication networks, for citizens and enterprises in application sectors encompassing civil protection, e-government, telemedicine, tele-education, search and rescue, tourism and leisure time, personal navigation, fleet management, agriculture and forestry, meteorology and generic users.

  — Development of monitoring technologies and systems for reducing the vulnerability of space-based services and for contributing to the surveillance of space.

  — Applications of space-based systems for risk prevention and risk management and all kinds of emergency, enhancing convergence with non-space systems.

— Exploration of space

  — Providing RTD support and maximising scientific added value through synergies with initiatives by ESA or national space agencies in the field of space exploration; facilitating the access to scientific data.

  — Support to coordinate efforts for the development of space-borne telescopes and detectors as well as for data analysis in space sciences.

— RTD for strengthening space foundations

  — Space research and development for long term needs including space transportation; research activities to increase the competitiveness and cost-effectiveness of the European space technology sector.

  — Space sciences including bio-medicine and life and physical sciences in space.

10. Security

Objective

To develop the technologies and knowledge for building capabilities needed to ensure the security of citizens from threats such as terrorism, natural disasters, and crime, while respecting fundamental human rights including privacy; to ensure optimal and concerted use of available technologies to the benefit of civil European security, to stimulate the cooperation of providers and users for civil security solutions, improving the competitiveness of the European security industry and delivering mission-oriented research results to reduce security gaps.

Rationale

Security in Europe is a precondition of prosperity and freedom. The EU Security Strategy: ‘A Secure Europe in a Better World’, adopted by the European Council, addresses the need for a comprehensive security strategy encompassing both civil and defence-related security measures.

Security related research is an important building block for realising a high level of security within the area of freedom, security and justice. It will also contribute to developing technologies and capabilities in support of other Community policies in areas such as transport, civil protection, energy, environment and health. Security research needs specific implementation rules to take into account its special nature.

Existing security related research activities in Europe suffer from the fragmentation of efforts, the lack of critical mass of scale and scope and the lack of connections and interoperability. Europe needs to improve the coherence of its efforts by developing efficient institutional arrangements and by instigating cooperation and coordination among the various national and international actors in order to avoid duplication and to explore synergies wherever possible. Security research at Community level will maintain an exclusively civil orientation and focus on activities of clear added value to the national level. As a consequence, civil security research within the Seventh Framework Programme will reinforce the competitiveness of the European security industry. Recognising that there are areas of ‘dual-use’ technology, close coordination with the activities of European Defence Agency will be needed in order to ensure complementarity.

Security research will emphasise European capabilities regarding surveillance, distribution of information and knowledge of threats and incidents as well as systems for better assessments and situation control through better use of common ICT-systems in the fields of different operations.

The special requirements concerning confidentiality in this area will be enforced but the transparency of research findings will not be unnecessarily restricted. In addition, areas in which research findings may be made public will be identified.

The non defence activities set out below will complement and integrate the technology- and systems-oriented research relevant to civil security which is carried out in other themes. They will be mission-oriented, developing the technologies and capabilities as required by the specific security missions. They are by design flexible so as to accommodate as yet unknown future security threats and related policy needs that may arise, stimulating cross-fertilisation and the take-up of existing technologies for the civil security sector, European security research will also encourage the development of multi-purpose technologies in order to maximise the scope for their application.

Activities

— Security of citizens: delivering technology solutions for civil protection, including bio-security and protection against risks arising from crime and terrorist attacks.

— Security of infrastructures and utilities: analysing and securing existing and future public and private critical/networked infrastructure (e.g. in transport, energy, ICT), systems and services (including financial and administrative services).

— Intelligent surveillance and border security: focusing on technologies and capabilities to enhance the effectiveness and efficiency of all systems, equipment, tools and processes as well as methods for rapid identification required for improving the security of Eur^{o}pe's land and coastal borders, including border control and surveillance issues.

— Restoring security and safety in case of crisis: focusing on technologies providing an overview of, and support for diverse emergency management operations (such as civil protection, humanitarian and rescue tasks), and on issues such as inter-organisational preparation, coordination and communication, distributed architectures and human factors.

The above four areas will be supported by the following themes of a more cross-cutting nature:

— Security systems integration, interconnectivity and interoperability: Intelligence, information gathering and civil security, focusing on technologies to enhance the interoperability of systems, equipment, services and processes, including law enforcement, firefighting, civil defence and medical information infrastructures, as well as on the reliability, organisational aspects, protection of confidentiality and integrity of information and traceability of all transactions and processing.

— Security and society: mission orientated research which will focus on socio-economic analyses, scenario building and activities related to: cultural, social, political and economic dimensions of security, communication with society, the role of human values and policy making, psychology social environment of terrorism, citizens' perception of security, ethics, protection of privacy, societal foresight and systemic risk analysis. Research will also address technologies that better safeguard privacy and liberties, and will address vulnerabilities and new threats, as well as the management and impact assessment of possible consequences.

— Security research coordination and structuring: coordination of European and international security research efforts and development of synergies between civil, security and defence research, improvement of legal conditions, and encouragement to the optimal use of existing infrastructures.

II. IDEAS

Objective

This programme will enhance the dynamism, creativity and excellence of European research at the frontier of knowledge. This will be done by supporting ‘investigator-driven’ research projects carried out across all fields by individual teams in competition at the European level. Projects will be funded on the basis of proposals presented by researchers both from the private and public sectors on subjects of their choice and evaluated on the sole criterion of excellence as judged by peer review. Communication and dissemination of research results is an important aspect of this programme.

Rationale

Investigator-driven ‘frontier’ research, within the framework of activities commonly understood as ‘basic research’, is a key driver of wealth and social progress, as it opens new opportunities for scientific and technological advance, and is instrumental in producing new knowledge leading to future applications and markets.

Despite many achievements and a high level of performance in a large number of fields, Europe is not making the most of its research potential and resources, and urgently needs a greater capacity to generate knowledge and translate such knowledge into economic and social value and growth.

A Europe-wide competitive funding structure (in addition to and not replacing national funding) for frontier research executed by individual teams, which may be of national or transnational character, is a key component of the European Research Area, complementing other Community and national activities. It will help reinforce the dynamism and attractiveness of Europe for the best researchers from both European and third countries, and for industrial investment.

Activities

This action will respond to the most promising and productive areas of research and the best opportunities for scientific and technological progress, within and across disciplines, including engineering and social sciences and the humanities. It will be implemented independently of the thematic orientations of the other parts of the Seventh Framework Programme, and will pay attention to new generation researchers and new groups as well as established teams.

The Community activities in frontier research will be implemented by a European Research Council (ERC), consisting of an independent scientific council, supported by a lean and cost-effective dedicated implementation structure. The management of the ERC will be carried out by staff recruited for that purpose, including officials from EU institutions, and will cover only the real administrative needs in order to assure the stability and continuity necessary for an effective administration.

The Scientific Council will consist of representatives of the European scientific community, ensuring a diversity of the research fields, at the highest level, acting in their personal capacity, independently of political or other interests. Its members will be appointed by the Commission following an independent and transparent procedure for their identification, agreed with the Scientific Council, that includes the consultation of the scientific community and a report to the European Parliament and the Council. They will be appointed for a period of four years, renewable once, on a basis of a rotating system which will ensure the continuity of the Scientific Council's work.

The Scientific Council will, inter alia, establish an overall scientific strategy, have full authority over decisions on the type of research to be funded and act as guarantor of the quality of the activity from the scientific perspective. Its tasks will cover, in particular, the development of the annual work programme, the establishment of the peer review process, as well as the monitoring and quality control of the programme's implementation from the scientific perspective. It will establish a code of conduct addressing, inter alia, the avoidance of conflicts of interest.

The dedicated implementation structure will be responsible for all aspects of implementation and programme execution as provided for in the annual work programme. It will, in particular, implement the peer review and selection process according to the principles established by the Scientific Council and will ensure the financial and scientific management of the grants.

The administrative and staffing costs for the ERC relating to the Scientific Council and dedicated implementation structure will be consistent with lean and cost-effective management; administrative expenditure will be kept to a minimum and will not exceed 5 % of the total financial allocation for the ERC, consistent with ensuring the resources necessary for high quality implementation, in order to maximise funding for frontier research.

The Commission will act as the guarantor of the ERC's full autonomy and integrity. It will ensure that the ERC acts in accordance with the principles of scientific excellence, autonomy, efficiency and transparency, and that it follows precisely the strategy and implementation methodology established by the Scientific Council. The Commission will draw up, in cooperation with the scientific council, an annual report on the ERC's operations and realisation of the objectives and submit it to the European Parliament and the Council.

The ERC will have the faculty to conduct its own strategic studies to prepare for and support its operational activities. In particular, it may consult with European, intergovernmental and national initiatives so as to programme its activities in the light of other research at European and national level.

The implementation and management of the activity will be reviewed and evaluated on an on-going basis to assess its achievements and to adjust and improve procedures on the basis of experience. In the context of the interim evaluation referred to in Article 7(2), an independent review will also be carried out of the ERC's structures and mechanisms, against the criteria of scientific excellence, autonomy, efficiency and transparency and with the full involvement of the Scientific Council. This will include the process and criteria for the selection of the members of the Scientific Council. The review will explicitly look at the advantages and disadvantages of a structure based on an Executive Agency, and a structure based on Article 171 of the Treaty. On the basis of this review, these structures and mechanisms should be modified as appropriate. The Commission will ensure that all the necessary preparatory work, including any legislative proposals which it considers necessary, is undertaken and presented to the European Parliament and the Council, as required by the Treaty, with a view to a transition to any modified structure required, as soon as possible. To this end, the Framework Programme will be adapted or supplemented in codecision pursuant to Article 166(2) of the Treaty. The progress report referred to in Article 7(2), preceding the interim evaluation, will give initial findings on the functioning of the ERC.

III. PEOPLE

Objective

Strengthening, quantitatively and qualitatively, the human potential in research and technology in Europe, by stimulating people to enter into the profession of researcher, encouraging European researchers to stay in Europe, and attracting to Europe researchers from the entire world, making Europe more attractive to the best researchers. Building on the experiences with the 'Marie Curie' actions under previous Framework Programmes, this will be done by putting into place a coherent set of 'Marie Curie' actions, particularly taking into account the European added value in terms of their impact on the European Research Area. These actions will address researchers at all stages of their careers, from initial research training specifically intended for young people to life-long learning and career development in the public and private sectors. Efforts will also be made to increase participation by women researchers, by encouraging equal opportunities in all 'Marie Curie Actions', by designing the actions to ensure that researchers can achieve an appropriate work/life balance and by facilitating the resumption of a research career after a break.

Rationale

Abundant and highly trained qualified researchers are a necessary condition to advance science and to underpin innovation, but also an important factor to attract and sustain investments in research by public and private entities. Against the background of growing competition at world level, the development of an open European labour market for researchers free from all forms of discrimination and the diversification of skills and career paths of researchers are crucial to support a beneficial circulation of researchers and their knowledge, both within Europe and in a global setting. Special measures to encourage early-stage researchers and support early stages of scientific career, as well as measures to reduce the 'brain drain', such as reintegration grants, will be introduced.

Mobility, both trans-national and intersectoral, including the stimulation of industrial participation and the opening of research careers and academic positions at European scale, is a key component of the European Research Area and indispensable to increasing European capacities and performance in research. International competition between researchers will remain central in order to ensure the highest quality of research under this activity. Increasing the mobility of researchers and strengthening the resources of those institutions which attract researchers internationally will encourage centres of excellence around the European Union. To ensure training and mobility within new research and technology areas, appropriate coordination with other parts of the Seventh Framework Programme will be ensured and synergies will be sought with other Community policies, e.g. on education, cohesion and employment. Actions on linking science education to careers, and research and coordination actions on new methods in science education are foreseen under the Science in Society part of the 'Capacities' programme.

Activities

— Initial training of researchers to improve their career perspectives, in both public and private sectors, inter alia through the broadening of their scientific and generic skills, including those relating to technology transfer and entrepreneurship, and attracting more young people to scientific careers. This will be implemented through Marie Curie Networks with the main objective being to overcome fragmentation of and to strengthen at European level the initial training and career development of researchers. Support is foreseen for the best early-stage researchers to join established research teams. Members of the trans-national networks must exploit their complementary competencies through integrated training programmes. Support will comprise recruitment of early stage researchers, organisation of training events also open to researchers outside the network and senior chairs and/or industry positions for knowledge transfer and supervision.

— Life-long training and career development to support the career development of experienced researchers. With a view to complementing or acquiring new skills and competencies or to enhance inter/multidisciplinarity and/or inter-sectoral mobility, support is foreseen for researchers with particular needs for additional/complementary competences and skills, for researchers to resume a research career after a break and for (re-)integrating researchers into a longer term research position in Europe, including in their country of origin, after a trans-national/international mobility experience. This action line will be implemented through both individual fellowships awarded directly at Community level and through the co-financing of regional, national or international programmes where this fulfils the criteria of European added value, transparency and openness.

Initially the co-financing mode will be implemented on a controlled scale allowing for the necessary experience to be gained.

— Industry-academia pathways and partnerships: Support for longer term cooperation programmes between organisations from academia and industry, in particular SMEs and including traditional manufacturing industries, will aim at stimulating intersectoral mobility and increasing knowledge sharing through joint research partnerships, supported by the recruitment of experienced researchers to the partnership, by staff secondments between both sectors, and by the organisation of events.

— The international dimension: to increase the quality of European research by attracting research talent from outside Europe and fostering mutually beneficial research collaboration with researchers from outside Europe. This will be addressed through international outgoing fellowships (with an in-built mandatory return phase); international incoming fellowships; partnerships to support the exchange of researchers. Common initiatives between European organisations and organisations from countries neighbouring the EU and countries with which the Community has a Science and Technology agreement will also be supported. The activity will include measures to counter the risk of ‘brain drain’ from developing countries and emerging economies and measures to create networks of European researchers working abroad. These actions will be implemented in line with the international activities under the ‘Cooperation’ and ‘Capacities’ programmes.

— Specific actions to support the creation of a genuine European labour market for researchers, by removing obstacles to mobility and enhancing the career perspectives of researchers in Europe. Incentive measures for public institutions that promote the mobility, quality and profile of their researchers will also be supported. Furthermore, awards to improve the public awareness of Marie Curie actions and their objectives will be provided.

IV. CAPACITIES

This part of the Seventh Framework Programme will enhance research and innovation capacities throughout Europe and ensure their optimal use. This aim will be achieved through:

— Optimising the use and development of research infrastructures,

— Strengthening innovative capacities of SmEs and their ability to benefit from research,

— Supporting the development of regional research-driven clusters,

— Unlocking the research potential in the EU's convergence and outermost regions,

— Bringing science and society closer together for the harmonious integration of science and technology in European society,

— Support for the coherent development of research policies,

— Horizontal actions and measures in support of international cooperation.

RESEARCH INFRASTRUCTURES

Objective

Optimising the use and development of the best research infrastructures existing in Europe, and helping to create in all fields of science and technology new research infrastructures of pan-European interest needed by the European scientific community to remain at the forefront of the advancement of research, and able to help industry to strengthen its base of knowledge and its technological know-how.

Rationale

Research infrastructures play an increasing role in the advancement of knowledge and technology and their exploitation. The importance of such infrastructures is already well established in areas such as energy, space and particle physics and is increasing in other areas. For example, radiation sources, data banks in genomics and data banks in social science, observatories for environmental and space sciences, systems of imaging or clean rooms for the study and development of new materials or nano-electronics, are at the core of research. They are expensive, need a broad range of expertise to be developed, and should be used and exploited by a large community of scientist and customer industries on a European scale.

The development of a European approach with regard to research infrastructures, including computing and communication based e-infrastructures and virtual infrastructures, and the carrying out of activities in this area at Union level, can make a significant contribution to boosting the potential of European research and its exploitation and contributing to the development of the European Research Area.

While the Member States' role will remain central in the development and financing of infrastructures, the Community can and should play a catalysing and leveraging role by helping to ensure wider and more efficient access to, and use of, the infrastructures existing in the different Member States, by stimulating the development of these infrastructures, and their networking, in a coordinated way, and by fostering the emergence of new research infrastructures of pan-European interest in the medium to long term. In this respect, the European Strategy Forum on Research Infrastructures (ESFRI) plays a key role in identifying needs and a roadmap for European research infrastructures.

Activities

Activities carried out under this heading will be executed across the whole field of science and technology. They will be implemented in close cooperation with the activities taking place in the thematic areas to ensure that all the actions undertaken at European level in the Community framework respond to the needs for research infrastructures in the areas concerned, including international cooperation.

The activities will be the following:

— Support for existing research infrastructures

  — Integrating activities to structure better, on a European scale, the way research infrastructures operate in a given field and to promote their coherent use and development, in particular through trans-national access, to ensure that European researchers, including researchers from industry and SMEs, may have access to high performing research infrastructures to conduct their research, irrespective of the location of the infrastructure,

  — Strengthening research e-infrastructure by fostering the further development and evolution and global connectivity of high-capacity and high-performance communication and grid infrastructures and reinforcing European computing capabilities, as well as encouraging their adoption by user communities where appropriate, enhancing their global relevance and increasing the level of trust and confidence, building on the achievements of GEANT and Grid infrastructures and based on open standards for interoperability.

— Support for new research infrastructures

  — Construction of new infrastructures and major upgrades of existing ones focussing mainly on preparatory phases, to promote the emergence of new research facilities, in accordance with the principle of 'variable geometry', building primarily upon the work conducted by ESFRI ([15]),

  — Design studies, through a bottom-up approach of calls for proposals, to promote the creation of new research infrastructures by funding exploratory awards and feasibility studies for new infrastructures.

Infrastructures projects proposed for funding in this respect will be identified on the basis of a series of criteria including in particular:

— Inability of existing mechanisms to achieve the objective.

— Added value of Community financial support.

— Capacity to offer a service in response to the needs of users from the scientific (academic and industrial) community throughout Europe, including added value to the European Research Area.

— Scientific excellence.

— Relevance at international level.

— Contribution to technological development capacity.

— Contribution to developing 'research-based clusters of excellence'.

— Technological and organisational feasibility.

— Possibilities for European partnership and strong financial and other commitment of Member States and other major stakeholders, as well as the possible use of EIB loans and Structural Funds.

— Evaluation of construction and operating costs.

As far as the construction of new infrastructures is concerned, the potential for scientific excellence of the convergence regions as well as the outermost regions should be taken into account, whenever appropriate. An efficient coordination of the Community financial instruments, in particular the Seventh Framework Programme and the structural funds, will be ensured.

RESEARCH FOR THE BENEFIT OF SMEs

Objectives

Strengthening the innovation capacity of European SMEs and their contribution to the development of new technology based products and markets by helping them outsource research, increase their research efforts, extend their networks, better exploit research results and acquire technological know how, bridging the gap between research and innovation.

Rationale

SMEs are at the core of European industry. They should be a key component of the innovation system and in the chain of transformation of knowledge into new products, processes and services. Faced with increasing competition in the internal market and globally, European SMEs need to increase their knowledge and research intensity, enhance the exploitation of research, expand their business activities into larger markets and internationalise their knowledge networks. Most Member State actions relevant to SMEs do not encourage and support trans-national research cooperation and technology transfer. Actions at EU level are necessary to complement and enhance the impact of actions undertaken at national and regional level. In addition to the actions listed below, the participation of SMEs will be encouraged and facilitated, and their needs taken into account, across the Seventh Framework Programme.

Activities

Specific actions in support of SMEs are conceived to support SMEs or SME associations that need to outsource research: mainly low to medium-tech SMEs with little or no research capability. Research intensive SMEs may participate as providers of research services or outsource research to complement their core research capability. Actions will be carried out in the entire field of science and technology with a bottom-up approach. Actions will include support of demonstration and other activities to facilitate the exploitation of research results, ensuring complementarity with the Competitiveness and Innovation Framework Programme. Financial means will be allocated through two schemes:

— Research for SMEs: To support small groups of innovative SMEs to solve common or complementary technological problems.

— Research for SME associations: To support SME associations and SME groupings to develop technical solutions to problems common to large numbers of SMEs in specific industrial sectors or segments of the value chain.

The clear focus will be on support for research projects. In addition, support will be granted to national schemes providing financial means to SMEs or SME associations to prepare proposals for actions under ‘Research for the benefit of SMEs’. During the implementation of the Community RTD Framework Programme, complementarity and synergy will be ensured with the actions of the Competitiveness and Innovation Framework Programme.

The Competitiveness and Innovation Framework Programme will encourage and facilitate the participation of SMEs in the Seventh Framework Programme through its horizontal services in support of business and innovation. Complementarity and synergy with other Community programmes will be ensured.

REGIONS OF KNOWLEDGE

Objectives

Strengthening the research potential of European regions, in particular by encouraging and supporting the development, across Europe, of regional ‘research-driven clusters’ associating universities, research centres, enterprises and regional authorities.

Rationale

Regions are increasingly recognised as important players in the EU's research and development landscape. Research policy and activities at regional level often rely on the development of ‘clusters’ associating public and private actors. The pilot action on ‘Regions of Knowledge’ demonstrated the dynamic of this evolution and the need to support and encourage the development of such structures.

The actions undertaken in this area will enable European regions to strengthen their capacity for investing in RTD and carry out research activities, while maximising their potential for a successful involvement of their operators in European research projects and facilitating the emergence of clusters, thereby promoting regional development in Europe. Actions will facilitate the creation of regional clusters which contribute to the development of the European Research Area.

Activities

The new ‘Regions of Knowledge’ initiative will involve and bring together regional actors involved in research, such as universities, research centres, industry, public authorities (regional councils or regional development agencies). Projects will cover joint analysis of research agendas of regional clusters (in coordination with other activities on the broader issue of regional innovation clusters) and the elaboration of a set of instruments to address them in specific research activities, including through the ‘mentoring’ of regions with less developed research profiles by highly developed regions and support for emerging Regions of Knowledge.

This will comprise measures aiming at improving research networking and access to sources of research funding as well as better integration and linking of research actors and institutions in regional economies. These activities will be implemented in close relationship with Community regional policy (structural funds), the Competitiveness and Innovation Framework Programme and the education and training programmes.

In the context of the specific activity of ‘Regions of Knowledge’ synergies will be sought with Community regional policy as well as with relevant national and regional programmes, in particular with regard to convergence and outermost regions.

RESEARCH POTENTIAL

Objective

Stimulating the realisation of the full research potential of the enlarged Union by unlocking and developing existing or emerging excellence in the EU's convergence regions and outermost regions ([16]), and helping to strengthen the capacities of their researchers to successfully participate in research activities at Community level.

Rationale

Europe does not fully exploit its research potential, in particular in less advanced regions remote from the European core of research and industrial development. In order to help researchers and institutions, whether in the public or private sector, of these regions to contribute to the overall European research effort, while taking advantage of the knowledge and experience existing in other regions of Europe, this action aims at establishing the conditions that will allow them to exploit their potential and help to fully realise the European Research Area in the enlarged Union. The actions will build on past and existing measures such as the European Centres of

Excellence under the Fifth Framework Programme in what were then acceding and candidate countries and Marie Curie Host Fellowships for the Transfer of Knowledge.

Activities

The action in this domain will comprise support for:

— Trans-national two-way secondments of research staff between selected organisations in the convergence regions, and one or more partner organisations; support for selected centres of existing or emerging excellence for the recruitment of incoming experienced researchers, including managers, from other countries.

— The acquisition and development of research equipment and the development of a material environment enabling a full exploitation of the intellectual potential present in the selected centres of existing or emerging excellence in the convergence regions.

— The organisation of workshops and conferences to facilitate knowledge transfer; promotion activities as well as initiatives aiming at disseminating and transferring research results in and to other countries and international markets.

— 'Evaluation facilities' through which any research centre in the convergence regions can obtain an international independent expert evaluation of the level of their overall research quality and infrastructures.

Strong synergies will be sought with Community regional policy. Actions supported under this heading will identify needs and opportunities for reinforcing the research capacities of emerging and existing centres of excellence in convergence regions which may be met by structural and cohesion funds.

Synergies will also be sought with the Competitiveness and Innovation Framework Programme in order to promote the regional commercialisation of RTD in collaboration with industry.

SCIENCE IN SOCIETY

Objective

To stimulate, with a view to building an open, effective and democratic European knowledge-based society, the harmonious integration of scientific and technological endeavour, and associated research policies in the European social web, by encouraging pan-European reflection and debate on science and technology and their relationship with the whole spectrum of society and culture.

Rationale

The influence of science and technology on our daily lives is becoming increasingly profound. Products of social activity and shaped by social and cultural factors, science and technology nevertheless remain a remote domain far from the daily concerns of a large part of the public and of policy decision makers, and continue to be the subject of misunderstandings. Contentious issues relating to emerging technologies should be addressed by society on the basis of well informed debate leading to sound choices and decisions.

Activities

The substantial and integrated initiative undertaken in this field will comprise support for:

— Strengthening and improving the European science system, and addressing the following issues: improving the use and monitoring the impact of scientific advice and expertise for policy-making (including risk management); the future of scientific publications; measures to make scientific publications more accessible to members of the public wishing to consult them; safeguards for scientific domains open to misuse; and issues of fraud, trust and 'self regulation'.

— Broadening the engagement of researchers and the public at large, including organised civil society, with science-related questions, to anticipate and clarify political and societal issues, including ethical issues.

— Reflection and debate on science and technology and their place in society, drawing on disciplines such as history, sociology and philosophy of science and technology.

— Gender research, including the integration of the gender dimension in all areas of research and the promotion of the role of women in research and in scientific decision-making bodies.

— Creation of an open environment which triggers curiosity for science in children and young people, by reinforcing science education at all levels, including in schools, and promoting interest and full participation in science among young people from all backgrounds.

— Strengthening the role of research carried out in universities and other higher education institutes and the engagement of such universities and institutes in the challenges of globalisation.

— Improved intercommunication and mutual understanding between the scientific world and the wider audience of policy-makers, the media and the general public, by helping scientists better communicate and present their work and by supporting scientific information, publications and media.

These activities will take the form of, in particular, research projects, studies, networking and exchanges, public events and initiatives, prizes, surveys and data collection. In many cases they will imply international partnerships with organisations from third countries.

SUPPORT FOR THE COHERENT DEVELOPMENT OF RESEARCH POLICIES

Objectives

Enhancing the effectiveness and coherence of national and Community research policies and their articulation with other policies, improving the impact of public research and its links with industry, and strengthening public support and its leverage effect on investment by private actors.

Rationale

Increasing investment in research and development up to the 3 % objective and improving its effectiveness is a top priority of the Lisbon strategy for growth and employment. Thus, the development of effective policies to leverage public and private research investments is a major concern of public authorities in light of the need to accelerate the transition towards a competitive knowledge-based economy. This calls for adaptability of research policies, the mobilisation of a broader range of instruments, coordination of efforts across national boundaries and the mobilisation of other policies to create better framework conditions for research.

Activities

The activities undertaken under this heading will complement the coordination activities under the 'Cooperation' programme and will aim at improving the coherence and impact of regional, national and Community policies

and initiatives (e.g. funding programmes, legislation, recommendations and guidelines). The activities will be the following:

— Monitoring and analysis of research related public policies and industrial strategies, including their impact, and development of indicators to provide information and evidence in support of the design, implementation, evaluation and trans-national coordination of policies.

— Strengthening, on a voluntary basis, the coordination of research policies via actions to support the implementation of the open method of coordination (OMC) and bottom-up trans-national cooperation initiatives undertaken at national or regional level on issues of common interest.

ACTIVITIES OF INTERNATIONAL COOPERATION

To become competitive and play a leading role at world level, the European Community needs a strong and coherent international science and technology policy. The international actions carried out under the different programmes within the seventh Framework Programme will be implemented in the context of an overall international cooperation strategy.

This international policy has three interdependent objectives:

— To support European competitiveness through strategic partnerships with third countries in selected fields of science and by engaging the best third country scientists to work in and with Europe;

— To facilitate contacts with partners in third countries with the aim of providing better access to research carried out elsewhere in the world;

— To address specific problems that third countries face or that have a global character, on the basis of mutual interest and mutual benefit.

Cooperation with third countries in the Seventh Framework Programme will be targeted, in particular, at the following groups of countries:

— Candidate countries;

— Countries neighbouring the EU, Mediterranean partner countries, Western Balkans countries (WBC) ([17]) and the Eastern European and Central Asian countries (EECA) ([18]);

— Developing countries, focusing on the particular needs of each country or region concerned ([19]);

— Emerging economies.

The theme-oriented international cooperation actions will be carried out under the ‘Cooperation’ programme. The international actions in the area of human potential will be carried under the ‘People’ programme.

Horizontal support actions and measures with a focus other than a specific thematic or interdisciplinary area covered in ‘Cooperation’ programme will be implemented under the ‘Capacities’ programme, and could be supplemented, in a limited number of cases, by specific cooperation actions of mutual interest. Efforts will be undertaken to improve the coherence of national activities by supporting the coordination of national programmes on international scientific cooperation. Taking into account the experience gained through INTAS and building on its work in the framework of cooperation with the Eastern European and Central Asian

countries, activities providing continuity will be undertaken through this programme and the ‘Cooperation’ and ‘People’ programmes.

The overall coordination of the international cooperation actions under the different programmes of the Seventh Framework Programme, as well as with other Community instruments, will be ensured.

NON-NUCLEAR ACTIONS OF THE JOINT RESEARCH CENTRE (JRC)

Objective

To provide customer driven scientific and technical support to the Community policy making process, ensuring support to the implementation and monitoring of existing policies and responding to new policy demands.

Rationale

The JRC's independence of special interests, whether private or national, combined with its technical expertise enable it to facilitate communication and consensus building between stakeholders (industry associations, environmental action groups, Member States' competent authorities, other research centres etc.) and policy makers, especially at the Community level and notably with the European Parliament. Through scientific and technological support the JRC helps to make the Community policy process more effective, transparent and based on sound science. Where and when appropriate, research conducted by the JRC should be coordinated with the research undertaken under the ‘Themes’ of the ‘Cooperation’ Specific Programme, in order to avoid overlap and duplication.

The JRC will strengthen its position in the European Research Area. In facilitating access to its facilities by European and non-European researchers, including early-stage researchers, it will increase its cooperation with other public and private research organisations, consistently improve the scientific quality of its own activities and contribute more scientifically to training, which will remain a high priority for the JRC.

The usefulness and credibility of the JRC's support to Community policies is closely linked to the quality of its scientific expertise and its integration in the international scientific community. The JRC will therefore continue investing in research and networking with other centres of excellence in relevant fields. It will participate in indirect actions in all areas with emphasis on common scientific reference systems, networking, training and mobility, research infrastructure and participation in technology platforms and coordination instruments where it has the relevant expertise to produce added value.

The JRC will actively pursue the promotion of the integration of new Member States and candidate countries in its activities to the level currently enjoyed by the EU-15.

Activities

The JRC's priorities will be in fields which are strategically important for the Union and where its input provides high added value. Scientific and technical support to Community policies will continue to be delivered in core areas such as sustainable development, climate change, food, energy, transport, chemicals, alternative methods to animal testing, research policy, information technologies, reference methods and materials, biotechnology, risks, hazards and socio-economic impacts. Growth will be in areas of key concern for the Community:

— Prosperity in a knowledge-intensive society

  — To carry out and develop advanced econometric modelling and analysis techniques in the context of policy definition and monitoring, for example in the follow-up to the Lisbon Strategy, the Internal Market and Community research and education policies.

  — To develop models to support a new balance between sustainability objectives and competitiveness in a responsible way.

  — To provide its scientific/technical support to the development of risk assessment and management procedures as a tool for the European decision-making process.

— Solidarity and responsible management of resources

  — To become a recognised science and technology reference centre for sustainable agriculture focusing on food quality, traceability and safety (including GM food and feed), spatial management and cross-compliance and to support the implementation of the Common Agricultural Policy.

  — To provide the Common Fisheries Policy with S&T support.

  — To enhance the provision of harmonised European geo-referenced data and spatial information systems (support to INSPIRE) and to continue developing new approaches to global environmental and resources monitoring (support to GMES).

  — To provide expertise and play a role in the GMES research activities and in the development of new applications in this field.

  — To support the implementation of the EU Action Plan on Environment and Health including providing support to on-going activities to establish a Community integrated environment and health information system.

  — To promote and enhance the development and validation of alternative strategies, and in particular non-animal methods, in all relevant areas of research (safety assessment, vaccine testing, health and biomedical research etc.).

— Freedom, security and justice

  — To develop activities contributing to the establishment of the area of freedom, security and justice, especially in areas related to protection against terrorism, organised crime and fraud, border security and prevention of major risks, in cooperation with relevant bodies.

  — To support the Community response to natural and technological disasters.

— Europe as world partner

— To strengthen support to Community external policies in specific areas such as external aspects of internal security, development cooperation and humanitarian aid.

([1]) Throughout the Seventh Framework Programme, 'SMEs' are understood to include microenterprises.

([2]) In particular with the activities carried out by the intergovernmental structure EUREKA. In addition, the experience gained by EUREKA clusters could be relevant to Joint Technology Initiatives in related areas.

([3]) This will include financial support for the administration and coordination activities of COST.

([4]) The term 'bio-economy' includes all industries and economic sectors that produce, manage and otherwise exploit biological resources and related services, supply or consumer industries, such as agriculture, food, fisheries, forestry, etc.

([5]) 'Life sciences and biotechnology — A strategy for Europe' — COM(2002) 27.

([6]) Complementary research relating to the sustainable management and conservation of natural resources is addressed under the 'Environment (including climate change)' theme.

([7]) COM(2000) 0769.

([8]) COM(2005) 0265.

([9]) COM(2006) 0105.

([10]) Complementary research relating to the production and use of biological resources is addressed under the 'Food, Agriculture and Fisheries, and Biotechnology' theme.

([11]) The research agendas of relevant European Technology Platforms will be taken into account in the different activities.

([12]) COM(2001) 370.

([13]) The European aeronautics industry invests 14 % of its turnover in research, the European car industry almost 5 % of its turnover; and the EU shipbuilding industry competitive advantage relies exclusively on RTD.

([14]) ACARE: Advisory Council for Aeronautics Research in Europe. Launched in 2001, it is the first operational example of a Technology Platform; ERRAC: European Rail Research Advisory Council; ERTRAC: European Road Transport Research Advisory Council; WATERBORNE Technology Platform.

([15]) ESFRI was launched in April 2002. ESFRI brings together representatives from the 25 EU Member States, appointed by Ministers in charge of Research, and a representative of the European Commission. The countries associated with Framework Programmes for Research were invited to join in 2004.

([16]) Convergence regions are those set out in Article 5 of the Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund (OJ L 210, 31.7.2006, p. 25). This includes 'convergence' objective regions, regions eligible for funding from the Cohesion fund, and outermost regions.

([17]) Other than associated candidate countries.

([18]) Formerly called the New Independent States: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

([19]) Noting that Latin America includes both developing countries and emerging economies.

ANNEX II

INDICATIVE BREAKDOWN AMONG PROGRAMMES

The indicative breakdown among programmes is as follows (in EUR million):

I. Cooperation ([1]) ([2])	32 413

Health	6 100
Food, Agriculture and Fisheries, and Biotechnology	1 935
Information and Communication Technologies	9 050
Nano-sciences, Nano-technologies, Materials and new Production Technologies	3 475
Energy	2 350
Environment (including Climate Change)	1 890
Transport (including Aeronautics)	4 160
Socio-economic Sciences and the Humanities	623
Space	1 430
Security	1 400
II. Ideas	7 510
III. People	4 750
IV. Capacities	4 097
Research Infrastructures	1 715
Research for the benefit of SMEs	1 336
Regions of Knowledge	126
Research Potential	340
Science in Society	330
Coherent development of research policies	70
Activities of International Cooperation	180
V. Non-nuclear actions of the Joint Research Centre	1 751
TOTAL	50 521

Special provisions concerning the Risk-Sharing Finance Facility (RSFF)

The indicative budgets for the ‘Cooperation’ and ‘Capacities’ programmes include contributions to the European Investment Bank (EIB) for the constitution of the RSFF referred to in Annex III. The Council decisions adopting the contributing specific programmes will establish, inter alia, the implementing arrangements under which the Commission will decide on the reallocation to other activities of the Framework Programme of the Community contribution to the RSFF and the income it generates that are not used by the EIB.

The Seventh Framework Programme will contribute an amount of up to EUR 500 million to the RSFF until 2010. For the period 2010-2013, there will be the possibility to release up to an additional EUR 500 million following the evaluation of the European Parliament and the Council in accordance with the procedure set out in Article 7(2) of this Decision on the basis of a report by the Commission containing information on the participation of SMEs and universities, the fulfilment of the Seventh Framework Programme selection criteria, the kind of projects supported and the demand for the instrument concerned, the duration of the authorisation procedure, the project results, and the funding distribution.

The amount made available out of the Seventh Framework Programme is to be matched by an equivalent amount from the EIB. It will come from the ‘Cooperation’ programme (up to EUR 800 million by proportional contribution of all thematic priorities, except socio-economic sciences and humanities) and the ‘Capacities’ programme (up to EUR 200 million from the research infrastructure line).

The amount will be made available progressively to the EIB taking account of the level of demand.

In order to ensure a rapid launch with a critical mass of resources, an amount in the order of EUR 500 million will be progressively allocated in the budget for a period up to the interim evaluation of the Seventh Framework Programme, referred to in Article 7(2) of this Decision.

([1]) Including Joint Technology Initiatives (including financial plan, etc.) and the part of the coordination and international cooperation activities to be funded within the themes.

([2]) The aim will be to enable at least 15 % of the funding available under the ‘Cooperation’ part of the programme to go to SMEs.

ANNEX III

FUNDING SCHEMES

Indirect Actions

The activities supported by the Seventh Framework Programme will be funded through a range of ‘Funding schemes’. These schemes will be used, either alone or in combination, to fund actions implemented throughout the Framework Programme.

The decisions for specific programmes, work programmes and calls for proposals will specify, as and when appropriate:

— The type(s) of scheme(s) used to fund different actions;

— The categories of participants (such as research organisations, universities, industry, SMEs, public authorities) which can benefit from it;

— The types of activities (such as research and technological development, demonstration, management, training, dissemination, and other related activities) which can be funded through each of them.

Where different funding schemes can be used, the work programmes may specify the funding scheme to be used for the topic on which proposals are invited.

The funding schemes are the following:

(a) To support actions which are primarily implemented on the basis of calls for proposals:

1. Collaborative projects

   Support for research projects carried out by consortia with participants from different countries, aiming at developing new knowledge, new technology, products, demonstration activities or common resources for research. The size, scope and internal organisation of projects can vary from field to field and from topic to topic. Projects can range from small or medium-scale focused research actions to large-scale integrating projects for achieving a defined objective. Projects will also be targeted to special groups such as SMEs and other smaller actors.

2. Networks of Excellence

   Support for a Joint Programme of Activities implemented by a number of research organisations integrating their activities in a given field, carried out by research teams in the framework of longer term cooperation. The implementation of this Joint Programme of Activities will require a formal commitment from the organisations integrating part of their resources and their activities.

3. Coordination and support actions

   Support for activities aimed at coordinating or supporting research activities and policies (networking, exchanges, trans-national access to research infrastructures, studies, conferences, etc.). These actions may also be implemented by means other than calls for proposals.

4. Support for ‘frontier’ research

   Support for projects carried out by individual national or transnational research teams. This scheme will be used to support investigator-driven ‘frontier’ research projects funded in the framework of the European Research Council.

5. Support for training and career development of researchers

   Support for training and career development of researchers, mainly to be used for the implementation of the Marie Curie actions.

6. Research for the benefit of specific groups (in particular SMEs)

   Support for research projects where the bulk of the research and technological development is carried out by universities, research centres or other legal entities, for the benefit of specific groups, in particular SMEs or associations of SMEs. Efforts will be undertaken to mobilise additional financing from the EIB and other financial organisations.

(b) To support actions implemented on the basis of decisions by the Council and the European Parliament (or by the Council in consultation with the European Parliament) based on a proposal from the Commission, the Community will provide financial support to multi-financed large-scale initiatives.

— A financial contribution from the Community to the joint implementation of well identified national research programmes, on the basis of Article 169 of the Treaty. This joint implementation will require the establishment or existence of a dedicated implementation structure. Community financial support will be provided subject to the definition of a financing plan based on formal commitments from competent national authorities.

— A financial contribution from the Community to the implementation of Joint Technology Initiatives to realise objectives that cannot be achieved through the funding schemes identified in part (a) above. Joint Technology Initiatives will mobilise a combination of funding of different kinds and from different sources; private and public, European and national. This funding may take different forms and may be allocated or mobilised though a range of mechanisms: support from the Framework Programme, loans from the European Investment Bank (EIB), risk capital support. Joint Technology Initiatives may be decided and implemented on the basis of Article 171 of the Treaty (this may include the creation of joint undertakings) or through the Decisions establishing the specific programmes. Community support will be provided subject to the definition of an overall blueprint of financial engineering, based on formal commitments from all parties concerned.

— A financial contribution from the Community to the development of new infrastructures of European interest. This contribution may be decided on the basis of Article 171 of the Treaty or through the Specific Programme Decisions. The development of new infrastructures will mobilise a combination of funding of different nature and origin: national funding, Framework Programme, Structural funds, loans from the EIB and others. Community support will be provided subject to the definition of an overall financial plan based on a commitment from all parties concerned.

The Community will implement the funding schemes identified in part (a) above in compliance with the provisions of the regulation to be adopted pursuant to Article 167 of the Treaty, the relevant State aid instruments, in particular the Community framework for State aid to research and development, as well as international rules in this area. In compliance with this international framework, it will be necessary to be able to adjust the scale and form of financial participation on a case-by-case basis, in particular if funding from other public sector sources is available, including other sources of Community financing such as the EIB.

In addition to providing direct financial support to participants in RTD actions, the Community will improve their access to debt finance through the ‘Risk-Sharing Finance Facility’ by providing a contribution to the EIB. The Community contribution must be used by the EIB, which will be a risk sharing partner, to contribute to the provisioning and capital allocation for loan and guarantee financing from its own resources. There will be no further liability for the Community budget. Subject to and in accordance with arrangements to be established by the regulation adopted pursuant Article 167 of the Treaty and the Council decisions adopting the specific programmes, this mechanism will enable the EIB to increase the amount of financing of European RTD actions (such as joint technology initiatives, large projects-including EUREKA projects, and new research infrastructures and projects run by SMEs) to help overcome market deficiencies.

In the case of participants in an indirect action established in a region lagging in development (convergence regions and outermost regions ([1])), complementary funding from the structural funds will be mobilised wherever possible and appropriate. In the case of participation of entities from the candidate countries, an additional contribution from the pre-accession financial instruments may be granted under similar conditions. As regards actions in the ‘research infrastructures’ part of the ‘capacities’ programme of the Seventh Framework

Programme, the detailed funding arrangements for these will be defined with a view to ensuring that there is effective complementarity between community research funding and other Community and national instruments, notably the structural funds.

Direct actions

The Community will undertake activities implemented by the Joint Research Centre, which are referred to as direct actions.

([1]) Convergence regions are those set out in Article 5 of Regulation (EC) No 1083/2006. This includes ‘convergence’ objective regions, regions eligible for funding from the Cohesion fund, and outermost regions.

STATEMENTS BY THE COMMISSION

Re Article 6

For the 7th Framework Programme, the European Commission proposes to continue with the same ethical framework for deciding on the EU funding of human embryonic stem cell research as in the 6th Framework Programme.

The European Commission proposes the continuation of this ethical framework because it has developed, based on experience, a responsible approach for an area of science which holds much promise and that has proven to work satisfactorily in the context of a research programme in which researchers participate from many countries with very diverse regulatory situations.

(1) The decision on the 7th Framework Programme explicitly excludes three fields of research from Community funding:

— research activities aiming at human cloning for reproductive purposes;

— research activities intended to modify the genetic heritage of human beings which could make such changes heritable;

— research activities intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

(2) No activity will be funded that is forbidden in all Member States. No activity will be funded in a Member State where such activity is forbidden.

(3) The decision on FP7 and the provisions for the ethical framework governing the Community funding of human embryonic stem cell research entail in no way a value judgement on the regulatory or ethical framework governing such research in Member States.

(4) In calling for proposals, the European Commission does not explicitly solicit the use of human embryonic stem cells. The use of human stem cells, be they adult or embryonic, if any, depends on the judgement of the scientists in view of the objectives they want to achieve. In practice, by far the largest part of Community funds for stem cell research is devoted to the use of adult stem cells. There is no reason why this would substantially change in FP7.

(5) Each project proposing to use human embryonic stem cells must successfully pass a scientific evaluation during which the necessity of using such stem cells to achieve the scientific objectives is assessed by independent scientific experts.

(6) Proposals which successfully pass the scientific evaluation are then subject to a stringent ethical review organised by the European Commission. In this ethical review, account is taken of principles reflected in the EU Charter of Fundamental Rights and relevant international conventions such as the Convention of the Council of Europe on Human Rights and Biomedicine signed in Oviedo on 4 April 1997 and its additional protocols and the Universal Declaration on the Human Genome and the Human Rights adopted by UNESCO. The ethical review also serves to check that the proposals respect the rules of the countries where the research will be carried out.

(7) In particular cases, an ethical review may be carried out during the lifetime of the project.

(8) Each project proposing to use human embryonic stem cells must seek the approval of the relevant national or local ethics committee prior to the start of the project. All national rules and procedures must be respected, including on such issues as parental consent, absence of financial inducement, etc. Checks will be made on whether the project includes references to licensing and control measures to be taken by the competent authorities of the Member State where the research will be carried out.

(9) A proposal that successfully passes the scientific evaluation, the national or local ethical reviews and the European ethical review will be presented for approval, on a case by case basis, to the Member States, meeting as a Regulatory Committee. No project involving the use of human embryonic stem cells will be funded that does not obtain approval from the Member States.

(10) The European Commission will continue to work to make the results from Community funded stem cell research widely accessible to all researchers, for the ultimate benefit of patients in all countries.

(11) The European Commission will support actions and initiatives that contribute to a coordination and rationalisation of HESC research within a responsible ethical approach. In particular, the Commission will support a European registry of human embryonic stem cell lines. Support for such a registry will allow a monitoring of existing human embryonic stem cells in Europe, will contribute to maximise their use by scientists and may help to avoid unnecessary derivations of new stem cell lines.

(12) The European Commission will continue with the current practice and will not submit to the Regulatory Committee proposals for projects which include research activities which destroy human embryos, including for the procurement of stem cells. The exclusion of funding of this step of research will not prevent Community funding of subsequent steps involving human embryonic stem cells.

Re the Energy theme

The ten themes of the Cooperation Programme include research needed to underpin the formulation, implementation and assessment of Community policies to which the Commission attaches a central role. It appreciates the importance that the European Parliament attaches to energy policy in general and to the promotion of energy efficiency and renewable energy sources in particular. In order to allow the Parliament to follow the implementation of the Programme, the Commission intends to continue the policy of transparency and provision of information. Appropriate information on projects funded by the FP will be fully available to the public through the internet. Particular attention will be given to ensuring, at least every two years, a comprehensive presentation of projects related to rational and efficient use of energy and the role of renewable energy sources.

Re Ideas

In the context of the progress report referred to in Article 7(2) and preceding the interim evaluation, the Commission will present to the European Parliament and the Council by mid-2008 a Communication on the methodology and terms of reference to be used for the review to be carried out by independent experts

concerning the ERC's structures and mechanisms. If necessary the Commission will present a proposal for the adaptation of the Framework Programme.