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Annual Report on Research and technological development activities of the European Union in 2006

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1. EUROPEAN SUPPORT TO RESEARCH: ACTIVITIES AND RESULTS IN 2006

1.1. Policy Strategy and Coordination

The EU's research policy set as its priority goal to help the EU to become the most dynamic and competitive knowledge-based economy in the world by 2010. As confirmed by the Commission in 2005, research, and on a broader basis, knowledge (from research, education and innovation) is an important element in achieving the objectives of the reinvigorated Lisbon Strategy. The creation of the European Research Area (ERA), the overall objective of the European Research Policy and thus a priority for the Commission, is at the centre of the knowledge-based economy and society. The aim of the EU is to overcome the fragmentation of efforts and to promote complementarities and synergies towards the generation of knowledge. Within the context of the new momentum for prosperity and enhanced competitiveness, stability and security, The Commission advanced towards attaining its 2006 objectives, namely conceiving and implementing policy initiatives towards the ERA, including preparatory work **for a Green Paper on the European Research Area, which was adopted in April 20071; making the last commitments under the Sixth Framework Programme (FP6);** and ensuring the successful launch of the Seventh Framework Programme (FP7) at the same time.

To implement the Lisbon Strategy and to make it more effective, the Commission has taken action at all levels: in the private and public sectors, at international, European, national, regional and local levels. In addition actions have been taken to reinforce coordination and synergies between research, innovation and cohesion policies.

Framework Programmes: an important role in European Research

Successful conclusion of sixth Framework Programme (FP6)

2006 was the last year for implementing activities under FP6. The various components of FP6 were smoothly managed: budgetary execution was above 99%, proposal submission was managed without any problems, as well as the work of the programme committees and the revision of the work programmes of the Specific Programmes. In FP6, new funding instruments were successfully created, such as Networks of Excellence and Integrated Projects – which permit the assembly of a critical mass of expertise and resources to achieve ambitious research objectives. The main results obtained with these instruments are presented in the following sections.

Adoption of Seventh Framework Programmes (FP7)

The adoption of the European Community (EC) Seventh Framework Programme and the European Atomic Energy Community (Euratom) Framework Programme in December 2006 marked a major achievement for European research. After years of preparation and intense negotiations, the main financial and legal instruments were adopted to contribute to the implementation of the European Research Area for the period 2007 to 2013.

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[1] COM(2007)161.

A Commission Communication[2] had launched the debate in 2004. All interested parties were consulted: stakeholders (by means of a large open consultation in the autumn of 2004), other institutions, experts (the Marimón Panel, and those involved in the Five Year Assessment, etc.), and this served as a basis for the formal proposals by the Commission in April 2005 which were accompanied by a detailed Impact Assessment. Subsequently, the Commission contributed actively to the intensive inter-institutional negotiations, leading to the adoption of all pertinent legislative acts in December 2006. The first 42 Calls for Proposals under FP7 were published on 22 December 2006.

In line with FP6, FP7 has introduced a simplification of the regulatory and administrative environment, notably concerning simpler access to the programmes, simpler administrative procedures and the transfer of some logistic and administrative tasks to external structures.

The number of funding schemes has been reduced, and fewer reports will be requested to the beneficiaries. On the other hand, the new intervention mechanisms, such as the loans from the European Investment Bank, further opening-up to international partners or the strengthening of cooperation with other policies (innovation and cohesion policies), will reinforce the contribution to competitiveness. Other novel or reinforced aspects are the Joint Technology Initiatives, the coordination of national programmes, the technology platforms and industry-driven projects in most technology sectors.

FP7 is a major driving force for the European Research Area, and will contribute to greater dynamism and competitiveness of the European economy, thus helping to build up citizens' confidence in Europe. Facing the challenge of globalisation, it focuses on the creation of a real internal market for knowledge. FP7 Specific Programmes support collaborative actions, stimulate excellence through competition with the creation of the European Research Council, enhance the human potential in European research and help to improve research infrastructures and overall capacities. Emerging and unforeseen needs will also be taken into account, and the dissemination of results will be encouraged.

Preparation of executive agency structures for FP7

In its proposals for FP7, the Commission indicated its intention to create an executive agency to handle the management of the full project life cycle for some parts of the Framework Programme (most notably Marie Curie, Space, Security and SME Actions). Shared logistical services will also be used by the whole of the Framework Programme - in particular, support to proposal submission and evaluation, a centralised helpdesk/enquiry service, a centralised repository for participant data and legal and financial viability checking of participants. By creating a separate executive agency, many of the associated administrative tasks can be carried out with greater efficiency and consistency, while freeing the Commission to concentrate on its core task of policy setting.

In advance of the creation of the Executive Agency, Calls for Tender for Information Technology (IT) services for the preparation and submission of proposals and support to the evaluation process, were successfully concluded. In addition, a contract for a new building located in the centre of Brussels specially adapted to the requirements for conducting proposal evaluations was signed to replace the old evaluation facility building used in previous Framework Programmes. A new helpdesk/enquiry service was also put in operation before the

[2] 'Science and technology, the key to Europe's future' – 16.06.2004.

launch of FP7. Much of this structure will be managed by the Executive Agency once it has been established. In parallel, work to undertake a cost-benefit analysis and to prepare the legal acts to establish the Executive Agency was near to completion by the end of 2006.

Setting up the European Research Council

The European Research Council (ERC) is a new European organisation for the support of research at the frontiers of knowledge which will benefit from a substantial budget (EUR 7.51 billion over the course of FP7) and independent scientific governance. It represents a dynamic new development in European research funding and a major departure from traditional operational methods and established governance structures.

The ERC will be made up of the Scientific Council and its Dedicated Implementation Structure (DIS). The founding members of the Scientific Council were nominated by the Commission following an independent identification process involving Europe's research community. The composition of the Scientific Council and the combined experience of its members reflect a broad field of expertise encompassed by frontier research.

During 2006, the Commission started to build up the implementation capacity of the DIS at operational level, firstly by establishing a Directorate to Implement the Ideas Programme. It is working closely and intensively with the Scientific Council, which met regularly during 2006 to establish the scientific strategy and evaluation methodology for the Ideas Programme. The operational experience from the Sixth Framework Programme's New and Emerging Science and Technology (NEST) Programme has provided useful input into the development work of the ERC. In particular, the Scientific Council has used the good practice of the NEST evaluation process as the basis for the evaluation procedures for the ERC activities.

Reinforcing Links with Local, National and Private Efforts

European Technology Platforms

At the end of 2006, there are 31 European Technology Platforms (ETPs) up and running, spanning a wide range of technologies which are key to Europe's growth and competitiveness.

The Commission services have strongly encouraged this bottom-up, industry led approach to defining medium to long-term research needs. The objectives and research priorities of the Strategic Research Agenda (SRAs) developed by these ETPs have to a broad extent been taken into account in identifying the research areas and priorities/projects of the ten themes of the Cooperation specific programmes and the first FP7 work programmes[3]. Each ETP is "covered" by at least one theme of the cooperation specific programme, in one case by up to 7 themes.

In May 2006, a large ETP conference was held in Vienna during the Austrian Presidency. The conference confirmed that ETPs are providing a valuable framework for addressing Europe's competitiveness via research and innovation and it that its future role could be extended to provide a more proactive approach to overcome barriers to innovation in Europe and identifying demand side policy actions in the area of standardisation, public procurement and

[3] See analysis in "At the launch of FP7" Third status report of ETPs; March 2007: ftp://ftp.cordis.europa.eu/pub/technology-platforms/docs/etp3rdreport_en.pdf

regulations. The consultation of ETPs on the Commission's lead market initiative in the 2nd half of 2006, including two ETP leader meetings in July and December, has been a first step in this direction. In October 2006, another ETP meeting brought together EIB financial experts with ETP leaders to discuss the potential of EIB instruments for the financing of ETP projects.

A new funding scheme to increase private investment in research

The Risk-Sharing Finance Facility (RSFF) is a new funding scheme of the European Investment Bank (EIB) supported by FP7 to predominantly increase private investment in Research, Technological Development and Demonstration (RTD) as well as in Innovation. The RSFF, which has been jointly developed by the Commission and the EIB, will provide loans and guarantees for RTD and innovation projects, including support to research infrastructures, which would otherwise not receive sufficient finance due to their high-risk nature. The EC and the EIB, as risk-sharing partners, will make a contribution of up to EUR 1 billion each to the facility to cover the specific risks related to the financing of RSFF projects. Based on this risk-sharing partnership, a total of up to EUR 10 billion could be provided to RTD and innovation projects under the RSFF.

In 2006, the Commission launched successfully the process of a consultation with the European Council and the European Parliament on the RSFF in the context of the adoption of FP7 at the end of 2006.

During 2006, EU Member States, future FP7 Associated Countries and other stakeholders were informed of the development of the RSFF through dedicated workshops and conferences. Their feedback on the various aspects of the facility was taken into account.

In order to support the implementation of the RSFF and to raise awareness of the new funding scheme among potential partner banks and project promoters, a Specific Support Action (SSA) was launched in 2006. Under this SSA, the EIB will carry out a number of activities to facilitate the introduction of the RSFF in the market, especially awareness raising activities.

During the last quarter of 2006, the EC and the EIB started negotiations on the agreement stipulating the terms and conditions for the implementation of the RSFF by the EIB. This agreement is expected to be signed in June 2007.

A new public-private link to boost Europe's industrial competitiveness

Joint Technology Initiatives (JTIs) are legal entities which are proposed as a new way of realising public-private partnerships in a strategic industrial research and development field at European level.

In the Commission's proposal for the Seventh Framework Programme, six areas were identified where a JTI could have particular relevance: hydrogen and fuel cells, aeronautics and air transport, innovative medicines, nano-electronics (ENIAC), embedded computing systems (ARTEMIS) and global monitoring for environment and security. In 2006, significant progress was made in developing the proposals for JTIs. The form of legal entity has also been confirmed, with JTIs favouring a joint undertaking under Article 171 of the Treaty.

In the roadmap presented by the Commission services in November 2006, it is stated that the six potential JTIs had not all reached the same level of preparation. It identified four "keys for success": additionality, market failure, governance, and the commitment of Member States.

The roadmap also indicated that the Commission services would arrange for an objective analysis of the economic and social effects of each potential JTI. The Commission has presented its first proposals for JTIs to the Council in spring 2007.

At the December 2006 European Council meeting, the Commission was invited "to rapidly make proposals for the setting up of the industry-led Joint Technology Initiatives, which are also open to SMEs, with a view to launching the most advanced ones in 2007".

The first Article 169 initiatives to integrate activities of national programmes

Article 169 of the EU Treaty provides a legal basis for the Community to support the integration of national research programmes by means of participation in research and development programmes undertaken by several Member States. Drawing a key lesson from the "European and Developing Countries Clinical Trials Partnership" (EDCTP), the first application of Article 169 which was launched under the FP6, an Article 169 initiative can only function effectively if there are three levels of integration between the national programmes involved: scientific, management and financial integration. The EDCTP has also shown that the latter is of particular importance and that, from the outset, a clear, multi-annual commitment from the participating countries must be ensured in financial terms. The scientific, management and financial integration represent essential boundary conditions which must be met satisfactorily before bringing forward a proposal for an initiative under Article 169 of the EU Treaty. The Commission discussed with CREST the proposed approach to these boundary conditions.

The Commission services identified as well four initiatives which had the potential to become Article 169 initiatives: - "Ambient Assisted Living" (AAL); - Baltic sea research (Bonus-169); - metrology (the science of measurement) (EMRP); - a joint research programme for research performing SMEs and their partners (EUROSTARS). Two of these, "EUROSTARS" and "AAL", appear to be the most advanced for proposal submission under Article 169 in 2007.

The Commission intends to propose Article 169 initiatives to the European Council and European Parliament for adoption, provided that the boundary conditions in relation to scientific, management and financial integration can be met.

Improvement of regional investment

The Commission has backed several activities aimed at raising regional involvement in the knowledge-based economy.

The 'Regions of Knowledge' Pilot Action[4] launched in 2003 with a budget of EUR 2.5 million, aimed at developing experimental activities involving networks of European regions (with the active involvement of universities, research centres and the business community) so as to create "knowledge regions" which could serve as models for the implementation of the Lisbon Strategy at regional level. According to the impact assessment of the Pilot Action completed in September 2006, the Regions of Knowledge Pilot Action successfully brought the notion of territory into science-policy thinking and the role of science into regional development thinking.

[4] http://cordis.europa.eu/era/regions.htm

The success of the Pilot Action led to the launch in 2004 of the "Regions of Knowledge 2"[5] policy initiative, this time in FP6. It is much more R&D oriented than its predecessor and it promotes increased and better regional investment in research through mutual learning, coordination and collaboration between regional players in R&D (including in academia and industry). At the end of 2006, a total of 21 projects had been financed under Regions of Knowledge 2, with a total budget of EUR 10.4 million. 'Regions of Knowledge 2' shows very encouraging results in presenting regions with a tool to focusing on the Barcelona objective (3%) at regional level.

Aiming at raising regional involvement in the knowledge economy, Regions of Knowledge activities constitute the first stone of a more ambitious regional dimension in the 7th Framework Programme.

A specific and systematic collaboration of regional actors was developed within the activities of the Mutual Learning Platform for the Regions, a concept launched in 2005 under the IRE Network. Two workshops were organised in June 2006 on the themes "How to make Regional Growth Poles Work" and "Regional Benchmarking". The MLP Final Conference took place in Brussels on 13 October 2006.

[5] http://cordis.europa.eu/fp6/dc/index.cfm?fuseaction=UserSite.FP6DetailsCallPage&call_id=180

A first time conference on 'Giving More for Research in Europe'

The first ever conference on the role of philanthropy in funding research was organised by the Commission in Brussels in March 2006, in cooperation with the European Foundation Centre. More than 200 participants – from charitable foundations, universities, industry, national authorities and research organizations – discussed strategies and initiatives on how to step up the role of philanthropy in boosting Europe's research funding and capabilities. The main conclusions were cross-cutting issues relating to governance, legal and tax treatments of foundations as means to increase the impact and effectiveness of research funding.

The need to create a European Forum in charge of developing a policy agenda to boost charitable funding in research came out of the conference debates. The forum will be created later in 2007 by the European Foundation Centre with the Commission's support. It will serve as a platform to improve mutual learning, synergies and collaboration between stakeholders, and help identify challenges and priorities in the role of philanthropy in research funding.

Creating a favourable environment for investment in research

Promoting fiscal measures to foster R&D

On 22.11.2006, the Commission adopted a Communication[6] on the more effective use of tax incentives in favour of R&D in order to boost R&D investments and enhance job creation and economic growth in Europe. The Communication clarifies the legal conditions arising from EU case law and sets out some basic principles and good practices for the design of tax incentives for R&D. It also encourages Member States to improve the use and coordination of tax incentives on specific R&D issues, in particular regarding the funding for large-scale trans-national R&D projects, the growth of young innovative enterprises, the cross-border mobility of researchers and the treatment of philanthropic funding of research.

A new Community Framework for State Aid for Research and Development and Innovation

After a thorough consultation of stakeholders in 2006, the new *Community Framework for State Aid for Research and Development and Innovation*[7] entered into force on 1 January 2007. The framework clarifies the conditions under which State aid for R&D&I is deemed compatible with the Internal Market. In particular, it provides clarifications on the treatment of public support to research organisations, including university-industry collaborations; of aid given in the form of fiscal measures; and of advances repayable in case of success. Furthermore, the framework introduces a range of new possibilities to provide State aid to support innovation: e.g. aid for young innovative enterprises, for the loan of highly qualified personnel and for innovation clusters.

Promoting knowledge transfer between public research organisations and industry

A public consultation[8] carried out in 2006 showed that the exploitation of publicly-funded research results is deemed to be an important driver for EU competitiveness. It also

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6 COM(2006)728 – http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0728en01.pdf

7 2006/C 323/01 – http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/c_323/c_32320061230en00010026.pdf

8 See report : http://ec.europa.eu/invest-in-research/pdf/download_en/consult_report.pdf

highlighted a number of key issues that should be addressed if closer PRO-industry links are to be achieved. On the basis of the results of this consultation as well as other sources of input (including new national guidelines, etc.), the preparation of a Commission Communication was initiated (which was adopted in 2007[9]).

Realising a Single Labour Market for Researchers

Promoting researcher's mobility and career development

The quantitative and qualitative availability of adequate human resources is a key aspect of the implementation of the ERA. In this context, the objective of promoting the attractiveness of the researcher's career and removing the obstacles to their mobility between countries, disciplines, sectors or institutions have continued to be subject to a number of initiatives within the Mobility strategy and the researcher's career development policy on the basis of the Communications "A mobility strategy for the ERA"[10] and "Researcher's in the ERA: one profession, multiple carriers"[11] endorsed by the Council.

In particular, progress has been achieved in the implementation of both the "Visa package" (containing one directive and two recommendations) aimed at facilitating the entry of third country researchers into the EU, and of the European Charter for Researchers and the Code of Conduct for their recruitment. The ERA-Link initiative[12] was also officially launched in June 2006 in the USA by Commissioner Potočnik and developed considerably since then. The various measures have been followed and promoted within the Steering Group Human Resources and Mobility (SG HRM) in which the Commission and the Member States have put into practice the Open Method of Coordination (OMC) entailing mutual information, coordination and exchange of good practices.

Regarding the Visa package, the two recommendations on long-term admission and short-term visa entered into force upon adoption (in 2005). Most Member States have started the transposition process of the directive and it is expected to be finalised by October 2007.

In connection to the amelioration of the career development of the researchers a number of developments took place in 2006 concerning the Recommendation on the European Charter for Researchers and the Code of Conduct for their Recruitment. The Commission co-organised the Austrian Presidency Conference on the "Charter and Code" (June 2006), which particularly stressed the need for a transparent and effective implementation process of these tools. Real progress includes: over 170 out of 650 institutions in 19 countries have now signed the Charter and Code. Following the Conference, the work towards the set up of a Charter and Code labelling mechanism was continued through an ad hoc working group.

The challenges for European University-based Research were addressed in the Communication "Delivering on the Modernisation Agenda for Universities: Education, Research, Innovation", issued in May 2006. This document was also a reply to the high political priority given to universities in the informal European Council meeting in Hampton Court in 2005, and was presented to the European Council in June 2006. Preparatory work was done to cover the appropriate follow-up activities under FP7.

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9 See COM(2007)182 and SEC(2007)449.
10 COM(2001) 331 final of 20.06.2001.
11 COM(2003) 436 final of 18.07.2003.
12 http://cordis.europa.eu/eralink/

The International Dimension of the European Research Area

To become more competitive and to play a leading role at world level, the European Community needs a strong and coherent international science and technology policy and actions. One of the main challenges has been the international opening up of the thematic priorities to third country participants. The political objective of this was to implement a target of EUR 285 million for third country participation in FP6 thematic programme priorities. Additional measures have been taken in 2006, in particular where a specific topping-up Call of EUR 20 million was successfully implemented in order to increase third country participation in European research projects already signed or under negotiation.

S&T in EU pre-accession and neighbourhood policy

For the candidate and potential candidate countries, the aim has been to create a maximum of synergy between the financing possibilities under the Pre-Accession Instrument (IPA) and FP7. The different IPA components are considered with the aim of supporting research capacity building and infrastructure projects which in turn can help in increasing the participation of the enlargement countries under FP7. In the renewed Neighbourhood policy, research has been playing an increasing role in creating closer ties and actions of mutual benefit with the Neighbourhood countries.

China-EU Science and Technology Year

Supporting the research relations with China, the "China-EU Science & Technology Year"[13] was launched in Brussels in October 2006 alongside the annual Steering Committee meeting of the Science and Technology Agreement. Over 130 joint EU-China research projects are supported in FP6 amounting to nearly EUR 900 million in total project funding. The launch of the China-EU Science and Technology Year shows the intention of both regions to promote and enhance cooperation in this field, including ways to improve the mobility of researchers between the two economic areas.

1.2. Indirect support actions

1.2.1. Life Sciences, Genomics and Biotechnology for Health

The Life Sciences, Genomics and Biotechnology for Health action of the FP6 had a strong focus on integrating post-genomic research, including research on related molecular mechanisms, into the more established biomedical and biotechnological approaches. It also aimed at integrating research capacities (both public and private) across Europe to increase coherence and to achieve critical mass. The last generation of projects was selected in 2006, leading to a global figure of more than 600 European collaborations involving around 7,500 research teams, with a global Community contribution of EUR 2.5 billion and a matching investment of approximately EUR 1.25 billion in the Member and Associated States.

A public-private partnership for better medicine for patients

To strengthen European competitiveness and to deliver better medicine to patients, the Commission further developed the idea of a Joint Technology Initiative (JTI) on Innovative Medicines together with the European Federation of Pharmaceutical Industries and

[13] http://ec.europa.eu/research/iscp/eu-china/index_en.html

Associations (EFPIA). This public-private partnership in R&D aims to address bottlenecks hampering the efficiency of the development of new medicines, notably by pooling resources from all stakeholders (industry, academia, SMEs, regulatory authorities, healthcare providers, patient organisations) around key research priorities as defined in the Strategic Research Agenda, i.e. better prediction of safety and efficiency of new medicines, better knowledge management and strengthened education and training. Continued efforts have been devoted to developing a sound governance structure and to defining the operational aspects of such a JTI. Significant advances were made in 2006 on the preparation of the Commission's proposal to the Council to establish the Innovative Medicines Joint Undertaking under Article 171 of the EC Treaty.

Strengthened international cooperation for health research

Health is an issue of interest and importance to all countries, so health research is international by nature. The internationalisation of health research funded by the Framework Programmes continued in 2006 with a significant increase in third country participation in new projects. The domain of INCO-health was successfully integrated in the first FP7 Work Programme for the Health Theme. Bilateral and regional dialogue with third countries for stimulating international cooperation were established and deepened, which was reflected in the priority setting for the first Calls for Proposals in FP7. In total, 15 topics for Specific International Cooperation Actions have been identified, in areas ranging from neglected infectious diseases to health services research, with a budget of EUR 64 million for the next two years. The Commission was also represented in the meetings of the Heads of International Health Research Organisations (HIROs), confirming the Commission's place among the main health R&D funding agencies in the world. Major workshops were organised with third countries e.g. on antimicrobial drug resistance (South-East Asia), proteomics (USA), health SMEs (China) and Tuberculosis (India). The Commission has continued its participation in the international Human Frontier Science Programme (HFSP) that includes the G7 countries plus several other countries, thereby enabling non-G7 EU Member States to take part. Cooperation was also initiated between international funding agencies on topics such as functional genomics and the use of infrastructures such as biobanks, which are essential tools for advanced health research. Over the last years, several large EU projects in mouse functional genomics have coordinated their research agendas[14] and thus enabled the EU to become a leading partner in large world-wide efforts such as the International Mouse Mutant Collaborative Project co-funded by the EC, the US National Institutes of Health (NIH) and Genome Canada[15].

Pandemic Influenza: combining reactive and preventive approaches

During the course of 2005, an increasing threat of pandemic influenza manifested itself with a number of human cases of H5N1[16] influenza infection in East and South-East Asia, the Caucasus region and Turkey, and with several smaller outbreaks of avian H5N1 infection in

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14 Nature, vol. 444, pp. 814-816, 14 December 2006.

15 Mouse international mutagenesis programme: see press releases: http://ec.europa.eu/research/press/2006/pr0709en.cfm ; http://www.genomecanada.ca/xpublic/media/pressReleasesDetails.asp?id=515&l=f ; http://www.nih.gov/news/pr/sep2006/nhgri-07a.htm

16 H5N1 is a subtype of the species Influenza A virus of the Influenzavirus A genus of the Orthomyxoviridae family - H5 stands for the fifth of several known types of the protein hemagglutinin. N1 stands for the first of several known types of the protein neuraminidase.

wild birds and poultry all over the EU. The Commission has been funding research in this field since 2000. In response to this crisis, a special Call for Proposals in the area of research on avian influenza was launched. In 2006, six projects were selected and have now started, with a global budget of EUR 14 million. These projects bring together a total of 40 excellent collaborating institutions, including 10 SMEs and two large vaccine companies, from all over Europe, as well as from China and Russia. These teams are working on issues such as the development of improved vaccines and vaccine delivery; on the factors affecting bird-to-human disease transmission and on better exploitation of the body's innate immune response. Their results will significantly help to prepare Europe for the possible outbreak of pandemic influenza and will lay solid foundations for future work to fight this and other emerging epidemics.

The European and Developing Countries' clinical trials partnership to fight HIV/AIDS, malaria and tuberculosis (EDCTP)

This first application of Article 169 of the EC Treaty, whereby the Community can participate in research programmes undertaken by several Member States, has the objective of reducing the burden of HIV/AIDS, malaria and tuberculosis via clinical trials and capacity-building in Africa. Following the first Calls for Proposals launched by the partnership, major research work has started on topics such as new tuberculosis drug regimes, new drugs for malaria, and vaginal microbicides for the prevention of HIV/AIDS. Two additional Calls were published in 2006 with, for the first time, direct financial contributions from the Member States. The Conclusions of the G8 meeting of June 2006, under the Russian presidency, referred to EDCTP, thereby acknowledging the momentum gained by this pioneering initiative. The EDCTP also provided significant support to the Global HIV/AIDS Vaccine Enterprise (GVE), an alliance of the world's main funding bodies for health research, including the EC, the US National Institutes of Health (NIH), the Wellcome Trust, the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the Gates Foundation, that aims at accelerating the development of a preventive HIV/AIDS vaccine based on a shared scientific plan. Accordingly, in 2006, the Gates Foundation, the EDCTP and its Member States published a joint Call for Proposals on 'Capacity building in preparation for the conduct of preventive HIV vaccine trials'.

1.2.2. Information society technologies

Information Society Technologies

Information and Communication Technologies are key enablers of growth and competitiveness in all sectors of the economy. The highest performing countries are those that are more innovative in ICT products and services and more active in adopting such innovations in other sectors.

Europeans are world industrial and technology leaders in a number of essential ICT fields and Europe has a head start in several technologies that are especially promising. These are strongholds that Europe needs to keep and improve in order to safeguard its position as an influential player in the global economy.

More than ever before, partnering at European level is needed to keep pace with soaring research costs in a context of global competition and increasingly complex and interdependent

technologies. The FP6 IST Programme and the ICT theme of the FP7 Cooperation Programme offer the frameworks for such collaborations.

Current ICT R&D projects strengthen leadership and seize new opportunities

The last IST calls for proposals under FP6 were launched in 2006, resulting in an additional 280 project contracts. This brings the overall FP6/IST project portfolio to a total of 1114 projects with a total Community funding of more than 3867 M€.

The FP6/IST projects bring together a balanced mix of partners and activities that cover mid- to long-term generic and applied R&D. The portfolio strikes a balance between strengthening leadership and seizing new opportunities in core ICT technologies, and supporting leading ICT applications. In addition, the Future and Emerging Technologies scheme continues to play a pathfinder role for the Programme.

In key industrial fields, such as nanoelectronics, micro and nano-systems, mobile and broadband communications and audio-visual systems, projects contribute to maintaining and further developing Europe's global position through an improved integration of the research activities. During 2006, research in nanoelectronics made further progress towards reducing the size of current components on a chip deep into the nano-scale, providing European industry with an important competitive advantage. The domain of micro and nano-systems pushed the limits of current technologies for higher density integration and integration of various materials. Activities in the field of communication and networking technologies moved into the next phase, including notably large integrated projects entering the verification stage.

European industry and academia are also exploring new opportunities and preparing for new markets. Present IST projects help find new fields for industry and business development, especially in areas such as opto-electronics, embedded systems, intelligent interfaces, cognitive systems and security-related developments. During 2006, photonics projects focussed in particular on achieving "photonic systems on a chip". Embedded systems projects developed systems with higher cost-efficiency, optimal performance, higher confidence, reduced time-to-market and faster deployment capacities. In the area of interfaces, new projects addressed multilingual technologies including machine translation and sensory modalities such as vision, hearing, speech, emotions and gesture capture. Projects in the area of cognition pursued the ambitious research objective of creating artificial cognitive systems able to understand their environment and behave intelligently. Security and dependability projects continued developing knowledge and technologies to manage and control complex and interdependent systems, in order to secure modern information systems and networks.

Europe is also well positioned to exploit new markets that will emerge from the deployment of societal applications based on the next generation of ICT technologies and services. The current portfolio includes a large number of projects that contribute to the application of ICT in healthcare, to the improvement of our safety on roads and to the exploitation of novel technologies for learning and cultural expression. In 2006, eHealth projects pursued their research agenda towards creating 'intelligent environments' that allow anywhere, anytime management of each person's health status, and that assist health professionals. The domain of eSafety & cooperative systems for road transport pursued the development of cooperative and

networked ICT systems for greater transport efficiency and increased safety. Under the heading of technology-enhanced learning, projects were launched to deal with learning organisations, competence building, collaborative learning and communities of practice.

Priorities for ICT research under FP7 set for future challenges

A main activity during 2006 was the preparation of the ICT parts of FP7. This involved both the definition of the content of future Work Programmes (WP) as well as operational aspects.

The input to the WP came from the following main sources: The i2010 ICT policy framework and in particular its flagship initiatives; the IST Advisory Group (ISTAG) and in particular its reports on 'Shaping Europe's Future through ICT' and 'Orientations for Work Programme in FP7'; the Strategic Research Agendas of the European Technology Platforms; wide consultations including more than 100 thematic meetings with various constituencies throughout the year; and lessons learned from previous IST Calls for Proposals as well as impact analysis and project portfolio analyses.

The first ICT Work Programme under FP7 specifies priorities for Calls for Proposals in 2007. It is articulated around seven challenges of strategic importance to Europe's industry, economy and society.

Three of the challenges aim at technology, industrial and business leadership addressing topics of (i) Converged communication and service infrastructures; (ii) The engineering of more robust, context-aware and easy-to-use ICT systems; and (iii) Increasingly smaller, cheaper, more reliable and low consumption electronic components and systems. In addition, the Future and Emerging Technologies scheme looks beyond today's concepts and paradigms.

Four challenges aim at socio-economic goals that will drive future ICT innovations. These include: (i) Making Europe a world leader in digital content and knowledge production and use; (ii) More sustainable health systems with ICT enhancing our ability to monitor our health and well-being and to treat major illnesses and diseases; (iii) Intelligent and safer mobility and technologies for sustainable development and energy efficiency; and (iv) Better inclusion and independent living of all citizens with ICT.

European Technology Platforms in ICT are cornerstones to industry and technology leadership

European Technology Platforms in the ICT area have been cornerstones for the approach to make FP7 act as a key to industry and technology leadership.

So far, nine ETPs have been launched in the ICT area: ENIAC – the European Nanoelectronics Initiative Advisory Council, ARTEMIS – the Advanced R&D on Embedded Intelligent Systems Platform, PHOTONICS21 – the European Photonics Research Initiative, EPOSS – the Smart Systems Integration Platform; eMobility – the Mobile and Wireless Communications Technology Platform, NESSI – the Networked European Software and Services Initiative, ISI – the Integral Satellite Communications Initiative, NEM – the Networked and Electronic Media Platform; and EUROP – the European Robotics Platform. Two of the platforms, EPOSS and EUROP, were launched in 2006.

The nine ETPs have been instrumental in establishing Strategic Research Agendas that set out what needs to be done to make sure that Europe is among the ICT leaders in the next ten years. This, in turn, has played a valuable role in making the ICT Work Programme in FP7 more strategic and better focused.

Joint Technology Initiatives for leadership in Embedded Computing Systems and Nanoelectronics

Two of the ETPs are the basis for Joint Technology Initiatives (JTI): ARTEMIS on embedded computing systems and ENIAC on nanoelectronics. During 2006, details were developed for the legislative proposal for the Joint Undertaking that will implement the JTIs.

These JTIs will combine, for the first time, a critical mass of national, EU and private resources within one coherent, flexible and efficient legal framework. They will also ramp up R&D investment in Europe by providing incentives to industry and Member States to increase their R&D expenditure.

The overarching objective of these two JTIs in the ICT area is to realise Europe's potential in the future markets for intelligent products, processes and services. The aim of ARTEMIS is to achieve world leadership in embedded technologies, allowing the cost-effective deployment of seamlessly connected systems and the spearheading of applications that enhance the safety, security and well-being of citizens. ENIAC aims to achieve world excellence in nanoelectronics, allowing the development of future generations of electronic components and their use in virtually any high-tech products and services.

Joint national research programme on Ambient Assisted Living

During 2006, significant progress was also made in the setting up of a joint R&D programme entitled Ambient Assisted Living (AAL) in the field of ICT for ageing well in the information society.

AAL will address the demographic ageing challenge by fostering the emergence of new innovative ICT-based products and services for independent living of elderly people, thus increasing their quality of life and autonomy and reducing the costs of their care.

The initiative will support stakeholders by providing a critical mass and a coherent European approach for developing interoperable solutions in this field and also adapt these to national/regional social preferences and regulations.

1.2.3. Nanosciences, Nanotechnologies, Intelligent Materials, New Production Processes

Integrate European research for the transformation of the industry

A major transformation of industry and of the industrial environment is essential for the European economy to grow at an acceptable rate. Policy actions and research activities building on a unique combination of nanosciences, materials technologies and production are contributing in a major way towards the creation of a knowledge-based and sustainable economy. Fundamentally different approaches as well as new concepts of production and consumption patterns are being explored. Particular effort has been directed towards small and medium-sized enterprises and their contribution to innovative technical solutions. Actions were also pursued to support valorisation of research results through exploitation strategy seminars.

An Action Plan for Europe (2005-2009)

The Action Plan on Nanotechnology proposed by the Commission, which makes states what the Commission and the Member States must do in order to keep Europe at the forefront in this field, was the subject of a very positive resolution by the European Parliament in September 2006. Through implementing the Action Plan, research funding is coupled with policy priorities, making research a real policy instrument and allowing coherence between Community and Member States' activities. With the full agreement of the Member States, funds have been allocated to the support of a responsible but, at the same time, assertive policy in nanotechnology research and development to strengthen Europe's position and to accelerate industrial innovation and change, while addressing any potential public health, safety, environmental and consumer risks upfront and also addressing other socially relevant objectives.

Technology Platforms: an important dimension

The finalisation of the Strategic Research Agendas (SRA) of more than 15 Technology Platforms on industrial sectors has contributed to the overarching objective of proposing a holistic strategy to speed up the rate of industrial change in Europe. In this effort, the Technology Platforms are assisted by a number of national platforms with the final goal of building the European Research Area in industrial technologies. Despite challenges from low-wage economies, the future of manufacturing in Europe has an important role as part of a sustainable, knowledge-based society, but this requires continuous product and process innovation. The Manufuture Technology Platform aims at combining European efforts with those of the Member States to develop a common long-term vision. The 1st Manufuture Industrial Advisory Group meeting, organised in Porto (PT) represented a crucial step in the recognition of the political importance of manufacturing in Europe. Moreover, the Manufuture conference held in Tampere (FI) in October 2006 marked the transition from planning to concrete actions considered necessary to sustain the competitiveness and employment capacity of the European manufacturing industry in a globalised economy. As a second example, with the Nanomedicine Technology Platform, a mechanism for bringing together European stakeholders on nanomedicine for the application of nanotechnology to achieve breakthroughs in healthcare has been activated. This platform has a federating effect, stimulating coordination and synergies of actions launched by Member States.

Nanotechnology: the key technology of the 21st century

As reflected in the Action Plan, nanotechnology is expected to be one of the key technologies of the 21st century. Research actions in nanosciences and nanotechnologies are providing a considerable impact in terms of new products which have a positive effect on the quality of life of the general public and which can solve problems in health, energy and the environment. Funding provided to research projects has already led to remarkable impact, e.g. in the field of the development of new optical and electronic organic materials which are expected to revolutionise many areas of industry, and by providing low cost and flexible electronic circuits and optical displays on polymeric substrates with very good environmental characteristics.

The project for "Nanoscale integrated processing of self-organising multifunctional organic materials" (NAIMO) is unique in that it will transform a plastic film substrate into a multifunctional composite. This will be achieved by combining organic nanoelectronics with solution-based additive manufacturing techniques such as printing. The results of the project are expected to contribute to the development of new products, such as organic electronic chips and displays, sensors, flexible solar cells and magnetic structures. These directly benefit health, welfare, security and the environment, while improving the competitiveness of European industry. This integrated project, although still a year from completion, has already achieved significant impact: it contributed to the creation of a spin-off company and to the expansion of a second one, involving venture capital. The project has already resulted in nine patent applications and 169 publications. The NANOBEAMS Network of Excellence, which is dedicated to the integration of European research in the field of nanomaterials analysis techniques, has successfully set up a European PhD School on "Nanoanalysis using finely focused ion and electro beams". Being the only one of its kind in the world, this PhD School focuses on three complementary techniques, with the purpose of training specialists in the field. The school is open to scientists with a degree in physics, biology or materials sciences.

It provides a complete and up-to-date teaching course on the fundamental, instrumental and technical applications of this topic.

Materials: the transition lynch pin towards high value-added products

Policy actions continue to reinforce Europe's deep knowledge base in materials science. The mastery of materials is essential for improving EU competitiveness and for fulfilling people's aspirations. Research actions are aimed at developing new advanced materials with a high knowledge content and improved performance. For example, a prototype artificial pancreas suitable for encapsulation of insulin-secreting tissue and small enough for the implementation in the human body has been developed. Initial testing of the device showed a good response and a method for the preparation of human pancreatic islets for use in a device suitable for humans has also been identified. The artificial pancreas offers the best hope for an end to insulin injections for diabetics. Another field to be mentioned is research on high performance nanostructured coated conductors by chemical processing. Key objectives were reached in producing an all-metal organic deposition wire with a quality and properties that make this the most promising result achieved worldwide so far in view of the commercial development of High Temperature Superconductors (HTS). The period 2006-2007 marks the 20th anniversary of the discovery of HTS, but the importance of this discovery has been tempered by difficulties in processing these materials due to their particular crystal structures. Research now shows great promise, with an indication that the production of HTS wires on an industrial scale might be possible in a rather short time period. It should also be highlighted that successful workshops in the field of materials were organised with Indian and Chinese institutions.

Production: the mainstay of the European economy and employment

Policy actions have been aimed at ensuring that industrial capacities, knowledge generation and RTD skills expand in Europe, since these are key determinants of prosperity, the quality of life, sustainability and employment prospects. European companies, particularly SMEs, must evolve and modernise their production processes by fostering new engineering approaches. For example, the European Robot Initiative is an on-going integrated project with the aim of strengthening the productivity of SMEs in manufacturing. This project is developing affordable and versatile robots with significantly reduced changeover and instruction times for use in traditionally manual workplaces. Also, a Network of Excellence on innovative production machines and systems for flexible and intelligent manufacturing aiming at the "Factory of tomorrow" is developing concepts, tools and techniques enabling the creation and operation of flexible, reconfigurable, fault-tolerant and eco-and user-friendly production systems. It will result in the setting up of an EU virtual Centre of Excellence able to share people, ideas and infrastructures for competitive manufacturing research, and has leading involvement in the development of international standards.

1.2.4. Aeronautics and Space

Air transport has seen a tremendous development in Europe over the past years. The air transport sector accounts for around EUR 300 billion in value added and 2.6% of the EU-25 GDP, with strong growth also foreseen for the coming years. At present, the sector employs 3.1 million people in Europe. EU R&D programmes are one of the contributors to this development, while not being granted to individual manufacturers but to consortia. By developing structures for lighter materials and composites, the making of more environmentally friendly engines, better performing equipment, systems and operational concepts, EU funding has contributed to improving industrial competitiveness within an

enlarged Europe whilst minimising the negative impact on environment, energy usage, safety, security and public health.

Activities in the **Space sector** have been focussing on complementing efforts by Member States and by other key players, including the European Space Agency.

In November 2005, the Commission adopted a Communication on GMES, with the objective to provide, on a sustained basis, reliable and timely services related to environmental and security issues in support of public policy makers' needs. It sets out a strategy for delivering operational GMES services by 2008, starting with the pilot phase of three first fast track services. Following extensive consultation with GMES Member States stakeholders, remaining FP6 resources have been focused on these fast track services.

Aeronautics

Cleaner, safer and less noisy

In 2006, most of the work was dedicated to the final stages of the aeronautics part of the FP6 thematic priority "Aeronautics and Space". 173 FP6 projects are presently being carried out with an EU contribution of EUR 827 million. Their proper monitoring is essential to ensure the best use of resources. Among the many important projects: "Significantly Lower Community Exposure to Aircraft Noise" (SILENCER) is worth noting. It has already produced important results, some of which have been introduced in aircrafts under development. A special inlet for the engine (zero splice liner) which has already been introduced on the new A380 has been shown to reduce the forward engine noise significantly. AIRBUS has received the "Decibel d'Or" reward for this development. The "Airborne New Advanced Satellite Techniques and Technologies in A System Integrated Approach" (ANASTASIA) project aims to provide on-board satellite-based communication, navigation and surveillance solutions to cope with the foreseen doubling of air traffic by 2020. A beneficial consequence of this better management of airspace capacity will be reductions in air pollution, noise and fuel consumption and increased safety. AERONET, a thematic network on the reduction of aircraft emissions, intends to identify gaps in knowledge and to support the policy and regulatory process, to strengthen the body of European expertise addressing the aircraft emissions problem.

Integrating actors all over Europe in aeronautics and air transport

Europe has a long record of cooperation in civil aeronautical research which has borne fruit, most visibly in the highly successful Airbus consortium but, until now, it has been largely confined to the seven countries with the strongest aeronautical sectors. A new ERA-NET Coordination Action, Air Transport Net (AirTN), was launched in 2006 which will extend that collaboration to all European countries with significant aeronautical research programmes. By coordinating national research efforts and launching joint activities, AirTN will help Europe's aeronautics industry to respond to the technological and environmental challenges of the future.

Promoting international cooperation with Russia and China

The target has been the promotion and reinforcement of international cooperation to exploit unused potential in domains of common importance, through enhanced participation of third countries in the Call for Proposals, bilateral collaboration and multilateral activities.

In 2006, a specific Call for Proposals was launched to incorporate third countries into existing FP6 projects. The cooperation with Russia and China has received particular attention. The second EU-Russia workshop on cooperation in aeronautics research took place in Brussels in April 2006. It was attended by around 150 participants. All major players from both parties were present. The examination of new avenues for cooperation during FP7 was amongst the

topics addressed. As a follow-up, a scientific workshop EU-Russia, took place in November 2006 at CIMNE in Barcelona aiming to identify areas of collaboration in simulation and modelling. Within the AeroChina Specific Support Action, an open seminar and review workshop in aeronautics took place in Xian in October 2006, aiming to identify win-win areas of collaboration in FP7. The Chinese state-industry AVIC1 and MOST, the Chinese Ministry of S&T, co-organised the event. The European aerospace industry and research was well represented.

Aeronautics Days 2006

The fifth edition of Aeronautics Days was held in Vienna from 19 to 21 June. Aeronautics Days 2006 offered stakeholders from across Europe and around the world the opportunity to discuss economic, environmental and societal challenges of air transport, debate future priorities in European aeronautics research and present results of current research. It was organised jointly with the Austrian presidency and attracted 900 participants from 41 countries. The opening ceremony included the participation of Commissioner Potočnik, the Austrian Secretary of State, MEPs, representatives of all major aeronautics companies, the research community and public authorities, and a large contingent of Europe's best and brightest aerospace students. The theme of the event was "Sustainable solutions for new horizons".

The "Clean Sky" Joint Technology Initiative

While the aeronautics industry recognizes the need to rapidly introduce more environmentally-friendly technologies, significant investment in research is necessary for substantial innovation in this area. Based initially on ACARE work and successive developments, the Commission has launched the concept of a Joint Technology Initiative (JTI) in the field of Aeronautics and Air Transport: the "Clean Sky" JTI, which aims at a quantum leap in the technological capability of Europe by 2020 and beyond, producing aircraft that will have minimal environmental impact and that will ensure EU industrial competitiveness. The planned JTI "Clean Sky" will deliver the various technology demonstrators, including flight test vehicles that will be essential for successful market introduction. "Clean Sky" is shaping up as an activity focused on the development of large-scale flight and ground demonstrators for vehicles and major systems. As such, it will fill a current gap in the RTD cycle at European level, which is the lack of capability to integrate RTD activities into large-scale demonstrators. The main EU aeronautics industry stakeholders have been developing the "Clean Sky" JTI concept since mid 2005. The proposal on this JTI was adopted by the Commission on 13 June 2007.

Space

In 2006 a third call was launched and proposals evaluated. The allocated budget of 45 M€ was dedicated to strengthening the GMES and Satcom end-to end service development.

In the GMES field, the widening of application fields covered in FP6 has been the goal, whereas in Satcom the convergence of satellite communications with GMES and GALILEO has been targeted primarily.

Given the ultimate goal of both the GMES and SatCom areas in the Space programme, which is to facilitate the development of (pre)operational services, the Commission gave priority to the negotiations of five of the six Integrated Projects that have passed all thresholds (three for GMES and two for SatCom). Nevertheless, because of the availability of additional budgets, a

number of projects could be selected for funding using conventional instruments like Specific Targeted Research Projects (STREP) and Specific Support Actions (SSA).

A specific Support Action of about 5 M€ had been negotiated with ESA as the predefined beneficiary (in compliance with Art, 9.2 (a) of the Rules for Participation) with the objective of supporting the "Soyuz in Kourou" Programme of ESA. The related project "Soymantry" started on 1 January 2006 with a duration of 40 months.

International cooperation

Under the 3rd call, progress has been made in *INCO* participation, which was rather weak in the first and second call. Amongst the proposals negotiated and partly contracted in 2006, in particular in the traditional instruments, there are a relatively large number of partners from INCO countries (about 17 % of participants, i.e. Russia, China, South Africa, Kasachstan and Ukraine). This is the result of several actions, including a number of dedicated meetings, partly organised in the corresponding countries, to stimulate interest in the Space activities of FP6.

In the framework of the "Common Economic Space" between the European Union and the Russian Federation a Space Dialogue has been established incorporating also ESA activities with the Russian Space Agency. The cooperation covers all areas of space activities and specific working groups will identify promising fields for future cooperation to be implemented jointly under the EU, ESA and Russian space programmes.

1.2.5. Food Quality and Safety

The Food Quality and Safety (FQS) priority aims at ensuring the health and well-being of European citizens through a better understanding of the influence of food intake and environmental factors on human health, providing safer, high-quality and health-promoting food. It contributes to the complex task of transforming knowledge in life sciences into innovations for society and the economy, for example through high-value bio-refinery products, innovative food and a cleaner environment, thus placing consumers as the main drivers and promoting a European Knowledge-Based Bio-Economy[17] (KBBE).

European Knowledge-based Bio-economy

Research, Knowledge and Innovation in the food sector are strategic policy issues closely linked to Europe's competitiveness and future prosperity. Complex innovations, adaptations and re-configurations reflect not only the progress in technology and science, but also new social norms, institutions and new mechanisms of trust in the public domain that involve economic, civil and institutional components. In 2006, the European Research Policy on Food Agriculture and Biotechnology placed special emphasis on supporting and strengthening these complementary relationships. EU research policy has also paid particular attention to some well-known animal diseases demanding immediate action, such as the bluetongue and avian influenza.

As actors of the Knowledge-Based Bio-Economy, members of the large FQS community addressed a number of hot research issues: the quest for more quality food, the sustainable production and use of renewable bio-resources, and the food-related disorders such as obesity and allergies. Other projects were funded to address threats to the sustainability and security of agricultural and fisheries production resulting from dramatic climate change and infectious diseases. A dedicated call for projects on Avian Influenza was launched in cooperation with the Health Priority.

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[17] 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.

Overall, 68 new research projects were funded in 2006 for a total EU contribution of more than EUR 250 million.

Building a European knowledge-based bio-economy[18]

Workshops for Heads of seven Technology Platforms[19] and Coordinators of ten related ERA-NET[20] projects were organised to ensure the systematic exchange of information in existing programmes and activities, to identify common strategic issues and to discuss the use of converging technologies. The Standing Committee on Agricultural Research (SCAR) contributed significantly to the formulation of innovative agricultural research in FP7 on the basis of its foresight activities and the working group discussions. Moreover, the KBBE-Net, a network of high-level officials from Member States, was created to facilitate the coordination of policy responses to shared challenges in key areas. The Work Programme for the first FP7 Call published in December 2006 focused on the research required to promote the KBBE in Europe. In addition, the preparation of the mid-term review of the Strategy on Life Science and Biotechnology is an essential element in the implementation of the KBBE.

Conference on the first results from FP6 "Food Quality and Safety Research"

During the whole of FP6, 189 projects, representing an EU contribution of more than EUR 750 million brought together more than 3,000 participants from all over Europe and the world.

These projects contribute to providing new, sustainable, safer, affordable, eco-efficient[21] and competitive products to the European consumer and help to address diet-related disorders and infectious diseases, therefore improving the well-being and health of the European citizens.

They also contribute to the competitiveness and sustainability of European industry and SMEs. A number of very interesting first results, ranging from organic farming to new insights into allergies and animal diseases, were presented in Brussels in December 2006 at a conference entitled "Food Quality and Safety Research: First Results from FP6"[22]. The event was held in the European Parliament and attracted more than 180 participants from research institutions and councils, industrial associations, advisory bodies and policy makers.

Positive physiological effects of omega 3 fatty acids in fish

In the field of nutrition and health, the "SEAFOODplus" project aims to improve the health and well-being of the European consumer by promoting higher fish consumption. It has delivered very interesting results, among which: a better understanding of how consumers perceive seafood, allowing the implementation of new strategies for increasing consumption for the population groups needing it most, the positive physiological effects of omega 3 fatty acids in fish diets on post natal depression, and novel smoking methods, dehydration and sterilisation methods that have been developed and are being commercially tested.

Improving the quality and safety of food without damaging the environment

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18 http://ec.europa.eu/research/biosociety/index_en.htm

19 http://cordis.europa.eu/technology-platforms/individual_en.html

20 http://ec.europa.eu/research/fp6/index_en.cfm?p=9_eranet

21 Eco-efficient products are less polluting and less resource-intensive in production, and allow a more effective management of biological resources.

22 http://ec.europa.eu/research/biosociety/news_events/news_first_results_fp6_en.htm

The "QUALITY LOW INPUT FOOD" project aims to improve organic and "low input" cereal production systems. Production protocols have been developed, which allow reductions in production costs while maintaining or improving product quality and safety and environmental impact. The economic effect of introducing innovation into commercial practice is currently being estimated for a range of commodities.

Assessing the health risks associated with heat-generated food toxicants

The heating of meat and other protein rich foods can generate various kinds of potentially hazardous compounds, some of which are genotoxic and carcinogenic, but so far there is little information and poor understanding of how these compounds are formed in food. The "Heat-generated Food Toxicants" (HEATOX) project intends to learn more about the formation and risk of acrylamide[23] in food. The results of "HEATOX" have made important contributions to prepare the "Draft European Commission Recommendation on the monitoring of acrylamide levels in food" and to the "CIAA Acrylamide Toolbox" drafted by the European Federation of the Food and Drink Industry describing details of existing methods to reduce acrylamide in foods.

Chemicals as contaminants in the food chain

The "CASCADE" Network of Excellence has helped to collect fragmented European research in the health risks posed by chemical pollutants in food, and especially focused on 'endocrine disrupter' chemicals which affect hormone receptors and accumulate in both the environment and the body.

Improvement of animal welfare in Europe

The results of the "Integration of animal welfare in the food quality chain: from public concern to improved welfare and transparent quality" (WELFARE QUALITY) project include the development of a prototype of WELFARE scheme using animal-based measures which will be tested from 2007 and which will contribute to improving the diversification and societal sustainability of farm animal production in Europe.

Diagnosis and control of epizootic diseases

The Network of Excellence "Epizootic Diseases Diagnosis and Control" (EPIZONE) was launched in 2006. It brings together the major European laboratories involved in this area and two Chinese institutions and foresees projections in all of the other continents. The EPIZONE teams working in the area of bluetongue were very actively involved in the control of the bluetongue outbreak in Northern Europe.

Europe plays an important role in Life Sciences worldwide

An important achievement in the field of life sciences in 2006 was the renewal of the agreement on the EC-US Task Force on Biotechnology Research for a period of 5 more years. This highlights Europe's determination to remain an important global player in Life Sciences and Biotechnology by furthering cooperation with other strong research communities in the context of FP7.

1.2.6. Sustainable Development, Global Change and Ecosystems

Sustainable Surface Transport

[23] Acrylamide is a substance that is produced naturally in foods as a result of high-temperature cooking, e.g., baking, grilling, or frying. It can cause cancer in animals and probably also in humans.

Surface transport encompasses road, rail and waterborne transport modes, each of which plays an essential role in people's daily lives. Efficient surface transport is a critical economic factor, supporting competitiveness and employment.

A strategic vision for maritime transport in 2020

In 2006, most work was dedicated to the final stages of the Sustainable Surface Transport part of FP6. 169 FP6 projects are presently being carried out with an EU contribution of EUR 493 million. All of these activities are contributing to the progressive integration of research at European level, towards genuine and productive synergies among research policies, to projects, and to the emergence of future partnerships. Technology Platforms ERRAC (rail), ERTRAC (road) and WATERBORNE (waterborne), as well as EIRAC (intermodal) and EURFORUM (urban) Coordination Actions have been major engines in achieving this integration, preparing vision documents and strategic research agendas. In 2006, a new strategic vision for waterborne transport in 2020, published by the European Waterborne Technology Platform was launched at an annual reception of the Community of European Shipyards Association (CESA) and the European Marine Equipment Council (EMEC), in Brussels. Maritime transport is a sector of strategic importance to Europe, given that 90% of the EU's external trade and 40% of its internal trade is transported by sea. Much of the world's shipping is owned by Europeans, and the turnover of Europe's maritime transport sector is over EUR 137 billion. The WATERBORNE project has produced its strategic research agenda, which provides a realistic framework for converting this vision into reality.

Green Paper "Towards a Future Maritime Policy for the Union"

A key element of the above-mentioned activities is their substantial contribution to Sustainable Development. The projects are developing critical technologies to face the many critical problems relating to transport and the environment (recycling, pollution and noise reduction), mobility (modal shift and intermodality, urban transport, connectivity and interoperability), safety and security, and Europe's competitiveness. Safety and security are growing concerns for citizens, the travelling public, businesses and governments around the world. Every year, about 50,000 Europeans die in road accidents, while train accidents continue to occur across Europe, despite major improvements in safety systems. Maritime transport is safer and causes less contamination, due to strict controls introduced as a response to major accidents, although the introduction of new types of vessels and mobility patterns require further measures. Ambitious policies to reduce transport-related risks rely on state-of-the-art research and technological development. In that context, the Maritime Policy Task Force played an active role in the preparation of the Green Paper "Towards a Future Maritime Policy for the Union: A European Vision for the Oceans and Seas", which was adopted on 7 June 2006 and launched at "The European Maritime Policy and the Regions" Conference in the Azores which took place in June 2006.

EU and Russia signed a Joint Statement on Rail Transport Research cooperation

A 'kick-off' workshop on EU-Russian cooperation on rail transport research took place in Moscow in April 2006. The result was a new 'EU-Russian Railway Research Joint Statement' and an 'Action Plan' aimed at establishing an operational platform for EU-Russian collaboration in this strategic transport arena.

In view to increasing cooperation between Europe and Russia, but also with countries like China, India, Brazil and South Africa, a Specific Call was launched to involve partners from targeted third countries in FP6 projects.

Conference & EXPO TRA 2006: Greener, safer and smarter road transport for Europe

In 2006, a major international conference and exhibition on road transport research 'Transport Research Arena (TRA)', jointly organised by the Commission services, the CEDR, the Conference of European Directors of Roads, and ERTRAC, the Advisory Council for European Road Transport Research, was held in Gothenburg in June. It has set the basis for a permanent bi-annual conference and exhibition on surface transport research which will represent the European counterpart of the American TRB conference. It is hoped that TRA 2006 has played a role in creating a more sustainable, safer and more efficient road transport system in Europe.

Environment

Environmental problems go beyond national frontiers and require a coordinated approach at a pan-European and often global level. With the overall aim of promoting the sustainable management of the environment and its resources, EU research has the objective to strengthen the capacity to understand, detect and predict and global change and develop strategies for prevention, mitigation and adaptation, and to preserve the ecosystems and protect biodiversity, including the sustainable use of land and marine resources. The overall budget allocated to environmental research projects in FP6 was EUR 852 million, of which 214 engaged in 2006.

European land use: creation of land use alternatives for sustainable development

The *Integrated Sink Enhancement Assessment* (INSEA) project created a methodology utilised for the impact assessment of erosion control measures for the Soil Thematic Strategy launched by the Commission. In parallel, the "Sustainability Impact Assessment: Tools for Environmental, Social and Economic Effects of Multifunctional Land Use in European Regions" (SENSOR) project developed a new typology of European regions combining social, economic and environmental characteristics. This methodology was adopted by the European Environmental Agency. Both projects are a tool for identifying alternative land uses within Climate Change policies, facilitating technological adoption, forestation and bio fuels.

Oceans contain 90% of the life forms on our planet: researchers explain how to use and protect them

The "Hotspot Ecosystem Research on the Margins of European Seas" (HERMES) project is a major international research project on Europe's deep seas. It is implementing a science policy interface linking research and policy. It also provides policymakers and stakeholders with good, relevant and timely scientific knowledge in support of European and international deep-sea governance. The results of this research were shown in a documentary on Europe's mud volcanoes, which can still be viewed online via the EuroNews website[24]. The project seeks to understand how to protect the oceans, their fauna and flora for the future.

Earth Observation: the EU contribution to the world effort on data collection

In 2005 the Group on Earth Observation (GEO), an international partnership of countries, the Commission and international organisations, embarked on establishing a Global Earth

[24] http://www.euronews.net/create_html.php?page=futuris&article=390906&lng=1&option=1

Observation System of Systems (GEOSS) within the next 10 years. In 2006, the GEONETCast project began to provide Europe and Africa with a global data dissemination system that can continuously distribute data and information directly to end-users, minutes after its acquisition 24 hours a day, 365 days a year.

Desertification: published results of ten years' research activities for mitigation of land degradation and desertification in Southern Europe

Many FP6-funded research projects on desertification have covered a wide spectrum of topics from the biophysical to its policy dimensions. Among the main achievements is the variety of methods developed to better study the biophysical aspects of land degradation and desertification, as well as desertification risk assessment and land degradation assessment. The results of these research projects are now available through the OPOCE in a specific publication of the Commission[25]. This publication is a direct contribution to the implementation of the United Nations Convention to Combat Desertification (UNCCD) for the restoration of desertified areas.

Promoting European-funded innovative technologies and integrated methodologies for solving water problems

The real-time flood decision support system integrating hydrological, meteorological and remote sensing radar technologies (FLOODRELIEF) project has developed a new powerful and highly accessible Internet-based real-time decision support system. This system has advanced the capabilities and accuracy of present forecasting systems and has demonstrated the ability of such systems to save lives and property. The results of this project, together with results from other EC-funded projects, were presented in two major international water forums: the World Water Forum in Mexico City in March and the IWA World Water Conference in Beijing in September.

European research results presented at an event of the United Nations Framework Convention on Climate Change conference in Nairobi

The African Monsoon Multidisciplinary Analyses (AMMA) provides African decision-makers with an improved assessment of rainfall changes which are likely to occur during the 21st century as a result of anticipated global climate change. In parallel, "Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies" (DAMOCLES) is an integrated ice-atmosphere-ocean monitoring and forecasting system specifically concerned with significantly reduced sea ice cover. Both projects facilitate the analysis of possible impacts on environment and human activities. By observing, understanding and quantifying climate changes, a broad perspective is given to decision-makers and stakeholders to consider adaptation to climate change.

Researchers develop new method for better Mediterranean Tsunami warnings

The "Tsunami Risk ANd Strategies For the European Region" **(**TRANSFER) and "Seismic eArly warning For EuRope" (SAFER) projects are elaborating an early warning Tsunami system for the Mediterranean. A specific EuroNews video presented[26] interviews of key scientists and presents the first results of on-going work using sophisticated seismometers, computer modelling, animations and data-sharing networks. The projects contribute to the development of an effective early warning system to protect those who live along sensitive European coastlines.

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25 "Conditions for Restoration and Mitigation of Desertified Area Using Vegetation" (ISBN 92-79-03072-8; Catalogue KI-76-06-331-EN-C).

26 http://www.euronews.net/create_html.php?page=futuris&article=395902&lng=2&option=1

Energy

Energy technologies are tools which will help Europe to face the joint issues of global climate change, the reduction of Greenhouse Gas emissions, energy independence and competitiveness. The sustainable energy component of this priority supports the development of the range of technologies necessary to provide Europe with clean, reliable and affordable technology. It had a budget of EUR 124 million for 2006. Forty three projects were launched in the last year of FP6 in the areas of Conversion, Transport and Renewable Energy Sources. It also supports the development of the European Area of Energy Research necessary for a true Europe of Energy. It is worth noting that projects in that area are also funded outside the Framework Programme under the research programme of the Research Fund for Coal and Steel (see section below).

Energy conversion and distribution systems

The aim is to develop cleaner, efficient and CO_2 free conversion systems as well as more resilient and intelligent energy networks able to deal with the challenges of the future.

Three European Technology Platforms aim to integrate activities and to develop links with the European actors concerned. Dealing with Hydrogen and Fuel Cells, Zero Emission Fossil Fuel Power Plants and Future Electricity Networks, they developed their respective visions for the necessary research strategies throughout 2006.

As a result of the interest shown by stakeholders, the preparation of the Fuel Cell and Hydrogen Joint Technology Initiative, aiming to create a critical mass of interest, competence and resources at EU level, continued with the intention of making a proposal in 2007.

The capture and transport of carbon dioxide (CO_2) from industrial sources to an appropriate site for secure and long-term storage is one of the most promising technologies for CO_2 free conversion systems. A high profile project launched in 2006 includes "CO2REMOVE", which looks at the important issues of reliability and safety of CO_2 Capture and Storage (CCS).

For future electricity networks, large projects studying alternative advanced architectures for future distribution networks with a high Renewable Energy Source (RES) and Distributed electricity Generators (DG) penetration have started the on-site validation of the most promising concepts. Furthermore, in line with the Energy Green Paper 2006, the preparatory work on the possible creation of a European Centre for Energy Networks has continued.

International cooperation has strongly developed. An agreement was signed with China for the demonstration of a near-zero emissions coal power plant with carbon dioxide capture and storage. The EU has also co-financed a project with the US on the development of fuel cells for residential heating.

New and renewable energy sources

One of the main European energy policy targets is the development of a range of technologies to complement and replace fossil fuels for electricity and fuel production. Renewable sources such as wind, Photo Voltaic, Bio Fuels, ocean and biomass are supported and it is aimed to bring them to a competitive level.

Nowhere has the progress of renewable energies been more spectacular than in the area of wind. Because of the combination of research activities and public support measures, wind energy has become a major component of CO_2 free indigenous electricity production in countries such as Denmark, Germany and Spain. The Up Wind Project, launched in April 2006, looks towards the wind power of the future, where very large turbines of 8 to perhaps 20 MW will stand in wind farms of several hundred MW, the order of a unit of a nuclear power plant.

The new European Technology Platform on Bio Fuels launched in 2006 is the most recent initiative of this nature following the one on Photo Voltaic. It aims to develop cost-competitive, world-class bio fuel technologies to achieve the vision that the EU will cover one fourth of its road transport fuel needs by clean and CO_2-efficient Bio Fuels by 2030, allowing the European economy and citizens to bypass or buffer possible oil shortages or oil price peaks.

Towards a European Strategic Energy Technology Plan

The Commission released a series of communication proposing "An Energy Policy for Europe" at the end of 2006. This package includes the Communication "Towards a European Strategic Energy Technology Plan", highlighting the key role of energy technology and stressing the need for a sea-change in European energy technology and innovation from basic research to market take-up needed in order to address the challenges of security of supply, climate change and competitiveness.

1.2.7. Citizens and Governance in a Knowledge-Based Society

Launching FP7 – Consultations and publication of the first Work Programme

A large web consultation was organised on the Socio-Economic and Humanities (SESH) research agenda for the first FP7 Work Programme in order to obtain the views of the scientific community and interested stakeholders. Note was taken of the comments content in the 450 responses received. These helped to structure the first calls for proposals that were published on 22 December. These calls concentrate on 33 research topics and 7 strategic topics, including impact assessment studies of the EU research in SESH. The research topics address important issues for the Lisbon and Gothenburg agendas, new trends in European societies such as demographic changes and civic participation, but also the development of new and more reliable socio-economic and scientific indicators. Besides, a totally new area for research called "Europe and the world" is opened up. It relates to the wider political and economic role of the EU as a world region.

The impact of the EU Socio-Economic and Humanities Priority on research

In 2006, there was the first opportunity to look at the impact of the SESH FP6 funding on research. From 2002 to 2006, 169 SESH projects were funded under Priority "Citizens and Governance in a Knowledge-based society" (as well as, to a certain extent, under Priority "Specific Measures Covering a Wider Filed of Research), involving 2,043 participants from 67 countries. A formal impact assessment study of EU SESH research on policy and science will be launched at the start of FP7.

Improving international cooperation in socio-economic sciences and the humanities in FP6

2006 saw the launch of a specific dedicated Call for the strengthening of international cooperation in the SESH programme. FP6 has included 77 international cooperation partners from 33 different countries in 35 projects, which is a clear improvement since FP5. Besides, regular contacts are now made with the US National Science Foundation, which materialised through a joint seminar on "Towards big social science; transatlantic perspectives" at the Euroscience Open Forum in Germany, and the UNESCO, with the participation of the Commission in the Steering Committee at the Buenos Aires International Forum on "The social-science-policy nexus" which brought together 2,000 participants from more than 80 countries.

1.2.8. Specific Measures Covering a Wider Field of Research

International Scientific Cooperation – From Knowledge to Action

Activities in international cooperation aim to enhance the production of knowledge and scientific excellence by enabling European universities, research institutions and firms to establish contact with their partners in third countries, thereby facilitating access to research environments outside Europe and promoting synergies on a global scale.

European research meets the world

The FP6 Work Programme in support of international cooperation was successfully completed with about EUR 350 million invested in collaborative research actions between EU and Developing countries (comprising Africa, Caribbean, Pacific (ACP) countries, Asian and Latin American countries), Mediterranean Partner Countries (MPCs), the Western Balkans, Russia and the Newly Independent States. In addition, specific Calls for Proposals were implemented targeting the increase of capacities of the best research institutes in Associated Candidate Countries for a better integration of these countries into the Framework Programmes and the European Research Area as a contribution to full integration. In 2006, this concerned three countries, Bulgaria, Romania (becoming Member States) and Turkey. For FP6 a total of 393 specific international cooperation contracts were signed involving EU and third country participants in equitable partnerships.

Key thematic foci of the specific international scientific cooperation addressing the specific socio-economic context of partner countries and regions were health and health systems, food security and sustainable use of natural resources and their ecosystems. The combination of these thrusts is considered critical for sustainable development in partner regions. Water and agriculture under conditions of desertification and scarcity, renewable energies as well as cultural heritage were the strongest collaborative themes with MPCs. Thematic thrusts with Russia and the other NIS focused on environmental and other challenges of these transition economies. Priorities were principally derived in response to international commitments (international conventions, Millennium Development Goals, etc.) and through policy dialogue with the countries and regions concerned so as to mobilise the best science in response to societal challenges. An illustration of what this can mean to harness successful international scientific cooperation is given below.

An international conference on Neglected Infectious Diseases (NIDs) took place in Brussels, in November 2006. NIDs are responsible for an estimated 500,000 deaths and millions of disabilities each year, with 90 per cent of cases occurring in low income countries. The conference brought together the European and non-European scientific community including policy makers, research managers, representatives of relevant international NGOs, UN bodies and other interested parties to discuss what needs to be done to increase the impact of EU-funded collaborative research on the control of NIDs. As part of FP6 and its predecessors, the International Cooperation Programme has been one of the few international research funding bodies focussing on the control of NIDs. At present there are 45 active projects with a total budget of EUR 42 million in FP6. The conference gave delegates an opportunity to discuss future European funding strategies for research into NIDs.

Looking at all international scientific cooperation across all components of the 6th Research Framework Programme, mobilisation effects were encouraging. Teams from 188 non-EU countries have participated in research and research coordination proposals across FP6. Of

these, 121 were developing countries and emerging economies, so-called INCO target countries. Eventually, some 3,316 teams from 99 INCO target countries have been selected for funding after competitive and independent evaluation of proposals.

Among the INCO target countries with more than 100 individual participations, Russia and China stand out well above the others (in decreasing order: Croatia, Brazil, India, Morocco, South Africa, Serbia and Montenegro, and Tunisia).

International Collaborative Mobilisation Effects of FP6 (2002-2006)

Region (Number of participating INCO countries)	Number of participations in proposals	Number of participations in contracts	Number of countries in the region	Total financial contribution from FP6 (rounded to next '000 Euro)**
Africa (47)	2,285	476	35	60,868,000
Asia (15)	3,842	689	15	60,237,000
Caribbean (15)	85	9	5	813,000
Latin America (17)	3,010	507	17	45,549,000
Mediterranean Partner Countries (8)	2,224	523	8	37,917,000
Pacific (2)	21	2	2	89,000
Russia and other New Independent States (12)	4,021	684	12	57,982,000*
Western Balkan Countries (5)	2,652	426	5	39,934,000
Total (121)	**18,140**	**3316**	**99**	**303,389,000***

* plus about 50 million Euro invested into scientific cooperation through INTAS

** total resources were higher because contributions to European partners are not included

Research in water management has helped

One of the most prominent goals of the EU is to halve the number of people with no access to safe drinking water and improved sanitation by 2015. Within FP6, continued attention was focused on water; the EU Water Initiative creates action programmes involving a partnership between the EU, Africa and 12 countries from Eastern Europe, the Caucasus and Central Asia. Research activities under the EU Water Initiative take a pro-active role in promoting research on integrated water resources management that engages fully with stakeholders and therefore has high impact potential[27].

At the Fourth World Water Forum in Mexico in March 2006, the Commission presented an independent review of a sample of about 70 international research projects dedicated to

[27] http://ec.europa.eu/research/water-initiative

improving the management of water funded under the past and current Framework Programmes. The review shows that the international partnership approach has borne fruit, but there needs to be even more engagement with policy-makers and civil society for the research to have greater impact[28]. As a direct follow-up to recommendations, a workshop was convened for almost 50 researchers from four continents in on-going water research projects to help them improve their communication and engagement capabilities[29].

New and emerging science and technology (NEST)

The full implementation of the New and Emerging Science and Technology (NEST) activities has been achieved. This activity, which represents a point of departure for Community research in the area of frontier research, has generated broad recognition of the quality and innovation of its trans-disciplinary agenda, including fields such as "synthetic biology" and "measuring the impossible". It has also acted as an important "precursor" to the development and implementation of the ERC (European Research Council).

Scientific support to policies (SSP)

The SSP Programme was completed in 2006, with the evaluation and negotiation and contracts being issued for all projects arising from the 5th call for proposals and the specific call on avian and human influenza. SSP projects' management has been pursued and the contributions to policy developments have been developed in a range of areas (agriculture, fisheries, animal health and welfare, environment, health, migration, security, crime and drugs, economic development and cohesion, energy, transport, information society, cultural heritage). For the purpose of this document, successful projects are illustrated from the specific fields of agriculture and fisheries and health.

Improving the coordination of agricultural and fisheries research efforts across Europe

Scientific Support to Policies supports strategic research directed towards Community policy development and legislation. Research delivers tools and analyses for the reform of the Common Agricultural Policy, the Common fisheries policy (CFP), trade, rural development, organic agriculture, animal health and welfare, bio security and environment and health issues.

In 2006, 16 new research projects have been funded in the field of fisheries and aquaculture for a total EC contribution of around 15 M€. The last call for proposal provided a wide range of coverage of important topics (Fisheries management, aquaculture, environment and control) in support of the CFP and offered the possibility to address topics such as climate change on fish distribution and a foresight exercise on research needs with the view to prepare FP7. This call represent an important contribution to the implementation of the development and successful implementation of the ongoing CFP which is highly dependent on research and objective advice provided by scientific Institutions.

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28 http://ec.europa.eu/research/water-initiative/iwrm_review_en.html

29 http://ec.europa.eu/research/eater-initiative/iwrm_scicom_en.html

Major events included a conference in February 2006, organised jointly with the Institute for Prospective Technological Studies (IPTS) of the Joint Research Centre (JRC) to discuss agricultural trade perspectives with Mediterranean Partner Countries[30].

The renewed Standing Committee on Agricultural Research (SCAR) which includes all 27 Member States, the Candidate Countries and the countries associated to the FP, undertook 3 major initiatives: the mapping of the European research capacity and infrastructure, the starting of a process towards a European research agenda and a foresight exercise on the European agricultural research needs from now until 2020. SCAR Collaborative Working Groups have been set up in 12 thematic areas. They cover thematic fields in which several Member States have a strong interest in European collaboration.

The European Initiative for Agricultural Research for Development (EIARD) is an informal coordination mechanism of European government departments responsible for funding agricultural research for development. EIARD provides the coordination platform for 44% of funds provided to the Consultative Group on International Agricultural Research (CGIAR) (around EUR 220 million annually). Elements of coordination include a common strategy for funding agricultural research, for the development at global, regional and national levels.

Research has helped to combat emerging threats in the field of animal infectious diseases.

A dedicated Call in the area of research on animal diseases in particular on avian and pandemic flu was published in December 2005 with a closing date in March 2006. A total of 26 proposals were submitted on avian flu and 11 were selected for funding with a total EU contribution of EUR 14 million and covering all the topics open in the Call, namely vaccines, diagnosis, pathogenesis and transmission, wild birds, virus survival and technology transfer to INCO countries.

In addition, two projects were funded on bluetongue disease: one targeted the development of new vaccines and a Coordination Action networking EU and third countries' laboratories involved in bluetongue and other similar emerging diseases. In both cases the workplan and the partnership were adapted to the unexpected situation following the outbreak in August 2006 which involved a new virus serotype in Northern Europe.

Research for the Benefit of SMEs

Small and medium-sized enterprises (SMEs) play a crucial role in European competitiveness and job creation, not only because they represent the overwhelming majority of enterprises in Europe, but also because they are the source of dynamism and change in new markets, particularly those at the leading edge of technology. Although a heterogeneous community, they are all confronted by increased competition resulting from the European internal market and the need to innovate constantly and accommodate advances in technology.

This action in FP6 offered SMEs with good ideas but lacking research capability the opportunity to leverage their innovative potential through cooperative research with other SMEs and research performing organisations. The scheme has been highly successful.

Research projects for the benefit of SMEs

[30] http://www.jrc.es/home/pages/detail.cfm?prs=1430

2006 has seen the number of research projects for the benefit of SMEs growing, with an increase from around 380 projects in 2005 to 513 projects in 2006, with a total FP6 budget of around EUR 450 million. Throughout the FP6, the Commission services have progressively adapted the management of research projects to small and medium-sized enterprises, for example by completely phasing out bank guarantees or blocked accounts, or by only requesting audit certificates at the end of projects. Periodic progress of research projects for the benefit of SMEs has also been systematically assessed with the support of independent experts, thereby providing for a qualitative assessment of projects and precious feedback to the research consortia. In 2006, these modifications were largely introduced in the FP7 Work Programme for Research for the benefit of SMEs, ensuring that these specific instruments are tailored to their beneficiaries.

Developing and coordinating support to SMEs at national level

2006 has also seen a breakthrough in the development of instruments aiming at supporting coordination of national and regional programmes and assisting SMEs in international RTD cooperation.

In this context, financial support, based on Article 169 of the Treaty, is proposed in favour of the "EUROSTARS" Programme jointly undertaken by Member States and Associated Countries to support R&D performing SMEs with high growth potential, with the objective of boosting their research and innovation capability.

1.2.9. Strengthening the Foundations of the European Research Area

Coordination of national and/or regional research programmes

The objective of the ERA-NET scheme is to develop and strengthen the coordination of national and regional research programmes through the exchange of information and common activities. The ERA-NET scheme therefore accommodates variable configurations of participating programmes, affords a long-term perspective and is flexible enough to allow for the different ways in which public research funding is organised in different Member or Associated States.

By the end of 2006, all negotiations of ERA-NET contracts had been finalised and there are 71 ERA-NET actions receiving Community support under FP6, covering a very large spectrum of disciplines and research areas.

Since the launch of the ERA-NET scheme in 2002, the initiative has 'met a need', according to an expert group responsible for reviewing it in late 2006. So far, more than half of these actions have already launched a joint call, or are preparing for the launch of a joint Call for cross-border proposals. The national funds supporting these joint calls or joint programmes represent more than 500 EUR million until now. The report suggested that the Commission should seek to ensure consolidation and coherence in the Framework Programme. It further unfolds recommendations for politicians, for the Commission, and for programme owners and managers at national level.

Coordination with European-level research frameworks and organisations

A coherent set of activities was deployed in 2006 aimed at improving coordination with European intergovernmental research frameworks and various European-level research organisations, including networks such as EuroHORCs, TAFTIE and EARTO. Particular effort has been made in enhancing the complementarity and synergy between the RTD Framework Programme and activities carried out under intergovernmental structures such as EUREKA, COST and EIROforum[31] and its members.

The COST activities were continued and funded through the COST Office at the maximum level of EUR 80 million during FP6, as laid down in the relevant Specific Programme, and following the successful COST Mid-term Review. The Commission continued close cooperation with EUREKA with one prominent objective being to prepare the launch of the

[31] EIROforum is the partnership of Europe's seven largest intergovernmental research organisations: CERN, EFDA, EMBL, ESA, ESO, ESRF and ILL

EUROSTARS Joint Programme for research performing SMEs under Article 169 of the Treaty. Also, considerable effort was dedicated to the development of two Joint Technology Initiatives (ARTEMIS and ENIAC) in relation with EUREKA ICT clusters.

Development of research and innovation policies

To complement the multilateral Open Method of Coordination (OMC) process under the aegis of CREST since 2003 in the field of R&D policy, a pilot OMC-NET call for proposals was launched in the fall of 2005. The objective of this new scheme is to support mutual learning and policy coordination activities carried out by more limited groups of Member States and/or their regions on policy issues of their specific interest. The call resulted in 10 projects being supported, treating issues such as for instance public procurement, research infrastructures or regional R&D strategies. The OMC-NET scheme will be continued in FP7, with a new call to be launched in September 2007.

Throughout 2006, work on the development of ERAWATCH, the integrated information and intelligence service on national and regional research policies, was continued. The public website containing the baseload information on the research policies of all Member States and a selected number of third countries was launched on 9 October 2006. With ERAWATCH[32] now having become an operational reality, further work will focus on improving the quality and consistency of the baseload information and on developing a portfolio of policy relevant analytical products.

In 2006, the Foresight S&T Knowledge Sharing Platform ensured the finalisation of a number of prospective studies on key issues for the future, such as industrial specialisation, R&D in the service sector, third countries' science and technology policies and capacities. The European wide cooperation in foresight methodology development was consolidated in the FOR-LEARN project, the European Foresight Monitoring Network, and biannual meetings with EU Member States foresight correspondents. An expert group on future key actors in science and technology finalised their work in 2006, reflecting on the future roles of universities, public research institutes, national authorities, multinational enterprises, start up firms, as well as researchers. In 2006, a symposium "The Way Ahead" was jointly organised with Microsoft focussing on visions on developments in science and technology, its impact on the future of society and strategic options to be envisaged. Two important meetings on the convergence of sciences and technologies have been organised jointly with the European Parliament. Finally, there has been a monitoring of a foresight exercise on the Future of European research in agriculture.

In 2006, the TrendChart on Innovation, which tracks innovation policy developments across 33 European countries, produced the European Innovation Progress Report 2006. This report provides a summary of the European Innovation Scoreboard results for 2005 and identifies key challenges for innovation policy makers based on the EIS results and the country reporting of the policy monitoring network. The Report also comments on different innovation governance structures and highlights examples of good practice. Three TrendChart workshops were organised in 2006 to explore key innovation issues: how to improve innovation policy governance in Europe, how to promote innovative services in the EU and how to use public procurement to enhance innovation. A fourth workshop in December 2006 launched the PRO INNO Europe initiative33 which combines analysis and benchmarking of national and regional innovation policy performance with support for cooperation of national and regional innovation programmes and incentives for innovation agencies and other innovation stakeholders to implement joint actions.

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32 The website is available for public consultation at http://cordis.europa.eu/erawatch

33 Full information on the initiative is available at www.proinno-europe.eu

1.2.10. Structuring the European Research Area

Science in Society

2006 has been marked by efforts to mobilise institutional actors and other stakeholders with a view to building a European Science and Society community. This process was launched at a seminar held in January, and has been followed up by continued on-line discussion and consultation using the "scientific information for policy support in Europe" (SINAPSE) web application[34]. In parallel to this, an exercise to map Science in Society research in Europe has been carried out, resulting in a report on the current situation and actors involved.

Governance

Every day, there are new developments in scientific research, which could improve our quality of life. However, the policy-making process does not always deal properly with assessing risks, or with taking public concerns into account. Two ground-breaking reports were published in 2006: "Economic and technical evolution of the scientific publication markets in Europe" and the report arising from the Gover' Science seminar "From Science and Society to Science in Society: Towards a Framework for Co-operative Research". Both are giving rise to important debate and new initiatives at policy level. The dialogue with Civil Society Organisations (CSO), initiated in 2005, has been further developed with a specific workshop on environmental research, which took place in March 2006.

New Experts Group to promote good science education in Europe

Recent work by the OECD indicates that the number of young people entering university is increasing, but they choose to study fields other than science and, in certain fields such as the physical sciences, the number of students is decreasing. In response to evidence that shows that young people across Europe are losing interest in key science studies, the Commission created a high-level group of experts to look into how best to support science education in Europe's primary and secondary schools. The group was chaired by Michel Rocard, former French Prime Minister and now Member of the European Parliament. The experts' mandate was to formulate policy recommendations to improve the way sciences are taught based on interaction with representatives of ministries of education and science and existing key European initiatives such as the POLLEN and NUCLEUS projects.

POLLEN, based on an inquiry-based learning and teaching model, aims to stimulate and support science teaching and learning in primary schools, so that children can observe, question and understand the world around them and develop scientific reasoning and problem solving.

NUCLEUS brings together five projects sharing the same goal: to reach thousands of teachers through directly involving them in activities and through providing them with vital new resources in the area of science education. It targets young people at both the primary and more specifically secondary school level.

Science in the city

[34] http://europa.eu/sinapse

The Commission is exploring a way to introduce the cultural dimension of science to the city. Two main initiatives have been taken: ESCITY, a pilot project funded under FP6 which aims to build a network of municipalities at European level with the focus on enhancing scientific culture, and an expert workshop specifically focusing on scientific culture, which was organised by the Commission and held in Brussels in June 2006. As a result of the workshop, a trans-disciplinary community research community on science and culture has been created.

Only 29% of European scientists are women

In 1999, the Commission launched an action plan on women and science, which set out a strategy to promote research by, for and about women. Actions to promote gender equality in scientific research have been undertaken. In 2006, "She Figures 2006", the second edition of statistics and indicators on women in sciences in the EU-25 has been published. "She Figures" shows that women are still under-represented in the European Union: only 29% of European scientists are women. The figures are even more worrying when looking at engineering and technology: only 5.8% of women carry out research in this field. Engineering and Technology still have a very "masculine" image. In May 2006, the Commission published a final report prepared by the WIST Group entitled "Women in Science and Technology - the business perspective". The expert group examined the situation in a number of Europe's top companies and analysed the possibilities for the promotion of women in Science and Technology from a business perspective and developed an integrated approach to the cultural change involved.

A European Platform of Women Scientists was launched. It will develop activities designed to help women scientists to share experiences and to network more efficiently at European level and to involve them more actively in research policy developments.

The Gender Monitoring Studies examine the implementation of gender mainstreaming in FP6. They show that, while there is an increase in women's participation as experts (24% in 2004 up from 17% in 2001), the number of women scientists participating in FP6 seems to have remained stable compared to FP5 (around 15% - final results will be available by the end of 2007). Gender Action Plans (a compendium of which has been available on the web since autumn 2005) are regarded as a useful tool for increasing gender awareness, but with variable quality and success so far.

Integrating ethics in European and international research

All EU-funded research activities must comply with a strict ethical code. In fact, Article 3 of FP6 states that: “All the research activities carried out under FP6 must be carried out in compliance with fundamental ethical principles.” For this reason, the Commission carries out an ethical review of project proposals with an ethically sensitive content. The number of proposals evaluated through an ethical review continued to highly increase; from 89 in 2003 to 411 in 2006.

The two main reasons for this large increase in the number of proposals being submitted are the greater awareness of the scientific evaluators of how to detect ethical issues that are not adequately addressed, and the lack of awareness within the research community of how to identify, explain and address the ethical issues in the proposals.

New evaluation procedures were also tested in order to speed up the process and to improve the overall quality of evaluations in FP7.

Several actions are being taken to promote the integration of ethical approaches to research at European level, with a view to achieving genuine and productive synergies among research policies and projects. This is supported by networking actions and cooperation with the Forum of National Ethics Councils, the Commission's EGE (European Group on Ethics in Science and New Technologies) and with the Council of Europe's COMETH (European Conference of National Ethics Committees). The 2007 Work Programme for Science in Society research in FP7 was completed, with a stronger emphasis on international cooperation and on the participation of Civil Society Organisations (CSOs) in FP7 projects.

International cooperation for ethics in science has focused on promoting international dialogue and capacity-building on ethics for Research Ethics Committees in developing countries. A number of major events took place in 2006, including the Global Forum for Bioethics in Research in Karachi and a Conference on the Bioethical implications of the Globalisation process in Brussels. Another topic in international cooperation was also an EU/USA dialogue on the ethical and legal aspects of biometrics (a conference was held in Washington DC).

European Research Open to All

Training, mobility, career development for researchers

The aim of FP6 on Human Resources and Mobility (HRM) is to encourage mobility of researchers, to attract researchers from all over the world to Europe and to stimulate a career in research. It had a budget of EUR 1,580 million of which 487 million in 2006. HRM (of which EUR 482 million allocated to Marie Curie actions) covers all stages of a researcher's professional life, from initial research training to life-long learning, career development and transfer of knowledge though researchers mobility.

According to the European Parliament, "Marie Curie Actions are widely regarded as the best part of the Framework Programme and have been highly successful"[35]. The high esteem of Marie Curie Actions is clearly demonstrated by the high number of applications: about 5,000 proposals were submitted in 2006[36]. Marie Curie actions are designed to give the opportunity to European researchers to gain experience across Europe and beyond but also to attract top-class researchers from third countries or Associate Countries and to transfer knowledge between the private and the public sectors as well as between regions. In 2006, a total of around 660 individuals have benefited from intra-European (EIF), outgoing (OIF) and incoming international (IIF) fellowships. The fellows themselves considered the Marie Curie fellowship scheme to have a significant impact in stimulating mobility: many of them would not have gone abroad had it not been for the fellowship[37]. In addition, around 210 researchers who already benefited from a Marie Curie Fellowship have received either a Marie Curie Reintegration (ERG) or an International Reintegration (IRG) grant to become professionally reintegrated within their country of origin or in another European Union or associated country. Furthermore, in 2006, some 800 European research organisations were supported by the Research Training Networks (RTNs) action to provide a platform for training to recruited researchers in the framework of a defined collaborative project.

In 2006, 30 Team leaders have been awarded with 4-year Marie Curie grants to work together with their newly recruited international teams in renowned host institutions. Likewise, 23 new Marie Curie Chairs holders have teaching positions at universities and research institutions enabling 3 of them to return from USA. The additional 36 new contracts for Marie Curie conferences will allow a total 3245 events for approximately 93000 students over all FP6 to participate in events covering a broad range of scientific topics.

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35 Amendments 970-1129 (n°1101) - Committee on Industry, Research and Energy on 23.3.2006, EP, 371.785v01-00, pp.85.

36 http://ec.europa.eu/research/fp6/mariecurie-actions/indexhtm_en.html

37 Impact assessment of the Marie Curie fellowships schemes, EC contract n° IHP-D2-2003-01, June 2005.

Regarding the Transfer of Knowledge Actions (TOK), 79 new contracts in place will facilitate the further development of research capacities and the establishment of durable industry-academia partnerships through exchange of research staff and recruitment of international experienced researchers.

Regarding efforts to promote researcher careers and mobility – in addition to the policy developments, the following progress is noted:

The European Researcher's Mobility Portal was revamped. As a result, the number of available curricula vitae, job vacancies and visits increased (on an average, monthly 40.000 unique visitors and about 310.000 pages views). The interoperability between the majority of the 31 national portals integrated in the European portal was further developed.

The ERA-MORE network was launched in 2004. Presently 200 Mobility Centres and local contacts points in 32 countries provided tailor-made assistance to mobile researchers and their families. For the period of September to December 2006, the ERA-MORE members have assisted around 17,000 researchers and answered about 25,000 questions on various topics ranging from legal issues to everyday life matters, thus replying to real needs. Strategic reflexions were also led to sustain the operations of the Mobility Centres after the EC funding stops, as initially planned.

A strong support was also brought in Vienna to the proposal of a 'European Platform for Researchers', as an open forum bringing together researchers and several stakeholders from industry, universities, social partners, etc. in order to set up a 'strong voice' for researchers, and to contribute to the developments of a genuine labour market for them.

The report on the "Mobility of Researchers between Academia and Industry: 12 Practical Recommendations" was finalized by experts working groups. The report is addressed to research organisations, universities and private companies engaged in research and public authorities. It contains a coherent set of recommendations for improving mobility and the career development of researchers between academia and industry, as a means of enhancing a culture of longer-term, structured cooperation in terms of knowledge transfer and development of cross sector skills.

The most noteworthy of the awareness raising activities in 2006 was the "Researchers Nights" based on the first experience of 2005. Over 100,000 persons participated in more than 100 towns in 21 countries in these successful events.

Promote the development of Research Infrastructures

The overall objective of the FP6 Research Infrastructures (RI) activity is to promote the development of a fabric of research infrastructures of the highest quality and performance in Europe, and their optimum use on a European scale based on the needs expressed by the research community. The EC provides support to the development of a European approach for the emergence of new facilities and for the operation and enhancement of existing infrastructures. To achieve this, a budget of approximately EUR 515 million within FP6 was allocated.

Research Infrastructures, the integrating factor

It is widely recognised that Research Infrastructures (RI) play an increasingly important role in the advancement of knowledge and technology and their exploitation. By offering unique services to users from different countries and from all areas of research and by attracting young scientists, and through the networking of facilities, the Community RI activities help the structuring of the scientific community in the reinforcement of an efficient European Research Area.

In 2006, a total of 45 new "Integrated Infrastructures Initiatives (I3)", "Coordination actions" and "Transnational Access" (TA) were signed, drawing on a 2006 budget of roughly EUR 150 million. The total number of networked infrastructures supported under FP6 all over Europe is now about 250 directly serving about 20,000 scientists, and several millions indirectly, i.e. through their databases and internet-based services.

In 2006, the Commission also conducted a second round of the 'Survey of European Research Infrastructures', together with the European Science Foundation (ESF). This would help the setting-up of a database of pan-European top-level research services.

Developing a European strategy for research infrastructures

In 2006, the Commission strongly supported the European Strategy Forum for Research Infrastructures (ESFRI) in its development of a coherent and strategic approach to policy-making. It participated, in particular, in the elaboration of the first European Roadmap for Research Infrastructures needed for the next 10 to 20 years. This document, published in October 2006, identifies 35 infrastructure projects in the following areas: Social Sciences and the Humanities, Environmental Sciences, Energy, Biomedical and Life Sciences, Materials Sciences, Astrophysics, Astronomy, Particle and Nuclear Physics and Computation and Data Treatment. This Roadmap is the result of an intensive two-year consultation and peer review process involving over 1,000 high-level European and international experts.

Important work was carried out in 2006 on “Legal Aspects on Research Infrastructures of pan-European Interest”. The first seminar was held on the impetus of Lord Sainsbury, in his capacity of President of the Council of the European Union in the second half of 2005. The objective was to identify good practices on the legal forms for establishing large-scale Research Infrastructures (RIs) in order to shorten the preparatory phase for future RIs and thus save valuable resources. A second workshop concentrated on the possible set-up of a new legal status for pan-European Research Infrastructures. The results, which were upgraded during the course of 2006, are available on the Commission web-site[38].

The setting-up of regular European conferences on research infrastructures

At the end of 2005, the 3rd high-level conference on Research Infrastructures was promoted under the banner of the UK's Presidency of the EU. Through its conclusions, published in early 2006, it contributed to clarifying the long-term scientific needs in relation to European research infrastructures, as well as addressing the possible international dimension of the new generation of research infrastructures.

1.3. Direct actions by the Joint Research Centre

The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. This entails the provision of sound and reliable scientific information about the economic, social and environmental situation in the EU, necessary for the European integration process. In order to fulfil its mission, the JRC develops and maintains its own S&T competencies both by performing research activities in house and by taking advantage of its extensive partnerships

[38] http://cordis.europa.eu/infrastructures/

with research organisations and stakeholders in Member States and beyond. The main contributions made in 2006 are presented below.

Activity 1 directly financed research FP6 2002-2006 EC

Sub Activity: Food, chemical products and health

One important achievement within this priority in 2006 has been the appointment of the JRC as the Community Reference Laboratory (CRL) in four areas: food contact materials, heavy metals in feed and food, mycotoxins, and polycyclic aromatic hydrocarbons. This has increased the status of the JRC as a major EU player and contributes to EU citizens' health and protection by assuring that Europe's food complies with regulatory and safety standards.

Also, the JRC has developed six new alternative methods for testing drugs that will reduce testing on animals. These methods use cell cultures to assess the toxicity of cancer drugs and to identify contaminated drugs and bring the added benefit of increasing the accuracy of testing, thereby making the tested products safer. The JRC was also very much involved in the conduct of the REACH implementation projects and in training some 20 new recruits for the future Chemicals Agency.

A JRC study on the co-existence of Genetically Modified (GM) and non-GM crops and seeds concluded that crop production at the 0.9 % threshold set by the EU is feasible with few or no changes in agricultural practices if GM presence in seeds does not exceed 0.5 %. In an associated development, the Commission asked the JRC to set up an EU 'Co-existence bureau' to become operational in 2007. In response to the EU emergency measures regarding the potential presence of the non-authorised genetically modified LL RICE 601 in rice and products imported from the US, the JRC confirmed the validity of detection methods for potentially GM-contaminated rice imported into the EU.

The JRC has also produced a series of avian flu situation reports on the avian flu outbreak which have proved to be important to policy services of the Commission.

Sub Activity: Environment and Sustainability

In the area of energy, the JRC examined future scenarios of energy consumption at the horizon 2050. A JRC study in this area has already been included in the energy package submitted to the 2007 Spring European Council.

Regarding the environment and sustainable development, the JRC was involved in the validation of atmospheric models enabling the EU to jointly improve its climate change and air pollution policies. It also published the first atlas of European soils, a fundamental tool for future EU actions for soil protection. The JRC also set up an environmental information system to help in the sustainable management of African natural resources and to assist in the provision of timely emergency support in case of famine and natural disasters.

In November 2006, INSPIRE, the new infrastructure for spatial information in Europe, was created. The JRC is at the core of the development of implementation guidelines covering meta-data, compatible networks and standardized data specifications.

The JRC is also a partner, together with African, European and American counterparts, in the Congo Basin Forest Partnership aiming at producing the first report ever containing exhaustive information about the different roles of Central Africa forests. The existing efforts will be merged to create a permanent monitoring tool of Central Africa forests.

Sub Activity: Horizontal activities

The JRC supported the Lisbon Agenda by publishing the scoreboard on industrial R&D investment and was instrumental in the preparation of the innovation scoreboard, both of which have become a reference for Community research and innovation policy.

The JRC developed *ConTraffic*, a system to combat fraud and increase global security that identifies false declarations of origin of containers thus reducing smuggling of counterfeit goods, nuclear materials or weapons. The JRC also extended its technical assistance in nuclear safety, nuclear security and the combat against illicit trafficking to the new neighbour countries in collaboration with the IAEA and Interpol.

The JRC provided the Commission with a rapid damage assessment for Lebanon after the 2006 conflict between Israel and Lebanon, for the Indonesian earthquake, and for the European forest fires. It also produced forecasts of fire risks and provided a number of flood alerts. The JRC also helped monitor the reconstruction process in Lebanon as part of the Commission funded forthcoming Reconstruction Facility. The JRC was also instrumental in helping to analyse the impact of the oil spill caused by the armed conflict between Israel and Lebanon.

Activity 2 directly financed research FP6 2002-2006 – EURATOM

In the area of nuclear energy, the JRC continued its research efforts to comply with the obligations of the Euratom Treaty for nuclear safeguards and non-proliferation, nuclear waste management, safety of nuclear installations and the fuel cycle, radiation protection, and control of the environment**.** In 2006, it also became the Implementing Agent of the Community in the Generation IV International Forum (GIF), when the Euratom Community acceded to the GIF Framework Agreement. In this role, JRC negotiated and concluded four GIF System Arrangements, while negotiations on several Project Arrangements were finalised for signature, expected in early 2007.

1.4. Research and Training Actions under the Euratom Treaty

Fission

Research and training actions under the Euratom Treaty constitute a key element of the Community research effort in the areas of fission energy research and innovation, nuclear safety and radiation protection, and radioactive waste management.

Fission energy and radiation protection research – increased integration through the Euratom programme

The FP6 Research Programme on Nuclear Fission and Radiation Protection directly contributes to key policy objectives for the EU, including the protection of society and the environment, the security of energy supply, sustainable economic growth and the knowledge-based society. In 2006, EUR 55 million of FP6 funding was committed to actions in the areas of radioactive waste management, radiation protection and other activities in the field of nuclear science and technology, training and infrastructures. The second series of "Euratom Research Projects and Training Activities" funded through the Euratom FP6 are described in the brochure[39] issued in March 2006.

Euratom joins international nuclear research initiative

[39] http://ec.europa.eu/research/energy/pdf/nuclear_fission_2_en.pdf

On 11 May 2006, the European Atomic Energy Community (Euratom) formally acceded to the Framework Agreement of the Generation IV International Forum (GIF), an international initiative for collaborative research and development on fourth generation nuclear energy systems. This platform for international research cooperation is investigating innovative nuclear energy system concepts to meet future energy challenges. Fourth generation nuclear energy systems consist of an array of nuclear reactor technologies that could be deployed by 2030. There are on-going FP6 actions in all six of the internationally agreed Gen-IV systems. The most important projects are RAPHAEL, a large Integrated Project on very high temperature reactors (EUR 9 million EU contribution), and GCFR, ELSY and HPLWR, which are smaller collaborative projects on gas-cooled fast reactors, lead-cooled fast reactors and super-critical water reactors respectively.

Stimulation of cooperation with international players

Several actions have been taken to promote enhanced cooperation between researchers from New Independent States (NIS) of the former Soviet Union and the European scientific community. A meeting took place in Moscow to discuss increased cooperation between the Euratom fission programme and those Russian authorities responsible for managing nuclear R&D, particularly in the area of nuclear safety. Russian partners are already involved in FP6 projects dealing with Russian reactor technology. The intention is to reinforce this cooperation in FP7, and maybe to extend it to cover the more general area of reactor systems.

The interaction with the international community via the Nuclear Energy Agency (NEA) and the International Atomic Energy Agency (IAEA) Committees and other meetings is continuously being intensified. In addition, Contact Expert Group (CEG) meetings in severe accidents, plant life management and transmutation have enabled important links to be maintained between the Euratom fission and ISTC (Russia) and STCU (the Ukraine) projects.

Nuclear energy in Europe: Current research, future potential

An important event in the area of communication, the FISA2006 Conference[40] was held in Luxembourg in March 2006. This event was a great success and attracted a high attendance; for the first time it covered not only Euratom fission safety research, but also innovative concepts, research on transmutation systems, as well as cross-cutting issues such as education/training and infrastructures. The conference was followed by seven parallel one-day workshops covering a number of key issues (such as materials, links with fusion, very high temperature reactors, prospects for education & training, etc.).

Fusion

ITER, an exceptional success

ITER is a project aimed to demonstrate the potential of fusion as an energy source. ITER is second only in scale to the International Space Station among the world's large international scientific projects. The countries involved represent over half of the world's population. The ITER Agreement, the Agreement on Privileges and Immunities, and the Arrangement on the Provisional Application were signed on 21 November 2006. This signature represents the end of the negotiations that started in 2001 and marks the start of the establishment of the ITER International Organisation on a provisional basis pending the entering into force of the ITER

[40] http://cordis.europa.eu/fp6-euratom/ev_fisa2006_en.htm

Agreement which is expected in the summer of 2007. The construction of the ITER experimental reactor is scheduled for completion in 2017.

In November 2006, Euratom and Japan initialled the so-called "Broader Approach Agreement", on the joint implementation of R&D activities to accelerate the development of fusion energy. The Broader Approach Agreement made the ITER sitting in Cadarache possible, and covers three important fusion projects that will be undertaken in Japan.

The same day, the European Union and the Republic of Korea signed a cooperation agreement, specific to fusion energy research. This agreement is to promote the joint implementation of research and technological development activities. The EU already has such bilateral Agreements with Japan, the Russian Federation and the US, and aims to have similar agreements with all ITER Parties. First steps have been taken to initiate negotiations with China and India to establish fusion agreements.

Creation of a Joint Undertaking for the European contribution to ITER

In view of the contributions in kind to be provided for ITER and the Broader Approach activities, the Commission continued the preparation for the creation of a Joint Undertaking under Articles 45-52 of the Euratom Treaty. The European Joint Undertaking will work with European industry and research organisations to build around half of the high-technology components that make up the ITER fusion project. It will also support other projects for the development of fusion. The Joint Undertaking, the so-called 'Fusion for Energy' is set up in Barcelona (ES) and should be operational in the course of 2007. A political agreement in the Council on the statutes of the "European Joint Undertaking" was achieved in December 2006 and adopted in early 2007.

Develop European cooperation on fusion

The *European Fusion Development Agreement* (EFDA)[41] is an agreement between all European fusion research institutions and the Commission to strengthen their coordination and collaboration, and to promote their participation in collective activities. The continuation of EFDA, including the work programmes for fusion technology and the operation and joint exploitation of the "Joint European Torus" (JET)[42] based in Culham (UK), was approved in 2006. The JET facilities were successfully operated by task forces of scientists from all Fusion Associations and an ambitious ITER relevant JET enhancement programme has been initiated and will continue in FP7. The 23 existing fusion Contracts of Association have also been extended into 2007. New Contracts of Association with institutions in Bulgaria, Lithuania and Slovakia come into force at the start of 2007. Cyprus, Estonia and Malta will participate as "Trans-national Research Units" within existing Associations, ensuring that all Member States will participate fully in the fusion programme in FP7. The objective of the Community Fusion Programme to coordinate and integrate all European fusion technology and physics research and development activities was fully achieved.

An itinerant exhibition on fusion research

Public information activities have been reinforced to satisfy the wide public interest generated by ITER. The itinerant Fusion Expo, shown at 15 events, including the ITER initialling in Brussels in May 2006, has been used to communicate progress in European fusion research and to provide information about ITER. The exhibition offers an overview of fusion research in European laboratories, on the challenges, the achievements and the outstanding issues in the development of this new energy source.

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41 A framework contract between Euratom and its European partners in the field of fusion energy research.

42 At present the world's largest nuclear fusion research facility.

9 projects to train engineers on fusion technologies

In order to reinforce the engineering capabilities needed for ITER construction, Euratom has implemented a Euratom Fusion Training Scheme (EFTS)[43]. Nine projects were launched in 2006. Young researchers, mainly engineers, are being trained in the skills which will be needed for ITER and beyond.

The Euratom activities research directly financed and developed by CCR are dealt in chapter 1.3.

1.5. Completion of Previous Framework Programmes and other Activities

2006 was the last year for launching Calls for Proposals within FP6. Meanwhile, projects from previous Framework Programmes have continued to produce results. The two latest studies on the impact of the previous Framework Programmes concluded that the previous programmes have played an important and positive role in Europe. The registration of patents and the commercial exploitation of the results show that the Framework Programmes improve Europe's innovative performance. The large number of scientific research publications, for example about 2,000 publications within the Fusion Programme per year, indicates the dynamism of the knowledge creation process.

Effort has been made to complete the scientific, technical, legal and financial monitoring of these projects, which is essential to ensure the best use of resources and to obtain the best possible results. Important issues have been the assessment of the impact of projects on science, economy, society and the environment at national, Community and international level, as well as ensuring that the research policy has a recognisable impact on the elaboration of related Commission policy initiatives and related legislative acts.

As an example, DG INFSO has established an 'Impact Observatory' that continuously provides a systematic and rolling process of data collection and analysis of the impact of completed IST RTD projects. Conclusions from a first group of studies indicate that projects have had a significant impact on the improvement of the knowledge base and on the enhancement of skills and competences across Europe. Projects have also been a source of technological and scientific innovation and have often triggered new research activities or taken up emerging trends and boosted the development of whole new fields. They have created value for participants through faster times to market, improved quality, or improvements in product lines. Innovative SMEs in particular experienced significant impacts on their competitive advantage. Projects were also instrumental in supporting policy goals such as those expressed in the i2010 initiative.

Salient achievements

Controlled and Reproducible fabrication of nano- materials: an industrial challenge

Of the major achievements which have been publicised, mention should be made of the Nano-FIB FP5 project aimed to produce a new instrument for nano-fabrication, a controllable Focused Ion Beams (FIB) "pencil" or beam. Working at the nano-scale demands very precise instruments, such as focused ion beams which can manipulate material at a smaller scale than

[43] www.efda.org

ever before. Nano-FIB's machine focuses its ion beam so precisely that it can carve molecular-structures, etchings and pre-defined defects on a substrate surface with nanometre accuracy. It is like sculpting with a hammer and chisel, only at the level of a group of atoms at a time. The most familiar use of such small-scale fabrication technologies is for manufacturing microprocessors and other integrated circuits. This project has boosted ion-beam technology by producing a far more precise beam and a direct-write ion beam process that is largely free of toxic chemicals and material waste. One of the most striking results of the project is the rapidity in getting the technology out of the laboratory ready for commercial roll out.

From 4 to 3 wheels to become a "green" car

After 6 year's work, a European consortium has developed a new clean vehicle for urban use. The “Compact Low Emission Vehicle for Urban Transport” (CLEVER) is a three-wheeled vehicle that is fully enclosed with seats for the driver and a passenger. A 213cc single-cylinder, 15 horse-power engine gives CLEVER the ability to accelerate from 0 to 60 km/h in less than seven seconds. Perhaps more importantly, the vehicle emits less than 60g/km of CO_2, a figure well in line with the EU's long-term emissions targets. As many EU countries have yet to develop a viable compressed natural gas (CNG) infrastructure, the CLEVER carries two removable cylinders that can be refilled externally. Its strengthened frame will protect the driver in a crash and the vehicle will have a top speed of approximately 90 Km/h. The vehicle combines the safety of a micro-car and the manoeuvrability of a motorbike, while being more fuel-efficient and less polluting than other vehicles.

New technologies, new potential for nuclear reactors

The High Temperature Reactor (HTR) technology development was restarted in Europe in 2000 after a 10-year break, with 9 coordinated projects in the Fifth Framework Programme. These projects concentrated on further developing HTR technologies and addressing key feasibility issues. In particular, the HTR-F project, focussed on fuel technology. It was shown in the HFR (High Flux Reactor, Petten, NL) that state-of-the-art fuel fabricated in Germany can be operated in Very High Temperature Reactor (VHTR) conditions, far beyond the operating conditions tested in the past (1000 °C core outlet temperature, very high discharge burn-up of 170 000 MWd/tHM), without losing its unique leak tightness to fission products.

First tests on the irradiated fuel behaviour in a deep final repository, carried out in the HTR-N project, showed the exceptional robustness of coated particles in geological disposal conditions, but this is subject to confirmation from longer-term experiments. The feasibility (materials, design, magnetic bearings) of a direct cycle helium turbine was addressed and the option initially chosen by all industrial projects to have a vertical shaft was challenged. On the basis of the analysis of existing experimental results, a deeper insight was obtained into HTR core physics and fuel modelling allowing the partners to improve their own codes and their qualification for HTR design. A consensual European safety approach was developed in order to allow the licensing of modular HTR with a simplified design taking account of the benefit of the specific inherent safety features of this type of system.

This HTR/VHTR, which is inherently safe, proliferation-resistant and modularly designed, is promising for the next generation of nuclear reactors.

Competitive and Sustainable Growth Programme

The evaluation of the results and of the anticipated socio-economic impact of completed FP5 Growth projects were analysed in detail. Based on 600 completed projects, results show that 68% of projects would not have been undertaken at all without EC funding, 75% of projects were effective in achieving their scientific-technical objectives and 39% reached both their scientific-technical and their exploitation objectives. The impact generated or expected from these projects has been identified to reach 1,730 prototypes/pilots, 480 new services and software tools, 7,500 publications, 400 patent applications, creation of 220 spin-off companies, as well as input to 270 EU legislative texts.

Supporting alternative employment of former weapons scientists through carrying out peaceful research activities

The Commission was appointed for managing the participation of the Communities to the International Science and Technology Centre (ISTC) in Moscow, and to the Science and Technology Centre in Ukraine (STCU). The Centres aim to contribute to the non-proliferation of expertise related to weapons of mass destruction (WMD). Through the support to peaceful research activities, they encourage weapons scientists of the Russian Federation and the independent states from the former Soviet Union to redirect their talents to civilian scientific areas. The Commission is represented in the Governing Boards of the Centres, which review their strategy and programmes, approve the Centres' budgets and lists of projects funded, and set new initiatives. In 2006, the Governing Boards of the Centres approved a total of 164 regular projects, out of which 110 are funded by the Communities and will be carried out with at least one European organisation. Altogether, the Centres' activities involved 13,484 former WMD scientists in 2006. The Commission is at present reviewing its policy towards the Centres while the Communities' funding to the Centres is shifting from the TACIS instrument to the new Stability Instrument.

"Next generation communication networks

With its strengths in communication equipment, devices, networks and eServices, Europe is well placed in the world-wide race to define and develop the network and service infrastructures of the future. With a strong consortium of major players in the mobile and wireless communication industry including manufacturers, network operators, R&D centres and academic institutions, the WINNER integrated project has developed a single ubiquitous radio access system adaptable to a comprehensive range of mobile communication scenarios from short range to wide area. WINNER has established the technological basis for 4th Generation Mobile in Europe ahead of standardisation. Over 2005 and 2006, the project submitted over 100 contributions to standardisation bodies such as CEPT, ITU-R, 3GPP and the Wimax Forum. Working towards the convergence of satellite and terrestrial networks, the MAESTRO project specified, implemented and validated the critical features of a Satellite Digital Multimedia Broadcast (SDMB) system architecture. The project laid the ground for the first worldwide test broadcast of mobile TV using the DVB-SH standard in the S-Band (2.2GHz) recently announced. It is bringing high-quality mobile TV channels to a wide audience and in various usage conditions such as inside and outside buildings, as well as while moving onboard a vehicle.

ICT for personalised healthcare

ICT offers powerful capabilities to improve illness prevention and safety of care, facilitate active participation of patients and enable personalisation of care. It opens new opportunities in health and disease management. The HealthyAims integrated project has developed key micro-system and communication technologies that bring intelligence directly to the human, in the form of medical implants and ambulatory measurement systems. The medical products developed include cochlear implant, retina implant and glaucoma sensor, functional electrical stimulation for upper limbs, sphincter sensors, implantable pressure sensor to monitor intracranial pressure and inertial measurement units for human body motion. This multi-disciplinary project extends the existing state-of-the-art in micro-systems, biomaterials, wireless communications, power sources and body area networks (BANs). The MyHeart integrated project is contributing to the fight against cardio-vascular diseases by developing

ICT-enabled solutions for prevention and early diagnosis. These solutions will allow ubiquitous access to medical expertise in the form of continuous monitoring, diagnosis, therapy, automatic feedback and professional interaction. The project has developed four product concepts and integrated industrially manufacturable prototypes that are currently being tested in six European clinics. Exploitation is under way with the creation of two start-up companies. The first company, "Wearable Information Technologies" (WearTech) in Valencia will commercially exploit some of the textile technologies and garments that have been developed in the project. The second company is a spin-off from the MyHeart partner CEA-LETI Grenoble and will offer solutions for motion sensing. Philips, the consortium leader is also poised to exploit the technology in its healthcare product lines."

Security research

The Preparatory Action for Security Research (PASR) prepared the ground for a new theme - Security - under FP7. In 2006 the last of a series of three PASR calls for proposals with an annual budget of 15 Mio € was launched and 15 projects were selected. In September 2006 the European Security Research Advisory Board published its final report on the content and particular implementation aspects of security research under FP7. Security is now a new research theme in the Co-operation Specific Programme of FP7.

A permanent communication to all European citizens

The dissemination of results and tools through publications, events, press releases and other appropriate mechanisms has continued, as well as the follow-up of promotional actions, information and communication activities, and the management of websites and links with CORDIS[44].

1.6. Research Programme of the Research Fund for Coal and Steel

Complementary to and managed outside the Framework Programmes, the Research Fund for Coal and Steel Programme (RFCS) was created on the expiry of the European Coal and Steel Community (ECSC) Treaty in July 2002. With a yearly budget of around EUR 60 million, financed by the interests accrued each year by the assets of the ECSC (EUR 1,600 million) at the time of the Treaty's expiry, the Fund supports research projects in the areas of coal and steel.

A vision for the future of the coal and steel sectors

In 2006, the Steel Advisory Group (SAG) and the Programme Committee (COSCO) assisted the Commission in the identification of research priorities for the steel sector. These priorities covered the full range of research topics of the Research Fund for Coal and Steel, from the development of new or improved technologies to guarantee the economic, clean and safe production of steel, to the development of steel products characterised by steadily improving performance, suitability of use, customer satisfaction, prolonged service life, easy recovery and recycling. These priorities were based on the short-term priorities identified by the European Steel Technology Platform (ESTEP)[45] working groups and published in the ESTEP document entitled "From a Strategic Research Agenda to Implementation" in March 2006.

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44 http://cordis.europa.eu/en/home.html

45 http://cordis.europa.eu/estep/

They were published in the Information Package and on the RFCS website[46] and were used to complement the selection criteria for the evaluation of research proposals submitted by 15 September 2006. As regard steel research, around 2/3 of the proposals likely to be supported by the Fund in 2007 were in line with these priorities.

[46] http://cordis.europa.eu/coal-steel-rtd/home.html

Undertakings and research organisations from the new Member States of the European Union have been able to participate fully in the activities of the Research Programme of the Research Fund for Coal and Steel since 1 May 2004. Participation from new Member States in 2006, although still modest, has increased. These results show the keen interest of the new Member States in the coal and steel sectors. Action was carried out in 2006 by the programme with the aim of increasing their involvement in the RFCS. This action notably included ad hoc presentations and pro-active invitations to experts from the new Member States to participate in the evaluation exercise and benefit from its many opportunities to network.

High efficiency, low emission

The objective of the COMponent TESt facility for a 700°C power plant (COMTES700) project is to design, manufacture, erect and operate a component test facility to test high-temperature durable new materials needed to realise a coal-based power plant with an overall efficiency in the range of 50%, as opposed to the currently achievable levels of about 43%. High efficiency saves resources and reduces emissions. A share of up to 20% of (CO_2 neutral) biomass can be added to the fuel resulting in a further avoidance of anthropogenic CO_2. The project contributes to increase the competitiveness of the European power industry.

As regards steel, the New Blast Furnace Process (ULCOS) project aims at reducing the CO_2 emissions from the steel-making plants. This project is jointly funded by the RTD Framework Programme and the RFCS with an overall Commission support of around EUR 25 million. The objective of this project is to develop a new blast furnace process route able to operate with very low CO_2 emissions, based on the drastically reduced consumption of carbon containing input materials.

The results shall lead to the selection and preparatory work required for a subsequent future large-size pilot project demonstrating the feasibility and CO_2 reduction potential of the new CO_2 reduced iron-making process or processes selected.

2. DEVELOPMENTS IN MEMBER STATES AND APPLICATION OF THE OPEN METHOD COORDINATION

1.2 The Open Method of Coordination in support of reaching the Barcelona objectives

The Barcelona objective of increase spending on R&D to approach 3 % by 2010 has been an integral part of the Lisbon strategy since its relaunch in 2005. On the basis of a commonly agreed set of Integrated Guidelines, Member States have formulated National Reform Programmes and have reported on the implementation of those for the first time in October 2006.

The Integrated Guidelines cover at the same time the macro-economic, micro-economic and employment dimension of the Lisbon strategy. One of these covers R&D policy. It confirms the 3 % objective and further calls upon Member States to develop a mix of policy measures to foster R&D by focussing on improving framework conditions, raising the effectiveness and efficiency of public spending, creating public private partnerships, strengthening centres of excellence, improving technology transfer, developing incentives to leverage private R&D, modernising the management of research institutions and universities and ensuring a sufficient supply of qualified researchers.

The Commission noted, in its Annual Progress Report published in December 2006, that with regards to R&D policy, most Member States have worked actively on developing and implementing the policies outlined in their NRP. Although there has been progress in many areas and most Member States have shown a strong commitment to increasing R&D spending, for some others further policy initiatives will be needed for them to reach their R&D spending targets.

CREST (Scientific and Technical Research Committee) has in November 2006 engaged in a mutual learning exercise on the basis of the National Reform Programmes and 2006 Progress Reports and adopted a report entitled 'Lessons for R&D policies on the basis of the National Reform Programmes and the 2006 Progress Reports' at its December 1 session.

Complementing this mutual learning on broad R&D policy developments, CREST has continued its work in the implementation of the Open Method of Coordination, where specific R&D policy issues have been subjects for discussion, exchange of experience, identification of good practice and mutual learning.

There are increasing indications that policy debates at Community level, in particular through the Open Method of Coordination, are having an effect on the way in which Member States are constructing their national R&D policy mixes. The overall view that emerges is that there is a degree of convergence appearing in that Member States have subscribed to a number of similar objectives and challenges and are, explicitly or implicitly, taking guidance from discussions at the European level or through the identification and transfer of good practices identified in other Member States.

CREST adopted its final report on the second cycle of OMC implementation in July 2006. CREST affirmed that the application of the OMC can continue to play an important role in strengthening and aligning Member States' policies to meet the challenge of achieving the Lisbon and Barcelona objectives. In its report, CREST called upon Member States to adopt holistic approaches to research and innovation policy making, including by ensuring an inclusive approach to policy governance and implementation, with for instance a reference to the activities of the Steering Group on Human resources and Mobility, dealing in particular with the intersectoral mobility and the European Charter for researchers/Code of Conduct for the recruitment of researchers. The report was based on the work carried out in five Expert Groups which addressed issues such as: policy mixes for R&D, the public research base and its links to industry, SMEs, fiscal measures for R&D and intellectual property rights. The results of the CREST group on fiscal measures for R&D were subsequently used as a source of information feeding into the Commission's Communication on how to better make use of tax incentives for stimulating R&D activity.

On the basis of the outcome of the second cycle and important policy developments, CREST engaged in a discussion with a view to selecting appropriate topics for the third cycle of OMC implementation. The outcome of this discussion has shifted the focus of OMC discussions partly away from the broad themes mentioned above to specific issues which raised the interest of a large majority of CREST delegations and where Member States displayed a clear will to take ownership of the process and to provide the leadership necessary to drive the discussions to tangible results.

As a result, the third cycle addresses the following issues:

- The expert group on **policy mixes for R&D** in October 2006 started a new round of peer reviews of Member States' R&D policy systems. The peer review process developed during the second cycle was optimised and six countries (Netherlands, United Kingdom, Lithuania, France, Belgium, Estonia) volunteered to be reviewed during this cycle. The aim of the peer reviews remains to at the same time draw policy relevant conclusions for the countries under review and to stimulate a process of discussion and policy learning on generic issues related to the formulation of R&D policy mixes.

  The peer review process for each country is kicked off with the preparation of a background report on the R&D system of the country in question. The report is meant to provide basic information to the reviewers and to raise issues for debate. A group of 3-5 peer reviewers subsequently visits the country and engages in discussions with R&D stakeholders, on the basis of a programme prepared by the country under review. The reviewers' findings are summarised in a review report, which is discussed by the CREST expert group. The main results are finally presented to the country under review during a feedback mission.

- The expert group examining how to better coordinate the use of the Framework Programme and the Structural Funds to support R&D focussed on the development of guidelines to support the coordinated use of both Community instruments. The main objective of the group was to close the information gap on how synergies between funding from the Structural Funds and the Framework Programme can best be achieved. The group has delivered two important outcomes:

  – Guidelines have been prepared containing 14 recommendations in 6 domains: RTDI strategies and governance, RTDI basis (infrastructure and human resources), RTDI excellence, international cooperation in R&D, exploitation and economic and social valorisation of R&D results, improvement of information and communication. The guidelines were adopted by CREST at its 7 May 2007 meeting.

  – The Guidelines were presented and discussed during a German Presidency conference held on 3 May 2007. The conference was attended by more than 200 stakeholders representing different stakeholders such as Structural Funds managing authorities, FP7 National Contact Points, CREST delegates, representatives from EU institutions,…

- The expert group on **internationalisation of R&D** started its work with a series of presentations on selected Member States' internationalisation strategies. The group undertook an in depth survey of how Member States and Associated Countries address the issue of cooperating with countries outside the European Research Area. Based on an analysis of the survey, round table discussions of selected aspects and a detailed case study of cooperation with China, a final report with recommendations will be delivered to CREST in the autumn of 2007.

- The expert group on **R&D in services** will look at how to develop policies for stimulating R&D in the service sector. The service sector currently accounts for more than 70 % of GDP in the EU, but its share in R&D expenditure remains low. A study of existing literature on the topic has been prepared. A final report will be delivered to CREST in the autumn of 2007, containing recommendations for policy development.

In addition to its work on specific R&D policy issues, CREST, in November 2006 and as indicated above, engaged in a dedicated mutual learning session on the basis of the National Reform Programmes and their 2006 Progress Reports. In its report on this exercise CREST recognised that the re-launch of the Lisbon strategy had brought about positive effects and called on political decision makers to sustain their commitment to the Lisbon reform process. In the field of R&D policy, CREST concluded that Member States should engage in a continuous cycle of adapting their policies, priorities and strategies in light of new challenges, including by considering coordinated action with other Member States or at the Community level. CREST furthermore acknowledged that much work still needed to be done to bridge the cultural divide between science and industry and recognised the need to make the academic environment more competitive.

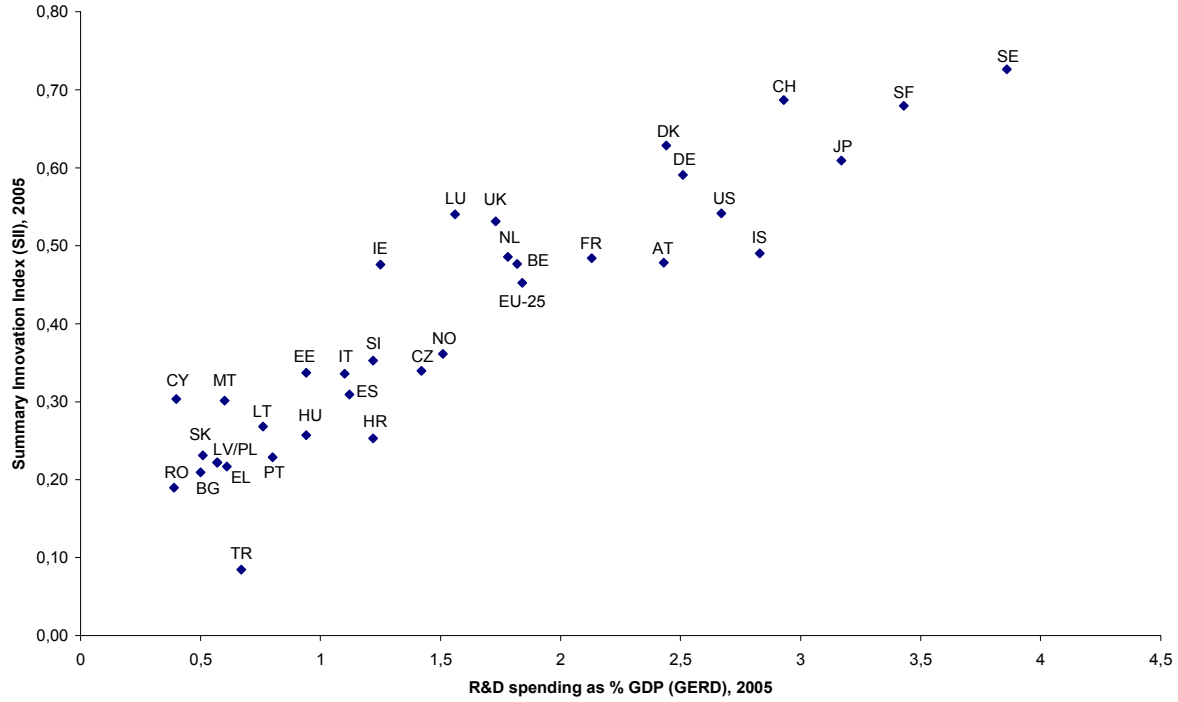
To complement the multilateral OMC process as it has been supervised by CREST since 2003, a pilot OMC-NET call for proposals was launched in the fall of 2005. The objective of this new scheme is to support mutual learning and policy coordination activities carried out by more limited groups of Member States and/or their regions on policy issues of their specific interest. The call resulted in 10 projects being supported, treating issues such as for instance public procurement, research infrastructures or regional R&D strategies. The OMC-NET scheme will be continued under FP7, with a new call to be launched in September 2007.

2.2 Trends in Public and Private Research Investment

2.2.1 Progress towards the 3 % objective

The volume of financial resources allocated to R&D is an indicator of the level of commitment to the production and exploitation of new knowledge, as well as one of the elements determining a country's innovation capacity. This is illustrated in figure 2.1 where the Summary Innovation Index (SII), a measure of a country's overall innovative performance, is plotted against R&D intensity. The correlation is remarkably close, indicating that R&D intensity is not merely an input measure, but probably also one of the main determinants of innovation performance.

Figure 2.1 Summary Innovation Index versus R&D intensity



Source R&D intensity : DG Research Data : EUROSTAT, OECD

Note : R&D intensity data for IT, NL, RO, UK, HR, TR, IS, CH, US, JP are for 2004; data for AT, FI are for 2006

Source SII : European Innovation Scoreboard 2006

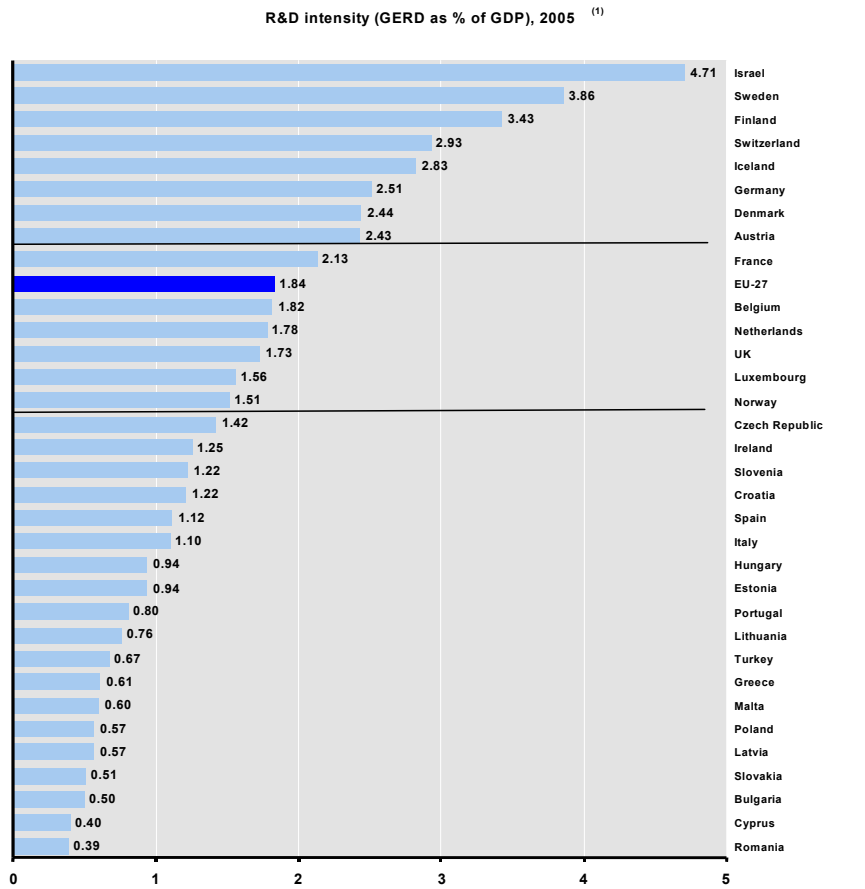
In 2005, EU R&D intensity amounted to 1.84%. Broadly speaking, one can distinguish three groups of countries according to the share of their GDP devoted to R&D (Figure 2.2):

- The three Nordic countries, Sweden, Finland and Denmark, as well as Germany and Austria top the EU ranking with values above 2.4% of GDP and therefore form the group of high R&D intensive Member States. In fact, Sweden and Finland spend significantly more than 3% of the national wealth on R&D.

- A second group consisting of five countries (France, Belgium, the Netherlands, the United Kingdom and Luxembourg) is close to the EU average with values between 1.5% and 2.2% of GDP. Among them, France is the only Member State scoring above average.

- A third, large group including the southern European countries and the new Member States shows R&D intensities below 1.5%. Differences within that group are still large, with countries such as the Czech Republic and Slovenia showing intensities well above 1% and Member States such as Romania having less than 0.4% of GDP devoted to R&D.

Figure 2.2 R&D intensity (GERD as a % of GDP, 2005)



Source: DG Research
Data: Eurostat, OECD
Note: (1) NL, IT, RO, UK, HR, TR, IS, CH : 2004; AT, FI : 2006.

Figure 2.3 compares for each Member State the level of R&D intensity in 2005 with its recent growth performance (2000-2005). After a period of slow but continued growth from 1.80% in

1998 to 1.88% in 2001, the EU-27 R&D intensity has stagnated in 2001-2002 and decreased slightly after that to fall back to its pre-1999 level.

An examination of the individual Member States' pace of progress since 2000 reveals a distinction between four groups of EU countries:

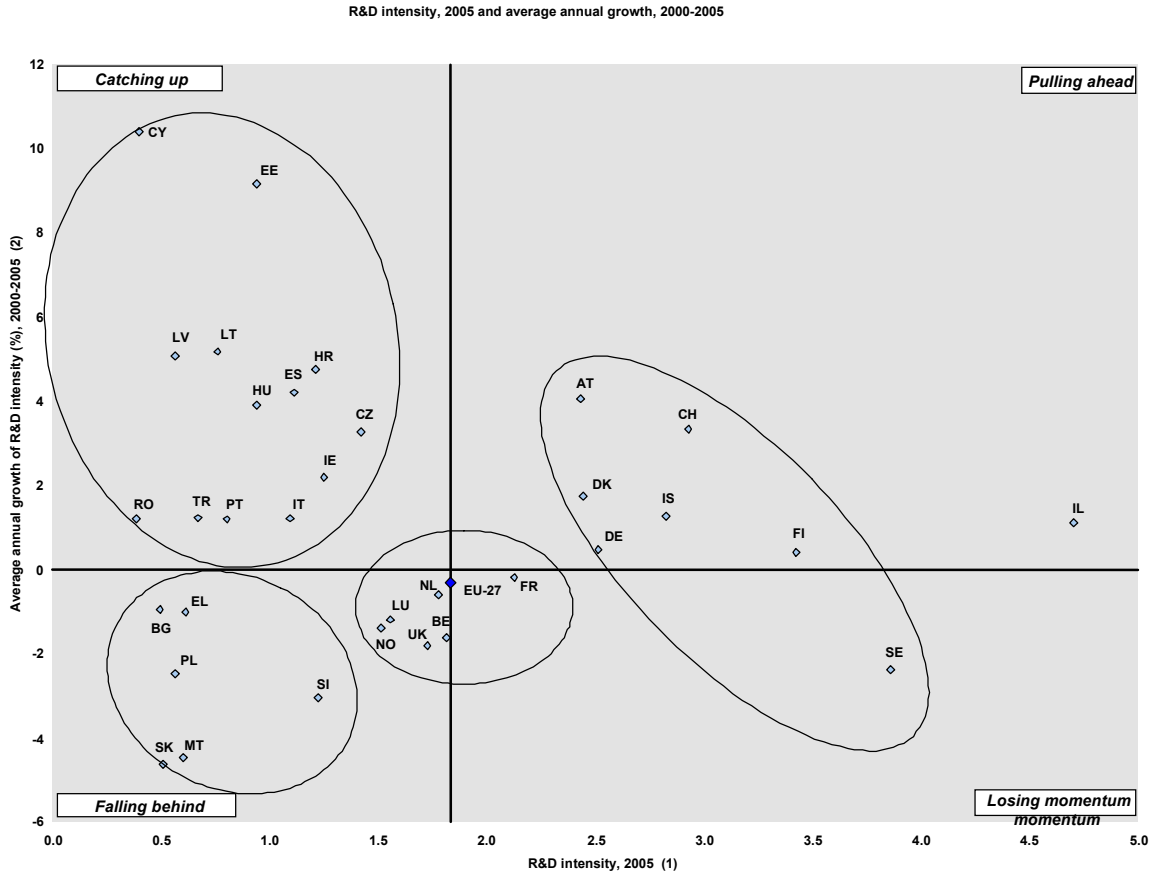
- With the exception of Sweden, all high R&D intensive Member States (i.e. Finland, Denmark, Austria and Germany) have been able to increase their already high R&D intensities between 2000 and 2005. These countries, among which Austria demonstrate the most impressive rate of growth and are pulling further ahead of the EU average. For Sweden, a trend reversal occurred in 2001-2002: after having increased sharply from 3.59% in 1998 to 4.25% in 2001, Sweden's R&D intensity declined after that year and is now equal to 3.86%.

- The group of Member States with average R&D intensities (i.e. France, the United Kingdom and the Benelux countries Belgium, the Netherlands and Luxembourg) all experienced declining R&D intensities between 2000 and 2005. France, whose R&D intensity is still above average, is losing momentum.

- The majority of the low R&D intensive Member States (i.e. R&D intensity below 1.5%) is catching up with the remainder of the Union, albeit at different speeds.

- Finally, a group of six low R&D intensive Member States including Greece, Bulgaria, Poland, Slovenia, Malta and Slovakia have been falling further behind since 2000.

Fig 2.3 R&D intensity, 2005 and average annual growth, 2000-2005



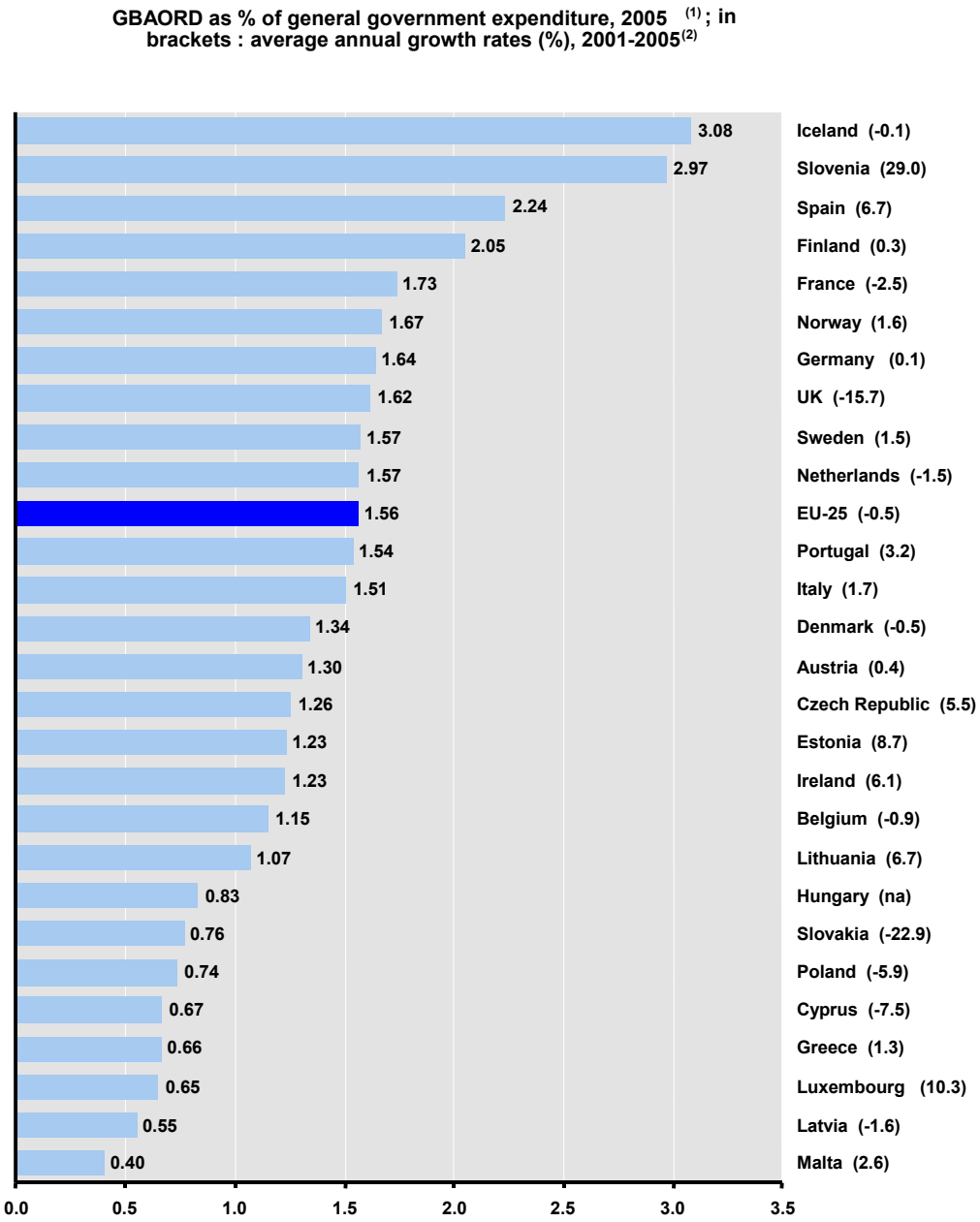
Source: DG Research
Data: Eurostat, OECD
Notes: (1) IT, NL, RO, UK, HR, TR, IS, CH : 2004; AT, FI : 2006.
(2) IT, NL, RO, UK, TR, IS, CH : 2000-2004; AT, FI : 2000-2006; EL, SE, NO : 2001-2005; HR : 2002-2004; MT : 2004-2005.

Key Figures 2007

2.2.2 Trends in public funding

In 2005, the EU-25 Government Budget Appropriations or Outlays for R&D (GBAORD) amounted to 1.56% of general government expenditure (Figure 2.4). Over the period 2001-2005, the EU-25 R&D share of the government budget slightly decreased, with an annual growth rate of -0.5% on average over this period. 15 European countries have a GBAORD of between 1% and 2% of the government budget, with a cluster of countries in the 1.5%-1.7% range.

Figure 2.4 GBAORD as % of general government expenditure, 2005



Source: DG Research

Key Figures 2007

Data: Eurostat

Notes: (1) PL, IS, EU-25 : 2004.

(2) PL, IS, EU-25 : 2001-2004; CZ, SK : 2002-2005; CY, MT : 2004-2005.

Apart from Slovenia, which has the highest level in the EU, all new Member States devoted less than 1.3% of their budgets to R&D. Among old Member States, only Ireland, Belgium, Greece and Luxemburg have R&D shares below 1.3% of the government budget.

In many European countries, the share of the government budget allocated to R&D has evolved considerably since 2001. Slovenia has increased enormously the R&D share of its government budget in 5 years (29% annual growth on average) to reach its current very high level of 3%. Spain, as well, committed in 2005 a much larger part of its government budget to R&D than in 2001, and is now second in the EU. At the other end of the scale, Slovakia and the UK significantly cut their public R&D budgets, as did France to a much lesser extent.

2.2.3 Trends in private expenditure

According to the Barcelona objectives, two thirds of total R&D expenditure should be funded by the business enterprise sector. In 2005, the business enterprise sector financed 54.5% of total R&D expenditure in the EU-27. Government accounted for slightly more than one-third of the Union's R&D spending (34.5%), while 8.5% of total R&D expenditure was funded from abroad (both from private and public sources). High R&D intensive Member States such as Germany and the Nordic countries Finland, Sweden and Denmark are characterised by a high involvement of the private sector in the financing of domestic R&D activities. Conversely, the government sector accounts for a large share of R&D funding in most of the new Member States and in the southern European countries. In 2005, more than 60% of R&D in Poland, Bulgaria, Lithuania and Cyprus was funded by the government sector.

In 2005 (which is the most recent year for which there are official statistics available), the EU had a business R&D intensity of only 1.17% (Figure 2.5), a value which was the same in 2004. Even more worrying is the fact that this value has decreased since 2000 (with an average annual growth of -0.6%), despite the acknowledged importance of business R&D for the future competitiveness of the European economy.

In contrast to these figures, the 2006 industrial R&D investment Scoreboard[47] (which is based on data collected from mid 2005 to mid 2006) shows that corporate investment in R&D has been growing strongly worldwide since mid 2005. The year-on-year increase in R&D investment for all the companies in the Scoreboard was 7.0%. This reinforces the recovery that started a year or so ago.

Of particular interest is the fact that, after a long period of stagnation, EU companies also increased their R&D investment by 5.3%. For comparison, their growth in last year's Scoreboard was only 0.7% and had even been negative in the previous year at -2.0%.

Nevertheless, this encouraging trend cannot hide the fact that, on aggregate, EU companies continue to increase their R&D investment less strongly than companies in the rest of the world.

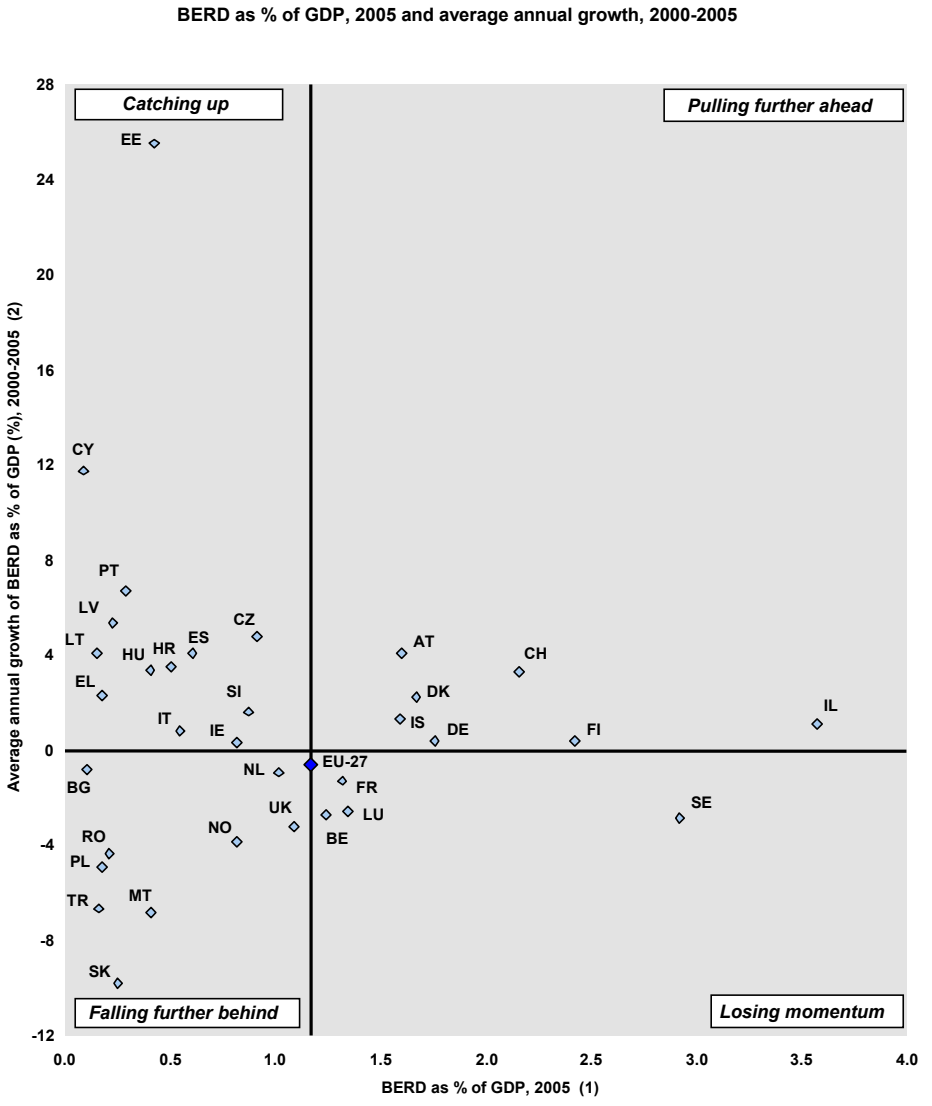
[47] See: http://iri.jrc.es/research/scoreboard_2006_data.htm

2.3 Trends in research policies

2.3.1 National R&D intensity targets

The relaunch of the Lisbon strategy in 2005 has sparked a renewed commitment from Member States to the 3 % objective. As a consequence, 26 Member States have now set explicit R&D intensity targets. National targets are adapted to the situation of the Member State in question and therefore span a range from 0.75 % GDP (Malta) to 4 % GDP (Sweden and Finland). Most Member States have set targets for 2010, the exceptions being the United Kingdom (target set for 2014) and Ireland (target set for 2013). Bulgaria is the only Member State which does not have a target.

Figure 2.5 BERD as % of GDP, 2005 and average annual growth, 2000-2005



Source: DG Research Key Figures 2007

Data: Eurostat, OECD

Notes: (1) RO, UK, HR, TR, IS, CH : 2004; IT, FI : 2006.

(2) RO, TR, IS, CH : 2000-2004; IT, FI : 2000-2006; UK : 2001-2004; FR, SE, NO : 2001-2005; HR : 2002-2004; ES, AT : 2002-2005; MT : 2004-2005.

If all Member States deliver on the commitments made through their targets, the overall EU-27 R&D intensity would progress substantially up to about 2.6% in 2010.

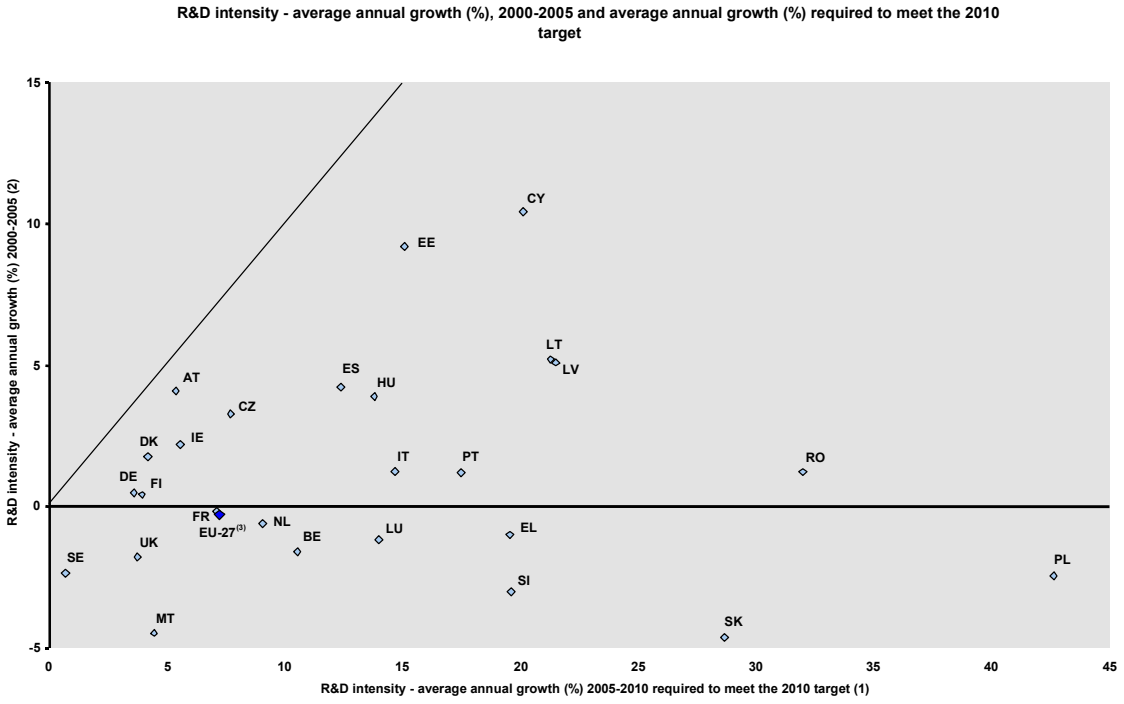
Comparing for each Member State and for the EU-27 as a whole the annual rate of growth in R&D intensity required to meet the target with the rate of growth experienced since the late nineties (1998-2005) enables us to assess the ambition of the targets (figure 2.6) :

A number of countries (Austria, Denmark, Ireland, Germany, Finland) have experienced rates of growth which, if they are maintained, would be sufficient to make these countries advance significantly towards their targets.

A larger group of countries have experienced a positive average rate of growth since the late nineties and are therefore progressing, but they will need to step up their efforts significantly if they are to deliver on the level of ambition reflected in their targets. These countries will therefore need to put in place and implement major R&D policy reform packages, commensurate with their target.

An equally large group of countries have experienced a negative average rate of growth since the late nineties and will therefore need to reverse a declining trend if they are to start progressing towards their targets. For these countries, targets are extremely ambitious (and in some cases even overambitious) and delivering on the ambition reflected in them will require strong commitment and radical reform packages.

Figure 2.5 R&D intensity – average annual growth (%) 2000-2005 and average annual growth (%) required to meet the 2010 target



Data: Eurostat, Member States

Key Figures 2007

Notes: (1) RO : 2004-2009; IT, NL, UK : 2004-2010; PL : 2005-2008; AT, FI : 2006-2010.
(2) IT, NL, RO, UK : 2000-2004; AT, FI : 2000-2006; EL, SE : 2001-2005; MT : 2004-2005.
(3) EU-27 does not include Bulgaria.
(4) IE, PL, RO, UK : R&D intensity targets for 2010 were estimated on the basis of data provided by these countries.

Apart from being an expenditure objective, the process of setting national targets has mobilised Member States to engage on the structural reforms needed to become more competitive knowledge-based economies. Therefore in all Member States, broader policy mixes have been put in place or are in the process of being put in place to reform the research system in support of this transition, typically tackling bottlenecks regarding capacities, linkages and governance. Over the past decade, the scope of policy mixes broadened and became more complex covering a variety of measures to dynamise research and innovation systems.

2.3.2 R&D policy priorities in the Member States

National policies for R&D have over the past decade evolved significantly towards more coherent, richer, but also more complex policy mixes. A large number of Member States have in 2006 established new strategy documents dealing with R&D, either as such or in combination with innovation policy issues. Apart from demonstrating the priority given to R&D in national policy making, these documents show that Member States are increasingly taking a multi-annual and strategic approach to R&D, with the view of offering a stable and predictable environment to an endeavour which is inherently long term in nature.

In a number of Member States (mainly the 'newer' Member States, but also in Ireland, Greece, Spain and Portugal), the formulation of new strategies is obviously driven by the new programming period of the EU cohesion policy (2007-2013), which promotes R&D and innovation as strategic priority.

Throughout 2006, work on the development of ERAWATCH, the integrated information and intelligence service on national and regional research policies, was continued. The public website containing the baseload information on the research policies of all Member States and a selected number of third countries was launched on 9 October 2006. The website is available for public consultation at cordis.europa.eu/erawatch. With ERAWATCH now having become operational, further work will focus on improving the quality and consistency of the baseload information and on developing a portfolio of policy relevant analytical products.

Based on the information contained in ERAWATCH and comparing across Member States, the following issues emerge as policy priorities for national governments:

- Improving science – industry linkages

  Many Member States have in 2006 launched new initiatives aiming at improving the linkages between the public R&D base and the private sector. Although it is obviously an issue of common concern, a variety of approaches have been followed, ranging from improving the legal framework governing science – industry interaction, over the introduction of collaborative research programmes, to networking and clustering schemes, the establishment of technology transfer offices at universities or the promotion of intersectoral mobility of researchers.

  There has recently been a move away from the traditional 'technology push'-type policy measures towards the introduction of public-private partnerships for R&D, aiming at the creation of a dynamic of open innovation in which the main rationale is one of two way knowledge circulation and a matching of business needs and research expertise.

  There is a wealth of policy measures in place across Member States to promote the building of long lasting and strategic partnerships between the public and private sectors, which can take a number of forms: joint research centres (e.g. Austria: Christian Doppler laboratories, NL: Leading Technological Initiatives), long term cooperation agreements having a sectoral or thematic focus (e.g. France: competitiveness poles, Belgium: competitiveness poles/competence poles, Estonia: competence centre programme, Hungary: cooperative research centres), networking and clustering schemes (e.g. Czech Republic: national cluster strategy, Denmark:

high tech networks, UK : knowledge transfer networks), large scale-long term collaborative R&D (France: Agency for Industrial Innovation, Spain: CENIT) or the establishment of national technology platforms (e.g. Poland: Polish Technology Platforms, UK: Innovation Platforms).

- Increasing the quality of public research

All Member States acknowledge the significance of having an excellent public research base as a factor of major importance in increasing overall R&D intensity by attracting private investment. The objective of excellence is often covering two related dimensions – one being the scientific quality as such and the other one, more implicit however, being the relevance of the research with regard to its potential economic use or potential societal relevance.

Most Member States launched activities fostering the excellence of their public research base. The approach taken again exhibits significant variation across Member States. A number of Member States have taken new initiatives with regard to the creation of centres of excellence. Italy and Austria have for instance launched 'National Institutes of Technology', which should develop into national flagships for R&D excellence. Other examples include the 'Platforms of strategic importance' in Malta or the German excellence initiative.

The set-up of new or the revision of existing evaluation procedures and a shift towards competitive funding of the public research base as compared to block institutional funding are related strategies which could be observed in 2006. Examples here are the Czech Republic with a legally set target for a gradual increase of competitive funding or the creation of the National Evaluation Agency in France. In 2006, Greece adopted a new law concerning the regular evaluation of university based research.

The issues of excellence is often linked to the issue of human resources in R&D, notably by increasing the attractiveness of research careers to ensure that the most talented people are willing to consider pursuing a career in R&D. This has resulted for example in the creation of 500 public researcher posts in Portugal and 2000 new posts in France.

For the new Member States in particular, their accession to the EU and their integration into the European Research Area has been an important driver for actions geared towards increasing the quality of their public research systems. For a number of other Member States, the driver has been a growing awareness of the globalisation of R&D and a willingness to ensure that public research performed in their respective countries can compete on a world scale.

- Building coherent policy mixes for R&D

Increasingly, Member States are becoming aware that in order to increase the intensity and quality of R&D activity requires putting into place a coherent set of policy measures. Although direct R&D policy measures continue to be the major part of national R&D policy mixes, the issue of building coherence with other policy domains (e.g. innovation policy, industrial policy, environment policy, health policy, fiscal policy,…) having an indirect impact on R&D is increasingly coming under the attention of national policy makers.

Some Member States are addressing this issue by developing strategies which cut across several Ministries or even the whole of government (e.g. Germany: High Tech

Strategy, Ireland: Strategy for Science, Technology and Innovation 2006-2013), instead of being documents being developed mainly by the research ministry.

This has led to changes in the institutional settings used for R&D policy in many Member States, extending beyond the policy instruments traditionally under the responsibility of the research Ministry, through the setting up of inter-ministerial or interagency coordination structures.

Increasing the involvement of stakeholders in policy making is also high on the agenda of Member States, with a number of them having set up consultative bodies. Worthwhile examples to note here are the policy councils where stakeholders and policy makers, in some cases even at the highest political level (e.g. Finland: Science and Technology Policy Council, Netherlands: Innovation Platform), meet to discuss and advise on further policy development.

2.3.3 Trends in public sector R&D

R&D expenditure in the higher education sector measured as % of GDP has been increasing in EU-27 from 1998 (0.37%) to 2002 (0.41%). Since then, up until 2005, it has remained stable at 0.41%. The intensity of R&D performed in government institutions measured as % of GDP has decreased in EU-27 from 1998 (0.27%) to 2004 (0.24%). In 2005, it remained at the same level as in 2004 i.e. at a much lower level than the intensity of R&D performed in the higher education sector. At EU level therefore, if the overall level of public R&D expenditure has remained very stable since 1998, its centre of gravity has been more and more directed towards the higher education sector over this period of time.

Within the EU, the relative positions of Member States have not fundamentally changed since the end of the nineties. Three main groups of countries may be considered.

The three Nordic countries Sweden, Finland and Denmark, as well as Austria, still stand out with the highest intensity of higher education R&D in 2005 (0.58% and above). The public R&D expenditure of these countries is largely university-oriented. This choice has been confirmed over the years: since 1998, Denmark and Finland have clearly transferred part of public R&D expenditure from government R&D to higher education R&D; from 1998 to 2005, Austria has increased its higher education R&D share of GDP by one third.

In a majority of European countries, expenditure on higher education R&D is within the range of 0.3% to 0.5% of GDP, whereas expenditure on government R&D ranges from 0.1% to 0.4% of GDP. In this group of countries, old Member States have basically the same R&D intensity as in 1998, both in higher education and in government institutions (except for the Netherlands in which the % of GDP devoted to government and higher education R&D decreased). As in 1998, France and Germany have the highest government R&D intensities in the EU in 2005, almost at the same level as their higher education R&D intensities. Government R&D maintains a remarkably strong position in these two countries, whereas in the two other largest Member States, the UK and Italy, university R&D prevails.

The third group of countries is composed of Luxembourg and most of the new Member States. Public R&D in these countries is mainly conducted in the government sector. However, a modest shift has taken place since 2003 in all of these Member States, which sees them slowly converge towards a more even distribution of public R&D over the government and higher education sectors. This shift is primarily due to a diminishing share of GDP devoted to government R&D, while in Latvia and the Czech Republic this is combined with an increase in the resources allocated to higher education R&D. In the two newest Member

States, Bulgaria and Romania, almost all public R&D is still performed by government institutions.

2.3.4 Stimulating private R&D expenditure: subsidies versus tax incentives

R&D executed in the private sector is mainly funded by the private sector itself: in 2005, it financed almost 82% of private sector R&D activities in the EU. High R&D-intensive Member States such as Germany or the Nordic countries Sweden, Finland and Denmark demonstrate higher shares of the private sector in the funding of business R&D, but several low R&D-intensive countries such as Bulgaria, Portugal or Slovenia enjoy relatively high support from the business sector for their domestic private R&D.

Public financial support to business R&D comes in either of two different forms: via 1) direct funding of a part of the targeted expenditures (subsidies or grants), or 2) fiscal incentives allowing companies to reduce their tax payments and the cost of research.

Direct government funding of private research represents less than 8% of total business R&D expenditure in EU-27. In low R&D intensive countries such as Romania, Slovakia and Malta it accounts for a much larger share of the expenditure, than in higher R&D intensive countries. Moreover, across the EU, the share of government funding has decreased significantly over the past years.

At the beginning of the 1990s, governments were financing about 12% of total domestic business R&D activities compared to less than 8% in 2005. The gradual reduction of direct subsidies to private R&D, however, was accompanied by an increasing use of fiscal incentives.

In general, fiscal incentives have evolved progressively in EU Member States since the beginning of the 1990s even though individual Member States choose very different combinations of the two policy tools (subsidies versus tax incentives). Moreover, the trend towards more fiscal stimuli has accelerated over the past five years.

Interestingly, while in the nineties the shift towards more favourable tax treatment of R&D went, without any exceptions, hand in hand with a reduction in direct subsidies (substitution effect), after 2000 the level of direct subsidies was in most cases no longer reduced but maintained (translating into a net reinforcement of the policy mix). Most Member States have chosen to focus on the strengthening of the whole portfolio by maintaining their level of direct funding while expanding their battery of R&D tax incentives.

In conclusion, even though tax treatment of R&D varies considerably in its design across EU countries, national governments increasingly recognize the importance of fiscal incentives for R&D as a complement to direct subsidies.

2.3.5 The ERA dimension in national R&D policies

It is undeniable that the introduction of the concept of a European Research Area in 2000, as the contribution of research policy to the broader Lisbon strategy, has been successful in putting research higher on the political agenda.

In contrast to this, however, ERA is only to a limited extent acknowledged as a factor in its own right and explicit mention of it is scarce, revealing a situation in which Member States contribute mainly towards developing the ERA by strengthening their national R&D capacity, the ultimate goal being a national system which in itself is excellent on an international scale.

Member States do recognise the importance of offering their researchers the possibility to engage in cross-border collaborations and are therefore supportive of high levels of national participation in international R&D programmes. Frequent mention is made in strategy documents of the need to participate strongly in the Framework Programme and measures aimed at stimulating, directly (e.g. financial support for preparation applications, co-funding of successful participants) or indirectly (e.g. through strengthening centres of excellence, imitation of Framework Programme thematic priorities, establishment of national Technology Platforms or building critical mass), the participation of their own nationals in the Framework Programme are often noted.

Some Member States have gone one step further and have introduced the (partial) unilateral opening up of their national research systems as part of their overall strategy, inspired by the view that knowledge spill-overs from abroad can add to the existing R&D capacity, can increase its quality through an exposure to increased competition or can give access to fields in which national capacity is limited. A study carried out on behalf of the Commission[48] made a number of interesting observations in this respect, leading to the conclusion that opening up is still a relatively minor part of national policy:

- The funding of transnational research projects is most commonly observed as an element of opening up. Although a majority (60 %) of the programmes surveyed in the study reported having funded transnational projects, the actual spend on transnational activities remains marginal, the majority of programmes remaining below 5 % of total budget.

- Only a small proportion (16 %) of programmes report having contributed to multilateral programmes with a central budget.

- Around two thirds of surveyed programmes allow participation of non-resident researchers from other EU countries. Only 23 %, however, have actually paid for the participation of foreign partners and an even smaller number (16 %) state that foreign participation is actively encouraged.

Bi- and multilateral cooperations between Member States, driven in part by the ERA-NET instrument which was introduced in FP6, are also apparent in many national policies, although more often than not cooperation is restricted to specific research domains or to specific projects, such as the construction of a joint research facility (e.g. ES and PT committed to jointly construct an international centre of excellence in nanotechnology; the facility is planned to be operational in 2008 and will gather 200 researchers and 200 other staff members, operating a yearly budget of 30 M€). Strategic approaches to cooperation amongst groups of Member States are scarce, with some notable exceptions such as the Nordic Council of Ministers or the Dutch-Belgian cooperation initiatives.

Making further considerable progress in the realisation of the European Research Area will depend on Member States taking more systematically into account the interdependency of their national research and innovation systems, maximising benefits from cross-border spill-overs, addressing in a coordinated way cross-border obstacles to circulation of human resources and knowledge, and optimising complementarity and synergies between their policies and programmes.

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48 *'Examining the design of national research programmes', December 2005, Optimat Ltd – VDI/VDE-Innovation + Technik GmbH*

3. INTERNATIONAL COOPERATION AGREEMENTS

During the reporting period the development of formalised frameworks of international scientific and technological cooperation continued. International S&T cooperation is a pillar of sustainable development of our societies as well as a necessary means to tackle global and regional challenges, such as climate change, biodiversity loss, health, sustainable food, energy and natural resources.

Particular emphasis was placed on developing the international dimension of the European Research Area and strengthening links with EEA – EFTA countries, Switzerland, Israel and candidate countries. Moreover, agreements were pursued particularly with industrialised and middle-income countries interested in coordinating S&T policies with the European Union. Developing relations with these countries in the context of S&T agreements is to add an institutional dimension to the general trend of increasing international scientific cooperation on a project basis referred to above (p. 29f). Similar to strategies pursued by other major industrialised or emerging economies, international scientific and technological cooperation is today a necessary dimension of international relations, a way to acquire access to knowledge systems elsewhere, to project influence in constructive win-win relations with other parts of the world and as a source of renown[49]. An overview of the status of formal agreements is provided on the web[50].

Preparation of the Association of Switzerland, Israel, the EEA-EFTA States (Island, Liechtenstein and Norway) and the Enlargement Countries (Turkey and the Western Balkan Countries) to the 7th Research Framework Programme

On 18 December 2005 the Council accorded the Commission the mandates to negotiate the renewal of the Association agreements with Switzerland (EC/Euratom) and Israel (EC). Following the Commission's strategy to encourage the enlargement countries to become associated to FP7 (EC), Croatia, FYR of Macedonia, Serbia and Turkey requested their association to FP7. The terms and conditions of association have been specified in the draft Memorandum of Understanding and immediately after the adoption of FP7 the Commission internal decision making procedure was launched.

The association of the Western Balkan Countries and Turkey have to be seen in the context of their perspective to integrate into the European Union. Association to the 7th Research Framework Programme allows becoming familiar with EU decision-making and European values. In cooperating on research at EU level compliance with the *acquis communautaire* in difficult areas as environment, energy or public health will be facilitated.

After FP7 had been adopted the EEA Joint Committee prepared a decision to adapt Protocol 31 of the EEA Agreement associating the three EFTA States to FP7 (EC).

All draft association instruments foresee a retroactive application as of 1 January 2007 to allow the entities of all associated countries to participate from the start of FP7.

An example of a particularly dynamic and strategic Science and Technology Cooperation Agreement: Russia

Russian teams participated in around 330 FP6 signed contracts (including 60 Marie Curie fellowships), worth approximately €2.7 billion of EC investments. The EC contribution to the actual Russian participation was around € 50 million, while the Russian partners themselves

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[49] The Evaluation Partnership (TEP), 2005. Impact assessment report on the Specific Programme International RTD Cooperation, Fifth Framework Programme (1998-2002). Luxembourg, OPOCE, 94p.

[50] http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=countries

contributed around € 20 million. In addition, through the INTAS programme, the EC invested another € 50 million in favour of Russian participants.

This is in addition to the numerous and active research cooperation activities by the EU Member States with Russia and in addition to the multilateral scientific platforms through which the EU and its Member States have been cooperating with Russia (e.g. ITER, CERN, International Space Station, etc.).

Reflecting this rich and dynamic relationship, our recently reinforced S&T policy dialogue aims to develop greater sharing of research agendas through a common decision-shaping process. In the present circumstances, the implementation of the 4th Common Space for Research is the most advanced and the least controversial of the four spaces in which EU-Russia cooperation is articulated.

New and upcoming Science and Technology Cooperation Agreements

In 2006, international scientific cooperation was strengthened with the conclusion of an Agreement on Scientific and Technological (S&T) Cooperation between the European Community and South Korea on 22 November. The S&T Agreement will promote collaboration in areas where the EU and South Korea have similar priorities, such as life sciences (biotechnology and health research), information society technologies and telecommunications, industrial and material technologies, sustainable development, renewable energy sources, satellites and earth observation.

Negotiations for agreements with Japan were further pursued. Furthermore, during 2006 the Commission received requests from Jordan and New Zealand for opening official negotiations on the conclusion of S&T agreements between these countries and the EC.

Renewal of Science and Technology Cooperation Agreement with Argentina

The S&T Cooperation Agreement between Argentina and the EU has been extended for another five years. This followed on from an independent evaluation of its performance during the first five years (2001-2005), which was analysed at the meeting of the steering committee in Buenos Aires in December 2006.

4. CONSULTATION AND MONITORING PROCEDURES

4.1. Scientific and Technical Research Committee (CREST)

In 2006 CREST held six meetings. Most of the discussions dealt with the so called '3%' OMC process. In this context, the Committee finalised and adopted a report on the 2nd cycle. Furthermore, CREST undertook a mutual learning exercise on the basis of the National Reform Programmes and the 2006 Progress reports, and adopted a report on the mutual learning. Finally, CREST prepared for and started a third 3% OMC cycle.

The third cycle includes the following topics:

(i) Internationalisation of R&D;

(ii) R&D in services;

(iii) Better coordinated use of the FP and the structural funds for support of R&D;

(iv) The series of peer reviews for the purpose of identifying good policy mixes is also being continued in the 3rd cycle.

The committee continued with its series of presentations of national basic research schemes. Following this model the Committee decided to continue with national presentations in 2007 on the theme "National structures linking research to applications in industry, society or government". In addition, two presentations were held dealing with science and research policies in Austria and in Finland respectively.

The Committee discussed and adopted guidelines for the working methods of CREST.

The Commission regularly kept the Committee informed of new policy initiatives and the presidencies informed CREST of the work in the Council. A series of presentations and exchanges of views were held dealing with a variety of topics, e.g. tax incentives in favour of R&D, Article 169 including experience with the ERA-NET instrument, International research cooperation, the Article 173 Annual report and a launch of the ERAWATCH website.

4.2. Programme Committees

2006 was the last year where the Programme Committees of the EC and Euratom Specific Programmes were operational under the Sixth Framework Programme for Research. All that year, they continued their efficient support to and monitoring of the implementation of the Specific Programmes.

During 2006, the Programme Committees for the Specific Programmes 'Integrating and Strengthening the European Research Area' and 'Structuring the European Research Area' held more than 40 meetings. They were asked for over 212 opinions by the Commission, most of them on draft decisions on the selection of proposals. [All the opinions given were favourable.]. The consultative committee for the Specific Programme under the Euratom Treaty met seven times. The Standing Committee on Agricultural Research (SCAR) met twice in 2006. The Programme Committees were regularly informed and had exchanges of views on the implementation of Specific Programmes.

At the end of the year, a preliminary structure of the Programme Committees for the Seventh Framework Programme was set up to be operational at the very beginning of 2007.

Positive and constructive exchanges confirmed the good collaboration between the Commission and the Programme Committees as well as the important role of the latter in the implementation of the Framework Programme.

4.3. External Advisory Groups

In continuity with the method followed during FP6, external Advisory Groups have been created by the Commission during the spring 2006, with the mandate to provide consistent and consolidated advice on the scientific and technical content of the annual Work Programmes under FP7. Advisory Groups' advice is meant to complement other sources of external advice received by the Commission, including from stakeholder consultations and, where relevant, from European Technology Platforms.

The different themes or parts of the FP7 Specific Programmes are covered by fifteen Advisory Groups: Health; Food, agriculture and biotechnologies; Information and communication technologies; Nanosciences, nanotechnologies, materials and new production technologies; non nuclear Energy and Euratom; Environment (including climate change); Transport (including aeronautics); Socio economic sciences and Humanities; Space; People;

Research for SMEs; Regions of knowledge; Research potential; Science in Society; Activities of international co-operation.

The members of Advisory Groups have been selected following the Commission guidelines[51], on the basis of excellence, independence and pluralism. Efforts have also been made to ensure an appropriate balance and diversity in membership of the groups, concerning notably gender, geography, and types of organisations. The mandates of the groups are based on those used in FP6, but have been broadened in order to reflect the wider scope of FP7. Finally, an additional emphasis has been placed on transparency. It has notably been provided for that the memberships and written advice of Advisory groups would be made publicly available on the Commission Website, as soon as the procedures requested by the Regulation on the protection of personal data[52] would have been completed. These procedures are currently under way, and a part of this information is already available at the following address:

http://ec.europa.eu/research/fp7/advisory_en.html.

All FP7 Advisory Groups were established on time so as to give advice to the Commission services during the preparation of the first FP7 Work Programmes, which were published in December 2006.

4.4. European Research Advisory Board (EURAB)

The European Research Advisory Board (EURAB) delivered recommendations to the Commission on International research cooperation, on the Commission proposals for the establishment of the European Institute of Technology (EIT) and on "Scientific publications" and the relevant policy on "Open access". In addition, EURAB started work on the issue of "Knowledge and technology transfer", on the societal impact of research, and on research management. The work on Structural Funds and on the EIT also continued, with reports to be published in 2007.

Furthermore, EURAB started a reflection and discussion with the Commission services on its own future (as the current mandate of EURAB will expire in 2007). The advice of EURAB and a description of its activities can be seen at the EURAB website:

http://ec.europa.eu/research/eurab/index_en.html

4.5. Monitoring and evaluation

In 2006, a panel of seven high-level independent experts was invited to analyse and review the implementation of the indirect research activities carried out during 2005 under FP6. The Monitoring Panel, chaired by Professor Gonzalo León, based its work on information provided by the Commission services and, for the first time, on interviews with external stakeholders.

The panel considered the implementation of the FP6 activities in 2005 as adequate and acknowledged the major steps forward towards the preparation of FP7. At the same time, the panel raised some areas for possible improvements, notably as regards the project review process and communication issues.

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[51] Communication on the collection and use of expertise by the Commission: principles and guidelines; *improving the knowledge base for better policies*, COM(2002)713.

[52] Regulation (EC) N° 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data.

While the monitoring activities focused on the short-term implementation of the Framework programme activities, ex-post evaluation studies were aiming at a more holistic assessment of its longer term impact. In 2006, eight studies on ex-post evaluations or related methodologies were completed. These covered a cross-section of research activities, varying in size from small-scale studies up to major evaluations over several years. Broadly, the evaluations underlined that research activities were functioning as planned and achieving their objectives. A comprehensive ex-post evaluation of FP6 is under preparation and will be accomplished in 2008.

5. STATISTICAL TABLES ON THE IMPLEMENTATION OF THE 6TH FRAMEWORK PROGRAMME

PROGRAMME

The statistical annex which accompanies this working document provides data on proposals received in 2006, on proposals retained for funding that were submitted in 2006, and on contracts signed in 2006 under the 6th Framework Programme. The format of the tables is the same as for the previous Annual Report and reflects the structure of the 6th Framework Programme.

5.1. Explanatory notes

The following notes apply to the tables:

- In the group 'Candidate and Associated Countries', Bulgaria, Romania and Turkey are both candidate and associated countries. FYROM (Former Yugoslav Republic of Macedonia) became a candidate country in December 2005 and it appears under the heading "candidate countries" in the 2006 statistical tables of the annual report. Iceland, Liechtenstein and Norway are associated countries in the framework of the European Economic Area, Switzerland and Israel are associated countries in the framework of an association agreement.

- It is not possible to calculate countries' 'success rates' from the number of proposals received and/or selected and those that result in contracts signed, since a proposal selected in year *n* might not result in a signed contract until year *n+1*.

- The figures related to EC financial contributions refer to commitments and not payments.

- SME participation information is missing due to gaps in the provision of relevant data for recording in the central FP6 contracts database.

- A collaborative link is assumed to exist between each pair of participants in each contract. The number of collaborative links created by a project is calculated in the following way

    (a) When there are *n* participants from a given country in a project, the number of collaborative links between participants from the given country formed as a result of the project is assumed to be *n*(n-1)/2*.

(b) When there are *m* participants from one country and *p* from another country in a project, the number of collaborative links created between the two countries as a result of the project is assumed to be *m*p*.

The total number of collaborative links is calculated by summing across all projects.

- RSFU - Fusion contracts are omitted in the statistics due to the unavailability of data.

5.2. List of tables in the statistical annex

Table 1a: FP6 Proposals submitted in 2006: Participation by Priority Area & Instrument

Table 1b: FP6 Proposals submitted in 2006: Participation by Priority Area & Country

Table 2a: FP6 Proposals retained for funding that were submitted in 2006: Participation by Priority Area & Instrument

Table 2b: FP6 Proposals retained for funding that were submitted in 2006: Participation by Priority Area and Country

Table 3a: FP6 Contracts signed in 2006: Participation & Contribution by Priority Area and Instrument

Table 3b: FP6 Contracts signed in 2006: Participation & Contribution by Priority Area and Type of Beneficiary

Table 3c: FP6 Contracts signed in 2006: Participation & Contribution by Priority Area and Country

Table 3d: FP6 Contracts signed in 2006: Participation & Contribution by Instrument and Country

Table 3e: FP6 Contracts signed in 2006: Participation & Contribution by Type of Beneficiary and Country

Table 4: Collaborative Links within contracts signed in 2006.