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REPORT FROM THE COMMISSION

**Annual Report on research and technological development activities of the European
Union in 2007**

[SEC(2008) 2380]

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Annual Report on research and technological development activities of the European Union in 2007

(Text with EEA relevance)

1. INTRODUCTION

This Annual Report covers developments and activities during 2007. It has been prepared pursuant to Article 173 of the Treaty establishing the European Community¹.

The report is accompanied by a Commission Staff Working Document, which provides more detailed reporting and statistics. The main chapters are on the activities and results achieved in 2007 and on developments in research and technological development (RTD) activities in the Member States of the European Union.

2. POLICY DEVELOPMENTS: EUROPEAN RESEARCH AREA (ERA)

Research, and more broadly the knowledge triangle (research, education and innovation), constitutes a cornerstone of the revitalised Lisbon strategy. European research policy attained its overall objectives for 2007 following the **new impetus given to the development of the ERA, and the first year of successful implementation of the 7th Framework Programmes** (EC and Euratom FP7).

Advancing towards research excellence, raising the efficiency and effectiveness of the European research system, increasing the openness and attractiveness of ERA, as well as developing a strategic partnership with Member States on international science and technology (S&T) cooperation and a closer research relationship with neighbouring countries, encapsulate the medium to long term aims of EU research policy.

In 2007, the Commission's main policy initiative in the field of research was the adoption of the *Green Paper "The European Research Area: New Perspectives"*². It launched a wide institutional and public debate at EU and broader level on possible actions to accelerate the creation of an open, competitive and attractive European Research Area³. A key stakeholder event was jointly organised by the European Commission and the Portuguese Presidency of the EU in October 2007 in Lisbon, to debate the various ERA dimensions. The consultation and public debate provided strong support for the development of policy initiatives for all dimensions of ERA, as highlighted by the Green Paper. The results were fully taken into account in the design and the preparation of the five key ERA initiatives planned in 2008: 1) a European partnership for researchers; 2) a framework to help Member States identify and

¹ "At the beginning of each year the Commission shall send a report to the European Parliament and the Council. The report shall include information on research and technological development activities and the dissemination of results during the previous year, and the work programme for the current year."

² COM(2007)161 04.04.2007.

³ http://ec.europa.eu/research/era/index_en.html

develop joint research programmes on a voluntary and "variable geometry" basis; 3) an appropriate legal framework to facilitate the building and operation of pan-European research infrastructures; 4) a strategic European framework for international S&T co-operation; and 5) a Commission recommendation and a "code of practice" on the management of IPR in public research institutions.

The importance of ERA can also be drawn from evidence of Europe's position in research given in the EU S&T Key figures 2007⁴ publication. These data highlight the need for stronger efforts to overcome the overall stagnation of R&D expenditure (1.84% of GDP in 2005 and 2006) and to make progress towards the "Barcelona target" of reaching 3% of GDP spending on research by 2010.

The sustainability of scientific human resources remains a key concern, especially due to the progressive ageing of the research labour force in many Member States. In EU 27, about 35% of highly qualified S&T workers were in the 45-64 year-old age group in 2006, compared to 31% in the 25-34 age group. Another outstanding feature of the global scene is the ability of the US to attract talented researchers from around the world. In 2004, 25% of the 400,000 foreign science and engineering workers in the US came from the EU. In 2007, actions taken under the EU strategy for mobility and career development of researchers have been actively pursued. These included the further development of the ERA-Link initiative to network communities of European researchers' outside Europe (originally in the USA in 2006 and extended to Japan in 2007), as well as the voluntary signing of the European Charter and Code of Conduct for the recruitment of researchers by nearly 700 research organisations. In parallel, the Commission and the Member States have engaged in the preparation of a renewed and reinforced partnership for better training, career and more mobility for researchers.

Another priority is the achievement of excellence in research, whether privately or publicly funded, as it is of crucial importance to Europe's competitiveness. In this context, in April 2007, the Commission adopted a Communication on "Improving knowledge transfer between research institutions and industry across Europe"⁵. This Communication and its accompanying guidelines offer operational guidance to public research institutions to improve the management and exploitation of intellectual property, especially in the context of collaboration with industry. The European Council of June 2007 welcomed the initiative for a European Charter for the use of intellectual property from public research institutions and universities (IP-Charter) to improve the knowledge transfer between research and industry⁶.

3. EU RESEARCH AND TECHNOLOGICAL DEVELOPMENT ACTIVITIES

3.1. Policy achievements

In order to progress in the construction of ERA, to reduce the fragmentation of research activities in the EU and to boost innovation, **several ongoing initiatives have been set up in the ERA context and within the specific FP7 framework.**

⁴ http://ec.europa.eu/invest-in-research/pdf/download_en/keyfigures_071030_web.pdf

⁵ COM(2007)182 04.04.2007.

⁶ http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/94932.pdf
COM(2007)182 04.04.2007.

The Commission adopted a Communication on "*Competitive European Regions through Research and Innovation*"⁷, to examine the scope for synergies between EU funding sources for research and innovation and the obstacles that tend to arise in achieving them. It encouraged improved coordination by the Member States and regions in the preparation and use of the funds and the diffusion of more detailed information on available funding and synergies, notably through the preparation of a Practical Guide to funding.

The Commission also presented a *Communication on pre-commercial procurement*⁸ to promote public procurement in research and innovation, to raise awareness of the possibility to procure R&D in a way which is consistent with procurement rules and which does not constitute state aid.

A *European Forum on Philanthropy and Research Funding* has been launched as a platform to explore complementary ways of funding research and to share experience in the area of philanthropic funding of research⁹.

Contribution to the ERA can also be underlined in the specific area of fusion energy. In this sector, the *International Thermonuclear Experimental Reactor (ITER)*¹⁰ is a prime RTD policy initiative. A key milestone was achieved on October 2007 when the ITER Agreement entered into force, following ratification by all seven parties (Euratom, China, USA, India, Japan, Korea and Russia). Euratom has played a mayor role in the establishment of the ITER International Organisation, providing financial, organisational and personnel support. The European Joint Undertaking for ITER and the Development of Fusion Energy, known as Fusion for Energy, was also established in 2007. Located in Barcelona, it will manage the EU's contribution to ITER.

As part of FP7, the *European Research Council (ERC)* was established on 2 February 2007 by a Commission Decision (2007/134/CE)¹¹. The ERC is one of the most important novelties of FP7 as it provides support to world-class science by individual scientists and teams and it will be the first pan-European funding agency for frontier research in all fields of knowledge, from the humanities and social sciences, to the life sciences and the physical and engineering sciences.

One of the other initiatives which form part of a broad research policy strategy is the *coordination of European Technology Platforms (ETPs)*. 34 of these are currently under way. The ETPs have increased efforts to implement their Strategic Research Agendas by tapping into different funding sources, including national sources. The Commission organised two seminars for ETP leaders, which allowed industry representatives to exchange best practices and to receive updated information on EU policy initiatives of relevance to their work.

The *Joint Technology Initiatives (JTIs)* are other major innovations included in FP7. They provide for new partnerships between publicly and privately-funded organisations involved in research. FP7 has identified a first set of six research areas for JTIs. Four of the legislative proposals were adopted on 20 December 2007 by the Council, after having consulted the European Parliament. These are "Innovative Medicine", "ARTEMIS" (on embedded

⁷ COM(2007) 474 16.08.2007.

⁸ COM(2007)799 14.12.2007

⁹ http://ec.europa.eu/invest-in-research/policy/philanthropy_en.htm

¹⁰ COM(2006)458 14.08.2006

¹¹ OJ L57 24.02.2007

intelligence systems), "Clean Sky" and "ENIAC" (on nanoelectronics components)¹². In 2007, the Commission also submitted the proposal for the Fuel Cells and Hydrogen JTI whose adoption is foreseen in 2008.

While JTIs are by nature long-term public-private partnership in industrial research, the so called *Article 169 initiatives* are designed to enhance the integration of national research programmes. Four initiatives were identified in 2007 in FP7, and two of them, "AAL" (on ambient assisted living) and EUROSTARs (for research performing SMEs), are likely to be co-decided by Council and European Parliament by summer 2008.

The *Risk Sharing Financing Facility* (RSFF) is another interesting initiative of FP7. It represents a new facility jointly developed by the EC and the European Investment Bank (EIB) to provide loans for high risk research, technological development, demonstration and innovation activities. The RSFF was launched on 5 June 2007, and the first contract was signed on the 10 July 2007.

Moreover, in FP7 *international cooperation* has been opened widely to the participation of third countries across the different Specific Programmes by including both geographical and thematic targeting. Organisations from more than 130 third countries have participated in the 2007 calls for proposals. Furthermore, the signature of the association instruments with Switzerland, Israel, the EEA/EFTA States (Iceland, Liechtenstein and Norway), Turkey, Serbia, Croatia, FYROM and Albania during the reporting period signified an impressive enlargement of ERA, in which researchers from 37 states are enjoying the same rights and obligations in their participation in FP7 research projects. Beyond that, the renewal of the S&T cooperation agreement with India and the launch of the negotiations on a S&T cooperation agreement with New Zealand are clear signals of the intention of the EC to further open its research to the world.

An important achievement at European level was the political agreement reached on 23 November 2007, on the establishment of *the European Institute of Innovation and Technology* (EIT)¹³, which aims at an improved integration of all parts of the knowledge triangle on education, research and innovation. It opened the track to the finalisation of the adoption procedure and to further progress regarding the choice of the seat, the designation of the Governing Board, the funding conditions and the definition of the themes to be covered within the first Knowledge and Innovation Communities (KICs).

Finally, and most significantly, research is now firmly embedded in the wider Lisbon Strategy. In its Strategic Report of December 2007, the Commission concluded that efforts need to be identified to attain the 3% investment objective and this is something to be taken up in the National Reform Programmes.

3.2. Implementation of Framework Programmes

The **7th Framework Programme**, with a total budget of over € 50 billion (Euratom FP7 € 2.7 billion for 5 years), constitutes a key tool to respond to Europe's needs in terms of jobs, competitiveness, sustainable development, to meet the research needs of other Community policies, and to maintain leadership in the global knowledge economy.

¹² OJ L30 04.02.2008

¹³ OJ L97 09.04.2008

FP7 represents a substantial increase compared with the previous Framework Programme (63% at 2007 prices), thus reflecting the high priority of research at EU level.

2007 was the first year of the implementation of FP7. More than 23,000 proposals were received in response to 54 calls, with a high number of participants (110,101). After the selection procedure, 2,854 of them were retained for funding (involving some 19,541 participants).

The ten Themes identified in the *Cooperation programme* reflect the key fields of knowledge and technology in which research excellence is particularly important to improve Europe's ability to address the social, economic, public health, environmental and industrial challenges for the future. In total, 8,030 proposals have been submitted in 2007 and more than 1,000 retained for funding.

In the *Ideas Programme*, the first year of the ERC formal operation was characterised by the creation of management and organisational structures as well as the organisation of the first call of proposals, the "Starting Grants", designed to support researchers in the early stage of their careers. For this first call 9,167 proposals were submitted, showing the big interest to this new initiative. Almost 300 of them were retained for funding.

The *People programme* supports a range of actions to foster the training and networking of researchers, career development, life-long learning and industry-academia partnership. In 2007, 4,195 proposals were submitted and more than 1,000 retained.

The *Capacities programme* aims at developing the best possible resources and conditions for Europe's research community. In total, 1,753 proposals were submitted for the different activities of the programme, and approximately 300 were retained.

Regarding the *Euratom* FP7, 57 proposals were submitted on nuclear fission and radiation protection and 15 of them were retained for funding.

Finally, concerning the **FP6 implementation**, even though FP6 was concluded at the end of 2006, 975 contracts were signed during the course of 2007.

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

4.1. The Open Method of Coordination in support of reaching the Barcelona objectives

In the field of R&D, the Open Method of Coordination (OMC) was set up following the 3% action plan¹⁴. Following the positive results of the first two OMC cycles (2003-2006), CREST launched a third cycle in October 2006. CREST Working Groups were established on the coordination of the Framework Programme and the Structural Funds, internationalisation of R&D, policy mixes and R&D in services. The CREST meeting on 6 July 2007 at Director-General level was a key event in the third OMC cycle. It was devoted to a discussion on progress towards the 3% target and priority actions to develop the ERA. A fourth cycle followed in December 2007 with a focus on universities, industry-led competence centres,

¹⁴ COM(2003)226 04.06.2003

internationalisation of R&D and the continuation of the policy mix peer review exercise (carried out by Austria and Bulgaria).

Complementing the work in the CREST Working Groups, CREST carries out an annual mutual learning exercise based on the National Reform Programmes in the context of the revised Lisbon strategy. The 2007 exercise focused on the progress made on national public and private R&D investment targets, obstacles against reforming the public research sector and strategies and challenges in opening the national research systems towards ERA.

The OMC-NET scheme was developed in order 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. A new call was launched in September 2007.

4.2. Trends in public and private research investment

R&D intensity

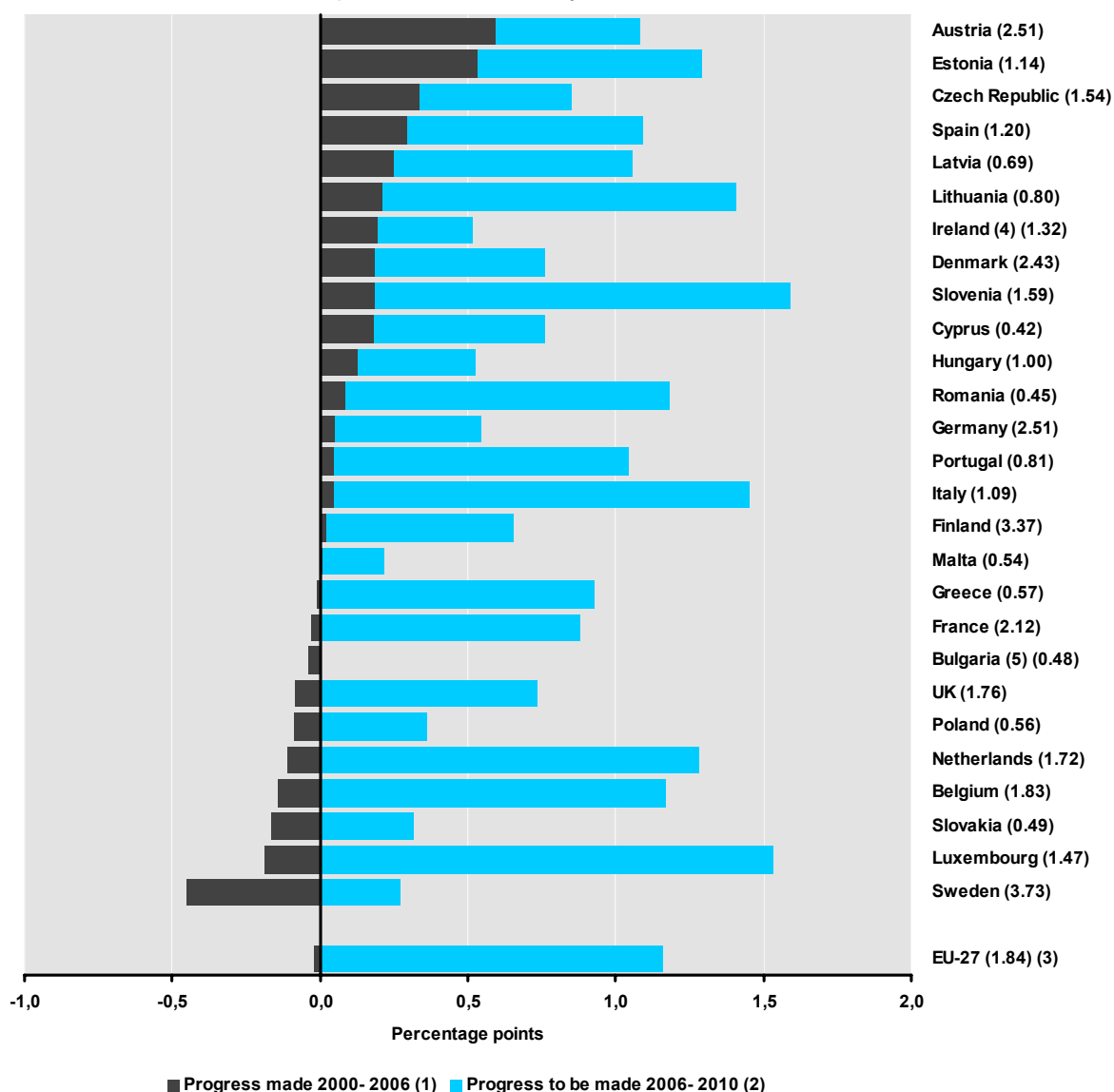
In 2006, as in 2005, EU27 Gross Expenditure on Research and Development (GERD) amounted to 1.84% of GDP. Since 2000, the R&D intensity of EU27 has remained within a small one-decimal range: from 1.79% in 1996-98 to 1.88% in 2002. The stagnation of R&D intensity at EU27 level hides a more dynamic and contrasted picture at Member State level.

The less R&D intensive Member States (the new Member States, Greece, Portugal, Italy, Spain, Ireland) have generally shown significant increases in their respective R&D intensities (these increases are considerable in some of them, especially after 2003), with the notable exceptions of Poland, Bulgaria, Slovakia, and Greece that have worryingly been falling further behind. Whereas substantial increases in R&D intensity are easier to achieve starting from very low values typical of the new Member States, or from the relatively low values seen in Ireland and Spain, they do illustrate that R&D intensity can increase, even under conditions of strong GDP growth.

Among the more R&D intensive Member States, only Austria and, to a lesser extent Denmark, have managed to make progress. R&D intensity in Sweden and Finland is already greater than 3% but remains below the targets they have set themselves at 4%.

R&D intensity increases are thus almost exclusively observed in less intensive R&D Member States. In EU27, progress towards higher levels of R&D intensity is therefore mostly a catching-up phenomenon. Figure 4.2 shows progress made by each Member State over the 2000-2006 period (grey) against progress still to be made to reach its own target (blue).

Figure 4.2 R&D intensity - progress towards the 2010 targets (in percentage points)
in parenthesis: R&D intensity as a % of GDP in 2006 (*)



Source : DG Research

Data: Eurostat, Member States

Notes: (*) IT, PT, UK : 2005, AT, FI : 2007

(1) IT, PT, UK : 2000-2005, AT, FI : 2000-2007; EL, SE : 2001-2006; HU, MT : 2004-2006.

(2) IT, PT : 2005-2010; UK : 2005-2013; FR : 2006-2012; EL : 2006-2015; AT : 2007-2010; FI 2007-2011.

(3) EU-27 does not include BG.

(4) IE : The R&D intensity target for 2010 was estimated by DG Research.

(5) BG has not set an R&D intensity target.

This catching-up by the less R&D intensive Member States, together with progress in Austria and Denmark, do not make much impact on the EU27 aggregate R&D intensity given the limited share of their GDP in the total EU27 GDP. In contrast, a block of old Member States, including France, UK, Germany and Italy, accounting altogether for a considerable share of

EU GDP, have not been able to increase their R&D intensities¹⁵. As a consequence, progress towards the 3 % target of EU27 has so far been limited. It must be noted that, even if all Member States reached their respective targets in 2010, EU27 R&D intensity in 2010 would then be 2.51%, below the 3% target set at European level. In other words, the targets set by Member States are not sufficient to reach the overall EU target of 3% in 2010.

Sources of funds

In 2005¹⁶, the financing of GERD by government amounted to 0.63% of GDP, by business enterprise 1% of GDP, by abroad 0.16% of GDP and by other national sources (private non-profit and higher-education sources) 0.04% of GDP. The collected statistical data do not provide a breakdown public/private of the 'abroad' source of R&D funds, so the proportion of public/private sources of funds cannot be accurately monitored.

Since 2000 a majority of Member States (17 MS) have increased the intensity of their government's direct support to R&D (funding of R&D by government as a percentage of GDP). This shows their commitment towards higher levels of R&D intensity. This increase is particularly pronounced in most of the catching-up Member States. But progress of government direct funding of R&D is also to be noted in Member States with intermediate and stagnating levels of R&D intensity (France, Belgium, UK and the Netherlands), especially in France. This progress is however slightly over-compensated by a decreased intensity of business funding of R&D in these countries.

The intensity of business enterprise support of R&D (funding of R&D by business enterprise as a percentage of GDP) has increased almost exclusively in Member States where this intensity was low or very low (Estonia, Latvia, Cyprus, Portugal, Hungary, Czech Republic, Spain, Slovenia, Lithuania, Bulgaria). In countries with high levels of business support to R&D, such as Sweden, Finland, Germany and Denmark, the intensity of business enterprise support of R&D has either fallen (Sweden) or stagnated. The only exception is Austria. The same holds for countries with average levels of business support to R&D (UK, the Netherlands, Belgium, Luxembourg, and France). All these Member States have not been able to increase their respective business R&D funding intensities. The intensification of business funding of R&D in the EU is above all a catching-up phenomenon.

Investments from the Structural Funds are included in the relevant Eurostat statistics, and it is important to note the contribution of cohesion policy to the R&D investment intensity in the new Member States. The average contribution from the Structural Funds for the period 2004-2006 was € 157.4 million, which triggered an annual average national investment of € 69.6 million. In the period 2007-2013, such investments in the ten new Member States are expected to increase to an annual average of € 2.7 billion (€ 2.9 billion including Romania and Bulgaria).

4.3. Trends in research policies

In 2007, national policies for R&D continued to evolve in complex policy mixes. With the view of addressing key drivers of economic growth, Member States were building up policy

¹⁵ The 11 Member States with high or very high R&D intensity growth account for only 16% of EU27 GDP, whereas the 16 Member States with limited and negative R&D intensity growth represent 84% of EU27 GDP.

¹⁶ Latest year for which the breakdown by sources of funds is available.

mixes by developing new strategies which cut across different ministries or by changing the institutional settings used for R&D policy, such as mergers between ministries dealing with research, education, employment, trade and industry.

Reforms in R&D policies have up to now been designed almost exclusively from a national perspective. As R&D systems are, however, increasingly interconnected, it is important that national policymakers take explicit account of the European perspective in their national policies in order to maximise the benefits from synergies and spill-overs. This will increase the effectiveness of national systems and, in the context of the ERA initiative, make a significant contribution towards developing the EU's research system as a whole to be a competitive player on the global scene. The Commission's 2007 Strategic Report has put special emphasis on the European dimension of research activities carried out at national level. Member States are expected to report in their National Reform Programmes on how their strategies will contribute to the European Research Area.

Member States continue to give special attention to increasing the quality of public research. In this context, institutional restructuring of the research performers is an ongoing process in several Member States, generally driven by the need to assure that public research performed in the respective countries can meet the highest standards on a world scale.

To stimulate private R&D investments, tax incentives for business R&D continue to be a major instrument for governments. Over the last years, fiscal incentives were introduced by a large number of EU countries, while others reinforced existing schemes. Member States which currently do not have such schemes, such as Germany, Finland and Sweden, have a growing interest to use them to stimulate R&D in SMEs and foster co-operation between public research and industry. Fiscal R&D incentives for labour social charges are in place in France, Belgium, the Netherlands and Spain.

In the same context, the increasing role of cohesion policy in financing R&D can be clearly noticed, especially in some of the new Member States. The effective use of Structural Funds earmarked for research and innovation is an important opportunity for many countries that still have a low level of funding.

5. OUTLOOK FOR THE FUTURE

All these achievements paved the way for 2008, the second year of implementation of FP7 and a year of major new developments for ERA.

The ERA Green Paper gave rise to the planning of the five ERA initiatives, which are being put forward during 2008. Furthermore, under the Slovenian Presidency of the EU, "the Ljubljana process" will be launched. Its goal will be to create a long-term shared vision of ERA developed in partnership by Member States and the Commission, with broad support from stakeholders and citizens.

6. SOURCES OF FURTHER INFORMATION

More details are included in the Commission Working Document that accompanies this Report. For further information, the following are publicly available:

- Annual Monitoring Reports for the Framework Programme and Specific Programmes, which provide a concise, independent summary of the progress and quality of the measures taken to implement the programmes.
- Five-year Assessment Reports which examine implementation and achievements of Community research activities over the five previous years.
- Key Figures reports published each year, providing a set of indicators to take stock of Europe's position in science, technology and innovation.
- Statistics on Science and Technology in Europe (Eurostat): statistics on R&D budgets, R&D expenditure, R&D personnel and patents in the Member States, broken down by region.
- Studies and analyses published in connection with the Community RTD programmes and addressing issues specific to the fields of RTD which they cover.

Most of these documents can be obtained or ordered from the Commission's Internet sites:

- The Gateway to the European Union, EUROPA site: http://europa.eu/index_en.htm
- The CORDIS site containing comprehensive information on the RTD Framework Programme: <http://cordis.europa.eu>
- The CORDIS site containing information on ERAwatch : <http://cordis.europa.eu/erawatch/>
- The site of the Commission's Directorate-General for Research: http://ec.europa.eu/dgs/research/index_en.html
- The site of the Commission's Directorate-General for the Information Society: http://ec.europa.eu/dgs/information_society/index_en.htm
- The site of the Commission's Directorate-General for Enterprise: http://ec.europa.eu/enterprise/index_en.htm
- The site of the Commission's Directorate-General for Energy and Transport: http://ec.europa.eu/dgs/energy_transport/index_en.html
- The Joint Research Centre (JRC) site: <http://www.jrc.ec.europa.eu>
- The Eurostat site: <http://epp.eurostat.ec.europa.eu/>