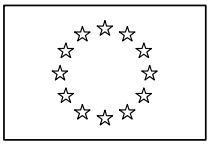

COMMISSION OF THE EUROPEAN COMMUNITIES

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REPORT FROM THE COMMISSION

Annual Report on research and technological development activities of the European Union in 2008

{SEC(2009)1380}

1. INTRODUCTION

This Annual Report covers developments and activities during 2008. It has been prepared pursuant to Article 173[1] of the Treaty establishing the European Community.

This 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 2008 and on trends in research and technological development (RTD) activities in the Member States of the European Union (EU).

2. POLICY DEVELOPMENTS : EUROPEAN RESEARCH AREA (ERA)

Research has been a centrepiece of the Lisbon strategy since its launch in 2000. Community research policy underpins the competitiveness of European industry and supports the development of other Community policies, making it a crucial policy domain for finding adequate responses to the challenges Europe is facing. By successfully finalising the second year of implementation of the Seventh Framework Programme (FP7) and continuing to make progress towards the European Research Area, Community research policy has attained its overall objectives.

The principal aims of Community research policy continue to be a strive for greater research excellence and enhanced socio-economic relevance by increasing the openness and attractiveness of the ERA to realise the fifth freedom (freedom of circulation of knowledge), by deepening international science and technology (S&T) cooperation and by forging closer relationships with neighbouring countries. Building strategic relationships with the Member States continues to be one of the principal tools for progressing towards these objectives.

A failure to invest more in research and develop a world-class research system in Europe will cost future generations dearly and put our well-being at risk. Statistics on R&D investments[2] reveal a persistent gap between the EU and the USA, with the EU's R&D intensity stagnating at 1.84% of Gross Domestic Product (GDP), well behind the 2.61% level in the USA.

Continuing to increase public investment in R&D is particularly relevant in the context of the financial and economic crisis, as it may have a countercyclical effect in a time when private R&D budgets are under pressure. At the same time, policy makers should ensure that private R&D investment is not crowded out and that distortion of competition through public R&D expenditure are kept to a minimum. Although the impact of the current downturn is difficult to predict, structural R&D policy reform continues to be crucial to mitigate the effects of the crisis and to consolidate recovery. R&D was therefore an essential part of the economic recovery package endorsed by the European Council in December 2008. In particular, the Commission proposed the launch of three major public- private partnerships in the automobile sector (the "European green cars initiative"), the construction sector (the "European energy-

[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] See http://ec.europa.eu/research/era/pdf/key-figures-report2008-2009_en.pdf

efficient buildings initiative"), and to increase the use of technology in manufacturing (the "Factories of the future initiative").[3]

On 30 May 2008, the Competitiveness Council launched the Ljubljana process, its principal aim being to improve the governance of research policy across the EU to progress towards the realisation of the ERA[4]. It creates a framework for strong involvement of all relevant research actors in the implementation of five specific ERA policy initiatives that were launched in 2008 (see section 3.1).

A long-term ERA 2020 vision was adopted by the Competitiveness Council on 2 December 2008[5]. This vision, a key reference for identifying future actions, projects a fully-fledged ERA by 2020 in which attractive conditions for doing research and investing in R&D intensive sectors in Europe are ensured through optimised scientific competition, cooperation, and coordination.

Realising a "fifth freedom", as endorsed by the European Council in March 2008[6], is at the centre of the ERA vision. The fifth freedom envisages the free circulation throughout Europe of researchers, scientific knowledge and technology. The removal of obstacles and the creation of new incentives to stimulate this circulation are key in this respect, including by revising those aspects of the different Community policies affecting research and knowledge.

3. EU RESEARCH AND TECHNOLOGICAL DEVELOPMENT ACTIVITIES

3.1. Policy achievements

The 2008 Spring European Council launched the second cycle of the revised Lisbon strategy and re-affirmed research and knowledge as one of the four priorities[6]. Making further progress towards the EU's R&D intensity target and the ERA were explicitly identified as areas for increased action.

The Ljubljana Process provides a framework for matching high-level political commitment and overall steering of ERA with concrete progress through joint actions and sustainable partnerships between the Member States, the Commission and relevant research actors. In this context, five ERA initiatives were launched in 2008 following the debate and stakeholder consultation on the 2007 ERA Green paper[7]:

– In order to accelerate the realisation of a genuine labour market for researchers, a Communication was adopted on "Better Careers and more Mobility: A European Partnership for Researchers"[8]. The process towards its implementation has been started up.

– To improve the exploitation of publicly funded research results, the Commission adopted a recommendation and a Code of Practice for universities and other public research organisations (PROs) on intellectual property management in knowledge transfer

3 COM(2008) 800
4 See doc. 10231/08
5 See doc. 16767/08
6 See doc. 7652/1/08
7 COM(2007) 161
8 COM(2008) 317

activities[9]. A working group of the Scientific and Technical Research Committee of the EU (CREST)[10] and a dedicated forum have been set up to support the implementation of the recommendation and the Code of Practice.

– A Communication on joint programming[11] of public research programmes was adopted. A High Level Group on Joint Programming (GPC) was established under the auspices of the Council to select the themes. Work to develop a common initiative in the field of Neuro-degenerative diseases, in particular Alzheimer' ("Alzheimer initiative") has been ongoing, led by the Member States.

– The Commission adopted a proposal for a legal framework for European research infrastructures[12]. Its aim is to provide a tailor-made legal framework to facilitate Member States' joint establishment and operation of large-scale European research infrastructures.

– A "Strategic European Framework for international S&T cooperation' was adopted, stressing the importance of developing the partnership between Member States and the Commission to strengthen co-ordination and create synergies in S&T cooperation with the rest of the world[13]. Increasing global challenges reinforce the need for a new approach to international cooperation in science and technology, as highlighted in the Communication.

The European Council decided in June to establish in Budapest the seat of the European Institute of Innovation and Technology (EIT), an initiative aiming at a better integration of the three poles of the knowledge triangle on research, education and innovation. Eighteen representatives from the research sector, higher education and companies have been nominated as members of the Governing Board. The first Knowledge and Innovation Communities (KICs) will be selected and launched by the end of 2009.

In 2008, European Technology Platforms (ETPs)[14] spearheaded the Commission's aim to implement different forms of large-scale public-private partnerships: they have spun off Joint Technology Initiatives (JTI), contributed to industrial initiatives in the context of the Strategic Energy Technology (SET) Plan[15] and helped shape the public-private partnerships under the economic recovery package[16], as referred to above. A number of ETPs moved beyond their research agendas by contributing to the Lead Markets Initiative[17].

Existing instruments for cooperation within FP7 such as Article 169 initiatives and JTIs[18] were further developed in 2008. The Commission adopted a proposal for an Article 169 European Metrology Joint Research Programme[19], and agreement was reached on both the Ambient Assisted Living[20] and EUROSTARS[21] initiatives. Following the adoption of the

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9 Commission Recommendation C(2008) 1329
10 See http://www.consilium.europa.eu/crest
11 COM(2008) 468
12 COM(2008) 467
13 COM(2008) 588
14 See http://cordis.europa.eu/technology-platforms/.
15 COM(2007) 723
16 COM(2008) 800
17 See http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm.
18 JTIs are public-private partnerships in industrial research at European level set up under Article 171 of the Treaty.
19 COM(2008) 814
20 OJ L 201, 30.7.2008, p. 49.

Regulations setting up the first four JTIs[22] in 2007, the Council adopted a fifth JTI Regulation on Fuel Cells and Hydrogen in 2008[23]. All five JTIs started their operations in 2008. The Commission Staff Working Document accompanying this Annual Report contains statistical information on the 2008 activities of the four JTIs set up in 2007. This constitutes the first reporting on progress achieved by these JTIs, as required by Art 11 (1) of the respective Council Regulations.

The Risk-Sharing Finance Facility (RSFF) provides loans for R&D and innovation investments with the support of FP7. FP7 will contribute up to EUR 1 billion to this scheme which, together with a matching contribution from the European Investment Bank (EIB), will allow to provide EUR 8-12 billion in loans. In 2008, the EIB signed 16 RSFF loan operations with a volume of EUR 1020 million. Since its launch in July 2007, the total loan amount signed under the RSFF has reached EUR 1480 million for the period 2007-2008.

It is to be noted that in December 2008 the Council approved the creation within the EIB of a European Clean Transport Facility (ECTF) to support investments targeting R&D and innovation in the areas of emissions reduction and energy efficiency in the European transport industry. The ECTF will amount to EUR 4 billion per year and targets automotive, railroad, aircraft and shipping industries.

In 2008, FP7 association instruments were signed with Bosnia-Herzegovina and Montenegro. Researchers from 39 countries (27 Member States and 12 Associated Countries) are now enjoying the same rights and obligations in their participation in FP7 research projects. In addition, in 2008 the already provisionally applicable S&T cooperation agreement with Egypt was concluded, an S&T cooperation agreement with New Zealand was signed and negotiations of an S&T cooperation agreement with Jordan (EC) were launched. Furthermore, the already provisionally applicable association agreements with Switzerland and Israel (EC) were concluded and entered into force.

During the SET-Plan[15] conference in Paris, the European Energy Research Alliance (EERA) was created. The SET-Plan European Industrial Initiatives will define roadmaps for their respective technologies during 2009. The EERA will ensure that the research agenda gives continuity and a strong innovative base for the initiatives.

Three Communications[24] addressing the ICT field provide a comprehensive strategy for ICT research and innovation in the EU. The strategy builds on successes and lessons learned from ICT activities in the Framework programme.

The Communications propose actions that combine both the supply and demand drive for innovation, public procurement of R&D as well as public-private partnerships to lead notably the development of the Future Internet. They also propose concrete actions to stop the fragmentation of the ICT research and innovation efforts, to better coordinate these efforts and pool resources when needed.

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21 OJ L 201, 30.7.2008, p. 58.

22 The first four JTIs are: Innovative Medicines (Council Regulation 2008/73/EC, http://imi.europa.eu), Clean Sky (Council Regulation 2008/71/EC, http://www.cleansky.eu), ARTEMIS (Council Regulation 2008/74/EC, http://www.artemis-ju.eu) and ENIAC (Council Regulation 2008/72/EC, www.eniac.eu).

23 Council Regulation 2008/521/EC of 30 May 2008, http://ec.europa.eu/research/fch

24 COM(2009) 116; COM(2009) 184; COM(2009) 108

The Communication "Towards a coherent strategy for a European Agricultural Research Agenda"[25] highlights a number of key initiatives to address the new challenges for European agriculture. A Communication[26] outlining a European strategy for marine and maritime research was also adopted in 2008.

Structural Funds play an important role in supporting the regions in implementing the Lisbon strategy. The Community Strategic Guidelines for Cohesion Policy focus increasingly on the Lisbon priorities which include research. An analysis of all approved operational programmes[27] shows that almost 25% (EUR 86 billion) of the total EU Structural Funds 2007-2013 are foreseen for R&D and innovation[28].

3.2. Implementation of Framework Programmes

The Seventh Framework Programme (FP7), with a total budget of over EUR 50 billion (Euratom FP7 EUR 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 build leadership in the global knowledge economy.

2008 was the second year of the implementation of FP7. Some 14000 proposals were received in response to 55 calls for proposals, with more than 72000 applicants. Approximately 2500 proposals were retained for funding.

Two executive agencies were established under FP7. The European Research Council Executive Agency (ERCEA)[29] was created to implement the FP7 Specific Programme "Ideas". The Research Executive Agency (REA)[30] will implement parts of the FP7 Specific Programmes "Cooperation" (themes on Space and Security), "Capacities" (Research for the benefit of Small and Medium Sized Enterprises) and "People" and provide general FP7 support services[31] on proposal reception/evaluation, management of appointment letters with expert evaluators and legal and financial validation of framework programme 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 challenges for the future. In total, 4619 proposals were submitted in 2008 and 787 retained for funding, with a total requested Community contribution of more than EUR 2.8 billion. Efforts have been made to increase cross thematic activities and cooperations with third countries through the launching of joint or coordinated calls.

In the *Ideas Programme,* the first call for "Advanced Grants" was published in 2008. More than 2000 proposals were received for this call and 275 were selected, with a total requested Community contribution of some EUR 589 million.

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25 COM(2008) 862

26 COM(2008) 534

27 An Operational Programme (OP) presents the priorities of the Member State (and/or regions) benefiting from the funds

28 See http://ec.europa.eu/regional_policy/atlas2007/index_en.htm

29 See http://erc.europa.eu

30 See http://ec.europa.eu/research/rea

31 With the exception of the Ideas Specific Programme and Euratom

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 2008, 4563 proposals were submitted and some 1200 retained.

The *Capacities programme* aims at developing the best possible resources and conditions for Europe's research community. In total, 1659 proposals were submitted for the different activities of the programme, and 281 retained, with a total requested Community contribution of some EUR 782 million.

Regarding the *Euratom* FP7, 38 proposals were submitted on nuclear fission and radiation protection and 18 of them were retained for funding, with a total requested Community contribution of some EUR 52 million.

During 2008, the *Joint Research Centre* has continued to pursue its research activities according to its specific programmes, contributing to the implementation of the FP7 direct actions in support to European policy makers.

In the course of 2008, the guidelines on the redress procedure were revised. The Rules for submission of proposals, and the related evaluation, selection and award procedures[32] were also revised in relation to the ethical review procedures, the handling of security-sensitive RTD actions and the evaluation scoring. Moreover, the work programmes[33] for all FP7 Specific Programmes were updated in 2008. The coordination of the inter-institutional relations with the Council, the European Parliament, the European Economic and Social Committee and the Committee of Regions, as well as CREST, was ensured.

Throughout 2008, several improvements have been made to the support infrastructure of FP7. This includes the first full year of operation of the central evaluation facility and the launch of the Unique Registration Facility (URF). Work has also been ongoing on developing acceptability criteria under which FP7 beneficiaries are allowed to charge personnel costs on the basis of average personnel cost calculations. Preparatory work has also been done on the revision of the 60 % transitional flat rate for indirect costs.

The high level of usage of the Community Research and Development Information Service CORDIS (16,4 million visits)[34] as well as its high level of availability (97,8%) were confirmed throughout 2008. All FP7 calls for proposals were published on time. The 2008 user satisfaction survey showed a high level of satisfaction, in particular with CORDIS News, FP7 pages and the email notification services. The number of subscriptions to the *research*eu supplements*[35] has doubled during 2008, demonstrating the interest of users in this publication.

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32 See ftp://ftp.cordis.europa.eu/pub/fp7/docs/fp7-evrules_en.pdf

33 See http://cordis.europa.eu/fp7/find-doc_en.html#workprogrammes

34 http://cordis.europa.eu

35 http://ec.europa.eu/research/research-eu/index_en.html

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 3 % objective

In the 3% action plan[36], the Open Method of Coordination (OMC) was identified as an important tool to help raise the EU's R&D intensity to approach 3% GDP by 2010. The OMC has since operated in yearly cycles. CREST launched a fourth cycle in December 2007 establishing CREST Working Groups on universities, industry-led competence centres, internationalisation of R&D and policy mix peer reviews for Austria and Bulgaria[37].

CREST also carries out an annual mutual learning exercise based on the National Reform Programmes in the context of the revised Lisbon Strategy. The 2008 exercise focused on the progress made on national investment targets and on the contribution of national R&D strategies to realising the European Research Area.

The OMC-NET[38] 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. As a result of a call launched in September 2007, seven projects were selected for funding in 2008.

In the particular domain of agricultural research, the Standing Committee on Agricultural Research (SCAR) plays an important role in facilitating agricultural research coordination across Europe in close collaboration with the network of Member States' representatives on the Knowledge Based Bio Economy.

4.2. Trends in public and private research investment

R&D intensity

The EU-27 R&D intensity measured as Gross Expenditures on Research and Development (GERD) as a percentage of GDP was 1.83% in 2007. Although real R&D expenditures have increased with 19.6% over the same period, R&D intensity has stagnated due to a corresponding increase in GDP.

The stability of R&D intensity at the overall EU level hides a much more diverse development at the level of the Member States. In particular, R&D intensity has increased in 17 Member States over the period 2000-2007. On the other hand, the ten remaining Member States (Belgium, Bulgaria, Greece, France, Luxembourg, the Netherlands Poland, Slovakia, Sweden, United Kingdom – representing all together about 47.1% of EU-27 GDP) have seen their R&D intensities decrease over the period 2000-2007. Considerable increases in R&D intensity have mostly taken place in countries with low R&D intensity, Austria being the exception, demonstrating that R&D intensity growth has mainly been a process of catching up.

Since 2005, each Member State (except for Bulgaria) has set a national R&D intensity target. These national targets may differ from the overall 3% target for the EU, depending on the

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36 COM(2003) 226

37 See http://ec.europa.eu/invest-in-research/coordination/coordination01_en.htm

38 See http://ec.europa.eu/invest-in-research/coordination/coordination02_en.htm

particular situation of each Member State regarding R&D expenditure. Figure 1 shows the progress made by each Member State towards its own R&D intensity target (grey) and progress that is still to be made (blue), showing that many Member States (and the EU-27 as a whole) still need to make considerable effort to start progressing towards their respective targets.

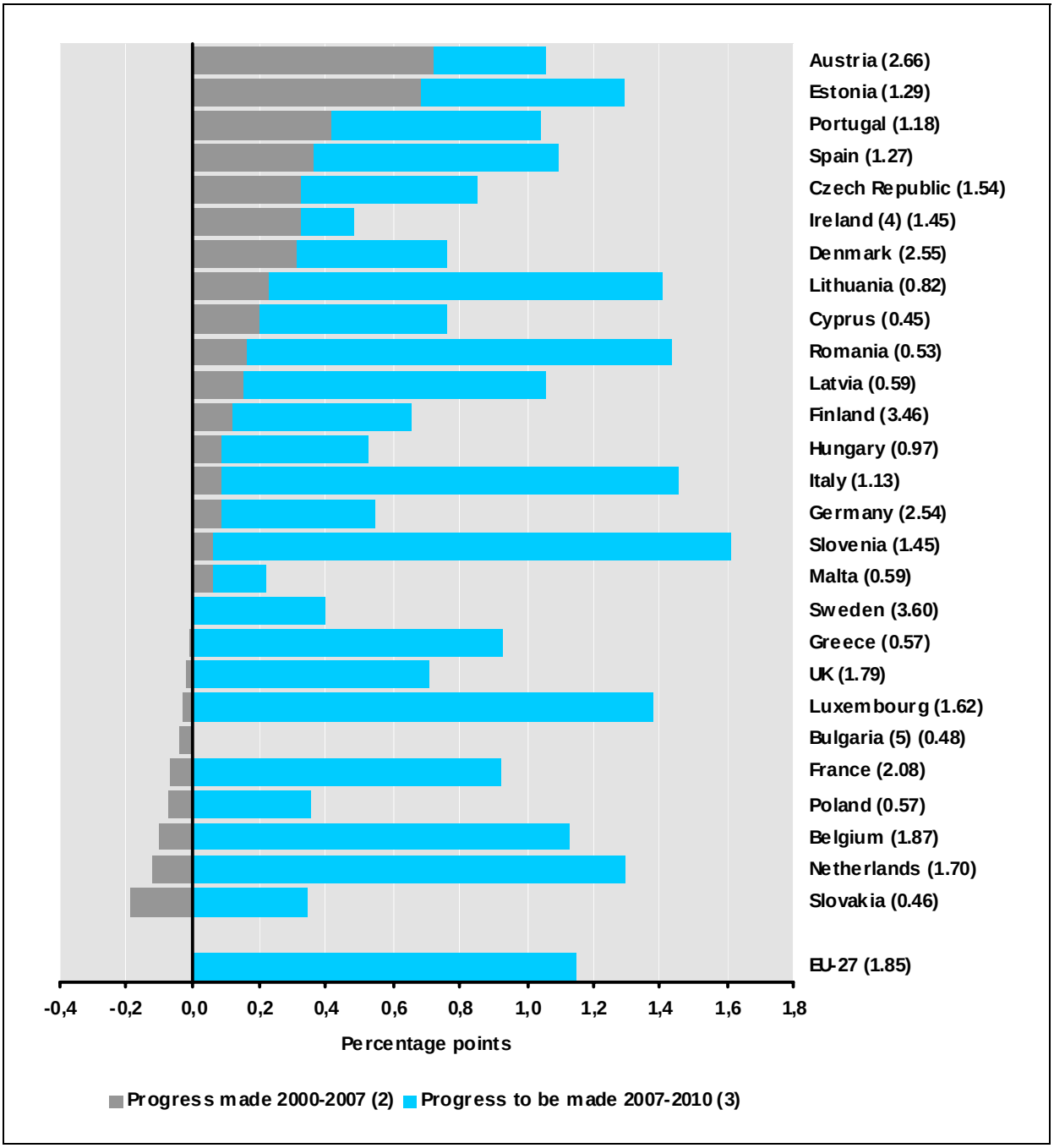
Trends in R&D funding[39]

R&D financed by government as a percentage of GDP in EU-27 equalled 0.63% in 2005, against 0.64% in 2000. Adding Community funds and foregone tax revenue to this figure would bring government R&D funding closer to the level reached in the US. As with overall R&D intensity, the picture at Member State level is more dynamic. Fourteen Member States have increased government support for R&D over the period 2000-2007. On the other hand, a slight decrease was observed in Germany and France, and a limited increase observed in the United Kingdom and Italy. The fact that these four Member States account for a very large share of the total government budget for R&D in EU-27 explains the stagnation observed at EU level.

R&D financed by the business sector is at a level of 1.00 % GDP in the EU-27, while it is considerably higher in the US (1.69 % GDP) and more than twice as high in South Korea (2.43 % GDP) and Japan (2.62 % GDP). It is noted that private funding of R&D increased substantially in Japan and South Korea between 2000 and 2006, but decreased in the US over the same period.

As for overall R&D intensity, increases in business enterprise funding of R&D have basically been linked to the catching-up process of Member States starting from a low level. This has not been sufficient to increase overall private EU R&D funding.

[39] R&D is funded from four sources : national business, national government, other national sources and abroad.



Source : DG Research
Data: Eurostat, Member States
Notes:
(1) IT: 2006; EE, IE, AT, FI: 2008.
(2) IT: 2000-2006; EE, IE, AT, FI: 2000-2008; EL: 2001-2007; FR, HU, MT: 2004-2007; SE : 2005-2007.
(3) IT: 2006-2010; UK : 2007-2014; FR: 2007-2012; EL : 2007-2015; EE, IE, AT: 2008-2010; FI: 2008-2011.
(4) IE: The R&D intensity target for 2010 was estimated by DG Research.
(5) BG has not set an R&D intensity target.

Figure 1 : R&D intensity - progress towards the 2010 targets (in percentage points); in brackets : R&D intensity, 2007 (1)

4.3. Trends in research policies

In 2008, national policies for R&D evolved towards more complex and coherent policy mixes, with many Member States focusing on implementation of strategies and some others developing new ones. Broadening the scope of strategies and changing the institutional settings for R&D policy-making are consistent trends.

As a response to the financial and economic crisis, Member States have put in place economic recovery packages, in which many Member States have attached great importance to R&D, although in a few of the hardest hit countries, public budgets are expected to be cut significantly and private budgets are under pressure. As direct relief to the private sector, many Member States opt to strengthen existing R&D tax incentives.

Almost all Member States focus on developing high-tech sectors in their economy. In many Member States, strategically important scientific domains or industrial sectors have been identified where support is to be concentrated. This concentration can follow a variety of routes: thematic collaborative research programmes, clustering initiatives, dedicated thematic research institutes or support to New Technology Based Firms (NTBF). A novel approach that is gaining ground is one whereby the concentration of resources is based on societal challenges instead of research domains or industrial sectors.

Increasing the quality and efficiency of the public research base continues to be a key aspect of R&D policy reform in many Member States. In this context, institutional restructuring of the public research base is an ongoing process, generally driven by the need to assure that public research can meet the highest standards at world scale.

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. Instruments offered by the Framework Programme continue to be the main tools used for ensuring coordination between national research programmes. Progress in opening up national research programmes is still limited, although there are a number of examples where Member States are reinforcing their cooperation at bilateral level. Many Member States have in recent years started to develop schemes to attract top researchers from abroad, as an additional way to strengthen their national systems. All Member States are actively following and participating in the activities of the European Strategy Forum for Research Infrastructures and are in some cases complementing them with work on the development of national roadmaps or by reserving national funding for participation in ESFRI projects.

5. OUTLOOK FOR THE FUTURE

The achievements listed above paved the way for 2009, the third year of FP7 implementation and a year of further developments for ERA.

Following their launch in 2008, the focus in 2009 will be on implementing the five Community ERA initiatives and taking further steps towards realising the 2020 ERA vision. The FP6 ex-post evaluation, the FP7 Progress Report and the ERC review represent important milestones towards the FP7 interim evaluation and the review of the European Union's financial framework.

6. SOURCES OF FURTHER INFORMATION

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

Annual Monitoring Reports for the Framework Programme and its Specific Programmes;

Five-year assessment reports;

Regular Science, Technology and Competitiveness Key Figures reports, taking stock of Europe's performance in research, science, technology and competitiveness and providing information on progress towards realising the European Research Area;

Statistics on science and technology in Europe (Eurostat);

Studies and analyses published in connection with Community research activities and policies;

The practical guide to EU funding opportunities for research and innovation[40]

Most of these documents can be obtained or ordered from the following websites :

The EUROPA site : http://europa.eu/index_en.htm;

The CORDIS site: http://cordis.europa.eu;

The Commission's Research website : http://ec.europa.eu/research;

The ERA website : http://ec.europa.eu/research/era;

The Investing in European research website : http://ec.europa.eu/invest-in-research;

The ERAWATCH website : http://cordis.europa.eu/erawatch;

The website of the Commission's Directorate-General for Research : http://ec.europa.eu/dgs/research/index_en.html;

The website of the Commission's Directorate-General for Information Society : http://ec.europa.eu/dgs/information_society/index_en.html;

The website of the Commission's Directorate-General for Enterprise : http://ec.europa.eu/dgs/enterprise/index_en.html;

The website of the Commission's Directorate-General for Transport and Energy : http://ec.europa.eu/dgs/energy_transport/index_en.html;

The website of the Joint Research Centre : http://ec.europa.eu/dgs/jrc/index.cfm;

The Eurostat website : http://epp.eurostat.ec.europa.eu

[40] See http://cordis.europa.eu/eu-funding-guide/home_en.html