The European Research Area: in quest of the Lisbon goals

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SUMMARY

A strong educational and scientific knowledge basie is one of Europe's traditional key assets that has made it possible for our continent to become world class in several research fields. Despite these great achievements, the position of the European research and technological development (RTD) potential is currently being challenged by a rapidly changing global competition, including the two main rivals, the US and Japan. The European Union (EU) is behind these countries as regards research and innovation output. Moreover, European research is faced with the implications of globalisation of markets and industries, digitalisation and new technologies, as well as a need to address societal issues such as an ageing population or climate change.
At the same time, the European Union (EU) is facing the uneven distribution of RTD capacities and excellence within its own borders, especially the EU12 countries are lagging behind in this respect.
In order to meet this twofold challenge the EU has to step up its efforts for the creation of a legitimate "European Research Area" that will make the EU more competitive on the international scene, and also encourage the less developed EU member states to invest more and better into research and innovation.

Keywords: *research and technological development (RTD), Lisbon goals*

INTRODUCTION

The most important guiding principle of the European level research and innovation policy is the „European added value". The basic idea is that funding research at the EU level composed of researchers coming from different Member States shall generate EU-wide benefits of scale and scope, provide additional funding, it will create a pool of resources, enhance research capacity, encourage multi-level policy coordination, and make knowledge available to a much wider target group (van der Horst et al., 2008).
The objectives of European value can be grouped into three different categories:
EU funding has a huge effect on the scale and scope of research activities. It is able to bring together what might otherwise be fragmented RTD resources to obtain a „critical mass" not attainable at the national level, and is capable of creating new resources which would not have been mobilised without EU intervention.

The second major factor justifying intervention at the European level relates to the fact that it can improve the quality of research and researchers. This embodies EU action to develop and better exploit the human resources through Europe-wide training and mobility schemes.

Finally EU intervention makes it possible to deal with pan-European challenges. Certain aspects of public policy (environment, health, food safety, climate change) have taken a global dimension, and can be tackled only on the basis of a common scientific experiment (Muldur et al., 2006).

The Lisbon Agenda: the framework strategy for „growth and jobs"

The Presidency Conclusions of the Lisbon European Council in 2000 began with an analysis of the EU's strengths and weaknesses. The Council coincided with the peak of the Internet boom, thus the document proclaimed that „the Union is experiencing its best macro-economic outlook for a generation" and that „growth and jobs creation is on". The most important weakness it mentioned was the underdevelopment of key economic sectors and human capital formation (Borrás, 2003).

Almost immediately after this summit meeting the new economy boom collapsed, the economic situation worsened rapidly, and the need for a faster economic growth in the EU was very much in demand. All the European summits from 2000 onwards have underlined the contribution of research and education in adapting to the new global competition. In March 2002, in order to achieve this target, the Barcelona Declaration firstly called for a rise in the share of European GDP invested in research (from 1.9% to 3%) and secondly, promoted the idea of increasing the number of researchers. These objectives were defined to create a dynamic area for research that elevates Europe to the forefront of international scientific excellence (Presidency Conclusions – Barcelona, 2002).

In 2004, the European Commission and the European Council decided to prepare a mid-term review of the Lisbon process, which was presented at the Spring Summit in March 2005. The former Prime Minister of the Netherlands, Wim Kok, was given the mandate by the European Council to lead a group of experts in examining the Lisbon Strategy. This report suggested that research was one of the major elements of the Lisbon process, however little progress had been achieved in innovating Europe's economy, and the reform process was not moving fast enough. The expert group advised to refocus the whole process on jobs and growth (Report from the High Level Group chaired by Wim Kok, 2004).

To achieve the 3% target, the Commission prepared a „Community Lisbon Programme" to complement the national action plans for growth and jobs, which were completed by the Member States in October 2005.

The programme consisted of 50 initiatives including regulatory actions, financing actions and policy development. The renewed Lisbon agenda adopted in 2005 introduced a streamlined reporting process, due to the fact that there were serious delays and shortcomings in the implementation. As a consequence, Member States prepared their National Reform Programmes (NRPs) including reforms elaborating on micro-economic, macro-economic and employment policies for the period 2005-2008. They submitted progress reports in the autumn of 2006, 2007 and will do the same in the coming months. These plans aim at enforcing the EU Commission and Member States' partnership to transfer effective and innovative practices from one country to another (Begg, 2007).

Based on the first years, the Commission has made an assessment pointing out the strengths and weaknesses of the renewed process. Four priority areas were identified, where more commitment and action is needed: education and research; SMEs; common employment policy; and a common energy policy. As regards research and innovation, a group of four high level experts were mandated by the Commission to draft a report, which made suggestions to boost Europe's research and innovation performance. The report's main recommendation was a „Pact for Research and Innovation to drive the agenda for an innovative Europe". The expert group underlined the fact that current efforts were not sufficient towards the revised Lisbon agenda, and more collective commitments were needed. The Seventh Framework Programme was confirmed as a key contributor to the re-launched Lisbon programme (Expert Group on R&D and Innovation chaired by Mr Esko Aho, 2006).

Important progress has been made in the implementation of the renewed Lisbon agenda, but still in March 2007 the European Council called both the Member States and the Commission to pursue actions that strengthen the internal market and competitiveness and provide better framework conditions for research and innovation (Begg, 2007).

The „European Research Area": theoretical background and practical implementation

Due to the unique structure of the European Union as a „political system" European policy making in all public domains has become very complex in the past decades, it is still in constant change and under evolution. Different theories exist for explaining European policy making, in most cases (for example trade, agriculture, monetary policy) intergovernmentalism or neofunctionalism is very well equipped to describe the rationale behind these developments. In the field of research and innovation policies, however, where sovereignty is shared between the regional, the national and supranational levels, these theories do not provide a clear explanation on how European level integration is taking place. Apart from the member states, increasingly also regional governments pursue research, development and technology policies. The EU centrally supports research and development and at the same time coordinates and finances activities at the regional level. Integration in the European research sector takes place basically along two pathways.

First, European institutions develop their own competencies in parallel with the nation state. This is put into evidence by the multi annual framework programmes, which have emerged since the 1980s as an important funding source for conducting research activities.

Second, the EU can take over as a „leader" in coordinating national policies in different policy domains. Together with the Community methods of integration (Community law) or the indirect effects of economic integration, new soft law instruments are guiding policy-making in the research field. Soft law governance uses tools such as benchmarking, action plans and exchange of information, sharing of best practices, and the definition of common goals to strengthen the EU in the international competition (Morado-Faodi, 2008).

Such a regulatory strategy, with the aim of achieving greater integration in a non-coercive manner, is better suited to the realities of national institutions and policies across a range of issue areas in an enlarged and diverse European Union (Edler et al., 2003).

Both of these paths lead up to a complex multi-level governance system, which is likely the most adequate way to present the functioning of the „European Research Area". The theory of „multi level governance" was introduced in the mid 1990s by Gary Marks, Liesbet Hooghe and Kermit Blank, primarily to describe the rational of the European cohesion policy, and how regions have become important actors in implementing community policies.

According to this concept, member states remain the most important players in the European policy arena, however states do not have any more monopoly in European level policy-making. Decision-making competencies are shared among actors at different levels. The European institutions, most importantly the Commission, the Parliament and the European Court have their independent influence in policy-making, and they do not act as the sole agents of national executives.

Furthermore, collective decision-making among the member states constitutes a zero sum game. There are always trade-offs between different decisions, thus at the same time in a particular issue some states have to give up on demands while on other issues these are the countries who gain.

Finally, political spaces are interconnected and closely linked. Even though national actors remain the most influential when defining the state preferences, sub national actors (regions) are active in both national and sub national arenas, hence creating transnational associations in the process. States do not have the monopoly to create links between domestic (regional) and European actors,

thus complex interrelations in domestic politics do not stop at the nation-state, but are extended to the European level (Marks et al., 1996).

The European Research Area is the latest attempt to cooperate on research matters within the European Union. Since the 1960s European leaders have promoted the idea of better co-ordination of national policies to take on the American and Japanese competition. A single research market and the free movement of researchers are central to the development of the EU. Since 1984 the EU has set the scale and guiding principles of research within the framework programmes. These multi-annual framework programmes are the driving force of a new collaborative approach and have largely contributed to the eventual development of the ERA (Guzzetti, 1995).

In January 2000 the European Commission published the Communication „Towards a European Research Area" (Commission of the European Communities, 2000), which was an important attempt to reform European RTD policymaking. One of its main goals is the building up of European research identity and the preparation for more effective and strategically planned pan-European cooperation. Its major means would be a better and more flexible co-ordination of national RTD policies; the implementation of multi-partner projects aimed at strengthening excellence on a research topic by networking the critical mass of resources and expertise around a joint programme of activities; the preparation of multi-partner projects to support objective – driven research by bringing together a critical mass of resources to reach ambitious goals, where the primary deliverable is knowledge for new products, processes and services (Commission of the European Communities, 2000). The aim of these instruments is to create self-organised, long-term co-operation across the EU that would take the place of the existing approach of short-term, small-scale, centrally managed projects. The European Commission this way receives more autonomy to initiate projects and programmes that directly affect national research actors.

The March 2000 Lisbon European Council endorsed the objective of creating a European Research Area (ERA), consequently many initiatives have been launched to pursue these goals. Globalisation of research has an ever more significant role, moreover new scientific powers are hosting considerable amounts of R&D investments. These trends expose Europe's ability to sustain a leading edge in knowledge and innovation, which was confirmed as the core element of the renewed Lisbon Strategy for Growth and Jobs in 2005.

The EU and Member States have likewise expressed that the ERA, along with high quality education and a supportive environment for innovation, ERA is essential for Europe to become a leading knowledge society and thus providing the necessary conditions for future generations.

The concept integrates three inter-linked aspects of European level research. A European 'internal market' for research should be formed, where researchers, technology and knowledge can freely circulate; an effective European-level coordination of national and regional research activities, and finally effective and well targeted programmes, policies; and initiatives need to be implemented and funded at European level.

With the emergence of knowledge societies and knowledge economies Europe needs to exploit its potential in a more efficient way. The ongoing process of economic integration, the additional opportunities and challenges opened up by future enlargements of the EU, and the growing impact of economic and technological globalisation urge the EU to establish an integrated RTD policy approach (Borrás, 2003).

In the 1990s important steps were taken in a number of key fields of technology including information and communication technologies (ICT), nanotechnology and life sciences. This fast pace progress boosted the expectations of policy-makers and society. However most of this progress was coming from outside Europe. The EU has never managed to reach the US levels of economic growth and employment. In addition to this, over the course of the last 15 years, major developing economies (Brazil, Russia, India, and China) have made important progress in economic growth. Foreign direct investment has flown into these countries, more and more setting up the production of middle- and high tech products. Due to trade liberalisation these countries are able to export these products to advanced markets such as the EU, thus posing new competitive threats to the developed economies. This trend even more pushes the EU (and other developed economies) to specialise in more high-tech industries, and puts research and development to the top of the political agenda (Muldur et al., 2006).

The assessment of research and innovation policies at the EU level has been occurring in the context of the so-called „knowledge-based economy". The notion comes from the fact that in the last two decades the role of knowledge has gained a central position in the dynamics of advanced economies. The conclusion has been made that the modern economies are based less on capital and labour, and more on knowledge, which has become the key factor of production.

The life cycles of nearly all products have become shorter, independently of whether they are high-, medium- or low-tech. Consequently the knowledge input these products represent is the main driving force behind this acceleration. Moreover one is witnessing a rapid expansion of knowledge. In previous decades substantial production of knowledge in just one area of science and technology was sufficient for a whole new wave of products or modes of production. Nowadays there exists a simultaneous rapid expansion of knowledge in many areas, such as ICT, biotechnology, new materials, nanotechnology, all of which have an important

impact on the dynamics of economies. Finally, the growing importance of the services sector, the increase in the stock of intangible assets, and the relationship between education and employment all emphasize the relevance of competence-building and learning abilities beyond the world of manufacturing (Borrás, 2003).

The EU's accomplishments in research and innovation in the international arena

On of the main goals of the EU's Lisbon agenda is to achieve a high level of research and development (R&D) spending. Two sub-targets for R&D spending were clearly defined in 2002: EU R&D intensity (R&D expenditure divided by GDP) was to increase from about 1.8 percent in the late 1990s to about three percent by 2010; and two-thirds of this spending was to be funded by the business sector, the rest being funded by governments (European Council, 2002).

As regards the EU's R&D intensity one can differentiate among three groups of countries within the European Union.

The first group of countries has already made significant progress in setting up a real knowledge-based economy. In 2006, the highest R&D intensity in the EU27 was registered in Sweden (3.73% of GDP) and Finland (3.45%).These countries are followed by Germany (2.53%), Austria (2.49%) and Denmark (2.43%).

The second group contains countries with figures between 1.5% and 2.1%. These Member States accomplish the average performance of the EU27 (France, Belgium, Netherlands, Luxembourg, United Kingdom).

The Member States with the lowest R&D intensity in 2006 (including Hungary) were countries below the 1.5% of R&D spending. Cyprus (0.42%), Romania (0.46%), Bulgaria (0.48%) and Slovakia (0.49%) are the worst performers of all EU27.

Table 1

Research and development expenditure, 1996-2007

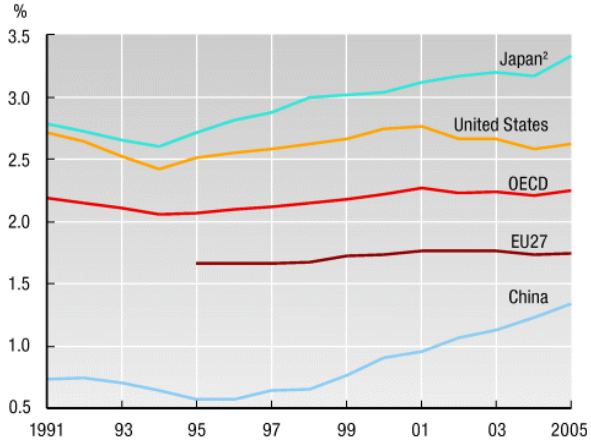
Research and development expenditure, by sectors of performance; All sectors												
% of GDP	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
EU (27 countries)	1.76	1.78	1.79	1.84	1.86	1.87	1.88	1.87	1.83	1.84	1.84	:
Belgium	1.77	1.83	1.86	1.94	1.97	2.08	1.94	1.88	1.87	1.84	1.83	:
Bulgaria	0.52	0.51	0.57	0.57	0.52	0.47	0.49	0.5	0.5	0.49	0.48	:
Czech Republic	0.97	1.08	1.15	1.14	1.21	1.2	1.2	1.25	1.25	1.41	1.54	:
Denmark	1.84	1.92	2.04	2.18	2.24	2.39	2.51	2.58	2.48	2.45	2.43	:
Germany	2.19	2.24	2.27	2.4	2.45	2.46	2.49	2.52	2.49	2.48	2.53	:
Estonia	:	:	0.57	0.69	0.61	0.71	0.72	0.77	0.86	0.93	1.14	:
Ireland	1.3	1.27	1.24	1.18	1.12	1.1	1.1	1.17	1.24	1.26	1.32	1.35
Greece	:	0.45	:	0.6	:	0.58	:	0.57	0.55	0.58	0.57	:
Spain	0.81	0.8	0.87	0.86	0.91	0.91	0.99	1.05	1.06	1.12	1.2	:
France	2.27	2.19	2.14	2.16	2.15	2.2	2.23	2.17	2.15	2.12	2.09	:
Italy	0.99	1.03	1.05	1.02	1.05	1.09	1.13	1.11	1.1	1.09	:	:
Cyprus	:	:	0.22	0.23	0.24	0.25	0.3	0.35	0.37	0.4	0.42	:
Latvia	0.42	0.38	0.4	0.36	0.44	0.41	0.42	0.38	0.42	0.56	0.7	:
Lithuania	0.5	0.54	0.55	0.5	0.59	0.67	0.66	0.67	0.76	0.76	0.8	:
Luxembourg	:	:	:	:	1.65	:	:	1.66	1.63	1.57	1.47	:
Hungary	0.65	0.72	0.68	0.69	0.78	0.92	1	0.93	0.88	0.94	1	:
Malta	:	:	:	:	:	:	0.26	0.26	0.54	0.54	0.54	:
Netherlands	1.98	1.99	1.9	1.96	1.82	1.8	1.72	1.76	1.78	1.74	1.67	:
Austria	1.59	1.69	1.77	1.88	1.91	2.04	2.12	2.23	2.22	2.43	2.49	2.55
Poland	0.65	0.65	0.67	0.69	0.64	0.62	0.56	0.54	0.56	0.57	0.56	:
Portugal	0.57	0.59	0.65	0.71	0.76	0.8	0.76	0.74	0.77	0.81	0.83	:
Romania	:	:	0.49	0.4	0.37	0.39	0.38	0.39	0.39	0.41	0.45	:
Slovenia	1.31	1.29	1.36	1.39	1.41	1.52	1.49	1.29	1.42	1.46	1.59	:
Slovakia	0.91	1.08	0.78	0.66	0.65	0.64	0.57	0.57	0.51	0.51	0.49	0.46
Finland	2.52	2.7	2.86	3.16	3.34	3.3	3.36	3.43	3.45	3.48	3.45	3.37
Sweden	:	3.47	3.55	3.57	:	4.18	:	3.86	3.62	3.8	3.73	:
United Kingdom	1.86	1.8	1.79	1.86	1.85	1.82	1.82	1.78	1.71	1.76	1.78	:
United States	2.53	2.56	2.61	2.65	2.73	2.74	2.64	2.67	2.58	2.61	2.61	:
Japan	2.81	2.87	3	3.02	3.04	3.12	3.17	3.2	3.17	3.32	:	:

Source: EUROSTAT, 2008

The highest increases in R&D intensity between 2000 and 2006 were found in Austria (from 1.91% to 2.45%), Estonia (from 0.61% to 1.14%) and the Czech Republic (from 1.21% to 1.54%) (*Table 1*).

Together, Germany (58 billion euro in 2006), France (38 bn) and the United Kingdom (32 bn in 2005) spent around 60% of total R&D expenditure in the EU27 (Commission of the European Communities, Directorate General for Research, 2007).

Figure 1: **Trends in R&D intensity in world economies 1991-2005**



Source: OECD, MSTI, 2007

As illustrated in *Figure 1*, R&D intensity in the EU has been stable since the early 1990s, fluctuating between 1.6% and 1.8%. In 2005, R&D intensity in the EU was still under 1.8%. The relative spending on research activities in the US has also been stable, but on average above 2.5%. Japan can be proud of an impressive performance, with the R&D intensity constantly increasing, and the figure has remained well above three percent since the early 2000s. It is equally worth noticing, how dramatically China's total R&D expenditure relative to GDP has been increasing, from about 0.5% 10 years ago to 1.5% in 2006. As a consequence, the EU is not really catching up with the US or Japan in terms of research spending, while China is catching up with the EU. If the current trend continues, by 2010 Europe's R&D intensity will have declined to its mid-1990s level of under 1.8% of GDP.

Table 2

Gross Domestic Expenditure on R&D, by sectors

Gross Domestic Expenditure on R&D, 2007					
	% financed by		% performed by		
	Industry	Government	Industry	Higher Education	Government
EU-27	54,1	34,7	63	22,1	13,8
United States	64,9	29,3	70,3	14,3	11,1
Japan	77,1	16,2	77,2	12,7	8,3
TOTAL OECD	62,7	29,5	68,8	17,1	11,4

Source: OECD, MSTI, 2008

As shown on *Table 2,* there are significant differences concerning the different sectors' contribution to both to the financing and performance of R&D activities in the EU, US and Japan. As regards the financial input, the governmental sector in the EU is playing a more important role (34.7%) than both in the US (29.3%) and Japan (16.2%). In Japan industry is providing the largest share for R&D funding (77.1%), considerably more than in the EU27 countries (54.1%). As for the performance of R&D activities, it is interesting to notice that in all three regions industry is the major stakeholder, however in the EU higher education is playing a relatively more important role than in the US and Japan.

The EU's research and innovation output is most frequently compared to another benchmark economy, that of the United States. The reason being that these economies are comparable in complexity and size. According to Mary O'Sullivan and the Expert Group on Knowledge for Growth one can distinguish between two types of explanations regarding the EU's R&D deficit towards the US.

The market based explanation is the most common justification; it states that the most significant difference between the EU and the US is the emergence of new sectors and the greater willingness of the US financial markets to fund new sectors and new firms. In addition the more flexible labour market in the US is an important factor in motivating the emergence of new industries and firms. The fragmentation of European product markets equally contributes to the above fact.

Other experts believe that the difference in R&D spending has more to do with the systematic interaction among different elements in an innovation system. From this point of view, deficits in R&D reflect the differences as regards the interactions and interfaces between various elements of the innovation systems. The public-private interface, the relationship between the components of the public sector and the industry plays an important role. The interface between the university system and the industry is equally more developed in the US. There is a smaller proportion of the working age population in tertiary education in Europe compared with the US, the level of funding allocated to education is significantly lower, and there is less attractiveness for foreign scholars and researchers to study and work in the EU. Finally the lack of professional management in European universities and the persistent rigid hierarchical structures in academia limit the contributions to R&D in the EU (O'Sullivan, 2007).

Another important reference to measure a country's accomplishments as regards research and innovation is the European Innovation Scoreboard (EIS). It has been elaborated by the European Commission in the frame of the Lisbon Strategy, to provide a comparative analysis of the innovation related performances of the EU Member States, other European and non-European countries. The Summary Innovation Index (SII) gives an overview of the innovation performance per state.

It is calculated with the aim of the most recent statistics from international sources (Eurostat, OECD, OHIM). The below indicators are taken into account when calculating the index:
S&E graduates; Tertiary education; Broadband penetration rate; Public R&D expenditures; Business R&D expenditures; Share of medium-high/high-tech R&D; Early-stage venture capital; ICT expenditures; High-tech exports; Employment in medium-high/ high-tech manufacturing; EPO patents; USPTO patents; Triad patents; *Community trademarks*; *Community designs*

Based upon the SII from 2007, one can basically differentiate between the following four groups of countries.
Sweden, Switzerland, Finland Israel, Denmark, Japan, Germany, the UK and the US are the leaders with scores well above those of the EU27. Of all the countries Sweden has the highest position.

Luxembourg, Iceland, Ireland, Austria, the Netherlands, France, Belgium and Canada constitute the second group, with the level that of the EU.

Estonia, Austria, Norway, Czech Republic, Slovenia, Italy, Cyprus and Spain are considered moderate innovators, with SII scores below the EU27 average.

Finally, Malta, Lithuania, Hungary, Greece, Portugal, Slovakia, Poland, Croatia, Bulgaria, Latvia and Romania are countries with significant need for catching-up. From the countries included in the EIS, Turkey has the worst performance.

As regards the fact that the EU's lagging behind in research and innovation compared to the US and Japan, the SII index shows the following trends in the last five years:

Table 3

Innovation gap, EU-US, EU-Japan

	EU innovation gap towards US and Japan	
	EU – US gap	**EU – Japan gap**
2003	-0,164	-0,162
2004	-0,146	-0,169
2005	-0,116	-0,162
2006	-0,1	-0,151
2007	-0,098	-0,15

Source: Commission of the European Communities, 2008

The US and Japan are still ahead of the EU27, however the gaps have been declining. The EU-US gap has significantly decreased between 2003 and 2006, and there is a very modest drop in 2007 (*Table 3*).

The EU-Japan gap first increased in 2004 and then decreased more importantly between 2004 and 2006 and very slightly in 2007. From the 15 previously mentioned indicators the US performs better than the EU in 11 case while the EU scores above the US in 4 indicators (S&E graduates, employment in medium-high and high-tech manufacturing, community trademarks and community designs). Despite the fact that the US is leading in 11 indicators, for 9 of these indicators the US is outperformed by at least one European country. Only in tertiary education and USPTO patents the US is performing better than any European country.

As regards the 15 indicators taken into account when comparing the EU and Japan (Early-stage venture capital is not relevant) Japan performs better than the EU in 12 indicators, while the EU only scores above Japan in 2 indicators (community trademarks and community designs). Although Japan is leading in 12 indicators, on 9 of these indicators Japan is outperformed by at least one European country. Only in tertiary education, USPTO patents and triad patenting Japan is performing better than any European country.

Thus, concerning the Summary Innovation Index (SII), the EU is in a relatively more favourable position that regarding the R&D intensity.

CONCLUSIONS

Research and innovation have been considered the milestones on which the Lisbon competitiveness goal was based initially in 2000, and equally in the occasion of the re-launch in 2005.

The European Research Area concept includes the following: a European „internal market" for research, where researchers, technology and knowledge circulate freely; effective European-level coordination of national and regional research activities, programmes and policies; and initiatives implemented and funded at European level. The European Research Area has become a key reference for research policy in the European Union.

Important steps are necessary in order to meet the internal and external challenges the European Union is facing at the moment. First the EU has to coordinate the efforts to help the less developed regions catch up as quickly as possible concerning research and innovation.
Second, and in parallel, the EU as a whole will have to deliver on its very ambitious goals set within the frame of the Lisbon program to maintain its position on the international playing field.

LITERATURE

Begg, I. (2007): Lisbon II, Two Years on: An Assessment of the Partnership for Growth and Jobs, Special CEPS Report.

Borrás, S. (2003): The innovation policy of the European Union: from government to governance, Cheltentam: Edward Elgar.

Edler, J.-Kuhlmann, S.-Behrens, M. (2003): Changing governance of research and technology policy: The European Research Area, Cheltentam: Edward Elgar. 574.

Guzzetti, L. (1995): A Brief History of European Union Research Policy. Luxembourg, Office for Official Publications of the European Communities.

Marks, G.-Hooghe, L.-Blank, K. (1996): European Integration from the 1980s: State-Centric v. Multi-level Governance. Journal of Common Market Studies, 34. 3: 341-378.

Morado-Faodi, S. (2008): The Missing Piece of the Lisbon Jigsaw: Is the Open Method of Coordination Effective in Relation to the European Research Area? European Law Journal, 14.5: 635-654.

Muldur, U.-Corvers, F.-Delanghe, H.-Dratwa, J.-Heimberger, D.-Sloan, B.-Vanslembrouck, S. (2006): A new deal for an effective European research policy The design and impacts of the 7th Framework Programme. Springer, Dordrecht.

O'Sullivan, M. (2007): The EU's R&D deficit & Innovation policy. Expert Group on Knowledge for Growth.

van der Horst, A.-Lejour, A.-Straathof, B. (2008): Why European innovation policy. In Gelauff, G.-Grilo, I.-Lejour, A. (2008): Subsidiarity and Economic Reform in Europe. Springer-Verlaag, Berlin Heidelberg.

Commission of the European Communities (2000): Towards a European Research Area. COM (2000) 6 final, Brussels.

Commission of the European Communities, Directorate-General for Research (2007): Key Figures 2007, Towards a European Research Area Science, Technology and Innovation. Brussels.

Commission of the European Communities (2008): European Innovation Scoreboard 2007 – Comparative analysis of Innovation performance. Pro Inno Europe paper Nr. 6, Luxemburg.

European Council (2002): Presidency Conclusions. Barcelona European Council, 15 and 16 March 2002.

Eurostat (2008): http://epp.eurostat.ec.europa.eu

Expert Group on R&D and Innovation appointed following the Hampton Court Summit and chaired by Mr Esko Aho (2006): Creating an Innovative Europe.Luxenbourg, Office for Official Publications of the European Communities.

High Level Group chaired by Wim Kok (2004): Facing the challenge The Lisbon Strategy for Growth and Employment.

OECD (2007): OECD Science, Technology and Industry Scoreboard 2007, Innovation and Performance in the Global Economy.

OECD (2008): Main Science and Technology Indicators (MSTI). 2008/1.