1. The European Research Area ‘goes global’: an introduction

Heiko Prange-Gstöhl¹

This introductory chapter will provide the framework for the two parts of the book that will deal with ‘global challenges and the external dimension of the ERA’ and ‘policy coordination in the external dimension of the ERA’. This chapter will first give an overview of the different phases of the development of the European Research Area (ERA) more generally. It will then present the evolution of the international dimension in the Community’s science and technology (S&T) policies and will explore the reasons why the external ERA dimension should be fostered. The chapter will conclude with some conceptual considerations on two of the core pillars of the external dimension of the ERA: research policy coordination and tackling global challenges effectively. These two issues are closely interrelated: on the one hand policy coordination has the potential to enable actors to address major problems more effectively (under certain circumstances that will be discussed in this book), on the other hand the ever more pressing need to address global challenges more effectively (and efficiently) has the potential to ‘motivate’ actors to closer coordinate their individual (that is regional, national, European, international) policies.

THE EUROPEAN RESEARCH AREA: A NASCENT INTEGRATION CONCEPT

An Emerging European Research Policy

Research policy in Europe is considered as a typical multi-level policy area (Borrás 2003; Grande 2000). Consequently, different territorial levels own autonomous decision-making capacities in research policies (Grande 2001). While early attempts of European states to cooperate in research policies started with the EURATOM Treaty of 1957, a true Europeanization of research policy was realized only with the Single European Act (SEA) of 1987, when competences for a common research policy were partly transferred to the European Community (Lawton 1999; Peterson and Sharp 1998).

A multi-annual Framework Programme (FP), which is so far the main instrument of a common European research policy, was implemented for the first time in 1983 with a budget of 3.75 billion Euro and focusing on eight strategic technology fields such as information and communication technologies, materials, energy and environmental technologies. Basically, the first FP only integrated those technology programmes of the Community that already existed at that time. While the second (1987–1991; 5.4 billion Euro) and third (1990–1994; 6.6 billion Euro) FP remained modest in terms of budget, with FP4 (1994–1998) research expenditures at the European level were doubled to 12.3 billion Euro. The main driver for this development was the Maastricht Treaty which further ‘communitarized’ research policy. The Treaty allowed pursuing research activities at the EU level that were necessary to achieve other than research-related goals of the Treaty. The following two FPs saw a further concentration of major programmes but only a moderate increases of budgets, with the fifth FP (1998–2002) providing an amount of 13.8 billion Euro and the sixth FP (2002–2006) of 16.2 billion Euro (both without EURATOM).

Only the seventh FP brought about major changes. First, a significant budget increase was realized, providing an amount of 50 billion Euro for a seven-year period (2007–2013) for research policies, which means an increase of 40 per cent per year compared to FP6. Second, new instruments with the aim to better coordinate research policies and programmes in Europe have been introduced. The ERA-NETs, established under FP6 to coordinate national and regional programmes of member states, were complemented by so-called ERA-NETs-PLUS which provide Community funds as an incentive to build up ‘common pots’ amongst national and regional programme managers to finance joint calls for proposals. The final objective is to identify so-called Article 169 initiatives which integrate national programmes into new joint programmes with an additional financial contribution from the Community.² In general, these integrated programmes are large-scale projects where member states cooperate due to a common interest on the basis of variable geometry.³

A second instrument that is used more frequently under FP7 is the Joint Technology Initiatives (JTIs) based on Article 171 of the EC Treaty. In 2008 the EU launched five JTIs. JTIs constitute public–private partnerships between the Community, member states and private actors under Community Law. Each JTI comprises a large part of research activities in a specific area, such as innovative medicines, embedded computer systems, aeronautics and air transport and nanoelectronics.⁴ Expectations towards JTIs are high: the Commission and member states expect the development of closer links between public and private research efforts, an improvement of the coordination of national research programmes as well as an enforcement of Europe’s industrial technology intensity.

The Advent of the European Research Area

Research policy as described above rather reflects an 'instrument-driven' or 'programme-driven' approach. This started to change with the advent of the European Research Area in the year 2000 when the ERA became the main political concept of European research policies. While the initial ideas of a European research space were already developed during the 1970s (André 2006), the ERA as a concept gained more political weight and has been further developed only since former Research Commissioner Busquin pushed it from the year 2000 onwards (see Edler et al. 2003; European Commission 2000). The Lisbon European Council followed up on the idea of an ERA and made it a key component of the Lisbon Strategy.⁵ Today the ultimate aim of the ERA is the creation of an 'internal market for research' with the free circulation of researchers, knowledge and technologies.⁶

Initially, the ERA went well beyond scientific and economic objectives by additionally focusing on enhanced interaction between science and society as well as on the establishment of common scientific values. In order to implement the new concept the European Commission proposed different instruments which were expected to design a common European model for research. This model was meant to correct the different 'fragmentations'⁷ of the European research landscape (for example national/European, public/private, universities/enterprises) while at the same time respecting national idiosyncrasies.

Since the European Commission did not provide a definition of the ERA, the concept had to be narrowed down through the activities the Commission proposed in the ERA context. The 2000 Communication entitled 'Towards a European Research Area' brought the following seven fields of action forward (European Commission 2000):

- A stock of material resources and facilities optimized at the European level (including the creation of 'virtual centres of excellence' and a 'European approach to research infrastructures');
- More coherent use of public instruments and resources (including better coordination of national and European programmes and closer relations between European research organizations);
- More dynamic private investment (including better use of indirect instruments such as fiscal measures and the development of tools to protect intellectual property);
- A common system of scientific and technical reference for policy implementation;
- More abundant and more mobile human resources (including the introduction of a European dimension into scientific careers);

- A dynamic European landscape, open and attractive to researchers and investment (including a reinforced role for regions and making Europe attractive for researchers around the world);
- An area of shared values.

In order to achieve these objectives the Communication suggested a set of instruments ranging from informative, legally non-binding ones, to financial, legal and political ones. In fact, the Lisbon European Council supported the ERA concept as a means of economic reform and encouraged the Commission to pursue the ERA's objectives strongly. However, the Heads of States and Governments did not agree to use the entire set of instruments proposed by the Commission, but rather stressed that research policies in Europe need to remain flexible and decentralized. Generally, member states' governments accepted the ERA as an integration concept, however not conceived as a transfer of sovereignty based on national interest or functional imperative, but as a limited coordination venture at the EU level (Banchoff 2003). Consequently, member states preferred legally non-binding governance instruments, particularly the Open Method of Coordination (OMC), to implement the ERA objectives.

With preferring non-binding governance instruments, one could argue that member states did not want to go beyond the provisions of the EC Treaty since the political target of coordinating national and Community research policies is already codified therein. Article 165 of the Nice Treaty stipulates that 'the Community and the member states shall coordinate their research and technological development activities so as to ensure that national policies and Community policy are mutually consistent'. To implement this political target, in 1965 the member states had already established a committee to recommend areas of joint action and ways to compare and to coordinate national research policies. This need for coordination was recalled at the 1972 Summit, followed by the creation of the Commission's Directorate-General for Research in 1973 and the Committee on Science and Technical Research (CREST) in 1974. CREST's objective was to assist the Commission and the Council in defining 'objectives and ensure the development of a common policy in the field of science and technology involving the coordination of national policies and the joint implementation of projects of interest to the Community'. In 1995 CREST's tasks were redefined to identify strategic priorities for Community policy and promote coordination by the Community and the member states of their research activities.

The Commission's proposal for the Sixth FP again affirmed the necessity to apply both the OMC and legislative measures in order to realize the ERA. National and European policies were meant to complement each other and to offer the highest degree of coherence. Nevertheless, negotiations on the new

FP revealed that the member states were not prepared to follow the Commission's ambitions. While Brussels understood the FP as only one instrument amongst others to create the ERA, member states felt no imperative to take measures that go beyond the application of the FP and the OMC in order to build a coherent ERA (Elera 2006, p. 564). Shortly after adopting the Sixth FP the Council once more stressed the independence of national research policies proposing again the OMC to implement ERA policies while at the same time rejecting the possible use of legislative measures in European research policies.⁸ As a consequence the ERA, in fact, lost political weight. However, the FP offered certain instruments which helped to coordinate national and regional research programmes closer, such as ERA-NETs. Additionally, the mobility of researchers was simplified and the creation of the European Research Council (ERC) was seen as a milestone to boost the quality of European fundamental research.

The further development of the ERA since the year 2005 was shaped by two major changes in European research and innovation policies: first, through embedding the ERA into the relaunched Lisbon Strategy, and second through the Commission trying to re-enforce its role as 'research policymaker' rather than being a sole executor of the Framework Programme. I will explore these two aspects further in the following sections.

Linking the ERA Better to the Lisbon Strategy

In 2004 the Kok-Report (named after former Dutch Prime Minister Wim Kok who chaired a High-Level Group to review the Lisbon Strategy) required urgent action to increase Europe's attractiveness for researchers and scientists and to make research and development (R&D) a top priority (Kok-Report 2004, p. 6). Based on this and other recommendations the Commission proposed a relaunch of the Lisbon Strategy 'by way of a European Partnership for jobs and growth' (European Commission 2005a, p. 14). EU Heads of States and Governments agreed to this proposal at the 2005 Spring European Council.⁹

Since 2005 the implementation of the Lisbon Strategy 'is based on a close partnership between the Commission and member states, with a clear division of responsibilities and a strong emphasis on maximizing the synergies between the Community and the national levels and between different economic policy areas'.¹⁰ The Commission proposes Integrated Guidelines for reform which are then approved by the Council and form the basis for member states' National Reform Programmes. By putting forward a Community Lisbon Programme (CLP) the Commission tries to ensure that policymaking and funding activities at the European level best serve the growth and jobs goals. Integrated Guidelines, the CLP and the National Reform Programmes

are drawn up for a three-year cycle. The Commission monitors the National Reform Programmes on an annual basis and proposes changes, if necessary. The relaunched strategy focuses on three main pillars:

- ‘Making Europe a more attractive place to invest and work’ by extending and deepening the Single Market, ensuring open and competitive markets inside and outside Europe, improving European and national regulation, and expanding and improving European infrastructure;
- ‘Fostering knowledge and innovation for growth’ by increasing and improving investment in research and development, facilitating innovation, the uptake of ICT and the sustainable use of resources, and contributing to a strong European industrial base;
- ‘Creating more and better jobs’ by attracting more people into employment and modernizing social protection systems, increasing the adaptability of workers and enterprises and the flexibility of labour markets, and investing more in human capital through better education and skills.

This Communication was followed by several initiatives trying to make the Lisbon Project more tangible (see European Commission 2005b, 2006a, 2006b). In all these documents the proposals range from improving the legislation and framework conditions to foster new technologies, promoting a free employment market for researchers, improving the access to research funds for SMEs and intensifying industry–university links, to proposing a European patent strategy and linking the European cohesion policy better to research and innovation.

While the ERA has not been mentioned in the key document relaunching the Lisbon Strategy, the Lisbon Integrated Guidelines 2005–2008 speak of establishing a European Knowledge Area (European Commission 2005d), however, not addressing the ERA specifically. Only the Integrated Guidelines for 2008–2010 are more precise, calling for ‘more rapid progress towards establishing the European Research Area, including meeting the collective EU target of raising research investment to 3 per cent of GDP is needed’ (European Commission 2007b, p. 14).

Additionally, the ERA concept now features prominently in the Community Lisbon Programme. While the ERA is missing in the 2005–2008 CLP, the 2008–2010 CLP devotes a specific objective to the ERA. ‘Objective 6’ states that ‘the Community will make the “fifth freedom”, the free movement of knowledge, a reality and create a genuine European Research Area’ (European Commission 2007b, p. 9). For the first time in an official EU document, the objective also brings forward the need to realize a ‘fifth freedom’, the freedom of knowledge, and consequently presents the ERA as a nascent integration concept closely linked to the concept of an ‘Internal Market’.

Beyond simply mentioning the ERA, the Commission this time also proposes concrete actions for implementation. These include:

- Pool R&D resources to ensure their more effective use, by agreeing by end 2008 areas for joint programmes and launching common calls for projects by end 2010.
- Improve cross-border mobility and career prospects of researchers based on a European 'passport'.
- Make the European Institute of Innovation and Technology (EIT) fully operational.
- Launch a new generation of world-class research facilities by drawing up by end 2009 roadmaps for the launch of the commonly agreed projects. For those projects of a global scale, launch a dialogue with interested international partners during 2008. (European Commission 2007b, p. 10)

Proposing these actions the Commission has acted quite cautiously trying not to put something forward it cannot deliver in the end. At the time of publishing the CLP all of these initiatives had already been quite advanced: a Communication on joint programming of research and a European initiative on researchers' mobility had been on their way, the EIT was about to be established and the European Strategy Forum for Research Infrastructures (ESFRI) had paved the ground for agreeing on common European infrastructures.

To sum up, today the ERA is linked more closely to the Lisbon Strategy than it was at the beginning of the century. However, this has only happened recently with the ERA finding its way into the latest CLP and the request to member states to report progress towards realizing the ERA in their National Reform Programmes.¹¹ This can be understood as a direct consequence of the 2007 ERA Green Paper.

By connecting the ERA better to the Lisbon Strategy it is likely that the coherence between research and other policies serving the creation of growth and jobs, notably innovation, cohesion, regional and employment policies, increases. Linking research policy goals closer to innovation policies has the advantage that coordination, monitoring and evaluation (of the Integrated Guideline referring to R&D) fall under the EU Treaty's economic policy provisions of Article 121 (Treaty on the Functioning of the European Union). This means that 'harder' coordination mechanisms apply for research policy than originally foreseen in the Treaty (that is, Article 181 Treaty on the Functioning of the European Union).¹²

Revamping the ERA: the ERA Green Paper and its Follow-up

Only when the European Commission published its Green Paper 'The

European Research Area: New Perspectives' (European Commission 2007a) was the ERA concept seriously revitalized. It was mainly Science and Research Commissioner Janez Potocnik who saw the necessity – after the Seventh FP has been successfully launched – to resuscitate the ERA given the emergence of new global challenges, new global S&T players, and a persistent performance gap between Europe and its main competitors the United States and Japan. According to the Green Paper the creation of the ERA combines 'a European "internal market" for research, where researchers, technology and knowledge freely circulate; effective European-level coordination of national and regional research activities, programmes and policies; and initiatives implemented and funded at European level' (European Commission 2007a, p. 2).

Publishing the ERA Green Paper marked a considerable push for European research policy activating policymakers at the national and European levels as well as public and private research institutions to work practically on the creation of a European Research Area. A public consultation on the ERA Green Paper mobilized some 800 responses on all of the so-called 'six axes' which mainly shall constitute the ERA (European Commission 2008b):

1. Realising a single labour market for researchers;
2. Developing world-class research infrastructures;
3. Strengthening research institutions;
4. Sharing knowledge;
5. Optimizing research programmes and priorities;
6. Opening to the world: international cooperation in S&T.

The Competitiveness Council of November 2007¹³ invited the Commission to prepare proposals on these topics that were finally adopted by the Commission during 2008:

- A Recommendation on the management of intellectual property in knowledge transfer activities (C 2008 1329) and a Code of Practice for universities and other public research organizations (PROs) was adopted on 10 April 2008.¹⁴
- A Communication on a European Partnership for Researchers was adopted on 23 May 2008 (COM 2008 317 final).¹⁵
- A Communication entitled *Towards Joint Programming of Research*¹⁶ was adopted on 15 July 2008 (COM 2008 468 final).¹⁷
- A Proposal for a Council Regulation (based on Article 171 EC Treaty) on a dedicated Legal Framework for the Construction and Operation of new Pan-European Infrastructures was adopted on 25 July 2008 (COM 2008 467 final).

- A Communication on a Strategic European Framework for International Science and Technology Cooperation was adopted on 24 September 2008 (COM 2008 588 final).¹⁸

While these five initiatives are considered to be the core activities fostering the ERA, the Commission and member states also agreed on several other measures to approach the 'fifth freedom'. In November 2006 the Commission adopted a modernized Community framework for State aid for research and innovation as well as guidance for a more effective use of tax incentives for R&D.¹⁹ Moreover, a new General Block Exemption Regulation (GBER) was adopted in July 2008. The Regulation authorizes aid in favour of SMEs, research, innovation, regional development, training, employment and risk capital.²⁰

Furthermore, in November 2007 the Commission adopted the Strategic Energy Technology Plan (SET-PLAN) which aims at setting up a dedicated European policy to accelerate the development and deployment of cost-effective low carbon technologies (European Commission 2007c, p. 2).²¹ The SET-PLAN should ensure that in the future energy research and innovation efforts are planned in alignment with EU energy policy goals (European Commission 2007c, p. 14). To that end a group of high level government representatives from each member state has been set up to steer the process and to 'propose options for an optimization of overall energy RDD&D efforts in the European Research Area through joint programming'.²² As such the SET-PLAN can be seen as a core sectoral component of the ERA.

A major difference between the first ERA Communication in 2000 and the ERA Green Paper in 2007 was the way in which both the Commission and the member states engaged in the follow-up of these papers. As explained above, the 2000 Communication was not taken up with the appropriate commitment by member states in favour of the upcoming discussion on the Sixth Framework Programme. Therefore, the time was too short to start serious discussions in the relevant fora and to implement the ERA through concrete actions.

The timing of the 2007 ERA Green Paper was different: it was launched immediately after the start of the Seventh FP which left research policy actors at the national and European levels sufficient room to devote more of their capacities and time to the ERA itself instead of already planning the next Framework Programme.

This engagement is mirrored in the launch of the so-called 'Ljubljana Process'. In May 2008, member states agreed that 'Europe needs to develop a common vision and effective governance of the European Research Area (ERA), in order to improve the coherence and synergy among several good initiatives already launched at national and EU levels, so that a globally

competitive, knowledge-based and innovative Europe can be created'.²³ This process is based on a long-term partnership between member states and the Commission, that is that 'member states, the countries associated to the Framework Programme for Research and Technological Development ..., and the Commission ... share responsibility for establishing the ERA of the future with a renewed commitment, with due respect for the roles and prerogatives of EU institutions and the principle of subsidiarity'.²⁴

The 'Ljubljana Process' consists of two parts: a 'vision' for the ERA and 'effective governance' of the ERA. Under the French EU Presidency in the second half of 2008 member states focused on the vision for the ERA. After consulting EU member states, countries associated to FP7, the Commission and other stakeholders, the French Presidency managed to come up with a text of such a vision which was adopted by the Competitiveness Council in December 2008.²⁵

However, the main changes in the context of the ERA concept appear in terms of governance issues. As a general principle of its future governance the ERA will be developed in 'partnership' between the actors. This means that all phases of its implementation (from the early phases of planning of initiatives to their implementation, monitoring and evaluation) are guided at the political level. A practical result of this principle might be the creation of a yearly ERA Council which would discuss the ERA dimension of national policies and the results of the mutual learning exercises. A second governance principle is that the ERA shall build links with other policies. In this context the Competitiveness Council of May 2008 recalled that the ERA is part of the Lisbon Partnership for Growth and Jobs, and is closely linked to education, innovation and other relevant policies. Enhanced links between Council formations, including through joint meetings and mutual information on subjects of common interest, could serve this purpose. Finally, consecutive EU Presidency Trios will in the future work closely with each other (mainly by drafting joint work plans and joint statements) and with the Commission in order to ensure coherent and sustained progress.²⁶

THE EUROPEAN RESEARCH AREA AND ITS EXTERNAL DIMENSION

The Development of an International Dimension in European Research Policies

International S&T cooperation has always been present in the Community's research policies since the launch of FP1 in 1983, although, in the beginning only on an ad-hoc basis.²⁷ These ad-hoc programmes were integrated in the

form of the INCO Programme in FP4. Consecutive FPs continued with specific programmes for international cooperation until FP7, which saw a decentralization in international cooperation activities towards thematic programmes (European Commission 2007d).²⁸

Two Commission Communications published in 1990 and 1995 explained the rationale for international S&T policies at the beginning of the 1990s (European Commission 1990, 1995):

- a new international context emerged as the Eastern bloc disappeared, the Mediterranean Basin faced several political changes, and the Third World has been more diversified;
- the conditions for research and technological development have changed through globalization of the economy and new emerging players;
- new global problems of the 21st century have become apparent.

In terms of international partners, S&T cooperation with Brazil, China and India was already identified as being of vital importance for the European Union in the mid-1990s (European Commission 1996). Cooperation with developing countries has been substantially enforced since the mid-1990s as a consequence of a demand from the Council and the EU member states to step up aid for developing countries in research and development (European Commission 1997a). Under FP5 and FP6 strategic objectives were targeted at the accession countries, other central and eastern European countries, newly independent states of the former Soviet Union,²⁹ the Mediterranean countries and developing countries.

While the FP fosters bottom-up collaboration the Community has also increasingly engaged in bilateral S&T agreements with several third countries. S&T agreements set a legal basis for reinforcing policy dialogues with industrialized countries, emerging economies and European neighbouring countries. Since 1994, agreements have been concluded with Argentina, Australia, Brazil, Canada, China, Chile, Egypt, India, Korea, Mexico, Morocco, New Zealand, Russia, South Africa, Tunisia, Ukraine and the United States of America. Additionally, several non-EU European countries are associated to the Seventh Research Framework Programme.³⁰

Despite an increasing engagement of the EU in international S&T cooperation and a growing understanding that 'in the context of a global economy and in the light of problems emerging at planetary level, research activities sometimes have to be defined on a broader scale than European' (European Commission 2000, p. 22), an approach to develop a real international research policy had not been proposed when the Commission made its ideas for a European Research Area public in 2000. The international dimension was

restricted to proposals aiming at enforcing the mobility of researchers, such as the creation of a system of grants for scientists from third countries and opening of national and European research programmes to researchers from third countries (European Commission 2000, p. 27).

Only one year later the Commission published a dedicated Communication on the international dimension of the European Research Area (European Commission 2001a). This Communication provided a more systematic effort to open the ERA to the world. It set broad principles for international S&T cooperation calling for an opening of all national research activities to third countries, including the industrialized countries, integrating candidate countries into the ERA, applying a diversified approach towards different regions, and strengthening coordination efforts between the member states and the Community. In fact, the Commission enforced this last point in the Communication by recommending setting up a 'Forum for international scientific and technological relations' made up of representatives of member states, international organizations, and the Community to provide an appropriate framework for the strategic analysis of trends in science, technology and economics (European Commission 2001a, p. 14). The Commission also planned to improve the administrative and regulatory conditions for the reception of non-European researchers within the ERA, to better finance researcher mobility, and to align EU scientific cooperation policies with EU foreign policy and development aid programmes.

However, the proposed measures were never endorsed by member states and followed-up by concrete joint actions of the member states and the Commission. The consent and support of member states is, however, essential since most of the necessary measures fall under national competences, such as labour market law, social security and university policies.

Nevertheless, on a few of these objectives the Community managed to make some progress. First, the instruments to foster mobility of researchers were strengthened with a view to attract scientist to enter the ERA.³¹ The Marie Curie International Fellowships provide an opportunity for European researchers to gain international experience. The newly launched IRSES scheme of the FP People Specific Programme allows the exchange of researchers for short periods between member states'/associated countries' organizations and those in 29 third countries covered either by an S&T cooperation agreement with the Community or by the European Neighbourhood Policy (ENP). Additionally, member states have since 2005 implemented the Scientific Visa Directive which allows issuing a residence permit for scientists for a period of at least one year.³²

Second, improvements in aligning Community S&T cooperation policies with other external policies and instruments can be noted. Examples are the research for development initiative with African countries (European

Commission 2007e), the Stabilization and Association Process with the Western Balkans (European Commission 2008d) and the Action Plans for countries covered by the European Neighbourhood Policy (European Commission 2008e). These external EU policies have a major S&T component.

In the same way other policy initiatives, particularly in the context of the Lisbon Strategy, have been rather silent on the external dimension of the EU's research policies. While the Commission's Communication *More Research and Innovation – Investing for Growth and Employment* of 2005, for example, acknowledged that 'to achieve sustainable global competitiveness, the EU has no choice but to become a vibrant knowledge economy', that 'world-wide competition to attract research and innovation investment is growing' and that 'in addition to attractive locations such as the US and Japan, new competitors have emerged, such as China, India and Brazil' (European Commission 2005b, p. 3f) international S&T cooperation was, however, not offered as a strategy to address these challenges. The same holds for other innovation-related policy papers such as the Communication *Putting Knowledge into Practice: A Broad-based Innovation Strategy for the EU* of 2006 (European Commission 2006a). Consequently, the Community Lisbon Programme 2005–2008 also did not have a link to the international dimension of European research (European Commission 2005c), although the Integrated Guidelines 2005–2008 (guideline number 7) stated that 'the international dimension of R&D should be strengthened in terms of joint financing, development of a more critical mass at the EU level in critical areas requiring large funds and through reducing barriers to mobility of researchers and students' (European Commission 2005d, p. 17).³³

It is not presumptuous to claim that an international EU research policy or strategy hardly existed. International S&T policy, including the bilateral European Community S&T agreements, was treated as kind of 'stepmotherly' and international S&T cooperation was perceived as an 'instrument' of the Framework Programmes not as a policy on its own. At the Community level, this only changed with the ERA Green Paper and major follow-up initiatives like the Commission's strategic European framework for international S&T cooperation (European Commission 2008c) and the launch of the next Lisbon cycle, which saw the external ERA dimension sneaking into the revived Community Lisbon Programme for 2008–2010.

The Commission's strategic European framework for international S&T cooperation for the first time aims at giving a long-term structure to the EU's international S&T policies by setting out several guiding principles for future international action, proposing an institutionalized partnership between member states and the Commission, applying differentiated regional priority-setting, giving preference to regional approach for S&T agreements, and

fostering better framework conditions for international cooperation both at the national and EU levels.

At the national level for most member states international cooperation in science and technology has also become a core element of national research policies. Countries like Denmark, Finland, Germany, Ireland, the UK and Sweden have an explicit international S&T strategy or their activities are embedded in a general globalization strategy. In these countries internationalization is seen as a measure to strengthen excellence and the competitiveness of the national innovation system, to get access to new knowledge, to gain access to new markets, talents and human resources, and to cope more efficiently with global challenges.

Unlike with past policy initiatives which tried to give international S&T cooperation a strategic touch, member states now seem to be more responsive to enforce the ERA's external dimension. Under the Open Method of Coordination member states and associated countries set up a CREST Working Group running in 2007 and 2008 to foster a coordinated S&T policy approach towards third countries and to identify areas and countries where joint action could generate added-value for them (CREST 2007).³⁴ At the highest political level the Competitiveness Council in February 2008 pointed out that 'the Commission and member states should further advance coordinated and mutually complementary international S&T cooperation strategies in order to strengthen Europe's role as a global key actor in science, research and technology'.³⁵ The Heads of States and Government recalled this request at their subsequent Spring meeting³⁶ and finally endorsed the Commission's proposals on a strategic European framework for international S&T cooperation at the Competitiveness Council in December 2008.³⁷

Objectives of the External Dimension of the European Research Area

The external dimension of EU internal policies receives ever greater awareness. Unlike in other policy areas, such as the internal market, environment, justice and home affairs, competition or energy policies, the 'external dimension' in research policies does, however, not imply a 'regulatory boundary shifting' beyond the EU's own borders (for example Lavenex 2004).³⁸ As research policy is not a regulatory policy the EU cannot 'export' its rules and regulations abroad for the purpose of creating a level playing field to maintain the Union's competitiveness, to secure its markets or to shape the international regulatory framework for trade and investment (Woolcock 2007). Internal market norms, for example, are promoted by the Commission and the member states 'when negotiating international agreements or enlargements, in regulatory dialogues with third countries and in the international fora dealing with internal market policies such as the World Trade Organization (WTO), the

World Intellectual Property Organization (WIPO) or the Basel Committee on Banking Supervision' (Gstöhl 2007, p. 6).

The 'external dimension' or the 'externalization' of the ERA has a different logic. It mirrors the combined international S&T cooperation efforts of the Community and the member states towards third countries to foster the cooperation between stakeholders (individuals and institutions) in- and outside the Union, to pump-up aid for S&T capacity-building abroad, and to guarantee access to knowledge, resources and infrastructures worldwide.

This policy is expressed through different arrangements. First, the Community's Research Framework Programme offers several options for third country entities to take part in Europe's joint research efforts. While the Framework Programme is generally open to third country participation, it provides additional instruments that aim at fostering cooperation with third countries. Specific International Cooperation Actions (SICAs) demand the participation of third countries³⁹ in calls for proposals to be eligible for funding.

Second, the Community has so far signed more than 30 bilateral S&T agreements, some being agreements associating the partner country to the Framework Programme. These sectoral agreements confirm a privileged partnership with the Community in science, research and technology matters. Recently the Commission and third countries have started to use these agreements to implement coordinated calls for proposals, in which both parties synchronize their calls in technical terms (that is through the alignment of content, resources, timing, evaluation criteria and procedures) while each side still finances their participants. A coordinated call aims at generating joint or tightly coordinated projects.

Third, international S&T cooperation is pursued in the context of the general bilateral or bi-regional agreements the EU has signed with third countries, such as the Stabilization and Association Agreements with candidate countries for EU accession, the Euro-Mediterranean Association Agreements, the Partnership and Cooperation Agreements with European Neighbourhood Policy countries and Russia as well as the Economic Partnership Agreements with ACP countries.

The loosest forms of cooperation, finally, are policy dialogues or other EU attempts to act as an international S&T promoter mainly with countries or regions with which no legal arrangement exists. Policy dialogues are very soft instruments to foster international S&T relations around the world, mainly with the aim of identifying joint S&T priorities. The EU establishes policy dialogues by providing platforms to bring together policymakers and stakeholders of a given region or group of countries with its EU counterparts.

The rationale to engage in international S&T cooperation is manifold, ranging from securing Europe's competitiveness to solving global challenges. The

need for an external dimension for the ERA can, first, be argued from the viewpoint of securing the EU's economic competitiveness. International competition is intensifying, and Europe faces a twin challenge from Asia and the US. However, the rapid growth of the Chinese economy, for example, will create not only a new competitor to Europe, but also a vast and growing market. For Europe to take advantage of the opportunities, it needs to have an appropriate economic and scientific base, recognizing that over the decades ahead competition is going to be growing.

Nevertheless, and in spite of the rapid rise of emerging economies, research and patenting in the key technology clusters are still performed dominantly in the Triad (the US, Japan and the EU). The US has a worldwide lead in health and information society technologies. Japan specializes in renewable energy and information technologies. Europe has the most advanced market for environmental technologies and holds a strong international position in applying sector-specific technologies for sustainable development. However, European-based firms show weaknesses in bio-fuels, fuel cells, a number of renewable energy technologies and clean fossil energy technologies. In the field of information technologies, Europe has been catching up in the 1990s, and European-based firms have a slight lead in telecommunication technologies. On the other hand, also with regard to health technologies, Europe is a competitive industry player and European-based firms hold a leading position in terms of export. It is, however, not as specialized as the US and Japan in terms of science production (measured by number and fields of scientific publications). The EU has in fact neither particular specialization nor under-specialization in any particular scientific field (European Commission 2007i).

A rapid growth of technology capability in many of the research and technology areas can be noted in emerging economies, especially in South East Asia. The current main drivers for the industrial and commercial growth of China and the 'Asian Tigers' are mature technologies. India and Russia are successfully specialized in software engineering services. India is the single biggest beneficiary of 'offshoring' or 'outsourcing' in the service sector with an enormous pool of educated, English-speaking workers. India has also started to become a major worldwide player in health technologies, while Russia explores its broad scientific capacity for advanced materials and nanotechnologies. Brazil is specializing in information technologies and biotechnologies as well as expanding its offshore software services.

In a global economy, Europe has no option but to improve its knowledge economy and underlying economic performance. Therefore, Europe's answer to the changing global S&T landscape consists of strengthening its international S&T position and opening up to the rest of the world in order not to miss technological opportunities arising outside its borders (European Commission 2007i). 'International opening can help instigate virtuous circles whereby the

EU becomes a stronger region in S&T and thereby becomes more attractive e.g. for internationally mobile scientists and engineers and for international investments in R&D' (European Commission 2008b, p. 26).

International S&T cooperation can improve the effectiveness and efficiency of Europe to respond to global challenges. 'Responding to urgent global challenges is no longer a policy option but a necessity', as a Commission Expert Group has recently described the situation. Responding to global challenges, such as global warming, energy resource security, food security, poverty, desertification and global public health, requires a more effective and efficient international S&T policy in Europe. This could include a concentration of efforts on research and technological areas that respond to such challenges like health technologies, renewable energy technologies, environmental technologies, or information technologies.

Effective responses to global challenges also imply S&T capacity building in third countries which would enable poorer regions to mobilize S&T resources to achieve more growth and prosperity. However, as capacity building is expensive, horizontal coordination with other EU external policies and programmes, such as aid and development policies, is required.

Finally, a well-defined international S&T policy will enable the promotion of political dialogue and trust. As Europe needs to strengthen its role as a reliable partner to respond to global problems jointly with its partners around the world, international collaboration in science and technology can be an important means to support also political dialogue and mutual trust building.

If Europe wants to strengthen its role in the world (European Commission 2005e, 2006c, 2007h) mutual trust building is an efficient tool, in particular if Europe has an interest in spreading its values. The perception of the European Union as being a 'soft power' can be an asset to be 'heard' at the international level. With a 'strong common voice ... Europe can play a more active role in international agenda setting and formulation of policies and strategies and be more audible in international negotiations' (European Commission 2008b, p. 29).

Global Challenges and the External Dimension of the ERA

As argued before, addressing global challenges is a key driver for an enhanced external dimension of the ERA. Two ultimate aims of fostering an external dimension are the reduction of global risks and the boost of prosperity around the world. International S&T cooperation also enables the EU to meet, for example, those international commitments that aim at regulating global challenges (European Commission 2008i).

Generally, global societal challenges are big challenges. They are often interrelated (like climate change, security of energy supply and prosperity, for

example) and need urgent treatment. This is costly. Therefore, prioritization and focusing need to be key principles of international S&T cooperation helping to share the costs of global efforts.⁴⁰ But how to prioritize and focus? How to best address global challenges through international S&T cooperation? What are the appropriate fora, actor constellations, policies and instruments?

In reality there are very different logics to prioritize and focus resources depending on the angle from where decision-makers approach this task. Human beings tend to think in terms of their own knowledge and domain of expertise. With a background as an economist, for example, a decision-maker would most likely think that cost-benefit analysis is an objective way to decide such an issue. A politician might pay more attention to the questions of power, influence and governance that would determine the outcome of any decision. Nonetheless, there would probably be a consensus on at least the broad priority areas, with the rest of a list more influenced by personal experience, preferences and prejudices. Healthcare would be near the top of most lists, although within this the main priority may be HIV/AIDS, malaria or maternal and child health depending on the criteria retained. For the policy-maker who has to make decisions, the challenge is to reconcile budget constraints, political pressures, public opinion, multiple time frames, and so on.

According to fora and actor constellations, it is often claimed that multilateral actions are needed to successfully tackle global challenges. The argument goes that joint multilateral activities are best suited to share costs and to limit the free-rider problem, where only some countries pay to tackle a problem while the majority enjoys the benefits of positive results. Indeed, in recent years efforts at the G8 level have increased to develop international research strategies jointly, including the involvement of those countries that are deemed as major G8 partners for successfully tackling global challenges.⁴¹

Others argue that to address global challenges, in particular in the areas of water supply, poverty reduction and food security, local research capacities have to be strengthened and research results have to be disseminated to end-users. Some authors criticized the fact that most of these programmes (in particular in the health sector), while addressing health research of interest to African countries, did not have as a primary goal to involve local research communities, in this way preventing the natural sedimentation and development of local critical mass.⁴² In fact, it seems to be advantageous to link between local, regional, national and global problems and actors to facilitate mutual learning. Local knowledge could be up-scaled to a regional or national level. National knowledge could also be disseminated to the regional and local levels.

In the context of addressing global challenges the EU is quite often confronted with the request to 'speak with one voice'. It is assumed that acting

together in tackling global challenges increases the efficiency of actions as well as their impact with regard to problem-solving. 'Europe speaking with one voice' in international negotiations or multilateral fora is therefore seen as a preferable condition when addressing global challenges. If this is true, what, however, would be the conditions for the EU (that is its member states and the Commission) to speak with a 'single voice' in different areas of global relevance? And what are the mechanisms that lead to a coherent 'European voice'?

The EU claims to have been in the lead in the international response to key issues that cannot be constrained by national boundaries like climate change, air and water pollution as well as health pandemics, and of having made major contributions to international negotiations establishing regulatory standards in these areas (European Commission 2006c). Built on these experiences and competences 'speaking with one voice' could be improved by better coordination in the Council to promote the emergence of consensus on issues of EU relevance that are subject to discussions in multilateral organizations (for example the UN), informal bodies (for example the G8) and other global fora or regional organizations. Practice shows that where the Community is already a member of UN bodies, multilateral and regional organizations, coordination in the Council on an EU position between the member states, the Presidency and the Commission is already well established (European Commission 2006c).

Policy Coordination in the External Dimension of the ERA

Policy coordination is a specific mode of governance for daily policymaking at the EU level. The Commission's White Paper on Governance of 2001 proposed policy coordination, in particular the Open Method of Coordination, as a tool to improve democratic policymaking in Europe and to strengthen the legitimacy and effectiveness of the policy process of EU institutions (European Commission 2001b). In contrast to the Community method or regulation, policy coordination relies on voluntary action and 'soft law' and is based on non-hierarchical instruments and deliberation amongst the actors.⁴³ Non-hierarchical modes of steering can be differentiated between positive and negative incentives, on the one hand, and non-manipulative negotiation methods on the other hand. Positive and negative incentives, such as side-payments, issue-linkages or sanctions, may change the cost-benefit considerations of actors in the desired behavioural direction. Through non-manipulative negotiation methods, such as arguing and learning, actors may be convinced to change their preferences voluntarily (Börzel et al. 2005).

Research policy coordination, and in particular the coordination of international research policies, is costly, time-consuming and complex as it has

both a horizontal (across policies and administrations) and a vertical (across different layers of government) coordination component. In a horizontal perspective achieving a coherent policy requires 'organizing the production and use of policy-relevant knowledge and integrating it in decision-making processes' (OECD 2005, p. 12). In a vertical perspective it needs to be recognized that research policy in Europe is a multi-level and multi-actor policy. This raises the likelihood of tensions between different levels of government, for example with regard to varying policy objectives, different aims, means and priorities, or because regions have significant own competencies for research policy, thus implementing their own strategies and programmes, including in the area of international S&T cooperation (Kaiser and Prange 2004; Prange and Kaiser 2005).⁴⁴

Although member states and the Commission have repeatedly acknowledged a shared interest in the closer coordination of their efforts, the coordination of national and Community research policies has not gone very far, yet. The reasons for that are manifold ranging from the competitive character of research and innovation policies to general stagnations of the European integration process in the mid-1960s (the French policy of the 'empty chair') and mid-1970s (economic recession). Moreover, with the legalization of research policies in the Single European Act of 1987 (and further institutionalized with the Maastricht Treaty), the regulative norm of a single European research area marked by coordination of national policies was replaced by a distributive policy, which means by the Framework Programmes.

A new attempt for coordination was started in 1994 when the Commission put forward the *Communication Research and Technological Development: Achieving Coordination through Cooperation* (European Commission 1994). The Commission's proposals were backed by member states first, but later they were not pushed as member states remained focused on the distributive mechanics of the Framework Programme. As already explained before, research policy coordination was finally back on the political agenda in 2000 when the ERA became the focus of a research policy at the European level defined in broader terms than the Framework Programme. The Open Method of Coordination, Networks of Excellence, ERA-NETs and the more frequent use of Article 169 were expected to spur the coordination of national and Community efforts.

What are the arguments for closer policy coordination and what is the expected effect? A general argument to support policy coordination at the European level goes that Europe's international S&T policy is characterized by 'fragmentation', which leads to the potential for duplication and sub-critical levels of action. Fragmentation is visible through both EC research programmes and individual national programmes often pursuing broadly similar goals and activities. Therefore, it is assumed that in order to exploit the potential of Europe's science base and its contribution to knowledge-based

policy, public policies need to be coordinated more effectively by working more closely together. In fact, such a statement must still be regarded as a 'hypothesis' since so far no empirical evidence has shown that fragmentation (if it exists at all) is negative per se and that lesser 'fragmentation' leads to the expected positive effects.

Besides this argument policymakers and academics frequently bring forward several reasons why policy coordination might be beneficial.⁴⁵ Amongst these reasons is the possibility of collaborative learning from good practices and, as a consequence, better coherence and enhanced efficiency of the European S&T system, the setting up of joint agendas, implementation of joint activities and also launching of joint programmes. Moreover, coordination is deemed to reduce costs as the effectiveness of research funding might increase. Through coordination policymakers and programme managers might develop common guidelines and standards, for example for programme development and implementation, for researcher mobility, or for commonly agreed approaches to intellectual property issues. The result could be a converging understanding on how to improve the framework conditions for international S&T activities.

In fact, the ability of learning from each other represents a key European added value of policy coordination, an incentive for working closer together, and is a necessity to develop coherent and consistent policies and strategies towards third countries. However, the success factors for achieving mutual learning under conditions of complex horizontal and vertical coordination needs are still rather unclear. In Europe the diversity of policies and institutions in the area of research constitute demanding conditions for mutual policy learning (Chalmers and Lodge 2003; Lundvall and Tomlinson 2002; Scharpf 2002). Even if policymakers are willing to learn from each other and consensus has been reached upon a best practice there still exist barriers to implement a new policy, for example, if the role of a specific national institutional set-up has been ignored.

Due to this diversity in Europe, the organization (or governance) of international S&T policy in terms of actor constellations and administrative levels is conceived as fragmented in Europe. Therefore, this volume will also address options to better link the different and numerous decentralized activities and strategies of actors in order to strengthen the governance of international S&T cooperation and make progress in reducing fragmentation, understood in the way mentioned above.

NOTES

1. The views expressed in this chapter are purely personal and do not necessarily reflect the position of the European Commission.
2. Article 169 EC Treaty states: 'In implementing the multi-annual framework programme the

Community may make provision, in agreement with the member states concerned, for participation in research and development programmes undertaken by several member states, including participation in the structures created for the execution of those programmes.'

3. The Seventh FP identified four potential initiatives under Article 169 of the EC Treaty: a joint research programme on 'Ambient Assisted Living' (AAL), one in the field of Baltic Sea research (BONUS 169), one in the field of Metrology (EMPR) and one for research-performing SMEs (EUROSTARS).
4. See European Council, Presidency Conclusions, doc 11018/08, 21/22 June 2007.
5. See European Council, Presidency Conclusions, 23/24 March 2000, Press Release 100/1/00.
6. Informal Competitiveness Council, Summary of the Presidency, Würzburg, 26/27 April 2007; Competitiveness Council, Council Conclusions on the launch of the 'Ljubljana Process' – towards full realisation of ERA, 30 May 2008; European Commission (2007a).
7. An ERA Expert Group set up by the Commission in 2007 to develop and expand rationales for ERA rightly points out that the term 'fragmentation', which is currently the core argument for developing an ERA, 'is an inappropriate metaphor' as the word 'describes a situation where something that is whole has been broken or divided into pieces while for Europe the aim is the reverse' (European Commission 2008f, p. 13). Moreover, the Expert Group confirms that the proof of 'fragmentation' still needs a proper analysis.
8. Council Conclusions, doc. 5742/03, 26 November 2002.
9. European Council, Presidency Conclusions, 22/23 March 2005.
10. See http://ec.europa.eu/growthandjobs/european-dimension/index_en.htm#e (accessed 26 August 2008).
11. The 2008 Spring European Council had called on member states 'to set out in their National Reform Programmes how progress towards national R&D investment targets will be achieved and how their R&D strategies will contribute to the realising and better governance of the European Research Area' (European Council, Presidency Conclusions, doc. 7652/08, 13/14 March 2008, p. 5).
12. These include: policy coordination in the Council, that is, at the highest political level; on the basis of European Council (that is Heads of States and Governments) conclusions the Council adopts proposals for member states' economic policies, which raises political pressure on member states; the Council monitors the implementation of these proposals on the basis of Commission reports; on the basis of Commission recommendations the Council can propose changes to member states' economic policies, and the Council Presidency reports member states' failures to the European Parliament.
13. Competitiveness Council, Council Conclusions on the Future of Science and Technology in Europe, 22/23 November 2007.
14. The Competitiveness Council adopted a Resolution in response on 30 May which emphasized the need for 'member states and the Commission to establish, in partnership, light and effective governance arrangements'.
15. Council Conclusions were adopted by the Competitiveness Council on 25–26 September 2008.
16. Joint programming involves member states on a voluntary basis and on the basis of variable geometry and is aimed at defining, developing and implementing common strategic research agendas based on a common vision and addressing major societal challenges.
17. The Competitiveness Council of 2 December 2008 adopted Conclusions on joint programming of research.
18. Council Conclusions on a European Partnership for International S&T Cooperation were adopted by the Competitiveness Council on 2 December 2008.
19. IP 06/1598 and IP 06/1600, 22 November 2006.
20. IP 08/1110, 7 July 2008.
21. The SET-PLAN was a response to the European Council Conclusions adopted on the basis of the Commission's Energy Package (that is the Communications: 'An Energy Policy for Europe' COM (2007) 1, 'Limiting global climate change to 2 degrees Celsius' COM (2007) 2, and 'Towards a European Strategic Energy Technology Plan' COM (2006) 847).
22. Council Conclusions, doc. 6326/1/08, 28 February 2008, p. 4.

23. Council Conclusions, doc. 10231/08, 3 June 2008, p. 3.
24. Council Conclusions, doc. 10231/08, 3 June 2008, p. 4.
25. Council Conclusions, doc. 16012/08, 2 December 2008.
26. See, for example, Draft 18-month programme of the Council, doc. SN 2782/1/08, 29 May 2008.
27. Due to lack of space I will not address member states' international S&T activities; for details see CREST (2007, 2008).
28. Under its Cooperation Specific Programme FP7 provides some dedicated instruments to promote international S&T cooperation with third countries such as Targeted Opening, Specific International Cooperation Actions (SICAs), Coordinated Calls and Twinning (for more details see European Commission 2008a). Moreover, the Capacities Specific Programme finances bi-regional dialogue platforms (INCO-NETs) with major regions to identify joint priorities and to improve the participation of the targeted regions in the Framework Programmes. It also supports bilateral S&T promotion platforms (BILATs) with countries that have signed an S&T agreement in order to implement joint action plans defined in the framework of the S&T agreement.
29. Outside the FP the Community and member states established the International Association for the Promotion of Cooperation with scientists from the New Independent States from the former Soviet Union (INTAS).
30. These are (December 2008): Albania, Bosnia & Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Montenegro, Serbia, Turkey, Iceland, Liechtenstein, Norway, Israel and Switzerland.
31. Nevertheless, one has to admit that both the international mobility of human resources for S&T towards the EU and the numbers of European researchers emigrating to other parts of the world is still quite marginal (European Commission 2007f, p. 38).
32. Council Directive 2005/71/EC of 12 October 2005 on a specific procedure for admitting third-country nationals for the purposes of scientific research.
33. The same sentence has been used in the Commission's Integrated Guidelines 2008–2010 (European Commission 2007g, p. 14).
34. See also van der Zwan in this volume.
35. Council Conclusions, doc. 6326/1//08, 28 February 2008, p. 9.
36. See Brussels European Council, Presidency Conclusions, Council Document 7652/08, 14 March 2008.
37. See Council Conclusions concerning a European partnership for international scientific and technological cooperation, 2891st Competitiveness Council meeting, Brussels, 2 December 2008.
38. At the political level the only exception where the EU tries to establish common rules in relation to research and innovation are intellectual property rules. At the research programme and project level the Commission tries to make sure, for example, that its high evaluation standards are respected when it comes to Coordinated Calls for proposals with third countries.
39. Eligible third countries are defined in the list of International Cooperation Partner Countries (ICPC).
40. See also the reports presented at the workshop 'Research priority setting for international S&T co-operation' organized by DG Research of the European Commission in September 2007 (http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=wkshp_25-26_09_2007).
41. See, for example, Joint Statement by the German G8 Presidency and the Heads of State and/or Government of Brazil, China, India, Mexico and South Africa on the occasion of the G8 Summit in Heiligendamm, Germany, 8 June 2007.
42. On the health research issue in Africa see Igumbor and Sanders in this volume.
43. The pressure for member states to comply with measures may vary from policy area to policy area depending on the concrete monitoring instruments, the different roles of EU institutions, the involvement of stakeholders, and the Treaty base.
44. See also Kaiser in this volume.
45. See CREST (2007) and European Commission (2008h).

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