

Actors, Arenas and modes of coordination in international S&T policies

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1. Introduction: The coordination of international S&T policies

There are at least three points that can be made about the coordination of international S&T policies. First of all, during the last three decades the number of public policy actors who were engaged in transnational S&T activities has grown significantly, mainly at levels above and below the nation-state. Secondly, and to some extent in consequence of the first development, there are today various new actor constellations that coordinate international S&T programmes. Those actor constellations either stretch across territorial levels or they bring together public and private actors who support those programmes through mutual financing arrangements. And thirdly, only little systematic research has been done on the coordination of international S&T policies. Although case study research has provided good knowledge about S&T policy strategies of individual nation-states, there are only few studies yet that thoroughly analyse how public policies have intensified transnational coordination in reaction to the internationalisation of the generation, use and diffusion of knowledge and technologies.

Against this background, the aim of this short paper is three-fold. In a first step it proposes a taxonomy of the different forms of international S&T coordination and cooperation which categorizes along two actor-centred dimensions: the number of actors as well as the different types of actors involved (section 2). Then, section three turns to the European perspective and tries to answer two questions: what specific interests the European Union and its member states have in this various forms of international S&T policies and what consequences arise for S&T policy coordination at the European level? On this basis, section 4 presents some conclusions.

2. Taxonomy of international S&T coordination and cooperation

By far the largest number of efforts to coordinate science and technology across territorial borders is taken in bilateral arenas. This holds for all types of actors who play a role in this field. Bilateral agreements or programmes do not only exist between governments at national or subnational levels, meanwhile even the European Union has concluded about 30 bilateral

agreements that either allow for the participation of third countries in projects funded by the framework programme or institutionalize an inter-regional dialogue with different kind of areas of regional integration. Within the EU, bilateral agreements are, however, clearly the domain of the member states. In the year 2000, the 15 member states of the EU were engaged in a total of 993 bilateral agreements of which only 290 were concluded among them (Clark et al. 2001). Even if bilateral agreements with accession countries are taken into account that have entered the Union since 2004, agreements with non-European countries still prevail. Here the largest number of formal arrangements exists with partner countries in Asia as well as in North and South America. Within the EU, Germany ranks first in the total number of agreements. The country has concluded, for example, more than 50 percent of all bilateral agreements that exist with North America.

Table 1: Actors, Arenas and modes of Coordination in international S&T policy

Type of actors	Number of actors			
		Bilateralism	Exclusive Multilateralism	Multilateralism
National and subnational Governments, Intergovernmental Organisations, EU	“Foreign Policy Agreements” Memoranda of Understanding	International Space Station (ISS), EU-INTAS, International Thermonuclear Experimental Reactor (ITER), OECD Global Science Forum		Intergovernmental Panel on Climate Change (IPCC), Human Frontier Science Program Organization (HFSPO), Intelligent Manufacturing System (IMS), United Nations
Governmental Agencies, Ministries	Agreements Letters of Intend Thematic programmes			
PROs National Science Councils	Thematic agreements and programmes Letters of intend Memoranda of Understanding	The Human Genome Organization (HUGO), Global Research Alliance (GRA)		Ocean Drilling Programme (ODP), Scientific Committee on Antarctic Research (SCAR)
Private Non-Profit Organisations	Thematic Programmes			Thematic Programmes

There is a notion in the literature that the majority of bilateral intergovernmental agreements are “‘empty’ expressions of diplomatic goodwill” and that “where informal collaborative links are strong and international relations are good, as within the EU, bilateral cooperation agreements are generally unnecessary” (Stein 2004: 444). This argument is to a certain extent plausible for the European context in which the ERA and a large number of intergovernmental research organizations provide an extensive institutional infrastructure for

S&T cooperation. It is, however, less convincing with regard to S&T policy coordination beyond European borders. Rather, there are at least two reasons why bilateral agreements between nation-states (or subnational entities) will remain important in the future. First, they comprehensively structure collaborative efforts between countries according to their specific technological profiles and they guarantee access to critical R&D infrastructure that often exist at only one specific place in the World. The example of U.S.-German bilateralism (table 2) shows that the large majority of the 53 formal arrangements regulate technology specific research in fields in which both countries share similar technological strengths, such as engineering, communication and space technologies (Wagner et al. 2001).

Table 2: U.S.-German “Bilateralism” in cooperative S&T programmes (BMBF 2006)

Total number of bilateral agreements	53
Number of government-government agreements	2
Number of agreements between ministries or governmental agencies	50
Number of agreements between PROs or National Science Councils	1
Number of agreements that regulate sectoral research programmes	13
Number of agreements that regulate specific research projects	36
Number of agreements that regulate access to critical research infrastructure	4

Second, the importance of bilateral S&T agreements is also due to the limits of transnational coordination in multilateral arenas which exist in two different forms. The arena of “pure” multilateralism is mainly characterized by the fact that nation-states generally invest little (financial) resources (as in the cases of the IPCC or HFSPO) into such programmes while other initiatives are either mostly funded by industry (IMS) or solely established by public research organizations (ODP, SCAR). In contrast, nation-states are much stronger involved in projects agreed upon in the arena of “exclusive” multilateralism. Here exclusivity refers to the participation of a limited number of countries which either belong to a specific regional context or – as in most cases – share the same level of scientific-technological development. The arena of “exclusive” multilateralism is typically the context for the transnational coordination of so-called megascience-projects which are limited simply by the fact that they are cost-intensive, require heavy infrastructures and explore new fields of basic research or engineering. Apart from that, also PROs and National Science Councils play a significant role in both multilateral arenas where they coordinate specific transnational research projects which receive in some cases additional funding from national governments.

3. Consequences for S&T policy coordination at the European level: Impediments and opportunities

Against this background the different arenas of transnational S&T policy coordination offer both impediments and opportunities for common action at the European level. On the one hand, a European dimension already exists for all of the three arenas. In case of bilateral S&T agreements between EU member states, a considerable number of research projects have been transferred into the ERA-Net funding scheme of the European Union. In the arena of

exclusive multilateralism, the EU has not only its own programmes either coordinated with a certain group of countries (INTAS) or along specific research themes (ISTC and STCU). The EU is also contracting party to the agreement establishing the consortium for the International Thermonuclear Experimental Reactor. In some multilateral arrangements, to which the EU is a party, it also provides either certain infrastructures, such as the regional secretariat for the IMS network, or direct financial contributions as in the case of the HFSPO. Therefore, EU member states do already coordinate their international S&T relations at the European level. Currently the two main instruments are the use of ERA instruments to extend research activities agreed upon in bilateral Intra-EU agreements as well as the conclusion of mixed agreements to structure multilateral S&T relations in cases in which the European Union lacks comprehensive competencies.

On the other hand, however, the European Commission's quite ambitious goals to strengthen coordination of member states' international S&T policies are not well-grounded. In a number of documents (European Commission 2001, 2005, 2007) the Commission called for:

- reinforcing the efficiency and the impact of member states' bilateral agreements,
- gaining better complementarities between Community and member states co-operations,
- giving multilateral initiatives preference over bilateral ones, and
- establishing a structured overall approach, generally geared towards problem-solving.

These claims have at least four shortfalls:

1. **The lack of a clear definition of the value added of coordination at the European level:** bilateral S&T agreements of EU member states primarily pursue the aim to enhance the position of national industries and the domestic science community by the provision of access to important sources of knowledge and technologies. Given the fact, that member states' industries and research organizations do not only compete with those in third countries, but also with respective actors within the EU, there is hardly reason to assume that the impact of those agreements could be reinforced by intra-EU coordination activities.
2. **A considerably constricted actor-perspective:** As in other fields of coordination in European RTD policy (namely in the fields of application of the OMC) the coordination of member states' policies, and thus the reliance primarily on representatives from national administrations, necessarily excludes various actors (cf. section 1) who contribute significantly to the structuring of international S&T cooperation and coordination. If S&T policy coordination is aimed at initiating processes of mutual policy learning, such a constricted actor-perspective per-se reduces the potential of coordination.
3. **The underestimation of the institutional divergence of member states' science systems:** These systems vary extensively in terms of their technological profiles, the number and the degree of autonomy of relevant actors, the modes of coordination among actors, the role of subnational entities, and not least in terms of their performance. These variations are also, not surprisingly, reflected by different member states' profiles of transnational coordination of science and technology. Under the

condition of persisting variations complementarities are limited. Because of that, the potential of the ERA to strengthen the coherence of research activities and policies is inescapably limited by the fact that a fully integrated area for science and technology will not emerge, but a co-development of European, national and regional institutional structures in which respective activities are embedded. Therefore the establishment of a structured overall approach is a bold venture.

4. **The overestimation of multilateralism:** There is hardly empirical evidence that coordination of S&T in the sphere of “pure” multilateralism will be effective and thus able to achieve appropriate policy results beyond its two current fields of application: a limited number of megascience projects and the solution of very specific commonly accepted problems. If this is true, multilateralism is not an alternative to bilateral S&T coordination which primarily aims at providing a general framework for transnational actor coordination.

4. Conclusions: Only limited room for Community-wide policy coordination of international S&T policy?

As a result, current EU Commission’s concepts for the strengthening of coordination of Community and Member States’ international S&T policies do not sufficiently claim why and in which fields an intensified coordination would achieve the expected results. A more promising concept would have to meet at least the following conditions.

Firstly, it has to be based on a mutually agreed added value. Currently, this condition seems to be met only in terms of megascience projects that overstrain the resources of individual member states. But even in those cases, European intergovernmental research organizations, such as ESA, establish alternative fora for coordination.

Secondly, given the structural diversity and performance of member states’ science systems, common coordination approaches of all 27 member states are likely to be rare cases. As a consequence, there is a need for rules and procedures of differentiated integration that have to be far more flexible than those of the Treaty of Nice.

And thirdly, a common European approach for international S&T cooperation should focus first on the establishment of a framework that supports S&T actors in their attempts to intensify their transnational activities (cf. Wagner et al. 2002). Important tools in this respect might be formal framework agreements with leading countries and regions that define rules for export control, the protection of IPR, technical standardisation, the exchange of scientists, the participation of private-sector industries, and the management of transnational projects.

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