



International Science and Technology Cooperation in
the EU's 7th Framework Programme: the specific programme

'Cooperation'

and its thematic areas

Executive Summary



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Executive Summary

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1 OVERVIEW

This study examines international cooperation in the European Union's (EU's) Seventh Framework Programme for Research and Innovation (FP7). The focus is on the specific programme 'Cooperation' and its ten thematic areas, which is examined from different angles, using different methodological approaches. The aim is to get a comprehensive overview of the multifaceted international research and innovation (R&I) cooperation of the EU with international partner countries not associated with FP7. The study provides an overall picture and assessment of the approaches towards designing and implementing international cooperation, thematically and geographically. It is based on policy objectives and expectations against which impacts, benefits and limitations of the increasingly 'mainstreamed' and decentralised international science and technology (S&T) cooperation process are measured.

FP7 confirms that S&T development has always been international by nature. Policymakers are very much aware of the need to address the grand societal challenges, leveraging research and innovation (R&I) cooperation at global level. FP7 takes into account the increasing internationalisation of industry and services, the shift in industrial and technological development towards fast-growing emerging economies, and the need to integrate them with the 'western economies' – a powerful driver of global knowledge production and knowledge-sharing.

The Framework Programme (FP) increasingly focuses on the grand global challenges such as climate change, poverty, infectious diseases, and threats to the energy, food and water supply, citizen security, network security and the digital divide, which urge for effective global S&T cooperation for sustainable development. International cooperation in FP7 has had several objectives: to integrate European excellence in R&I into the global science and innovation context; establishing strategic partnerships with international partner countries in selected fields of science; to focus S&T activities on specific problems of international partner countries or of global character; and to improve the access to global research, facilitating contacts with international partners.

The assessment of international cooperation in the study followed a specific pattern, reviewing:

- the relevance of international cooperation activities in relation to the general strategy and the specific thematic objectives of international cooperation in FP7;
- programme efficiency and effectiveness in terms of rules and procedures, approaches to programme design, and best practice approaches to design and implementation;
- programme impacts in terms of outputs, benefits and impacts on the different dimensions addressed by S&T activities.

The methodological approaches underpinning the study to collect factual evidence for policymaking at EU level consisted of:

- a reconstruction of the international cooperation strategy in the FP7 'Cooperation' programme and the structural analysis of activities and instruments;
- a statistical analysis of the eCORDA data of international cooperation in FP7;
- interviews;
- surveys;
- case studies.

2 THE POLICY FRAMEWORK

It is a firm assumption of the EU's Framework Programme that S&T development has always been international by nature, driven by the increasing internationalisation of industry and services, the industrial and technological development shift towards fast-growing emerging economies, and their increasing integration with the 'western economies'. The grand global challenges urge for effective global S&T cooperation for sustainable development, to deal with climate change, poverty,

infectious disease, threats to energy, food and water supply, citizen security, network security and the digital divide.

The growth of the European Research Area (ERA) through greater integration and cross-border coordination of research investments and activities has a positive impact on the competitiveness and attractiveness. An international S&T policy is necessary to create a competitive global role for Europe. The main objective of international cooperation in FP7 has been to integrate European R&I excellence into the global science and innovation context through strategic partnerships with international partner countries in selected fields of science, to focus S&T activities on specific problems of international partner countries or of global character, and to improve access to global research and facilitating contacts with international partners.

A stronger international ERA dimension should be achieved by:

- integrating neighbouring countries into the ERA (particularly Egypt, Morocco, Russia, Tunisia and Ukraine);
- fostering strategic cooperation with key international partner countries, through geographic and thematic targeting.

International cooperation builds on the following: (a) joint development of and access to research infrastructures to tackle scientific challenges, (b) fostering of researchers' mobility and global networking, (c) further opening of research programmes to third country participation, and (d) managing intellectual property (IP) issues.

FP7 addresses international cooperation differently from the previous FPs: international cooperation in FP7 is embedded in all EU research support. The FP7 set-up makes clear reference to international cooperation in its introductory sections, focusing both on R&I and science in general, but also on the specific domain of information and communication technologies (ICT).

International cooperation activities are developed in line with three basic principles:

- programming, which includes both broadening of international research collaboration in programmes and in research themes, and programming of specific priorities for international partner countries;
- targeting actions and budgets at the level of the relevant calls for proposals;
- partnership and dialogue, guaranteeing a fair level of third country partner participation in cooperation with EU partners.

International activities in FP7 are complementary and synergetic, facilitating the cooperation of different global research partners with European researchers through a simplified procedure, exemplified by the unique registration facility, reduced evaluation criteria, simplified forms, etc.

3 INTERNATIONAL COOPERATION IN THE 'COOPERATION' WORK PROGRAMMES

The 'Cooperation' specific programme in FP7 is structured into 10 thematic areas, all of which have an international cooperation strategy: Health; Food, Agriculture and Fisheries, Biotechnology (KBBE); ICT; Nanosciences, Nanotechnologies, Materials and New Production Technologies (NMP); Energy; Environment (including Climate Change); Transport (including Aeronautics); Socio-economic Sciences and Humanities; Space; and Security.

Health, Food, Agriculture, Fisheries and Biotechnology, and Environment have a significantly higher budget share dedicated to international cooperation, as compared to the overall 'Cooperation' programme budget. For Transport (including Aeronautics) and Socio-Economic Sciences and the Humanities, the budget share for international cooperation is about as high as the share in the overall 'Cooperation' programme. The international cooperation budget for Nanosciences, Nanotechnologies, Materials and New Production Technologies, and Space and Security is slightly lower than the general 'Cooperation' share.

Among the FP funding instruments, those most frequently used for international cooperation are Collaborative Projects (CPs), and Coordination and Support Actions (CSAs); CPs for the actual research activities and CSAs for the set-up and design of international cooperation activities.

4 INTERNATIONAL COOPERATION: THEMATIC SET-UP AND MANAGEMENT IN THE EUROPEAN COMMISSION

The study clearly shows that within FP7, international cooperation activities are developed according to the basic principles of programming, targeting, and partnership and dialogue. They are not developed as a stand-alone activity, but are rather complementary and synergetic with the overall FP research activities. The European Commission is working hard to simplify procedures and optimise the administrative burden on participants, while at the same time guaranteeing monitoring and public expenditure accountability.

The European Commission is one of the key players in international cooperation in FP7. It has the responsibility to guide, design and manage international cooperation activities, from thematic and geographical points of view. Interviews were carried out with European Commission policy officers in thematic and horizontal units, as well as with officials in charge of the overall strategic coordination of international S&T and innovation cooperation activities.

However, international cooperation is driven by different bodies:

- the high policymaking level deals with top-level agreements with third country partners and with the definition of umbrella cooperation agreements embedding R&I cooperation;
- the thematic units in the Commission Directorates-General (DGs) are in charge of design and implementation;
- the horizontal units in the Commission provide support to design and implementation activities, and the process is significantly supported by:
 - ✓ R&I players
 - ✓ policymakers in partner countries
 - ✓ agencies in charge of R&I policy implementation
 - ✓ other stakeholders, such as user groups.

Proposals for international cooperation can emerge from high-level policy agreements, from thematic level initiatives, or from policy-level requests. Such a proposal initiates an internal consultation process in the European Commission, involving the thematic units and the horizontal international cooperation units, and leading to the internal feasibility assessment of the proposal.

The internal consultation then moves outside the European Commission, growing into an external consultation process, which sets the key principles of the approach and involves R&I players and external stakeholders and policymakers in the decision-making process. The process then moves on to design and integration, which builds on an integrated top-down and bottom-up approach.

The set-up of international cooperation in FP7 is maintaining the **necessary flexibility** of a combined bottom-up approach with an adequate policy umbrella. It adapts to top-level policy requirements and to the needs of the specific thematic units, and is the most efficient approach for managing the investigation and assessment needs of international cooperation in the FPs.

5 THE STATISTICAL ANALYSIS OF THE ECORDA DATABASE

The statistical review of international cooperation in FP7 confirms the policy emphasis on international cooperation. Some areas predominate in the FP7 'Cooperation' international cooperation activities in terms of number of projects: Health, Food, Environment, and Space. The analysis also shows that there are some priority areas (such as Health) in receipt of more resources than others. In numeric terms, the overall work programmes for the 'Cooperation' specific programme had a mostly stable trend from 2007 to 2013; international cooperation activities increased sharply from 2007 to 2009, remained stable in 2009 and 2010, increased again in 2011 and dropped in 2012, and then increased sharply in 2013. The highest share of funds to participants of international partner countries is provided in the Health area, and low-income countries have the highest share of participation in this thematic field. Middle-income countries participate most actively in the Food thematic area. Industrialised countries participate most actively in the ICT and Security priority areas.

FP7 international cooperation projects in the Health area prevalingly involve industrialised countries and African partners, and Asian and Latin American countries slightly less so. The financial contribution to Health is highest for African partners and quite high for industrialised country partners; it is a bit lower for the Asian region. Research in Food is about equal across industrialised, African and Asian countries, and a little lower in Latin America, while the largest financial contribution for Food is in Africa, followed by Asia and Latin America.

The highest share of ICT projects is undertaken with industrialised international partner countries, followed by Eastern Europe/Central Asia (EECA) countries at a distance. The highest share of Nanotechnology projects is with EECA countries, followed by the Latin American area and industrialised countries in general. The highest financial contribution goes to EECA countries.

The most important partners in FP7 international cooperation are Russia, the United States, China, India, Brazil and South Africa. These six countries account for a cumulated number of 1493 projects — 43.3 % of the total, and a financial contribution of over EUR 223 million — 48.33 % of the total. The United Kingdom, Germany, France, Italy, Spain and the Netherlands represent 70 % of all coordinators. The project and funding statistics show that they work mainly with Argentina, Brazil, China, India and Mexico.

In FP7 international cooperation projects, there is a very high share of higher education establishments and public research organisations, and a quite limited share of private-sector R&I bodies.

6 THE SURVEYS

The online surveys targeted EU and third country partners and National Contact Points (NCPs). A full-scale survey sample was drawn from the eCORDA database for the FP7 project participants, and a full sample of the thematic NCPs in third partner countries was used.

One of the basic and widely accepted purposes of the EU's FP is to support international R&I cooperation. There are several main reasons for EU coordinators to include a third country partner: to gain access to complementary know-how, in order to pursue specific S&T goals, and to gain access to specialised human capital. Science, and not innovation, motivates international cooperation.

EU project coordinators have a strong interest in accessing complementary know-how when they cooperate with industrialised countries. Collaborative R&I projects represent just one (albeit the most vital) variant from a broad spectrum of different instruments in international cooperation. The majority of NCPs confirm the positive effects of FP7 international cooperation, according to nearly all objectives oriented towards European players' interests. However, NCPs also raised some criticism concerning objectives oriented towards third country partners' interests. Survey respondents consider project review procedures of FP7 international cooperation appropriate and easy to follow, and overall rules and procedures adequate for project implementation, and flexible

enough to facilitate management of unexpected outcomes. One of the successfully solved challenges of programme coordination and implementation is the communication and dissemination of information.

The majority of EU coordinators believe there is room for improvement and simplification of formalities, and reduction of the administrative burden. NCPs' feedback on the effectiveness of the operation of the NCP system and on interaction with the European Commission indicates relatively high satisfaction with the information flow from the Commission. A significant share of responding NCPs consider contact with Commission services to be easy and effective.

Survey respondents indicate positive effects on scientific publications, and for a share of respondents there is a positive impact on innovation. For more than half of responding third country partners, collaboration with EU partners had also a significant impact on new or improved processes. The vast majority of both EU and third country partners are convinced that applications developed within the specific projects are likely to have further deployment potential in the near future, in terms of additional funding opportunities on the basis of the FP7 reference, the attraction of additional R&I investment and the commitment of the current partners.

In a nutshell, FP7 international cooperation is expected to show clear additionality and have positive impacts for higher quality, continuity and sustainability, but also for international integration of scientific research. Direct impacts on participating organisations and their structures and capabilities can be expected. Potential impacts on innovation, international science industry linkages, market development or competitiveness are not excluded, but usually are not seen as a direct outcome of FP7 international cooperation.

Survey respondents also highlight the advantages of FP7 international cooperation as compared to national funding mechanisms:

- easier access to international research communities/networks;
- better connections with leading minds in the field;
- a better reputation, position and status for participating researchers/organisations;
- better leverage for available funding/extra funding;
- better for ensuring the establishment of international consortia.

The survey results distinctly indicate that the geographic direction of international cooperation is based on existing relationships between research actors and on the development of relationships through communication and dissemination activities. They also reflect clearly that in FP7, international cooperation was initiated and coordinated mainly by academia. Moreover, the survey shows that the work of NCPs towards international cooperation needs to be brought to the forefront and better integrated in the overall design and implementation process: NCPs are the key for broader participation of new R&I players that are not necessarily already connected with pre-existing research networks.

Survey participants are quite critical in respect to administrative burdens related to FP7 international cooperation. However, this feedback must be interpreted carefully in light of the Commission's continuous effort to simplify and speed up administrative procedures of R&I funding. In addition, the level of bureaucracy implicit in the expenditure of public funds and the associated need to monitor and review R&I policies generates administrative burdens (evaluation, documentation, control mechanisms, etc.) for the programme administration and applicants.

In general, R&I actors in third countries have a very positive view of NCPs in terms of EU project coordinators engaged in international R&I projects. In many cases, EU coordinators communicate with their international country partners directly. They also indicate that NCPs have a key role in disseminating the 'FP culture' at local level, mobilising R&I players in third partner countries and improving their knowledge and participation in EU funding. They need to be further integrated and leveraged to improve the overall impact of FP international cooperation.

The surveys also addressed the issue of sustainability of international cooperation projects. The vast majority of third country partners believe that the applications developed within the specific projects are likely to have further deployment potential in the near future. The consortium partners are in general committed to further developing the project research activities. The overall FP

assessment shows, however, that only a small number of projects are really sustainable, with autonomous follow-up.

On the whole, the surveys demonstrate that international cooperation seems to have fared well in FP7. The participating players are satisfied overall, and most criticism is in line with comments generally made on EU R&I programmes: the administrative burden, the circulation of information and the sustainability of projects.

7 THE CASE STUDIES

The case studies have the purpose of describing international cooperation experiences in three different geographical areas: one industrialised country (the United States), one emerging economy (India) and one Mediterranean partner country (Tunisia). The case studies provide deeper insights into international cooperation in S&T in the EU's FP7 from the third country perspective. They build on and complement the previous quantitative and qualitative analyses:

- the United States is a particularly important partner in Health, ICT, Nanosciences, Energy, Transport, Security and Socio-Economics;
- India is a major partner country in several thematic areas: KBBE, Nanosciences, Energy, Environment, Transport and Socio-Economics;
- the areas where Tunisian researchers cooperate with European players are principally Food, Agriculture and Biotechnology.

All involved stakeholders, policymakers, NCPs and R&I players are strongly interested in international cooperation activities with the EU. Several issues for consideration emerged from the survey. Many case study participants indicate that the benefits need to be mutual. Fast-developing and developed countries convey a feeling of an imbalance in benefit allocation. There is a clear request for a more integrated bottom-up approach to be merged with the top-down policymaking process, i.e. ensuring that the interests and points of view of international partner countries are increasingly taken into account when designing the activities and setting up the projects.

Case study participants indicate that it is very important to establish, consolidate and maintain global partnerships to address the grand societal challenges. International cooperation is one of the key elements for managing these challenges. Another vital aspect concerns small and medium-sized enterprises (SMEs): their position is not easy, and they have to overcome many obstacles owing to their limited size. All players, but mostly Tunisian and Indian interviewees, underlined that the role of SMEs in international cooperation should be supported and their access to benefits improved.

The motivation for and significance of international cooperation for third country partners were specifically investigated, and third country partners have clearly confirmed the importance of the nature and benefits of the international cooperation activities carried out.

Overall, the three countries' stakeholders confirm that international cooperation projects are of higher scientific or technical complexity. The case studies show a clear correlation between the S&T level of a country and the history of its relationships in R&I and the need to undertake targeted exploration initiatives such as those funded by CSAs.

All three case studies confirm that there are challenges in terms of the administrative and management requirements for FP7 international cooperation. The interviewees mention issues related to funding instruments and availability of funding to third country partners.

In some cases, the timeframe of FP7 international cooperation projects is too short to achieve the targeted objectives. Regardless of this, however, networking is viewed as vital by all case study participants: they search for workshops and conferences in order to meet people with similar interests and for chances to build mutual trust. Trust building is extremely important for the success of cooperative R&I activities, both in general terms and specifically in international cooperation.

One last key element concerns the bureaucratic requirements for mobility: a joint diplomatic effort is necessary to allow the issuing and renewal of researchers' visas.

8 RECOMMENDATIONS

The emerging picture shows a sound and rational approach to international cooperation, which combines the flexibility requirements of S&T development with the accountability needs of public policies. There are, however, several recommendations in support of the diffusion of good practices in international cooperation activities in the EU's FPs.

- The European Commission plays a leading role in proposing and integrating a holistic approach to design and implementation, but effectiveness and performance in some cases seem to be bound to a specific thematic area and the specific initiative of individuals. Thus, increased communication across European Commission Directorates-General (DGs) and between Commission units can spread the benefits of best practices in this area.
- European Commission services have developed best practice approaches to designing and implementing international cooperation activities: the assessment of international cooperation opportunities following specific templates is one such case. These templates, adapted with flexible implementation guidelines, could be spread across the different Commission services, both to horizontal and to vertical thematic units.
- In general, there is a wide range of international cooperation activities across the European Commission. Although a flexible approach is needed, central sharing and coordination of approaches would allow dissemination of knowledge concerning best practices and tools developed in different services. Thus, this coordination function, which needs to be very 'lean', should span all DGs and act as an information-sharing facility on feasibility studies, on the use of common templates for international cooperation in geographic and thematic directions, and on the design of CSAs.
- Since the international cooperation policy design process calls for continuous feedback in order to improve policymaking and policy implementation, coordination at European Commission level could include the development of templates to describe international R&I cooperation results and impacts, which can be shared internally.
- On the other hand, the study shows that R&I, and international cooperation in R&I in particular, calls for a particularly flexible approach. It is therefore recommended that Strengths-Weaknesses-Opportunities-Threats (SWOT) analyses, and cost-benefit assessments for S&T themes and geographical directions not be carried out systematically, but rather are left to the initiative of the services with subject-matter expertise.
- R&I stems from a combination of research-driven knowledge creation and demand-driven development of scientific and technological solutions. Thus, the coordination process of international R&I cooperation should ensure that both 'supply-driven' and 'demand-driven' research equally contribute to the shaping and design of R&I activities. This is integrated in the design of the Horizon 2020 FP, which is moving towards 'responsible research and innovation', and takes into account the societal grand challenges in particular.
- There are certain thematic areas, such as ICT and Health care, which are particularly prominent in international R&I cooperation, since they are specifically concerned with international competition. This aspect could be taken into account in the design of thematic and geographic research activities.
- The Commission has been working to reduce the administrative burden in R&I support programmes. There are still margins for improvement in FP research administration, especially concerning difficulties faced by third country partners in familiarising themselves with the rules. Another area needing improvement relates to the differences in contractual and accounting rules, for example between the EU and the United States. The Commission could address this issue to prevent it becoming a barrier for third country participation in the FP.
- The European Commission involves EU representations in the design of the international cooperation process. The involvement of the NCPs in third countries is, however, still patchy. This is most likely due to the relatively recent establishment of many international NCPs and the need to improve their set-up and range of operations. The study shows that R&I players

strongly support NCPs' activities, and that their assessment is very positive. The developing approach to international R&I cooperation could increasingly leverage the capabilities, skills and resources of NCPs in international partner countries.

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This study reviews and analyses international research and innovation (R&I) cooperation in the Seventh Framework Programme (FP7) of the EU, considering specifically the 'Cooperation' specific programme and its thematic areas. It provides a comprehensive qualitative and quantitative picture of all the projects involving international country partners in the FP7 'Cooperation' programme, i.e. third countries which are neither EU Member States nor FP7 Associated Countries. The result is an evidence-based input to EU policymakers supporting and implementing international cooperation in the Framework Programme (FP). The comprehensive review of international R&I cooperation provides an overall picture of recent experience in the FP and provides lessons for future design and implementation.

The study is based on extensive qualitative and quantitative research, including desk reviews, a statistical review of the project database, three surveys aimed at EU coordinators, at third country project participants, and at National Contact Points (NCPs) in third countries, and three case studies on one developing country, one fast developing country, and one industrialised country. It shows that the European Commission has integrated international cooperation in FP7 in a comprehensive and advanced policy and implementation design. The Commission has been developing best practice approaches for the design and implementation of international cooperation in FP7, involving stakeholders in a combined top-down and bottom-up process, which ensures the necessary flexibility to adapt to a fast developing world. The conclusions include a set of recommendations for the improvement of the approach to international cooperation in EU FPs.

Studies and reports

