



European Added Value

of EU Science, Technology
and Innovation actions and
EU-Member State Partnership
in international cooperation

Main Report



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Innovation*



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European Added Value of EU Science, Technology and Innovation actions and EU-Member State Partnership in international cooperation

Main report

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INTRODUCTION

This document is the final report of the study '*European Added Value of EU Science, Technology and Innovation actions and EU-Member State Partnership in international cooperation*'. The study was commissioned by European Commission Directorate-General (DG) Research and Innovation through the Framework Contract (SMART 2009/0042) of DG CONNECT and was carried out by Technopolis Group in cooperation with Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH. The study results should feed into future policymaking and support the achievement of the desired international Science, Technology and Innovation (STI) cooperation activities of the European Union (EU). The study outcome is based on several data collection methods, including deskwork, interviews, surveys and a small number of case studies. This study takes also stock of the work and findings of the study "International Science and Technology Cooperation in the EU's Seventh Framework Programme: the 'Cooperation' specific programme and its thematic areas", which has been commissioned in parallel.

This report provides the main outcomes and conclusions of the study, and outlines a number of recommendations for future policymaking. The study was prepared by Wieneke Vullings (project leader), Erik Arnold, Patries Boekholt, Neil Brown, Bastian Mostert, Monique Rijnders-Nagle, Léonor Rivoire (*Technopolis Group*), Strahil Birov, Tobias Hüsing and Simon Robinson (*Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH*). Support was given by Manfred Horvat (*Technische Universität Wien*), Luca Remotti (*Intrasoft International*) and Derek Jan Fikkers (*Technopolis Group*).

Study objectives

Researchers, research organisations and policymakers choose to cooperate with other countries for various reasons and motives. In particular, the choice to work with countries outside the EU (for EU researchers/organisations) or reversely for extra-EU researchers to work with countries in the EU, can be based on various drivers and motives that differ per actor. Generally, these actors can make use of different (funding) mechanisms at different levels (local, national, European, or a joint EU-Member State level) to make such cooperation possible. So far, however, little work has been carried out to map and assess the outcomes, benefits and impacts of international Science, Technology and Innovation (STI) activities, let alone the specific European Added Value (EAV) of international STI cooperation. Not many attempts have been made to define and measure the added value and assess the means to achieve it while this could further support the justification of the Union's investments in international STI cooperation. Why would policymakers and researchers choose EU mechanisms over national mechanisms to support STI cooperation? What impacts do they expect and how can those be attained? What is the difference between national support actions versus European or joint EU-Member State (MS) actions? Can a better understanding of the 'added value' of the European and joint EU-MS actions be reached through assessing these differences? These are some of the questions underlying this study, which has as main goals:

1. To define under which circumstances international STI cooperation objectives and actions carried out at EU level (these can either be coordinated or joint EU-Member State actions or solely EU actions) will be more effective than if carried out at national or local level, and make suggestions for defining and measuring this added value, with a specific focus on actions carried out through the EU's Seventh Framework Programme for research and innovation (FP7).
2. To define the means of actions, and types of measures that might be taken at EU level (including and distinguishing those which promote joint EU-MS actions) that are most effective to achieve the desired international STI cooperation objectives.

This study focuses on an additional number of sub-questions:

- What is meant by 'European Added Value' (EAV), and why is it an important concept?
- Why does the research community, including in industry, want to cooperate internationally, e.g. outside the EU (and why do third country actors want to cooperate with EU actors), and how was this cooperation supported in FP7?

- Do the existing assumptions in the literature regarding European Added Value of international STI cooperation actions cover the whole spectrum?
 - How can the concept of EAV be further operationalised?
 - Is there an added value of the activities currently being carried out at EU or joint EU-MS level?
- Do the current policy actions actually lead to the expected impacts and added value of international cooperation, and what can we learn for future policy making?

The 'third country' perspective

Whilst international cooperation will involve a minimum number of two partners, the balance of 'effort' may not be reciprocated equally from both sides. For example, Country A may consider Country B as a policy priority while Country A itself counts as one amongst many of Country B's partner countries. Similarly, researchers in Country A may actively seek to work with (and subsequently co-publish with) researchers in Country B. However, only a small proportion of Country B's research community may collaborate with those from Country A. This effect will be magnified if the two countries differ in the size of their research populations. All the same, it is important to view cooperation policy, patterns and impacts from both perspectives, since such observations represent a single snapshot of activity and may indicate important developments with regard to future cooperation patterns and strategic policy decisions. This study therefore attempts not only to analyse the EAV relevance for European beneficiaries, but also for beneficiaries in the non-EU countries (third countries).

Methodology adopted for this study

In order to reach the objectives of this study, a number of activities have been carried out in the course of this study.

Desk research consisted of a literature study and analysis of the E-CORDA¹ database. This led to three main outputs:

First, it led to a better understanding of the EAV concept, and a conceptual framework to operationalise EAV in practice. What elements constitute EAV, in theory, for international STI cooperation? The result of this work is part of this final study report and will be presented in the next sections.

Second, it contributed to the conceptual development of a so-called 'EAV database' in which data and information were collected on a selection of actions that have been taken at EU, EU-MS and MS levels. This database was requested in the Terms of Reference of the study with the purpose of providing and organising the available data and information on STI cooperation actions as a basis for understanding the potential to generate European Added Value. The database includes information on the objectives of over 30 specific actions, the level of governance of these actions, the geographical or thematic focus, the benefits and impacts, and existing evaluations and monitoring of data. The database:

- provides an overview of the different types of actions carried out; the different governance modes; the financial efforts involved in these actions; the common drivers and objectives of these actions;
- supports the identification of gaps in the types of information that would be needed in the future to monitor and evaluate the processes and results of these actions in order to measure European Added Value;
- provides information about what can be measured, and what cannot be measured; and

¹ The E-CORDA (External Common Research Data Warehouse) database contains data on applicants/proposals and signed grants/beneficiaries with regards to the European Framework Programme for Research. For this study, an export from the E-CORDA database has been used (status May 2013).

- provides a reality check with regard to the circumstances under which EU and EU-MS actions are being carried out, and when scale and scope are important factors.

The database was delivered as interim deliverable to the Commission, accompanied by the document 'Guiding Note to the EAV Database'. In this Guiding Note it is concluded that although the database is a useful tool for analysis, it is not a 'holy grail' for quantifying EAV. The database could therefore be useful to the European Commission policy officers to have a quick overview of actions at different levels, or do undertake simple analyses relating the different parameters to each other, or monitoring progress of the actions after a certain period of time. It would also be useful to an audience that has a more limited or no knowledge of some or all of the actions it contains, and for those who want a brief overview of the range of actions that exist, or of one specific action. For such queries, short fact sheets can be produced based on the database to get an overview of the most important factors of the action.

Limitations of the EAV database and preliminary suggestions to make EAV more visible and measurable:

The database appeared not a very suitable instrument for quantifying European Added Value. There is not sufficient quantitative information available about the inputs, outputs and benefits at the levels needed to compare the different benefits. Moreover, if it is to be used as a complete inventory of international STI cooperation activities, continuous effort should be put in further building and sustaining it. The question, however, would rise whether the costs of this activity would outweigh its benefit. Ideally, one would want to know whether a mobility action carried out at the European level (either EU or joint EU-Member State) provides an additional 'value' for the researchers and research institutions involved compared to a situation in which they make use of a national mobility scheme. This would require answers to questions such as 'does the EU level action lead to better science or more outputs?' 'Does it lead to a better competitive position for the researchers, or for Europe as a whole towards other countries?' This would require a better tracking of long-term impacts of both the EU (and EU-MS) actions as well as the MS actions, which is currently not being done on a structural basis. A number of lessons learnt for future tracking of the STI cooperation data and information on EAV are:

- Actions can be taken at different levels and therefore lead to different ranges and types of results and added value. Entries vary between large, multifaceted agreements or programmes, and individual time-bound projects focused on a specific set of countries and activities. Inevitably this makes it difficult to have a database that suits both purposes, or that results in information that is easily comparable, or consistently entered. The most optimal way to compare a number of actions would be to look at the lowest level of the activity that it represents.
- Many STI actions do not primarily focus on international cooperation and therefore objectives and results are not reported as such. For example, it seems challenging to report on the budget, the type of action, the goals/objectives that only focus on those elements of an action that relate to international STI cooperation, let alone specifically information on STI cooperation with third countries. In the case of the European Development Fund (EDF), for example, its remit is much broader than just international STI cooperation. It is problematic to include only its international STI cooperation activities, while the information available is not so specific. The EDF's main aims and objectives relate to poverty alleviation - which is important to know as contextual information, but not particularly helpful for the main purposes of a database.
- In more than half of the cases, information on budgets was not readily available. Where we are dealing with an 'umbrella' action, the budgets for all individual actions under it should be included, but one could also argue to only look at the cost of administering the programme. E.g. a number of actions do not really have their own budget but provide the framework for others to fund specific activities. In addition, there is usually more than one funder, and they do not always fit one of the categories given. This can be explained for each of the actions individually, but will not allow for a generalised comparison with drop-down menus in a database.
- If at all evaluations are available (only in 40% of the cases in the database) quantitative information about the results and long-term impacts of an action is often still lacking. Often, the formal monitoring/evaluation information available focuses on actions at a 'higher level' (e.g. the interim evaluation of FP7 INCO activities, which mentions many of the actions that are covered, but none in any great detail). This does not provide sufficient information for comparison and quantification. Ideally, information should be collected at the level of the activity itself with clear quantitative and qualitative indicators to monitor and evaluate actions. A suggestion for such an indicator framework has been provided in our previous study on monitoring STI cooperation activities². In this report additional suggestions will be given on how to monitor and evaluate in particular the added value of the EU and joint EU-MS actions based on a number of identified value added impact routes.
- To be able to 'compare' actions and understand the added value of the EU and joint EU-MS actions, it should be very clear what actions can be considered 'EU' or 'Joint EU-MS' action. When populating the database, it however became clear that 'coding' the actions according to their governance level was not evident and required explanation. Many actions are multi-faced, with different funders, coordinators and other stakeholders involved.

² 'Overview of International Science, Technology and Innovation cooperation between Member States and countries outside the EU and the development of a future monitoring mechanism'. Erawatch Network ASBL (prepared by Technopolis Group/Manchester Institute of Innovation Research (2013).

- Sometimes there are multiple actors impacted by the actions. E.g. bilateral STI agreements in the short to medium term should impact on those undertaking Research and Development (R&D), but ultimately it is hoped that this will benefit the economy, the public, etc.

Having summarised the limitations for assessing the added value, the database does extensively report on outputs, expected outcomes and impacts. Moreover, the database assessment provided useful insights for the other data collection methods, such as the interviews, the surveys and the case studies.

The third output of the desk research is an analysis of the international cooperation activities within the context of FP7. This is performed based on the E-CORDA database and it provided a clear insight into the different actions that are taking place – and are used – at the EU and EU-MS levels. It also supported the sampling of research project participants from the different specific programmes which are targeted by one of the two surveys.

Furthermore, about 30 **interviews** have been carried out. Half of the interviewees represented the European Commission, the other half an EU Member State or a third country. In the interviews, the benefits and perspectives of the non-EU countries (so-called 'third countries') were included as well. These interviews provided rich information and examples, and focused on the following topics:

- The meaning of European Added Value of international cooperation in STI and examples where clear added value has been reached;
- The views of interviewees on the possibility of measuring EAV;
- Major areas of added value related to key problems/needs that need to be addressed by EU or joint EU-MS action;
- Best practices of added value of EU and joint EU-MS action and views on the measurement of the effectiveness of these actions;
- Third country perspective and reciprocity;
- Future opportunities for policy making.

In short, the interviews made clear that the major areas of EAV are those where joint action becomes more efficient, when a wider geographical reach can be achieved, a policy dialogue can be started or where standards need to be set. Most of the interviewees stated that the EAV is not so evident in domains close to market and in competitiveness activities. Working on a bilateral (MS to MS) level on the other hand, is perceived as advantageous when flexibility is needed, little bureaucracy can be handled and when the activity relates to longer term mobility support. From the perspective of third countries it became clear that it is important for these countries and researchers to be visible in Europe, but also to have a clearer view on Europe's strengths. These countries often deploy pragmatic reasons for involving in STI cooperation with EU countries or participate in European Commission (EC) activities (such as funding and geographical reach) but at times there is also an inherent need to cooperate.

Moreover, a **questionnaire** was sent to members of the Strategic Forum for International S&T Cooperation (SFIC) to provide their Member State view on a number of topics. These topics align with the interview topics presented above. In total, 5 Member State replies to the questionnaire were returned.

Two **surveys** have been carried out. The first one addressed National Contact Points (NCP) that have a particular focus on international cooperation (56 EU INCO-NCPs and 72 non-EU INCO NCPs). The response rate was fairly high: 48.2% for the EU-NCPs and 31.9% for the non-EU NCPs. The second survey addressed the Research Project Participants of a sample of research projects funded under FP7 based on the analysis described earlier. This survey targeted a sample of a little over 6.000 FP7 project participants, including third country participants and reached a final response rate of 23.3%.

The INCO-NCP survey was developed jointly with the team of the other study that was carried out in parallel about the "International Science and Technology Cooperation in the EU's Seventh Framework Programme: the 'Cooperation' specific programme and its thematic areas", and posed questions on the following topics to the INCONTACT representatives:

- NCP operations;
- Motivations to participate in FP7 International Cooperation activities for researchers;

- Efficiency, effectiveness and impact of the participation in FP7;
- Added value of the EU action for the researchers;
- Possibilities for improvement of the EU activities and policy.

The Research Project Participants survey asked questions about the motivations for cooperation in STI; the expected outcomes and impacts of the cooperation; the added value of the cooperation and the role of the EU or joint EU-MS activity in adding this value; potential barriers and opportunities for international STI cooperation; future policy options and mechanisms. In the surveys particular attention has been paid to the third country perspective and benefits. The survey results are extensively discussed in this report in the Sections 3, 4, and 5.

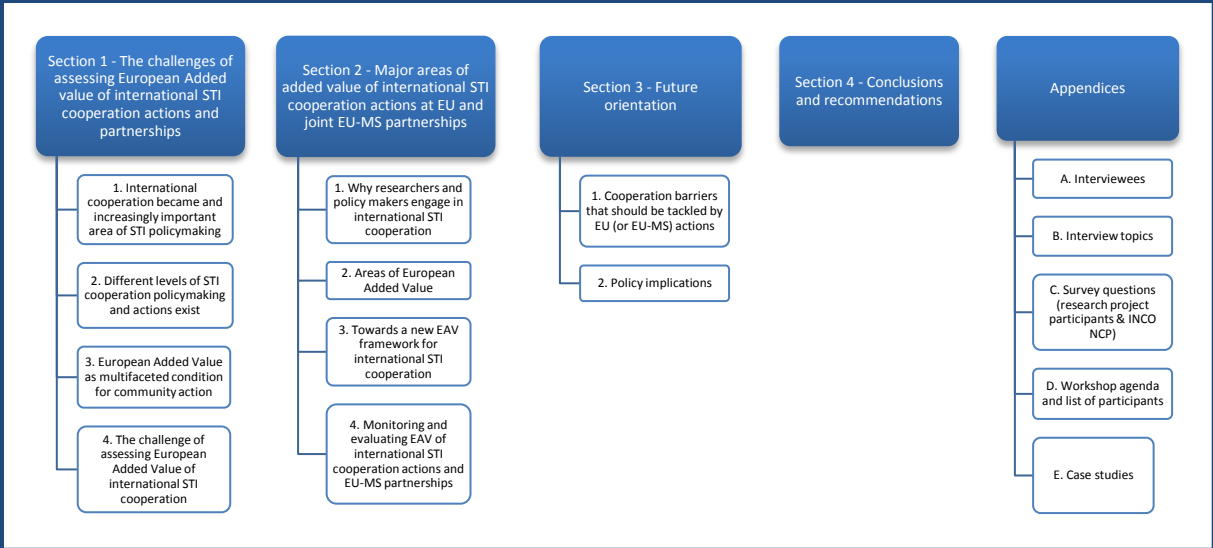
A limited number of **case studies** or **success stories** (see Annex E) on STI activities and their impacts and benefits have been selected in order to have a deeper insight in what constitutes European Added Value, and particularly to study the (mutual) benefits for third countries. The cases consisted of the European and Developing Countries Clinical Trials Partnership (EDCTP); EU's relations with Latin America and the Caribbean (EU-CELAC); and the Europe-Japan Opening of a Laboratory for Integrated Micro-Mechatronics Systems (EUJO-LIMMS). These cases were compared with comparable Member State initiatives to gain a better understanding of the existence and nature of the EAV. In the cases, EAV proved to be related to the more effective pooling of funds; increased networking with more countries and researchers involved; the better combining of leading minds and bringing together researchers from a greater number of disciplines; and the high-level policy commitment that lead to better coordination and a clearer set of priorities. The success stories were selected in discussion with European Commission policy officers, based on the inclusion of at least one third country. The cases are also comparable to similar national actions. The success stories also include cases with a focus on industrialised countries (EUJO-LIMMS) and cases with a focus on developing countries (EDCTP) or developing and emerging countries (EU-CELAC).

In mid-October 2013 an **expert workshop** was organised where comparisons were drawn between the benefits derived from EU, MS and EU-MS support to international STI. The workshop, which took place in Brussels, aimed at developing useful recommendations to the EU on the measurement and on maximisation of EAV for future international STI cooperation programme design and implementation. A total of 8 external experts participated in the workshop.

Structure of the report

- Section 1 sets the scene of the study by showing how international STI cooperation has become an increasingly important policy domain, with the implementation of actions supporting this cooperation on different levels (EU, joint EU-MS, and MS). It explains why assessing the European Added Value of the EU and Joint EU-MS actions – the main objective of this study – is of importance, and what the challenges are of operationalising this complex concept, especially for international STI cooperation.
- Section 2 focuses on the identification of the major areas of European Added Value of international STI cooperation, based on the data collection and desk work carried out in this study. It focuses on the following questions: 'Why do policymakers and researchers want to cooperate internationally (e.g. outside the EU and vice versa), and why should this cooperation be done at the EU level rather than by an individual MS?' The section concludes by drawing up a new framework for EAV of international STI cooperation based on 5 EAV criteria, and it provides an input to the future monitoring and evaluation mechanisms of EAV.
- Section 3 takes a forward looking approach, based on an analysis of current barriers for STI cooperation, and provides inputs for future policymaking.
- In Section 4, the key conclusions and recommendations of this study are presented.

The report contains a number of annexes: first, an overview of the people and organisations that have been interviewed in the context of this study (Annex A); second, the list of interview topics that have been used (Annex B); third, the list of survey questions for both surveys (Annex C); and fourth the workshop agenda and the list of participants (Annex D). The detailed descriptions of the three cases are also provided (Annex E).



1. THE CHALLENGES OF ASSESSING EUROPEAN ADDED VALUE OF INTERNATIONAL STI COOPERATION ACTIONS AND PARTNERSHIPS

International cooperation became an increasingly important area of STI policymaking

In the past years international cooperation – the cooperation between European policymakers, researchers, research organisations and industry with these actors outside of Europe – has become an increasing issue for national and European STI policies. A previous study³ performed by the Technopolis Group together with partners, summarised that this trend was driven by various factors such as the emergence of the BRICS grouping – Brazil, Russia, India, China and South Africa – an increased political debate of global challenges, the globalisation of Research and Development (R&D), general demographic developments and increased policy debate and ambitions in Europe to provide more critical mass and international profile to research excellence. The EU is losing ground in technology development, and each EU Member State by itself lacks critical mass. Scientific production and innovation are becoming more international, and although the Union is catching up, it is still suffering from an innovation gap with the US and Japan, and strategic cooperation is needed⁴.

Particularly the development of the European Research Area (ERA) has stimulated more discussion on the topic. Internationalisation strategies became more and more part of the general STI policies on both national, European and global levels, and the link between the internal and external dimension of ERA is gradually being established. A 2011 study⁵ by the Technopolis Group and the Manchester Institute of Innovation Research shows for instance that within Europe, all EU Member States have at least one agreement with third countries. Member States with a high number (>15) of agreements mentioned in the ERAWATCH⁶ Country Reports are Belgium, Finland, Germany, Lithuania, Poland, Portugal, Slovakia, Spain and the United Kingdom. A range of countries is targeted by the EU Member States, but there is a certain focus on excellence, competitiveness and growth. The countries for which agreements were reported in more than ten Member States are China (18), India (17), USA (15), Japan (15) and South Korea (13).

Also, the European Commission (EC) adopted a 'Strategic European Framework for International Science and Technology Cooperation' in 2008 and the same year, a 'Strategic Forum for International S&T Cooperation' (SFIC) was established by the Council of the European Union to act as a focal point for the development of a coherent approach to international cooperation and the external dimension of ERA. Over the past years, SFIC has been working on the symbiosis of the external and internal dimension and has developed a step-by-step approach, starting with a geographic and a thematic pilot initiative on 'EU S&T cooperation with and vis-à-vis India' and 'energy research (in close coordination with the SET-PLAN)' respectively, that means in areas where cooperation between SFIC members could provide added value.

In September 2012, a Commission Communication entitled '*Enhancing and focusing EU international cooperation in research and innovation: a strategic approach*'⁷ was adopted. This communication presents the most recent strategic approach of the EU in maximising the opportunities presented by increased globalisation of research and innovation. It is considered to act as a framework for international cooperation under Horizon 2020 and should assist its implementation. This strategy distinguishes between three country groupings, each with a different focus of international cooperation activities as shown in Figure 1.

³ Drivers of International collaboration in research. Final Report. European Commission 2009. ISBN: 978 -92 79-14232-1 Edited by Technopolis Group and Manchester Institute of Innovation Research.

⁴ Commission Staff Working Document Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on 'Enhancing and Focusing EU International Cooperation in Research and Innovation: A Strategic Approach' {COM(2012) 497 final}.

⁵ Overview of International Science, Technology and Innovation cooperation between Member States and countries outside the EU and the development of a future monitoring mechanism. Erawatch Network ASBL (prepared by Technopolis Group/Manchester Institute of Innovation Research (2013).

⁶ <http://cordis.europa.eu/erawatch/>.

⁷ COM(2012) 497.

Figure 1 Country groupings and focus of international cooperation

Country grouping	Focus of international cooperation
EFTA countries ⁸ , EU enlargement countries ⁹ and countries covered by the European Neighbourhood Policy ¹⁰	<ul style="list-style-type: none"> Fostering integration into – or alignment with – the European Research Area, including through their possible association to Horizon 2020
Industrialised countries and emerging economies	<ul style="list-style-type: none"> Increase the Union’s competitiveness; Jointly tackling global challenges through common innovative solutions; Develop enabling technologies by accessing new sources of knowledge.
Developing countries	<ul style="list-style-type: none"> Complementing the Union’s external policies and instruments by building partnerships; Contribute to the sustainable development of these regions; Address challenges such as the green economy, climate action, improved agriculture, food security and health.

Source: COM(2012) 497.

If the European Union (EU) wants to maintain its position as one of the leading regions in research and innovation in the world, it must position itself as an attractive location for conducting research and innovation and as a partner for engaging in international cooperation (with countries outside the EU). Chapter two provides a more in-depth analysis of the way international STI cooperation is organised in FP7, with what mechanisms and resources, and to what extent researchers and policymakers make use of these mechanisms across the European countries and thematic areas.

In spite of this increased policy focus on international STI cooperation, there is still, however, a general reluctance to invest financial resources in global STI undertakings. A 2012 OECD report¹¹ on international STI cooperation governance states that “even within the EU – after six decades of efforts at integration – some 85% of all public research and development (R&D) is programmed, financed, monitored and evaluated at the national level”. The authors argue that this reluctance is due to legitimacy issues for national governments: they have difficulties justifying spending money on international cooperation rather than on national research projects. In general, amongst the public there is little awareness of the long-term benefits that can be achieved by international STI cooperation. Thus, the EU needs to find ways to develop the most efficient and effective policies to create added value for the individual Member States and the Union, and also find ways to assess this added value and show the results to the public. The sections 1, 2 and 3 of this report therefore support the further thinking of how the European Added Value of international STI cooperation actions can be better assessed.

Different levels of policymaking and actions in STI cooperation exist

Historically in policymaking, a tension exists between the role of the Union and the individual Member States. A key question is often to what extent the Union funding should be considered as an *addition to* national R&D budgets, or as *part of them*? In 1995, Luca Guzzetti’s ‘Brief history of European Union Research Policy’, described this tension as following: “each government is essentially trying to keep national control of technologies which it considers strategic and in which it has a competitive advantage over other countries, while at the same time being prepared to develop those technologies at Community level which it feels are less important”. Redclift et al¹² also argued that subsidiarity assumes a vertical relationship between the EU and Member States, and it identifies the EU as a supranational body, whereas on the contrary, the unification ambition stresses the horizontal relationships in which the Union is a force for unification that “might

⁸ EFTA countries are Norway, Switzerland, Iceland and Liechtenstein (<http://www.efta.int/>).

⁹ The current enlargement countries are the Western Balkans (Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Albania, Bosnia and Herzegovina and Kosovo), Turkey and Iceland (Enlargement Strategy and Main Challenges 2012-2013).

¹⁰ The countries of the European Neighbourhood Policy (ENP) framework are Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Lebanon, Libya, Moldova, Morocco, Occupied Palestinian Territory, Syria, Tunisia and Ukraine (http://ec.europa.eu/world/enp/index_en.htm).

¹¹ OECD DSTI/STP/STIG(2012).

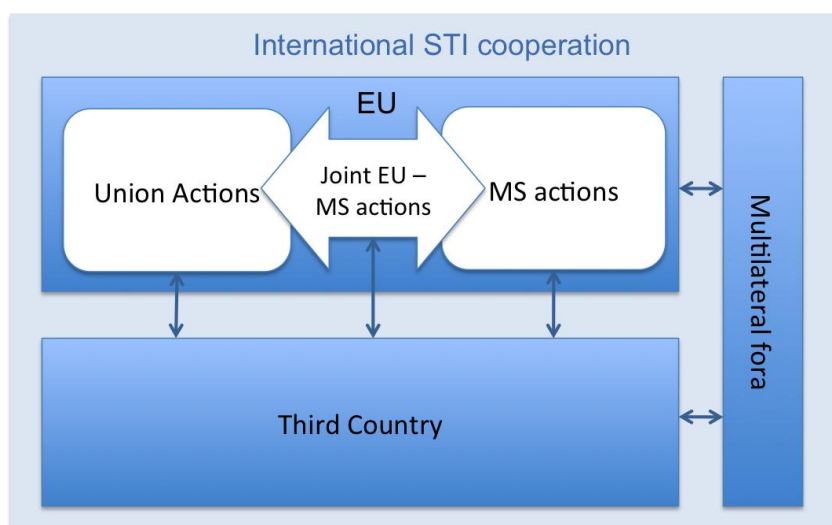
¹² Redclift et al (2000) Social Environmental Research in the European Union: Research Networks and new agendas. Edited by M. R. Redclift.

produce a denationalisation of research systems". In this study we have distinguished three levels of international STI actions in order to delineate the different roles of the Union versus Member States. This generally includes a broad variety of modalities (i.e. type of policy instruments and actions) such as communication, dialogue or networking activities; agreements or regulations; information services; joint programmes or projects; joint institutes; funding schemes including mobility schemes and foreign branches. We distinguish the following three levels:

- EU level actions;
- Joint EU-Member State partnerships;
- Member State level actions.

The following figure shows the intertwining between those levels. In addition, additional partnerships are being established between EU Member States, the EU and third countries and international organisations. These are briefly touched upon but not as a main focus of this study.

Figure 2 Three levels of STI international cooperation with third countries



A – EU-level actions and FP7

The main focus of this study is on the added value of EU actions (and joint EU-MS partnerships, discussed in the next paragraph), and in particular the impacts, benefits and added value of international STI cooperation actions in FP7.

At the European level, the EU Framework Programmes for Research and Technological Development (FP) have been the key financial instrument to promote EU-led international STI cooperation. Since FP6, the 'opening up' of the FP, and specifically the international cooperation (INCO) programme, has become a key element to include third countries – both industrialised as well as emerging and developing. FP7 even widened the possibilities for international cooperation by allowing international cooperation in all European research activities, across all thematic areas. The approach to international cooperation in FP7 aimed to further mainstreaming international cooperation across all parts of FP7, including the Euratom programme, by the opening up of existing instruments, and implementing a number of targeted international cooperation actions¹³. This allowed entities from all third countries to participate in FP7; however, not all of them are eligible for funding from the EU budget. Under FP7, automatic funding is granted to Associated Countries and the International Cooperation Partner Countries (ICPC). The list of ICPCs is adopted every year as part of the work programme.

¹³ Commission Staff Working Document Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on 'Enhancing and Focusing EU International Cooperation in Research and Innovation: A Strategic Approach' {COM(2012) 497 final}.

The specific programmes of FP7¹⁴ each have various priority areas. To implement FP7 the Commission makes use of a number of funding schemes (or project types), including Collaborative Projects, Networks of Excellence, Coordination and Support Actions, Individual projects, Support for training and career development of researchers, research for the benefit of specific groups - in particular SMEs - and direct actions of the Joint Research Centre (JRC). In case research cooperation is dedicated to a third country, group of countries, or region considered as an International Cooperation Partner Country (ICPC), research is implemented through a Specific international Cooperation Action (SICA). All these funding schemes operate 'horizontally' across the specific programmes. In addition, there are special funding schemes which include ERA-NETs, Article 185 Initiatives and Joint Technology Initiatives. Figure 3 presents the priority areas, funding instruments (or project types) and types of initiatives for the "Cooperation", "People" and "Capacities" specific programmes, which are the focus of this study¹⁵. Based on the analysis of the E-CORDA database, only those project types and initiatives/actions that include international cooperation with third countries are presented in this figure. This analysis also provides the initial sample for one of the surveys of this study; the survey amongst research project participants.

Figure 3 International cooperation activities within Cooperation, People and Capacities

	Priority areas	Project type	Initiatives/actions
Cooperation	<ul style="list-style-type: none"> • HEALTH • KBBE & OCEAN • ICT • NMP • ENERGY • ENV • AAT, SST & TPT • SSH • SPA • SEC • General activities 	<ul style="list-style-type: none"> • Research for the Benefit of Specific Groups (BSG) • Collaborative Projects (CP) • Coordination and Support Actions (CSA) • Networks of Excellence (NOE) 	<ul style="list-style-type: none"> • ERA-NET • ERA-NET PLUS • Article 185 • Joint Technology Initiatives (JTI) • European Technology Platforms (ETP) • Joint Programming Initiatives (JPI)
People	<ul style="list-style-type: none"> • Marie Curie Actions 	<ul style="list-style-type: none"> • Coordination and Support Actions (CSA) • Marie Curie Actions (MA) 	<ul style="list-style-type: none"> • International Research Staff Exchange (IRSES) • International Incoming Fellowships (IIF) • International Outgoing Fellowships for Career Development (IOF) • Career Integration Grants (CIG)
Capacities	<ul style="list-style-type: none"> • INFRA • SiS • INCO 	<ul style="list-style-type: none"> • Research for the Benefit of Specific Groups (BSG) • Collaborative Projects (CP) • Coordination and Support Actions (CSA) 	<ul style="list-style-type: none"> • INCO-NET • BILAT • ERA-NET/ERA-NET PLUS • INCO-H2020 • Supporting the EU access to third countries programs • Reinforcing cooperation with Europe's neighbors in the context of the ERA • Strengthening European research facilities in third countries • Strengthening joint European S&T centers in third countries • R2I-ENP

Source: E-CORDA database (May 2013).

The analysis of international STI cooperation activities in FP7, demonstrated that most STI cooperation occurs within three of its five major pillars (i.e. specific programmes or SPs), namely in Cooperation, People and Capacities, and less in Ideas and Euratom. The number of *projects* with third country participants and the number of third country *participants* are highest for Cooperation (22.7% of the projects contain third country participants, 5.2% of the participants are from third countries), followed by Capacities (16.6% of the projects have third country participants and 5.0% of the participants are from third countries). This is in line with the nature of the projects and the associated budget of these specific programmes. More than one out of five cooperation projects includes a third country participant, coming from 105 different third countries.

¹⁴ The specific programmes of FP7 are Cooperation, Ideas, People, Capacities and Euratom. More information about FP7 can be found at http://cordis.europa.eu/fp7/home_en.html.

¹⁵ Based on the most recent Work Programme (i.e. the Work Programme 2013).

Figure 4 Third country involvement within specific programmes of FP7

Specific Programme	# of projects	# of projects with Third Country participants	%	# of Third Countries	# of participants	# of Third Country participants	%	# of participants in projects with Third Country participants
SP1 COOPERATION	5,646	1,281	22.7%	105	64,448	3,345	5.2%	17,670
SP2 IDEAS	3,297	16	0.5%	15	3,776	19	0.5%	50
SP3 PEOPLE	7,815	147	1.9%	33	14,525	156	1.1%	519
SP4 CAPACITIES	1,627	270	16.6%	76	15,223	762	5.0%	3,148
SP5 Euratom	117	31	26.5%	11	1,593	48	3.0%	573
Other	4	-	-	-	60	-	-	-
Total	18,506	1,745	9.4%	108	99,625	4,330	4.3%	21,960

Source: E-CORDA database (May 2013).

Figure 5 shows the EU budget contribution for EU and third country participants in each of the specific programmes under investigation. The average and typical (median) EU contributions for EU participants are highest for Cooperation projects, followed by People and Capacities projects, respectively. Average and typical EU contributions for third country participants show a slightly different pattern since they are highest for Cooperation projects, but then followed by Capacities with the People specific programme closing the line. Based on the highest relative contributions and by far highest number of projects, most of the EU funding towards international STI cooperation is spent in the Cooperation specific programme. Considering the total FP7 budget allocated to these specific programmes (Cooperation: €32 billion, People: €4.75 billion, Capacities: €4 billion)¹⁶, the part of the total specific programme budget allocated to international STI cooperation in Cooperation and Capacities are approximately the same. The fraction of the total People specific programme budget set aside for international STI cooperation is relatively small.

Figure 5 EC Contribution (average and median) per specific programme per participant

	EU participants		Third country participants	
	Average	Median	Average	Median
SP1 COOPERATION	€330,016	€243,293	€135,708	€75,320
SP3 PEOPLE	€234,472	€180,584	€84,509	€15,000
SP4 CAPACITIES	€205,041	€111,650	€94,792	€60,130

Source: E-CORDA database (May 2013).

For the Cooperation specific programme, the predominant areas in which third country participation takes place are in Health; Food, Agriculture & Biotechnology (KBBE & OCEAN); ICT; and Environment. This is not so surprising taking into account that throughout FP7 in addition to the general opening up, specific third countries were regionally targeted through coordinated calls. These focused typically on health topics, energy themes and nanotechnology for instance¹⁷. Especially for these STI areas, international cooperation seems to be of importance, due to the nature of the problems to be solved or the supply chains in the sector for instance.

In the People specific programme, third country participation is part of the Marie Curie international fellowships and the International Research Staff Exchange Scheme (IRSES). Finally, in the Capacities specific programme, third country participation occurs in its research infrastructures (INFRA), science in society (SiS), and international cooperation (INCO) areas. The 'INCO' priority area in the Capacities specific programme covers dedicated international cooperation actions that support the International Cooperation Strategy aimed at promoting participation of third country

¹⁶ New Practical Guide to EU Funding Opportunities for Research and Innovation, Competitive European Regions through Research and Innovation, European Commission 2011.

¹⁷ European Commission (2008). Opening to the world, international cooperation in Science and Technology. Report of the ERA expert Group.

participants in FP7 and Member State programmes, stimulating policy dialogues with third countries/regions, and launching studies relevant to international cooperation (INCO)¹⁸.

Figure 6 shows detailed information on third country participation within this last area (based on the most recent Capacities work programmes and the E-CORDA database). The INCO activities with the highest number of projects with third country participation, third countries involved and participants from third countries are the INCO-NETs, BILATs, and Reinforcing cooperation with Europe's neighbours in the context of the ERA.

Figure 6 Third country participation in SP4 Capacities – INCO Priority area

Capacities (INCO)		Projects			Participants	
		Total #	# third country participation	# third countries	Total #	# third country participation
Capacities (INCO)	• INCO-NET	16	15	60	335	148
	• BILAT	32	32	20	188	78
	• ERA-NET/ERA-NET PLUS	7	6	11	112	20
	• INCO-H2020	2	2	6	22	9
	• Supporting the EU access to third countries programs	11	11	12	65	27
	• Reinforcing cooperation with Europe's neighbors in the context of the ERA	49	47	13	207	54
	• Strengthening European research facilities in third countries	6	6	6	41	6
	• Strengthening joint European S&T centers in third countries	1	1	1	9	2

Overall, Europe cooperates most often (in absolute terms) with the Russian Federation, the United States and China. Figure 7 shows the top-10 most participating third countries per specific programme. This shows the increased attention for the BRICS countries over the past years for instance. It would however also be interesting to keep in mind what economic powers will rise in the next few years. What other longer term growth potentials can be identified and are of interest for the future international cooperation policy? Examples could be Mexico, Indonesia, Nigeria, Turkey, Colombia and Vietnam, but these are still not very present in the top-10 most participating third countries.

Figure 7 Most participating third countries per specific programme and project participation

	SP1 COOPERATION		SP2 IDEAS		SP3 PEOPLE		SP4 CAPACITIES		SP5 Euratom	
	Country	#	Country	#	Country	#	Country	#	Country	#
1	Russian Federation	353	United States	5	China	36	Russian Federation	76	Russian Federation	11
2	United States	331	Australia	1	Russian Federation	25	United States	46	Ukraine	7
3	China	253	Benin	1	India	16	Ukraine	40	United States	7
4	India	194	Canada	1	Ukraine	11	India	38	Japan	6
5	South Africa	168	Ghana	1	Argentina	10	South Africa	32	Korea	4
6	Brazil	163	India	1	United States	7	Egypt	29	South Africa	4
7	Canada	133	Kenya	1	Egypt	6	China	27	Canada	3
8	Australia	118	Lebanon	1	Thailand	4	Australia	26	Australia	2
9	Ukraine	108	Mali	1	Uganda	4	Jordan	26	China	2
10	Mexico	88	Mexico	1	South Africa	4	Brazil	25	India	1

Source: E-CORDA database (May 2013).

¹⁸ Commission Staff Working Document, Accompanying the Document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on 'Enhancing and Focusing EU International Cooperation in Research and Innovation: A Strategic Approach' COM(2012) 497 Final.

Figure 8 Number of participants per specific programme and by country grouping

Specific Programme	EU27 countries	EFTA/Enlargement countries/European Neighbourhood Policy	Industrialised countries/emerging economies	Developing countries	Other	Total
SP1 COOPERATION	56,284	5,226	2,204	706	28	64,448
SP2 IDEAS	3,273	484	11	8	0	3,776
SP3 PEOPLE	12,735	1,659	115	16	0	14,525
SP4 CAPACITIES	13,045	1,630	407	128	13	15,223
SP5 Euratom	1,475	77	40	1	0	1,593
Other	0	0	0	0	60	60
Total	86,812	9,076	2,777	859	101	99,625
% of total	87.1%	9.1%	2.8%	0.9%	0.1%	100%

Source: E-CRODA database (May 2013).

Third countries currently comprise in total 12.5% of the total number of participants. The majority of these participants are from countries that belong to the group of EFTA/enlargement/European Neighbourhood Policy countries (8.8%). Only 0.9% of the total number of participants are from developing countries. In line with this, the average EU contribution to the different country grouping participants is highest for the EFTA/enlargement/European Neighbourhood Policy countries: €340,838. The developing countries participants receive the lowest EU contribution: €151,317.

In addition to facilitating international cooperation via FP7, the EU does this via other activities such as:

- The Joint Research Centre (JRC): The JRC's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle. In order to tackle challenges of a global nature it cooperates with international partners.
- STI agreements: The EU has signed STI agreements with third countries which offer a political, legal and administrative framework for coordinating and facilitating international cooperation in STI between European entities and international partners. These are considered useful instruments for a structured STI dialogue of the Union with selected third countries and frameworks for exchange of information, developing mutual understanding, identifying areas for coordinated and collaborative activities and for building trust¹⁹.

B – Joint EU-Member State partnerships and actions

Some of the actions in the Framework Programmes are not solely EU actions, but are undertaken, governed or largely funded both by the EU as well as (a number of) Member States. Examples of these so-called joint EU-MS partnerships are for instance the pilot actions that have been established by the SFIC (with the USA, China and India); the EU-Latin American and Caribbean States and EU-Africa Senior Officials Meeting (EU-CELAC SOM and EU-Africa SOM); the Monitoring Committee for Euro-Mediterranean Cooperation in RTD (MOCO); the European and Developing Countries Clinical Trials Partnership (EDCTP); Joint Programming Initiatives; and coordination of national policies and activities of Member States and Associated Countries concerning international STI cooperation (ERA-NET and ERA-NET Plus projects). The three selected case studies for this study provide a better insight into the organisation of these types of actions, the impacts and benefits, and the EAV derived from these actions if so. Here, these cases are briefly presented and in the next section the EAV is being discussed.

¹⁹ European Commission (2008) Opening to the world: International cooperation in science and technology. Report of the ERA expert group.

European and Developing Countries Clinical Trials Partnership (EDCTP) (see also Annex E)

The European and Developing Countries Clinical Trials Partnership (EDCTP) was created in 2003 as a coordinated European response to the global health crisis caused by three main poverty-related diseases: HIV/AIDS, tuberculosis and malaria. The basis of EDCTP is a partnership. It currently unites 14 participating European Union (EU) Member States plus Norway and Switzerland with sub-Saharan African countries. *"The partnership helps EU Member States to integrate and coordinate their own national research and development programmes and form partnerships with their African counterparts"*²⁰. The purpose of the partnership is to ensure synergy and optimal use of resources and have a greater impact on the three poverty-related diseases, which are important indicators for EAV. EDCTP is cofunded by the European Commission and EU Member States under Article 185 (ex Article 169) of the EU Treaty to promote a more integrated approach to health research among European countries. It is anticipated that there will be an EDCTP II programme under Horizon 2020.

The programme seeks to increase cooperation and networking of European national programmes in order to improve the quality of research in relation to the diseases and to accelerate development of new clinical interventions to fight them, particularly in sub-Saharan Africa. Before the establishment of EDCTP, individual EU Member States were already undertaking R&D programmes or activities aimed at developing new clinical interventions to combat these diseases, often as part of long-term partnerships with developing countries. However, these individual programmes and activities were not seen as sufficiently coordinated and lacked the necessary coherence of approach to best combat the diseases in developing countries or to find optimal treatments. EDCTP's Joint Programme document explains: *"previously, new tools for the prevention and treatment of the diseases risked remaining stuck in the development pipeline. Because of the restricted market opportunities, the pharmaceutical industry may not be expected to take the necessary investment risk on its own. In addition, many member states and their partners in the developing countries have substantial collaborative research activities in this field, but these programmes are often fragmented, uncoordinated, under-funded and lack capacity in the field. New and specific requirements, such as a need for multi-centre protocols, a demanding regulatory environment and universal ethical standards are other reasons for a well-coordinated, intensified effort"*. EDCTP pools resources, funding and activities to obtain critical mass (human and financial) and benefits from the combination of different expertise and resources available in the different European and developing countries that are collaborating in the programme.

Europe-Japan Opening of the Laboratory for Integrated Micro-Mechatronic Systems (EUJO-LIMMS) (see also Annex E)

The Europe-Japan Opening of the Laboratory for Integrated Micro-Mechatronic Systems (EUJO-LIMMS) is an international cooperation initiative between the Institute of Industrial Science of the University of Tokyo (UT-IIS) and partner organisations (CNRS, EPFL, IMTEK and VTT) from four different European countries. Together they conduct joint academic research in micro- and nanotechnologies, capitalising on the complementary expertise of the different partners, and reinforcing research collaboration between the two regions. The longer-term aim is to apply these technologies to a range of applications, including in electronics, communication systems, molecular and cellular bioengineering and low cost technology.

The initiative stems from an International Joint Unit – known as LIMMS – created between UT-IIS (Japan) and CNRS (France) in 1995. The LIMMS was initially used by CNRS to learn about the new technologies of Micro-Electro-Mechanical Systems from the University of Tokyo and transfer this knowledge to CNRS institutions. However, over time, the relationship became much more mutual and collaborative, involving the mobility of both French and Japanese researchers. More recently, the founding organisations decided to increase the number of organisations involved in the project, by opening up to three new European partners in the consortium. This expanded partnership applied for EU funding through the FP7-INCO-LAB programme, in order to support the European expansion of the initiative (EUJO-LIMMS) and thereby became a joint EU-Member State initiative. The LIMMS expansion is partly funded through the EU's INCO-LAB initiative, which specifically seeks to establish European laboratories in third countries, which can serve as catalysts to structure and increase cooperation.

²⁰ http://www.edctp.org/The_Organisation.724.0.html.

The objectives of the European partners involved are: to define and develop a series of joint projects combining the expertise of new members with that of LIMMS; to have one or more of their researchers hosted in Tokyo for a long stay to develop and complete the selected joint project; to establish an interaction with the EUJO-LIMMS consortium for an extended collaboration plan; and to become an actor of long lasting international collaborative actions between Japan and Europe. EUJO-LIMMS also receives funding from the Japanese Society for the Promotion of Science, which seeks to create world-class research hubs through networking, and to advance multilateral collaboration in cutting-edge fields of science. Its funding contribution is specifically to support the mobility of researchers of the University of Tokyo towards Europe.

EU-CELAC partnership (see also Annex E)

The EU-CELAC partnership (previously EU-LAC) is a bi-regional partnership covering all countries of the European Union and the Commission on the one hand, and all Latin American and Caribbean countries on the other hand. The EU-CELAC strategic partnership and activities have been established with a view to supporting policy dialogue and priority setting. The EU-CELAC partnership was formed to increase the ability to speak with one voice. EU-CELAC is the implementation of a political dialogue at the levels of Heads of State who come to an agreement on broad common priorities.

The main motives of the creation of an EU-CELAC strategic partnership result from strong historical, cultural and economic ties. The close relationship between the EU and Latin America and the Caribbean countries since the Rio de Janeiro Summit (1999) has been focused on the promotion of shared interests and values, and was consolidated during the subsequent summits of Madrid in 2002, Guadalajara in 2004, Vienna in 2006, Lima in 2008, Madrid in 2010 and Santiago de Chile in 2013. With each subsequent summit, political contacts and dialogue have intensified, and there has been progress in dealing with a wide range of issues including climate change, migration, the fight against illegal drugs, the promotion of human rights, education, cultural issues, as well as in the fields of science and technology. Consequently, the EU and its Latin American and Caribbean (LAC) partners decided to consolidate their relationship by creating a Strategic Partnership to convene Summits of Heads of State or Government every other year. Through this Strategic Partnership both regions have jointly decided to focus on themes of common interest: e.g. i) Science, research, innovation and technology; ii) sustainable development, environment, climate change, biodiversity, energy; iii) regional integration to promote social inclusion and cohesion; iv) migration; v) education and employment to promote social inclusion; vi) world drug problem; vii) gender; and viii) investments and entrepreneurship for sustainable development.

In order to support and implement the political and strategic dialogue, a number of operational initiatives have been set up. Indeed, apart from the biennial summits and regular Senior Officials' Meetings, the EU and CELAC are working on a number of specific thematic dialogues and initiatives. Three of the eight above mentioned areas are supported by specific projects: i.e. the Joint Initiative for Research and Innovation (JIRI); the EU-LAC Knowledge Area; the EU-CELAC Structured Dialogue on Migration; and the EU-CELAC Coordination and Cooperation Mechanism on Drugs (COPOLAD).

C – Member State level actions

To assess the EAV of international actions that have been carried out at EU level, or jointly with Member States, one ideally would want to compare these actions with similar actions taken at the Member State level. This could be one way to identify the value added of the former. Individual Member States or groups of Member States do have a range of policies and instruments in place to support international STI cooperation, in parallel to what is happening at the EU level. These include in general mobility schemes, open for extra-EU participants; specific international R&D cooperation schemes, including joint R&D projects; opening up of national STI policy instruments to foreign actors; technological attachés in foreign countries; and multi- and bilateral agreements. At this Member State level, an action is governed by a particular Member State, or a group of Member States, without interference of the European Union. These are for instance national mobility programmes, bilateral programmes or regional (multilateral) Member State undertakings towards for instance MERCOSUR. Other examples are: the participation of EU Member States in 'ASEA UNINET'; the Austrian Appeal Programme to improve quality of teaching and research, management and strengthen scientific dialogue with third countries; the programme for Nordic Innovation projects with Asia, and other parts of the world; the German 'Land of Ideas' campaign

to promote Germany as a location for higher education, research and innovation; the Member States' participation in the Ibero-American programme CYTED; the FinNodes in Finland; and the 1000 PhDs programme in the Netherlands (with China).

What is complicating the assessment of EAV, however, is the lack of sufficient (quantitative and qualitative) data on the specific Member State activities. A previous study on monitoring international STI cooperation in Member States²¹ has showed that data on STI expenditures at the national level is rarely disaggregated into activities related to international cooperation, let alone cooperation with third countries. Moreover, budgetary data for individual agencies, research councils, and other STI funders again suffers from a lack of disaggregation into international cooperation activities. Again, the picture for data on third country activities is worse. This lack of precise data is mostly due to the fact that a large component of international cooperation in research is bottom up, funded by responsive mode research funding programmes. In addition, the international components within research grants often remain 'hidden'. Data on this are not systematically collected by research agencies. The increasing tendency for research agencies to 'mainstream' internationalisation efforts (i.e. not to separate such activities from all other facets of research funding) militates against the collection of relevant budgetary data. There is also a tendency for STI cooperation programmes to address multiple objectives (e.g. science and development, or research and education), which further precludes the precise attribution of budgetary data. Nevertheless, based on the limited financial data that was available for the 10 most active²² Member States that have been studied in 2012/2013 it is estimated that they annually spend between 10 and 20 million euro on international STI cooperation with third countries. In most cases annual budgets for STI cooperation are decreasing.

Thus, in this study a qualitative approach has been taken to get a better view on comparable examples of MS actions versus the EU and joint EU-MS actions. For instance, the SFIC members have been asked to provide their input about the motives and reasons for undertaking actions either at the Member State level, or at the EU level. The results of this consultation will be further discussed in the next sections.

Other partnerships

Besides these three levels, other partnerships already existed long before the Framework Programme or other EU actions came into place, such the European Organisation for Nuclear Research (CERN), the European Molecular Biology Laboratory (EMBL) and the European Synchrotron Research Facility (ESRF). All these are essentially based on Member State (or associated countries) memberships, but with recent opening to the rest of the world. The Commission has signed with a number of these European research organisations (CERN, EUREKA, EUROSTARS, ARTEMIS and ENIAC for instance) administrative arrangements. Even without Union budget however, they would still be 'European' initiatives.

Besides this, the Commission has a long-standing cooperation with international organisations such as the United Nations (UN), the World Meteorological Organisation (WMO), the World Health Organisation (WHO) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO). Not all of them are, however, specifically addressed in this study, although they do participate in actions under the Framework Programme. In that respect, it is clear that while identifying EAV, a careful analysis against different research and innovation objectives and internationalisation objectives is needed. The potential benefits of all these types of actions are many, ranging from benefits for researchers, research organisations, policymakers, industry and the civil society at large.

²¹ Overview of International Science, Technology and Innovation cooperation between Member States and countries outside the EU and the development of a future monitoring mechanism. Erawatch Network ASBL (prepared by Technopolis Group/Manchester Institute of Innovation Research (2013).

²² In terms of international cooperation activities.

The challenge of assessing European Added Value of international STI cooperation

European Added Value as multifaceted condition for Union action

All EU policy initiatives must respect the principle of subsidiarity as defined in Article 5 of the Treaty establishing the European Community²³. This is the principle whereby the Union does not take action unless it is more effective than action taken at national, regional or local level. When examining whether Union action is justified, one must analyse two aspects:

- Why can the objectives of the proposed action not be achieved sufficiently by Member States?
- As a result of this, can objectives be better achieved by action by the Union (test of European Added Value)?

Also for actions taken to support and stimulate science, technology and innovation this principle is of great importance. A paper by Erik Arnold²⁴ on the long-term impacts of R&D funding showed that the Framework Programmes (FP) had, from the start, as a core objective to create additional added value. However, the paper by Arnold also shows that the concept of EAV has evolved over time. The concept was initially based on what was called the 'Reisenhuber criteria' in order to justify Community support for R&D. These criteria stated that funding research by the European Community is legitimate in the following cases:

- Research conducted on such a **vast a scale** that single Member States could not provide sufficient financial means and personnel;
- Research which would obviously **benefit financially** from being carried out jointly, after taking account of the additional costs of international collaboration;
- Research which would achieve significant results in the whole of the Community for **problems on the international scale**, owing to the complementary nature of national efforts;
- Research which contributes to the **cohesion of the common market** and which promotes the unification of European science and technology, as well as research which leads where necessary to the establishment of uniform laws and standards.

Due to the extension of the scope of the Framework Programmes to include basic research, another criterion was added: the **development of scientific and technical potential** in Europe. During FP5, the focus further shifted towards a more societal orientation in order to support the use of new technologies and solve the so-called European paradox. The creation of the European Research Area (ERA) should lead to the creation of a common market in research and to increase the European research competitiveness. During FP6, according to Arnold, the Commission expanded the definition of EAV therefore further: from the collaboration of teams, towards allowing researchers in any of the Member States to compete with all other researchers to win funding, making **competition** a new definition of EAV. In FP7, EAV was again further extended towards this idea of competition for individual researchers through the establishment of the ERC and the 'Article 185' initiatives such as the European Developing Countries Clinical Trial Partnership (EDCTP), which was introduced earlier, but also the Joint Programming and Joint Technology Initiatives that support a bottom-up development of joint strategic research agendas. This evolving character of the concept of 'European Added Value' of research support through the FPs, is shown in **Figure 9** derived from the paper by Arnold.

²³ Terms of Reference of the specific contract 'Assessment of the Impacts of International Science & Technology Cooperation Activities' SMART 2012/0040 which is leading for this study.

²⁴ Arnold, E. (2012). Understanding long-term impacts of R&D funding: The EU framework programme Research Evaluation first published online October 25, 2012.

Figure 9 The Evolving Character of 'European Added Value'

Dimensions of European Added Value	FP1	FP2	FP3	FP4	FP5	FP6	FP7
	84	87	90	94	98	02	07
	-	-	-	-	-	-	-
	88	91	94	98	02	06	13
Scale too big for Member States to handle alone							
Financial benefits: a joint approach would be advantageous							
Combines complementary MS efforts to tackle European problems							
Cohesion of European markets							
Unification of European S&T across borders							
Promotes uniform laws and standards							
Mobilising EU potential at European and global level by coordinating national and EU programmes							
Contributes to implementing EU policy							
Contributes to societal objectives (later 'grand challenges')							
Exploits opportunities for the development of European science, technology and industry							
Structures the EU R&D community and 'fabric'							
Improves quality through exposure to EU-wide competition							

Note: The first six rows are the Reisenhuber criteria. Source: Arnold, E. (2012).

Thus, the principle of EAV has evolved over the past years from "adding value to national efforts through scale and networking to playing a role in coordinating Member State policies and taking wider actions in support of EU-level Policy"²⁵. This is shown for instance by the change of focus of the Union's instruments from focus on collaborative research to other areas such as researchers' mobility.

The topic of European Added Value has been subject of various previous studies that recognise the challenges associated with defining and measuring it. EAV is a multi-faceted concept with different meanings to different actors. Moreover, the EAV strongly relates to the drivers and motives of these different actors for the specific actions they are involved in, and consequently relates to different types of impacts and benefits for them.

A study by the Institute for European Environmental Policy (IEEP)²⁶ expresses this clearly: "there is no commonly shared understanding of EAV as a concept in itself, for both methodological and political reasons. Some relate the EAV concept to legal EU principles such as subsidiarity and proportionality, some refer to an economic efficiency rationale, while others argue that it implies solidarity and the dissemination of best practice across the Union." As Stampfer²⁷ states: "what seems to be problematic is that so many laudable goals have been packaged and sold under the heading EAV. While this again can be understood, it seems to have consumed the possibility to talk in a sensible way about our topic: EAV can stand for nearly anything." A challenge related to this "multi-purpose use" is that EAV is also "unfortunately often used in an inflationary way...bearing the risk that the phrase is turned into "fashionable buzz-words" that quickly lose their meaning."²⁸ This multi-use and trendiness makes it a concept difficult to quantify (some experts have even rated it as a "mission impossible").

²⁵ European Policy Evaluation Consortium (EPEC), Understanding the Long Term Impact of the Framework Programme, Final Report, 5.12.2011.

²⁶ Institute for European Environmental Policy – 2012: Criteria for maximising the European Added Value of EU budget: the case of climate change with references to Ederveen, S., G.Gelauf and J. Pelkmans (2006), European Commission (2007); Tarschys, D (2005), Gros, D. (2008), Molino, E. and Zuleeg, F. (2011), Vertes, A. (2011) ; EC (2011) The added value of the EU budget, Commission staff working document accompanying the Commission Communication 'A budget for Europe 2020', SEC(2011)867, 29.6.2011, Brussels.

²⁷ Michael Stampfer – 2008: European Added Value of Community Research Activities -Expert analysis in support of the Ex Post evaluation.

²⁸ Salvador Garriga Polledo – 2010: Reflection Paper on the concept of European Added Value with references to D. Tarschys: The Enigma of European Added Value (SIEPS 2005) and Yellow Window Management Consultants SA/NV, Technofi SA, Wise Guys Ltd. - 2000: "Identifying the constituent elements of the European Added Value (EAV) of the EU RTD programmes: conceptual analysis based on practical experience" Final Report.

Moreover, since many activities and programmes combine various policy drivers, often goals and envisaged outcomes and impacts are not well defined and (expected) effects are rarely specified or operationalised. The absence of good insights into the benefits and impacts of STI cooperation activities thus provides a real challenge for the identification of major areas of EAV, which is a key topic of this study report.

There are a number of examples within the European Commission that make an effort to grasp the EAV of several actions. One example comes from DG SANCO and its Consumers, Health and Food Executive Agency (Chefa). Chefa (previously EAHC) has developed 7 'added value criteria' and a scoring system (or fitness check) to measure its actions based on these criteria. These are 1) the promotion of best practice, 2) networking, 3) economies of scale, 4) implementation of EU legislation, 5) benchmarking for decision making, 6) cross-border threats, and 7) free movement of people. More information on this scoring system can be found at: http://ec.europa.eu/health/programme/docs/ev_20120503_eu_added_value_en.pdf

Assessing EAV of international STI cooperation

Little work has been carried out on assessing EAV that arises specifically from international STI cooperation activities of the EU. Therefore, within the context of this study there is a need to operationalise the concept of EAV in a way that is helpful for the identification of future policymaking and strategic prioritisation. Some first remarks can be made on the conceptualisation of EAV of EU STI actions and on EU-Member State partnership in international STI cooperation.

First, a clear understanding is needed of the drivers and objectives for policy action. The study²⁹ (2009) performed by the Technopolis Group and the Manchester Institute of Innovation Research, and related conference on drivers for international STI cooperation identified a number of motives (as also mentioned before) to engage into EU-MS STI collaborations, such as for instance the ability to speak with one voice, the ability to set common rules and regulations for STI-cooperation and the ability to support capabilities in developing countries with more impacts due to opportunities of scale. Second, it should become clear who is best suited for developing and implementing the policy action and activities. Third, an understanding is needed with what modalities the impacts and benefits will likely be the largest. Thus, defining EAV needs to be based on the questions: 1) what are the policy priorities (and for whom: policymakers, researchers, research organisations, or industry?); who should support it (EU or MS/Local/Regional) and in what way should it be done if on EU level (effectiveness of spending)? As we already discussed in the previous section, based on the EAV principles, EU action is only justified if there is a clear additional benefit from collective efforts, compared with action by Member States. Moreover, the benefits should exceed those that would have been realised in the absence of public expenditure.

In a strict sense, to define the circumstances under which actions are more effective if carried out at the EU level compared to the national or local level, a comparison should be made of the actions that are carried out at these different levels. Moreover, in the ideal world, effects of international cooperation activities should be quantified. However, comparing activities as well as quantifying the outputs is in practice a very challenging task, as has already been argued. First, for a number of EU actions there are not always comparable national support mechanisms in place. In this case, when the EU or EU-MS action provides for a solution for an existing problem, the action provides automatically 'added value' for the beneficiaries. Simply said, there was no alternative available at the Member State level. This can be called **input additionality**³⁰. The question, however, remains whether the EU or joint EU-MS action was the most effective support mechanism to solve the problem.

In case there is a comparable national support mechanism in place, added value can only be realised when the EU or EU-MS action provides for a leverage of the output, outcome, or impact. For instance, because of the EU action performance of the international STI cooperation is faster, better, or more efficient (**process additionality**) or more effective (**output additionality**). To measure this, clear data and information are needed about the inputs, outputs, outcomes and impacts of the measures on both levels. Unfortunately, this information is in many cases not (yet) available, especially at the national level. At the EU level, a number of studies about participation in the FP and European programmes such as COST and EUREKA provide good information as well as a

²⁹ Drivers of International collaboration in research. Final Report. European Commission 2009. ISBN: 978 -92 79-14232-1 Edited by Technopolis Group and Manchester Institute of Innovation Research.

³⁰ Michael Stampfer – 2008: European Added Value of Community Research Activities -Expert analysis in support of the Ex Post evaluation.

limited set of evaluations of multi-lateral programmes. They, however, mostly focus on the STI outcomes and impacts as such, and do not include a component that provides insights into the effects and impacts on the cooperation and cooperation mechanisms, which would be useful in order to get a better idea of the added value of organising STI cooperation at the Member State level or bilaterally, at the EU level, or jointly with EU and Member States. An example is provided in the box below with regards to the STI agreements between the EU and third countries.

STI agreements

The European Union has concluded bilateral STI agreements (STA) with a number of individual (third) countries. These agreements constitute a framework and a privileged forum to identify common interests, priorities, policy dialogue, and the necessary tools for STI collaboration. In parallel, the Member States (MS) also have signed agreements with many of these countries individually. In the case of the US for instance, the EU, MS, public and private entities together have signed a large number of bilateral and multilateral agreements on specific issues. A parallel study on STI agreements³¹ shows that there are three types of objectives that are being mentioned in these agreements. For EU agreements these are usually related to the facilitation of the cooperative activities in fields of common interests, while for the individual Member States, the increase of general welfare and explicit diplomacy objectives play a role as well. Most of the EU STAs have been evaluated or will be evaluated, but at the level of the Member States, evaluations are largely lacking.

So what do we know about the added value of these EU STAs? An ERA expert group concluded already in 2008³² that the EU STI agreements are useful tools for a structured S&T dialogue and for developing cooperation frameworks. It was also concluded, however, that future STAs should be more specific about goals and objectives and strategies. Criteria should be developed for assessing delivery against goals. It appeared that MS were often not (sufficiently) involved in elaborating and implementing the STAs. Moreover, objectives are often set in very broad and general terms, which make a (quantitative) assessment difficult, and no structural use of indicators is being noticed³³. This makes evaluating added value also a very challenging task.

To zoom into a specific example one can look at the EU-US cooperation. The EU-US STA led to the SFIC initiative to set up a joint EU-MS partnership with the US in which the Member States could work vis-à-vis the US. The general goal was *"to push cooperation through the development of a Strategic Research and Innovation Agenda (SRIA) which offers a general view of the priorities set up by EU Member States with the US"*³⁴. This initiative included workshops and conferences and stimulated mutual learning and sharing of best practices. The joint partnership was based on a strategic roadmap established by the SFIC that will be further developed throughout 2014. This, together with the opening up of Joint programming initiatives for countries such as the US, is expected to boost the cooperation between MS and the US.

Despite the difficulties mentioned before about assessing the impacts and added value of the STA, the evaluation of the EU-US STA in 2013 did point towards a number of effects and impacts of the cooperation between the US and EU MS in FP7, based on the STA. BILAT-US and Link2US for instance seem to provide an important 'one stop shop' with information and advice regarding proposal and project administration, policy developments in the US and EC and potential partners. During a joint EU-MS workshop about cooperation with the US, a number of issues were mentioned that point towards the potential added value of the EU-US STI agreement over the individual MS agreements:

- Coordination at the EU level leads to speaking with 'one voice', and by clearly expressing the potential for cooperating on shared grand challenges, the attention of the US agencies and researchers could be attracted.
- A new focus could be put on collaborative innovation, although Intellectual Property (IP) regimes and identifying the right US counterparts might be problematic.
- In the framework of Horizon 2020, EU and joint EU-MS instruments could be instrumental for the increase of cooperation with US, such as the Joint Programming Initiatives (JPIs), the European Institute of Innovation and Technology (EIT) – Knowledge and Innovation Community (KICs), the EU's Entrepreneurship and Innovation Programme (EIP) and the Future and Emerging Technologies (FET) flagships. The EU-US STI agreement provides the opportunity to rethink the options for implementing these initiatives together with the US.

The Strategic Forum for International S&T Cooperation (SFIC) has been discussing the issue of EAV in relation to STI cooperation policy internally and in stakeholder consultations³⁵. In their view,

³¹ Fikkers, D.J. and Horvat, M. (2014). Basic principles for effective international Science, Technology and Innovation agreements. Draft report for the European Commission. Technopolis Group, 2014.

³² European Commission (2008). Opening to the world, international cooperation in Science and Technology. Report of the ERA expert Group.

³³ Fikkers, D.J. and Horvat, M. (2014). Basic principles for effective international Science, Technology and Innovation agreements. Draft report for the European Commission. Technopolis Group, 2014.

³⁴ Acheson, H & Léon, G (2013) Evaluation of the EU-US agreement on S&T. Final report for the European Commission.

³⁵ Third Report of Activities of the Strategic Forum for International S&T Cooperation (SFIC).

working effectively together will increase the attractiveness of Europe's research and innovation environment and foster better conditions for investment and acquisitions in key markets. A part of SFIC's role is to contribute to the European strategy for international STI cooperation by setting priorities and better coordinate existing measures. SFIC therefore needs to: "*identify areas in which coordinated or joint initiatives provide added value compared to bilateral activities*"³⁶. This study should support the future priority setting and policy making of the EU on international STI cooperation.

SFIC has proposed a **definition of European Added Value** as a way to identify a common EAV approach on the external dimension of the ERA. This should guide SFIC activities and be embedded in its future work. According to this definition, EAV in the external dimension of ERA is achieved when EU/Member State-driven international STI activities are directly related to:

- **Scale and complexity:** These are international STI activities of such scale and complexity that no single Member State can provide the necessary financial or human resources, and hence need to be carried out at European level in order to achieve and develop critical mass; and to reduce the research or commercial risk for one single country or organisation. Interesting examples are for instance the European and Developing Countries Clinical Trials Partnership and the Human Frontier Science Programme.
- **Coordination of the EU and MS STI potential:** These are international STI actions that contribute to the development of the external dimension of the European Research Area (ERA) by promoting EU and Member States' STI potential emerging from European science and technology policies and programmes in a global context and work in international fora as well as research that may lead (when necessary) to the establishment of uniform international rules or standards.
- **Enhanced European knowledge base:** International cooperation that contributes to increasing the excellence and attractiveness of European research and innovation. This includes improving STI capabilities, enhancing mobility, and increasing the research competition by for instance developing European research infrastructures.
- **Economic impact, efficiency gains and financial benefits:** International action at European level or EU/MS partnerships vis à vis third countries that have an economic impact, either in the form of efficiency gains (e.g. simplification and streamlining, pooling and more efficient use of scarce public resources, etc. allowing avoidance of duplication and rationalisation of efforts) or financial benefits (even after considering all costs and risks inherent in international cooperation). This can include for instance the leverage public funding can have on private investment.
- **Societal/grand challenges:** International STI activities that focus on specific societal/grand challenges that are shared across Europe (pan-European) and with third countries.
- **European values:** International cooperation at EU-level that can enhance European values in cooperation with third countries (i.e. mutual interest, respect, reciprocity).

As it is stated in the third Report of Activities of SFIC, the EAV of international cooperation is: "*the possibility of choosing the level of cooperation from the perspective of the mutual interest of the partner country and the MS/AC/European actor*". SFIC also recommended in the report that further definition of the EAV is needed, in particular identifying the benefits of EU/MS international cooperation at European level and the complementarities between the EU and MS level. This will help to further develop a strategy for the external dimension of the ERA with impacts for researchers, institutions, companies, and policymakers. This study attempts therefore to provide useful information for the further development of this strategy, in line with the recommendation, and to conceptualise the EAV while identifying possible metrics for measuring it. The main objective is not to come up with another set of differently formulated statements about EAV, but to identify those areas where added value can be the largest ('major' areas of added value) and the circumstances under which the outcomes of actions are most effective if carried out at EU level, or jointly with the MS.

³⁶ Third Report of Activities of the Strategic Forum for International S&T Cooperation (SFIC), 2012, (ERAC-SFIC 1353/12).

2. MAJOR AREAS OF ADDED VALUE OF INTERNATIONAL STI COOPERATION ACTIONS AT EU AND JOINT EU-MS PARTNERSHIPS

European Added Value is a highly subjective concept, as we have argued before. What is clear however is that there are at least two major audiences with respect to international STI cooperation actions: researchers and their organisations, from both the public and private sectors, and policymakers. For the understanding of EAV, the distinction between the researcher and the policymaker levels is critical, since both audiences have highly divergent motives for engaging in international STI cooperation, and different expectations of its outputs, outcomes and impacts. Correspondingly, there will be a set of policy actions (or instruments) by which these motives/drivers may be more or less effectively achieved for each of these groups of actors. Finally, each of these actions should produce a number of outputs (and related indicators) that might have some use in assessing and measuring the notion of EAV. In this section we analyse the study results about the main motives and drivers for researchers and policymakers to engage in international STI cooperation and their views on major areas of added value. This leads to the proposal of an update of the SFIC criteria of added value based on this prioritisation. Finally, in this section a proposal is made for a number of indicators in order to assess in the future whether these criteria are being reached through a 'EAV check'.

Rationales for and expected benefits of international STI cooperation vary greatly depending on actor, domain and level of application

Based on previous studies and the current data collection, we have identified what the rationales are to cooperate internationally in the STI domain, and what the differences are between rationales for researchers, research organisations and policymakers.

The literature on the topic of internationalisation in S&T³⁷ reflects this division of rationales. The first strand found is the 'bottom-up' internationalisation of science ('narrow' paradigm³⁸) that is international collaboration dynamics stemming from the activities of researchers and research organisations themselves. The second strand is public policy towards the internationalisation of science ('broad' paradigm). In the 'narrow' paradigm, main drivers are to improve the quality, scope and critical mass in science and research by linking national resources and knowledge with resources and knowledge in other countries. The focus is on scientific problem solving, and building up national STI capabilities through international cooperation and integration into international networks of knowledge circulation. In the 'broad' paradigm, STI cooperation can be a means to reach other policy objectives, such as improving national STI and economic competitiveness, capacity building in developing countries, creating political stability, and solving global societal challenges, to name a few. The weight of the broader drivers seems to have increased in the past few years due to external trends.

The 2009 study on drivers for international cooperation in science, technology and innovation (STI)³⁹ showed that the focus on STI cooperation for certain Member States with non-EU countries is often based on the existence of competence in the respective countries, historic path dependencies, language or geographical proximity. For individual researchers and research organisations (public or private) on the other side, drivers to cooperate with countries outside the EU vary from intrinsic scientific drivers to personal and career motivations, but also are driven by more pragmatic reasons such as available funding, instruments and policies. In their study on global science, Wagner & Leydesdorff⁴⁰ support this distinction and conclude that researcher-driven

³⁷ Based on the literature review that was performed as part of the study 'Overview of international science, technology and innovation cooperation between Member States and countries outside the EU and the development of a future monitoring mechanism'. DG Research and Innovation, 2013. Carried out by Technopolis Group and Manchester Institute for Innovation Research.

³⁸ Drivers of International collaboration in research. Final Report. European Commission 2009. ISBN: 978 -92 79-14232-1 Edited by Technopolis Group and Manchester Institute of Innovation Research.

³⁹ Drivers of International collaboration in research. Final Report. European Commission 2009. ISBN: 978 -92 79-14232-1 Edited by Technopolis Group and Manchester Institute of Innovation Research.

⁴⁰ Wagner, C. S., & Leydesdorff, L. (2005a). Mapping Global Science Using International Co-authorships: A Comparison of 1990 and 2000. *International Journal of Technology and Globalization*, 1(2), 185–208.

scientific cooperation is often based on a self-organising phenomenon related to preferential attachment, i.e. researchers prefer co-authors with a central place in the network in order to raise their own visibility. In many cases, individual researchers work in search for recognition and reward, from a self-interest and their own career perspective. Cozzens et al. (2011)⁴¹ further specify this and argue that cooperation is made up of a combination of the following three types:

- Career-oriented cooperation, initiated by research professionals;
- Research project-oriented cooperation, with a primary focus on producing research, usually involving two (or more) senior researchers;
- Sponsor-initiated cooperation, in response to a government funding programme or the request of a particular industrial sponsor.

Cozzens et al. (2011) also stress the importance of the different domains of research and their impact on the research cooperation motives and drivers. While in the field of neutron scattering for instance the cooperation is based on complementary skills with a focus on advancing science, cooperation in the field of bio-fuel research is rather driven by commercial interests and opportunities and based on the availability of (scarce) commodities⁴².

Furthermore, the motives and drivers for international STI are largely associated with the concept of EAV. Both policymakers as well as researchers expect a number of outputs, outcomes and impacts preferably benefitting from international STI cooperation. These are naturally interwoven with the reasons to cooperate. Several attempts have previously been made by a number of authors to list these benefits.

The interviewees of this study have also further specified that the actors involved in international cooperation in *innovation* also differ from the actors involved in cooperation in *research*. Therefore, the reasons for cooperating in innovation versus cooperating in science vary, as well as the expected impacts and benefits and the perceived EAV. Based on our previous and current studies on this topic we have separated the broad reasons (or goals) and a range of (expected) benefits for international STI cooperation for researchers on the one hand, and policymakers on the other.

Figure 10 Reasons and expected benefits of cooperation with third countries

Reasons to cooperate	Expected benefits of international STI cooperation
Policymakers	
1. Improving the policy dialogue between countries on STI	<ul style="list-style-type: none"> • Improved policy networks and partnerships • Maintenance of historic ties
2. Establishing a cooperation Framework	<ul style="list-style-type: none"> • Improved mutual trust
3. Developing common rules and regulations	<ul style="list-style-type: none"> • Stronger bi- and multilateral relations
4. Improving research excellence in own country, or region (for EU countries as well as for third countries) and STI capabilities	<ul style="list-style-type: none"> • Improved influence in regulatory regimes or standards • Better alignment of agreements on cooperation • More efficient and effective cooperation processes between countries and organisations
5. Increasing economic competitiveness and innovation	<ul style="list-style-type: none"> • Leveraged co-investment in research, development and innovation
6. Attracting/retaining/developing human resources for STI in both EU/MS and third country	<ul style="list-style-type: none"> • Opening up of markets for innovations • Enhanced quality of national research base and the national research sector
7. Improving the international political and diplomatic climate	<ul style="list-style-type: none"> • Improved research networks and partnerships
8. Improving policy monitoring, benchmarking and learning	<ul style="list-style-type: none"> • Improved policy learning
9. Support STI capacity building in developing countries	<ul style="list-style-type: none"> • More efficient and effective policies in place
10. Solving international (global) challenges	<ul style="list-style-type: none"> • Better insights into best and worst practices of countries
11. Supporting dissemination and outreach of STI activities and outputs to other countries	<ul style="list-style-type: none"> • Broad uptake of STI outcomes

⁴¹ Cozzens, S., Bal, R., Berger, E., Thakur, D., & Wang, J. (2011). Changing Roles for the Global South in International Collaborative Learning. *International Journal of Institutions and Economies*, 3(3), 445–466.

⁴² Examples derived from: Steinz H. (2012) The changing approach towards developing countries in international STI cooperation.

Researchers and research organisations (public and private)	
1. Establish cooperation networks with leading minds and preferred partners	<ul style="list-style-type: none"> • Better quality research team, decreased cognitive distances between partners • Maintenance of existing collaborations and improved networks • Better access to complementary knowledge, expertise, skills and research subjects • Improved mutual trust and shared costs and risks • Faster and better tackling of complex scientific and technical problems that cannot be solved with domestic resources alone • Increased number of co-authored papers published in high-ranking journals • Improved access to foreign markets for knowledge and innovation dissemination • Improved impact and visibility of one's research or organisation • Increased access to funding for research and innovation • Improved access to (a new) scientific labour market
2. Improve scientific critical mass on a particular topic or in a particular domain	
3. Improving research excellence, scientific quality (personal, or research group/organisation) and STI capabilities	
4. Increase access to funding for research	
5. Raising (personal) impact and visibility and speeding up career development	

Source: Technopolis Group and Empirica based on literature review and interviews.

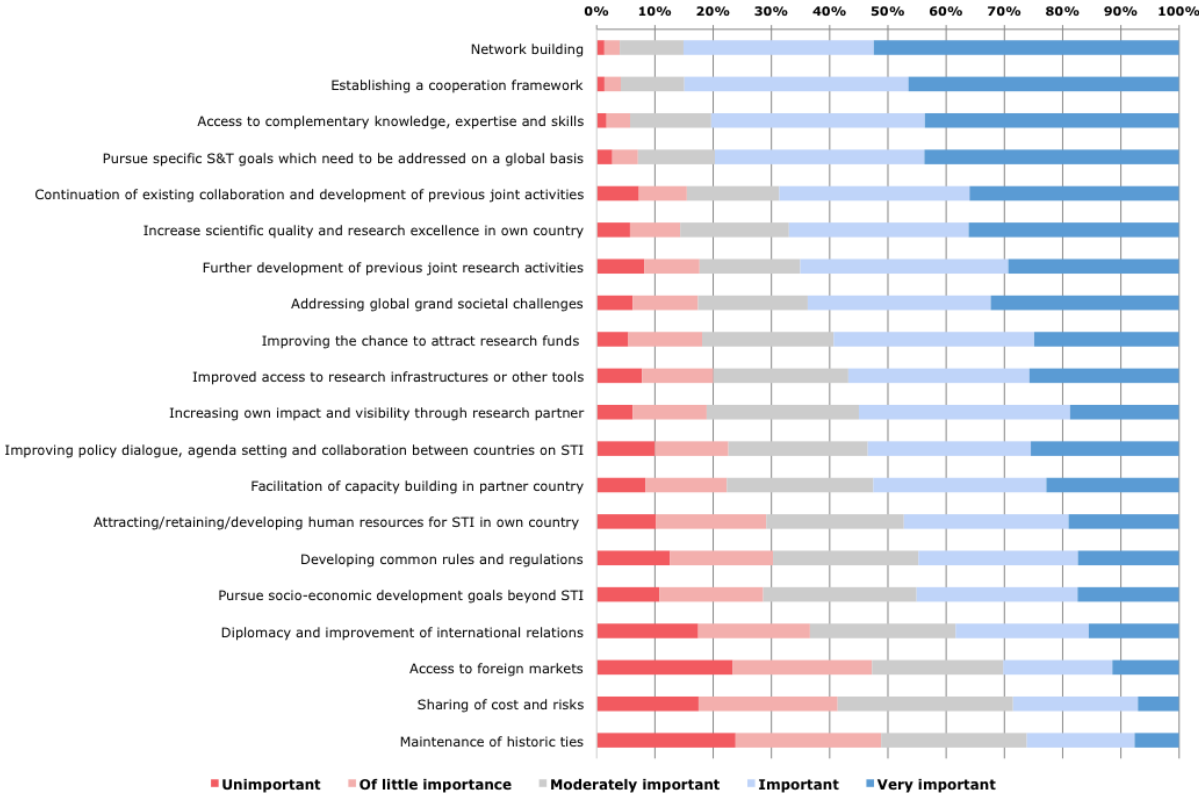
Areas of European Added Value

Based on the long-list of reasons and motives to cooperate internationally we have asked project participants in FP7 and the INCO-NCPs why they would prefer to make use of the EU and joint EU-Member State actions, and in particular why they prefer the EU FP7 instruments to the national ones, if so. In other words, what makes the European Union action of added value? Although limited, we have also found some empirical evidence of the circumstances under which the EU action is most effective, which leads to a selection of 'major areas of added value' for international STI cooperation at the end of this chapter.

Network building and establishing a cooperation framework are the major reasons and (expected) benefits for international cooperation in European and joint EU-MS STI cooperation actions

The study survey results show, by means of the next graph, that the most important reasons for engaging in international cooperation in FP7 for research project participants from the EU countries were network building; establishing a cooperation framework; gaining access to complementary knowledge, expertise and skills; pursuing specific STI goals, which need to be addressed on a global basis; being able to continue existing collaboration and further development of previous joint research activities; and improving the chance to attract research funds. For non-EU respondents, increasing scientific quality; attracting/retaining/developing human resources for STI; and improving the policy dialogue seems to be of higher importance than for the participants from EU countries. The least important reasons for the FP participants seem to be pursuing socio-economic development goals beyond STI; improving the diplomatic climate; access to foreign markets; sharing of costs and risks; and the maintenance of historic ties.

Figure 11 Reasons to collaborate in FP7 for research project participants (EU and non-EU)



Source: Technopolis Group and Empirica research project participants survey (2013).

The research project participants were also asked about the expected areas of impacts of the projects they have been engaged in together with (non) EU countries. Improved networks in the domains of their work and the established cooperation frameworks scored highest, together with increased dissemination and outreach. The survey results also show that it is expected that the results and impacts contribute to addressing grand global challenges, although this was not always a primary reason to engage in international STI cooperation. The response was not unambiguous with regard to a number of (expected impacts). Less than half of the sample of participants in FP7 for instance thought that the projects (would) result in the development of common rules and regulations, or improved mobility (outbound and inbound).

Overall, the respondents of the non-EU countries in the FP7 research participants’ survey are more positive about the (expected) impacts of the FP7 cooperation than the EU country respondents. They were more positive about the results with regards to the improvement of mobility than the EU respondents. They were also slightly more positive about the impacts with regards to improved research excellence both in the own country as well as in the partner country, and the development of joint research infrastructures.

In the INCO NCP survey, only a few respondents (22,3%) thought that through STI cooperation activities in FP7, significant spillovers were generated on foreign markets. Also, not many respondents thought that it had a significant impact on the sharing of costs and risks. About 51% thought that FP7 international cooperation activities had an impact on competitiveness and innovation.

Figure 12 Main differences in EU and non-EU responses

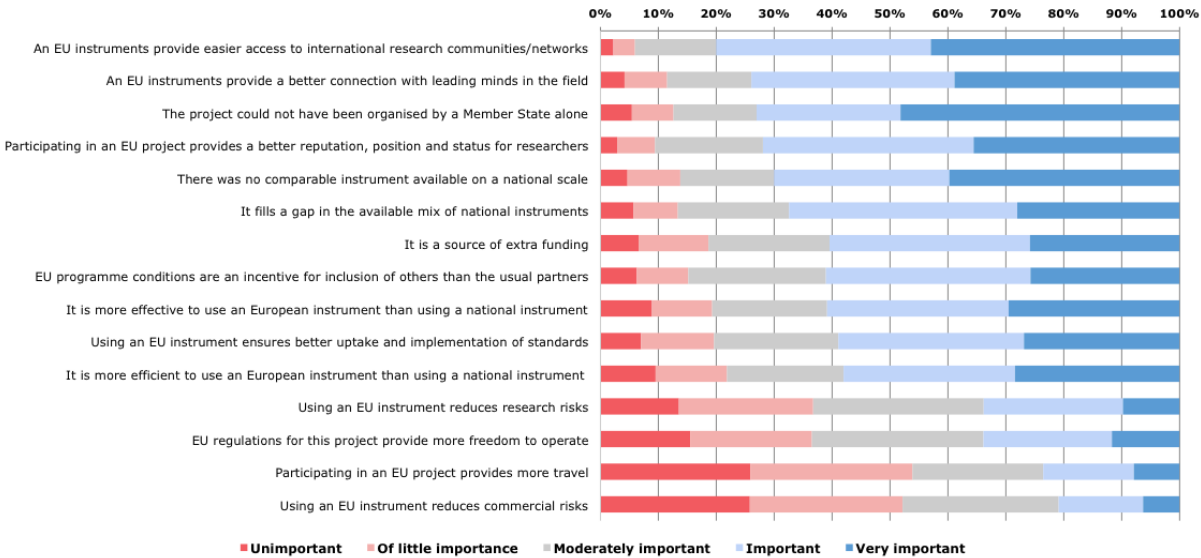
	Reasons	(Expected) benefits
Main differences between EU and non-EU respondents	Of higher importance for non-EU respondents are: a) Increasing scientific quality; b) Attracting/retaining/developing human resources for STI; c) improving the policy dialogue.	Overall, the non-EU respondents are more positive about the (expected) impacts. In particular with regards to: a) the improved research excellence in their own and the partner country; b) the improvement of mobility.

Source: Technopolis and Empirica based on surveys and desk study.

EU and joint EU-MS actions provide easier access to networks, better connections with leading minds and a certain scale and scope compared to national actions

To better understand what the added value of the EU action (or joint action) could be, compared to the national actions, the survey participants were asked about their preferences of EU actions over national actions. The results are very much in line with the networking objective as mentioned earlier. The participants first of all answered that the EU action provides **easier access** to international research communities and networks and **better connections** with leading minds in the field. In the interviews, this was also mentioned as one of the major reasons for participating in FP7 international cooperation. Both for EU as well as non-EU countries the action provides for a greater pool of researchers and organisations than the individual researchers and organisation never would have been able to access on their own. Even the policymakers and researchers in countries that have an active international cooperation policy, such as Germany and France, mentioned that because of the EU action, they get easier access to networks and the leading minds both within Europe as well as beyond. Although it is for them not a replacement of their own internationalisation strategies, the EU action adds to the existing activities, provides valuable information and **efficient intelligence** about the strategies of the other EU countries and their contacts in the world. Many respondents also mentioned that without the EU action the project could not have been organised, which implies that a certain **scale and scope** is needed to be able to organise it.

Figure 13 Reasons to prefer FP7 to national supporting mechanisms



Source: Technopolis Group and Empirica research project participants survey (2013).

The opinions of the EU respondents did not differ much from the non-EU respondents. However, the non-EU respondents were slightly more positive with regard to the fact that the EU instrument

was more effective and efficient than the national ones, that it could not have been organised by a (member) state alone and that there were no comparable national instruments available. They were less positive about the statements that the EU instrument provided for more freedom to operate or provided more travel opportunities.

A number of 'other' reasons were mentioned by the EU interviewees pointing at important factors of added value such as that the national perspective would lead to **fragmentation and duplication** of research effort and that the EU action provides a **more concrete regional approach** to the spirit of international cooperation research rather than a bilateral approach, which is often the case of national funding.

Moreover, a number of the interviewees mentioned that cooperation at the EU level may have various advantages for third countries: it likely **increases the geographic scope** and allows **outreach to an increased number of countries**. This can not only lead to **greater networking opportunities** but also to a **higher visibility** for the third country, **greater market access**, and **easier (or quicker) access to European research and technology**. A certain amount of **prestige** and excellence-guarantee has also been mentioned. These motivations are, according to the interviewees, even more important to developing countries since they are highly dependent on international cooperation to carry out research, as national resources are limited and insufficient. For a country such as Japan, on the other hand, it is more important to catch up on developments in areas they have not focused on previously, but are now recognising as vital, and they see that Europe has made more progress in that particular area (e.g. sustainable energy).

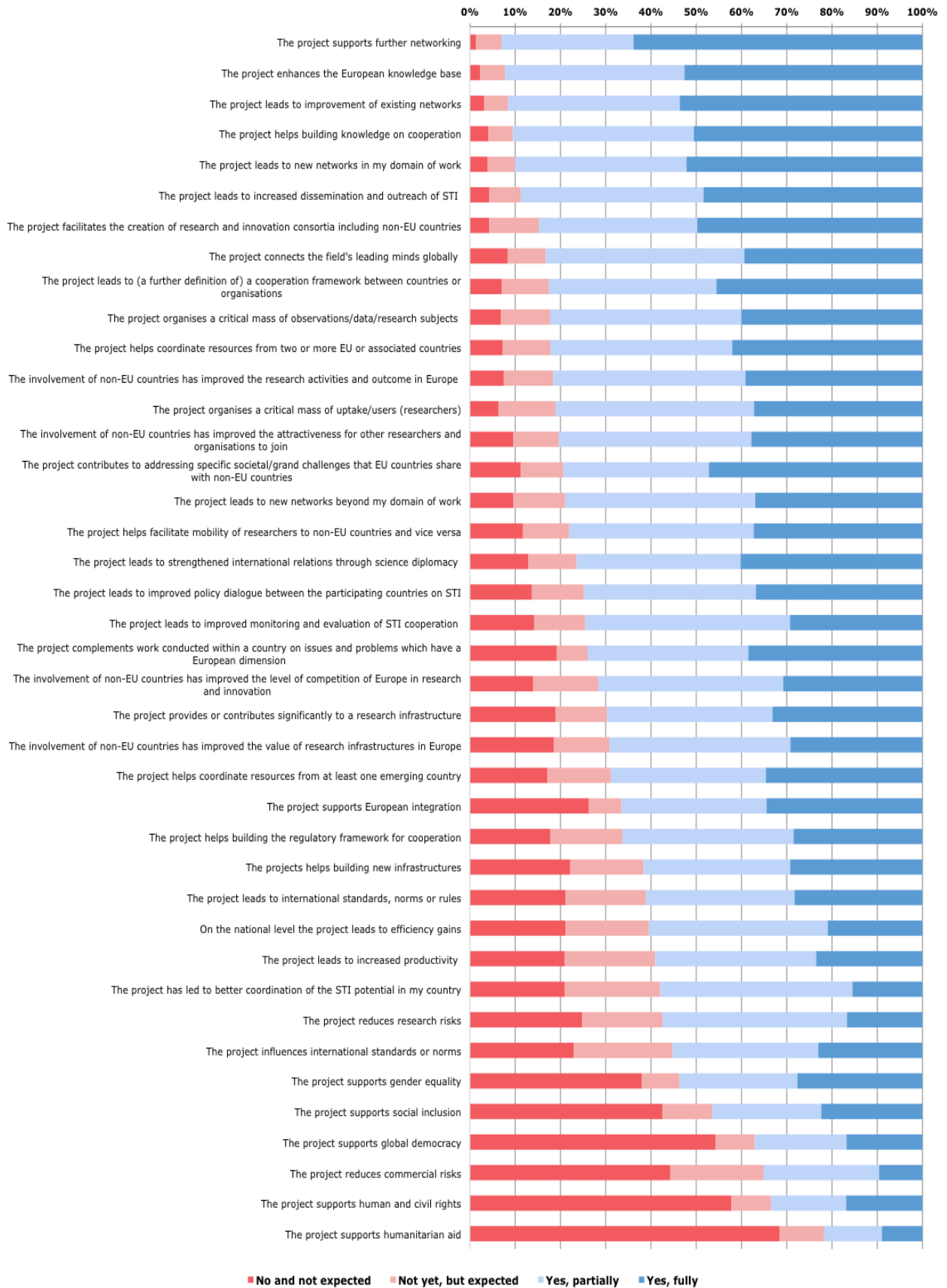
The research project participants' survey also shows a clear overview of the different areas of added value ranked by importance for their projects. Although it does not tell us whether the impact could have been achieved if the action was organised at the Member State level, it provides a good overview of the major impact areas of the FP projects. Practically all (> 90%) project participants state that their project fully or partially:

1. Support further networking and lead to the improvement of existing networks;
2. Enhance the European knowledge base;
3. Help to build knowledge on cooperation;
4. Lead to increased dissemination and outreach of STI;
5. Connect leading minds globally.

A significant group of respondents (about 40% or more) does not expect their project to contribute to broader societal goals such as supporting gender equality, social inclusion, global democracy, humanitarian aid and civil rights. They also do not expect their projects to contribute to the reduction of commercial risks. The responses of EU participants do not differ greatly from the non-EU respondents, although the latter are (again) overall slightly more positive about the outcome and impacts of their projects. EAV seems indeed to be less evident in domains close to market and in competitiveness activities (such as the reduction of commercial and research risks and a better uptake and implementation of standards and regulations).

On average, the answers from respondents at higher or secondary education institutes (HES) and research organisations (REC) are slightly more positive on EAV than the answers of those at private for profit (PRC) organisations and public bodies (PUB). The largest differences between the answers from these groups of respondents can be found in the outcomes and impacts related to the external policies and European values.

Figure 14 Current outcome and impact expected of FP7 projects as indicator for EAV



Source: Technopolis Group research project participants survey (2013).

Assessing the EAV routes of international STI cooperation through practical examples

It appeared to be very challenging to assess the added value of the current activities of FP7 with regard to international cooperation in more detail, let alone to quantify the value added. In some cases the general actions (or instruments) and their specific actions are clearly described in terms of objectives, expected added value and so on, but more often the links between the objectives, activities and expected impacts as well as a clear view on expected European Added Value is missing from the official documentation. Based on desk research and existing evaluations, interviews and case studies we have attempted to understand the EAV routes a little better.

Chinese participation in FP5 and FP6: Example of European Added Value for EU and third countries

A survey carried out for the evaluation of the Chinese participation in the EU Framework Programmes 5 and 6 shows that the European involvement in the previous FPs added value to existing as well as new partnerships. It summarised that *"Participants of the surveys tended already to have international patterns of collaboration and competition with China. However, almost three quarters of participants' relationships with Chinese partners were new, so the Chinese participation in the FPs is part of a process of building networks across the EU and Chinese R&D communities. In 30-40% of cases, this study shows, the network relationship led to visits and closer contacts. EU participants were three times as likely to build on their Chinese relationships when looking for further international R&D funding as they were to omit them from the next application."* Moreover, the study showed that Chinese participation happened as a result of an EU-based partner's initiative and that the main reasons for seeking Chinese partners for EU parties was to *"launch new collaborations, improve their proposal's probability of being accepted by the Commission, to access Chinese experience and data and to find new markets"*.

Based on a number of interviews, this survey study, moreover, concluded that *"Chinese R&D capabilities are in many cases being strengthened. FP funding can be used for research, and in the eyes of Chinese researchers this is an important advantage compared with many other foreign funding sources, which focus more on capacity building. Working with standardisation issues provides insight into possibilities and brings opportunities to influence standards formulation. Project and research management were among the 'soft' skills being transferred to China in a number of the projects"*.

Source: EPEC (2009). *The evaluation of Chinese participation in the Framework Programme*. Authors: Arnold, E.; Schwaag Serger, S.; Busillet, S.; Brown, N.

Interviewees in this study also emphasised that assessing the actual EAV of current EU and joint EU-MS actions is tricky. EAV depends largely on whether one is comparing it to actions at the level of 'larger' MS (or MS with a larger STI budget) versus comparing it to actions at the level of 'smaller' MS (or MS with a smaller STI budget). Since the larger MS have more means for international STI cooperation, the EAV is in some cases less evident than for smaller MS with fewer resources. A specific type of action mentioned by a number of interviewees in this regard is the establishment of foreign branches, or placing dedicated STI staff in third countries, which is often only supported by the MS with a larger budget for STI cooperation.

Moreover, EAV differs for cooperation in innovation compared to cooperation in research. EAV for cooperation in innovation seems to be to a large extent sector specific. On the one hand, in certain sectors, where (trade) interests of specific MS or third countries are important and the stakes are large, EAV of innovation cooperation is less likely. For instance, in-depth cooperation between the EU and Japan in the automotive industry is less likely to happen considering Japan's position in this sector. On the other hand, particular technology areas such as aeronautics and space require efforts by more than one country, and most often a number of countries, to achieve results due to high risks and associated costs. Secondly, in general, the more one moves away from the pre-competitive phase (or in other words, the more one moves towards the market, or the higher the technology readiness level), the smaller the EAV will be due to increased competition between MS, and between MS and third countries. An interviewee explained that in ICT, for instance, since it is relatively close to market it is harder to align MS activities. Another interviewee made clear that in security research, there is also not that much 'pre-competitive' space. In areas where industrial competitiveness is less of an issue, the most (potential) EAV as identified by interviewees, is in the area of setting standards.

A number of EAV elements can, however, be distinguished from the surveys, interviews and case studies. According to the interviewees, from the policy perspective, coordinating the EU and MS STI potential is a clear element of EAV. Europe needs to be a more attractive place to study and work in order to ensure that it is working with the best and the brightest. Ways to increase Europe's

attractiveness are for instance addressing framework conditions for mobility or harmonisation of pension plans. Diplomacy is an important element of EAV for policymakers. According to an interviewee, no matter how tense the diplomatic situation is, international STI cooperation 'can keep things open'.

From the researcher's viewpoint, besides networking, the possibility of organising better consortia, including researchers with different backgrounds, increases the potential of cooperation. The demands in science and technology development for multidisciplinary, scale and cost reduction require a multilateral approach, which can be coordinated and (co-)funded by the European Commission, or jointly with a group of MS. This includes also the cooperation in large research infrastructures, such as in the European Strategy Forum on Research Infrastructures (ESFRI), the Joint Programming Initiatives (JPIs), and EDCTP. These large initiatives in most cases cannot be organised by a MS alone. The aforementioned study by Arnold⁴³ about the longer term impacts of R&D funding already showed that the FPs added size and scope to researchers' networks, increasing quality and including them in international 'invisible colleges' of researchers working at or near the leading edge in their fields. A more pragmatic added value, often mentioned by the survey respondents both in EU and in non-EU countries is the leverage of additional funding through FP7 activities and instruments: it provides them with more funding opportunities for their research. Also, the survey results of the INCO NCPs show that best practice sharing can be an important EAV for improving future STI cooperation activities.

From both viewpoints (researchers and policymakers), networking is another important element of EAV. Various interviewees have confirmed the importance of EAV with regard to networking and building relationships. Engaging in networking activities governed at EU level assures that a greater number of potential partners can be reached in comparison to governance at MS-level. This especially applies to for instance materials research. Materials have a long value chain and are used across the sectors in different applications. Moreover, research in materials is characterised by a strong specialisation in nations. Bringing actors together actively in this 'matrix' of values and applications, which are spread out over different countries, is especially important. In line with the previous statement, the EAV lies in finding partners and leading minds, and building personal relations through a clear portal in the EU. It provides the opportunity to link with the leading minds in Europe. Almost 95% of the FP7 participants' survey respondents claim that their project supports further networking, and almost 90% say that the project leads to new networks in their domain of work. Many interviewees (both EU policymakers as well as MS representatives) mentioned that it is an important added value to make Europe visible to third countries. Some interviewees explicitly mentioned 'speaking with one voice' as important EAV, although not all were convinced about this area of added value.

The case studies or success stories (see also Appendix E) in this study further explain some of these findings⁴⁴. The joint EU-MS partnerships that were selected as cases have been compared with Member State initiatives in order to understand the elements of EAV better. These show that added value often can be found in the up-scaling of activities and increasing the scope of the work, streamlining and harmonising agendas, and exchanging best practices. However, it is not possible to draw any conclusions at this stage given the available information on whether joint activities in reality lead to better, faster or higher impact research outcomes or innovations leading to improved economic growth, health, or other longer-term expected STI impacts.

By pooling funds and resources, the European and Developing Countries Clinical Trials Partnership (EDCTP) provides for great scope and scale. An increased political support and streamlined health agenda was established. There is a great outreach of the lessons learned.

The Kenya Medical Research Institute (KEMRI)-Wellcome Trust Programme is a Member State activity carried out between UK and Kenya organisations (see further Annex E). Even though both the EDCTP and KEMRI-Wellcome Trust initiatives are aimed at defeating diseases in Africa and creating capacity there, EDCTP was formed to pool a higher value of resources, funding and

⁴³ Arnold, E. (2012). Understanding long-term impacts of R&D funding: The EU framework programme Research Evaluation first published online October 25, 2012.

⁴⁴ The comprehensive descriptions of the success stories can be found in the annexes. A short description of the joint EU-MS partnerships is also provided in section 1.

activities to achieve a greater impact against these objectives⁴⁵. EDCTP yearly invests on average €51 million for research and €22.6 million for capacity building. The KEMRI-Wellcome Trust only invests €7.6 and €11.6 million, respectively. Moreover, by involving a much higher number of organisations both in the developing and in developed worlds, EDCTP can combine political will and defined health priorities in a more comprehensive way. In the joint EU-MS initiative, the capacity building effort is targeted to a wider number of third country organisations, and so it is potentially more effective. Lessons learnt in one organisation can be applied to others with similar characteristics. Moreover, success cases can be used as showcases, and increase other organisations' interest in the programme. The two initiatives also differ with respect to their governance. The EU initiative is governed by a European-level unit; the European Economic Interest Group. This ensures, for instance, commitment from the different organisations involved and a strategic use of the funds collected.

Because EDCTP can carry out more projects, and can involve more researchers with different backgrounds (in terms of organisations and country of origin), the exploitation of complementarities in the research groups is favoured. This way, EDCTP has a better chance to generate results, which are fundamental for defeating poverty-related diseases in Africa. Moreover, African researchers working within EDCTP also get in contact with more and more different researchers. EDCTP may, in this sense, be (more) effective in creating capacity in Africa, as African EDCTP researchers are exposed to a richer portfolio of experiences, although this obviously has not been assessed in such detail yet. The greater scope and scale of the EU initiative also implies a greater extent of the accomplishment of the Programme objectives. This is confirmed by available data on the results such as with the objective of building capability in Africa. In 7 years (2002-2009), EDCTP trained at least 45 PhD students and 45 Master students. KEMRI-Wellcome Trust Programme trained a comparable number of African people (28 PhDs, and about 70 Masters), in a time frame of 20 years (1989-2009).

The Europe-Japan Opening of the Laboratory for Integrated Micro-Mechatronic Systems (EUJO-LIMMS) brings complementary expertise and increased heterogeneity

The founders of the original LIMMS initiative decided to extend the collaboration to other European partners in order to reinforce research collaboration between Europe and Japan in the micro and nanotechnologies sector. While the existing collaboration was already beneficial to the two partners, these organisations acknowledged that the potential European Added Value was much more interesting, and the addition of other European partners has already expanded and strengthened the collaboration and research activities being undertaken. The new European partners also bring complementary expertise to tackle challenging projects.

By opening up to Europe more widely, the EUJO-LIMMS project increased the number and heterogeneity of organisations involved in the International STI cooperation. This can potentially bring an increase in the performance of the cooperation itself (process additionality). All in all, more and different research performers at different levels are having the possibility to exploit the potential of the LIMMS facility, pursuing their own research projects but also collaborating with other researchers and learning from them. As the new partners have only joined in the last couple of years, it is unlikely that the full EAV has yet materialised. However there are already signs of an increase in the research output of the laboratory. In less than a year⁴⁶, the publication rate has increased substantially⁴⁷. A part of this increase is likely to be due to the four additional research projects that started within the EUJO-LIMMS research framework. However, it is also possible that the presence of researchers coming from EPFL (École polytechnique fédérale de Lausanne), IMTEK (Department of Microsystems Engineering at the University of Freiburg in Germany) and VTT (Technical research centre of Finland) had an impact on the research projects already in place at LIMMS, and on their publication rates, with knowledge transfer between groups facilitated by the physical proximity of researchers.

⁴⁵ This comparison has to be made with great caution. KEMRI and EDCTP are not exact similar initiatives, and have been established on different grounds and with different scale and scope of resources. It is used here however as an example to show what can be the added value of an initiative such as EDCTP compared to initiatives with smaller scope and scale.

⁴⁶ The EUJO-LIMMS laboratory was only launched in February 2012 as continuation of the LIMMS initiative which already was a 'well-oiled machine' with 15 years of experience in international research collaboration.

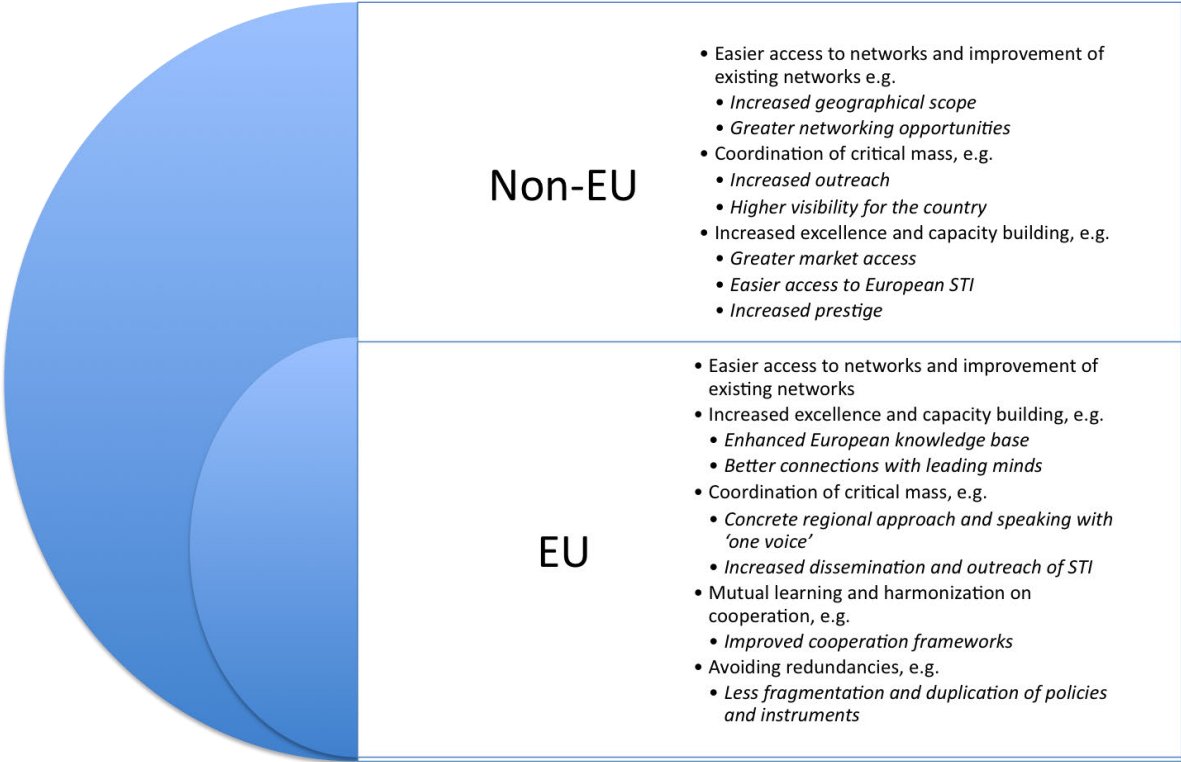
⁴⁷ Between 2004 and 2011, research carried out at LIMMS resulted in 153 publications in journal papers and 226 conference proceedings – corresponding to a yearly average of about 22 and 32 publications respectively. In 2012/2013 the number of publications increased substantially (+38% in journal papers and +42% in conference proceedings).

EU-CELAC supports speaking with one voice, and a critical mass can be reached based on a high number of countries and representatives. A greater space for dialogue has been created.

The CYTED Programme (Iberoamerican Development Programme for Science and Technology) is an intergovernmental multilateral Science and Technology cooperation programme (see further Annex E). It was created in 1984 as an International Framework Agreement signed by 19 Latin American countries and two EU Member States - Spain and Portugal. As found in the case study comparing EU-CELAC and CYTED initiatives, the EU-CELAC strategic partnership and activities have clearly been established with a view to supporting policy dialogue and priority setting. The EU-CELAC partnership was formed to increase the ability to speak with one voice. In this respect, the EU activity seems to be on the way to reach this goal. This objective can be achieved only thanks to a collective EU effort, not through the action of a few Member States. The reason for this is that it makes it possible to reach a critical mass of countries in order to be more efficient in tackling major common challenges. Also, by involving a much higher number of countries and representatives, in particular EU Member States, the EU-CELAC partnership sends a strong signal of political will, and allows more legitimate and more acceptable decisions. Compared to the CYTED programme, EU-CELAC created a space for dialogue between EU and CELAC, which did not exist before, since it is a broader initiative with participation of EU non-Hispanic countries in the political dialogue with Latin America.

The following figure summarises the major areas of added value as derived from the study.

Figure 15 The major areas of added value of EU and joint EU-Member State actions for European and non-European countries summarised



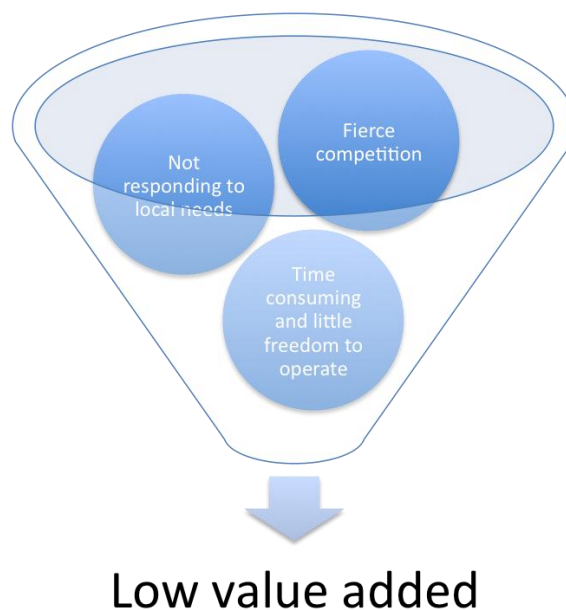
Source: Technopolis Group and Empirica based on desk work, interviews, surveys and case studies.

The EU or joint EU-MS actions do not always add value to the international cooperation

The value of the European action can, however, also be a negative one. In other words, sometimes it is more effective and efficient to organise international cooperation at Member State level than at EU level, or jointly with the EU. We have asked in the surveys under what circumstances participants would prefer national actions to EU (or joint) actions that support international STI

cooperation. The main arguments were related to bureaucracy, fierce competition, links with local needs and expected freedom to operate.

Figure 16 Circumstances under which EAV of EU and joint EU-MS actions is expected to be low(er)



Source: Technopolis and Empirica based on surveys and interviews.

In the interviews it has been stressed that both types of cooperation – *bilateral*, and often at the level of the Member States, and *multilateral*, often at the EU level, or joint EU-MS partnerships – are needed and complement each other. Interviewees mentioned various times that cooperation at EU level is suitable for **broader areas, more general cooperation, and in more top-down areas** such as policy dialogue, whereas certain MS are targeted by third countries for more specific and closer cooperation. It was also clear from the interviews that **cooperation at EU level is seen as more bureaucratic** than at bilateral level. When one decides to cooperate more closely on certain issues one may decide to arrange this bilaterally rather than at EU level since negotiation is perceived as more intense and time-consuming at the EU level. The increased transaction costs associated with more bureaucracy of cooperation at EU level then outweigh the benefits. Moreover, the chance of finding the common ground required for the partnership is more likely to be found with one Member State than with all the 28 EU Member States.

Towards a new EAV framework for international STI cooperation

The desk research and inputs received from the survey respondents and interviewees leads to a prioritisation of the elements or areas in which the European Union can add value with regard to international STI cooperation. In this section these elements are clustered into 5 so-called 'criteria for added value'. These criteria can also be used for the future monitoring and evaluation of the added value of single actions, programmes, instruments, and all other activities that have the objective to foster international STI cooperation that are valid to a greater or lesser extent for the EU and non-EU countries. Moreover, the European variable geometry allows for specific groups of countries to focus on specific domains and areas related to their particular fields of expertise and stages of scientific development.

Based on the study results, we argue that these five criteria are better aligned with the actual EAV of the current international STI actions that are being carried out at EU and joint EU-MS level than the more conceptual SFIC framework. The five areas are: 1) Networking, 2) Facilitating (European) excellence and capacity building, 3) Coordination of critical mass, 4) Fostering mutual learning and

harmonisation in (and beyond) Europe, and 5) Avoiding redundancies and acting economically and effectively.

- 1. Networking.** These are international STI activities (indirectly) aimed at bringing *individuals* and *organisations* together, facilitating matchmaking, partnering and networking. A clear added value for the EU and EU-MS involvement can be found in this area for both policymakers and researchers and industry. Policymakers can be brought together to discuss the cooperation framework through which researchers and research organisations can cooperate. They learn from each other's best practices and worst cases, and can organise and pool funding in joint programmes. The usual suspects, often the bigger European countries, seem to have less need for this support, but the smaller countries find added value in the support in identifying the main actors and the right contact persons. The larger countries, however, still find it useful to be linked in multilateral initiatives. For them this provides, as one interviewee has put it "a better view on who is cooperating with whom, and for what reasons". In other words it provides useful intelligence on the cooperation strategies of other European countries, rather than providing them the insights in the third country, in which they often already have contacts. For researchers, improved networks can help them to identify the 'missing links' in their research consortia; or open up new ways of funding research that were not known to them before. This is a clear 'input additionality' of which many respondents in this study say that these instruments or mechanisms are not in place in the Member State, or cannot be organised by one Member State alone. It is also an 'output additionality' in the sense that the networks that are being supported are perceived as being 'better' networks.
- 2. Facilitating (European) excellence and capacity building.** This area of added value mainly supports the researchers (and to a lesser extent industry). It is the assumption that international cooperation contributes to the increase of excellence because the best minds available can find each other and work together to solve complex research questions, and they can make use of the best methods, tools and subjects available. It should also contribute to the attractiveness of European research and innovation. This includes improving STI capabilities (actors), enhancing mobility (links between actors), and increasing the research competition by for instance developing European research infrastructures.
- 3. Coordination of critical mass.** This criterion is about increasing visibility and strengthening competitiveness towards third countries. An important rationale for EU action is that international STI activities that are of such scale (large of size) and complexity (largely difficult/complicated) that no single Member State can provide the necessary financial or human resources/expertise or infrastructure/equipment, need to be carried out at European level in order to achieve and develop this critical mass; and to reduce the research or commercial risk for one single country or organisation. Interesting examples are for instance the European and Developing Countries Clinical Trials Partnership and the Human Frontier Science Programme. However, size is not always a driver per se for international cooperation; the EAV is also based on the option to put the best complementary expertise together to address the target. It also includes the coordination of the STI potential in the Member States and in Europe as a whole and linking the best complementary expertise in Europe and beyond – allowing innovative multidisciplinary approaches. This can be related to *Internal* issues such as support in reducing the gap between Europe's regions and countries in terms of STI and integrating less-connected institutions and young researchers into European and international networks. But it also includes an important *External* component, namely to contribute to increased visibility of the EU and MS STI potential in third countries (e.g. by EU branding) and a stronger position in negotiations than when acting at MS level, by speaking with one European voice. This can lead to increased influence in international fora, thereby maintaining EU interests (advocacy).
- 4. Fostering mutual learning and harmonisation in (and beyond) Europe,** leading to standardisation and improved knowledge, also of international STI cooperation processes and practices. These are also efforts that ensure a common way of conducting international STI cooperation activities together with third countries, addressing issues that have to do with the *framework* conditions for these activities, practical issues such as *evaluation practices, project and programme management*, and *values* associated with integrity issues and ethics both at the level of the *international cooperation* component as well as at the level of the *STI* component. A Member State can develop such a cooperation framework itself, or can join forces with other Member States to learn from others' best practices to cooperate with for instance China, Russia, Brazil, or other third countries that are more difficult to access. The EU can play an important role in providing these framework conditions and influence standards that could lead to easier access to third countries for European industry etc.

5. **Avoiding redundancies and acting economically and effectively.** International action at European level or EU/MS partnerships vis-à-vis third countries can result in efficiency gains by *pooling* and more efficient use of scarce public resources, *leverage* of public funding on private investment, and alignment of international STI cooperation priorities (*streamlining*), allowing avoidance of duplication and rationalisation of efforts. International STI cooperation activities at EU level can contribute to the achievement of wider EU policy goals by the realisation of greater *economic* (activities focused on increasing private sector opportunities and innovation) and *societal impacts* (activities that focus on specific societal/grand challenges that are shared across Europe and with third countries).

Figure 17 summarises the major areas of EAV for each criterion as derived from this study's data collection and desk research, making a distinction between EU and non-EU countries and the different actors.

Figure 17 Major elements of EAV of international STI cooperation per actor

EAV criterion	Major area of EAV	EU		Non-EU	
		Policymaker	Researcher	Policymaker	Researcher
Networking	Easy access to networks and building new networks and collaborations	x	x	x	x
	One portal through which networks can be built throughout Europe			x	x
	Improving diplomacy	x		x	
	Increased geographical scope			x	x
Facilitating European excellence and capacity building	Organising better consortia with leading minds		x		x
	Increasing the reputation, position and status for researchers and organisations		x		x
	Greater market access			x	x
	Easier access to European STI			x	x
	Increased attraction of human resources				x
Coordination of critical mass	Organising stronger commitment amongst all partners		x		x
	Coordinating the EU and MS STI potential	x			
	Developing a concrete regional approach and speaking with one voice	x			
	Adding size and scope to the networks and work	x	x	x	x
	Increase visibility of Europe towards third countries and vice versa	x	x	x	x
	Increased outreach of STI	x	x	x	x
	Improving the policy dialogue	x		x	
Fostering mutual learning and harmonisation	Harmonisation and standardisation	x		x	
	Best practice sharing	x		x	
	Addressing framework conditions for research, competitiveness and innovation	x		x	
	Capacity building in research and project management				x
	Pursue specific STI goals which need to be addressed on a global basis	x	x	x	x
Avoiding redundancies and improving efficiency	Alignment of STI cooperation activities	x			
	Reduced fragmentation and duplication of policies and instruments	x	x		
	Leverage of funding for research		x		x
	Pool funding and resources	x	x		

Source: Technopolis Group and Empirica based on desk work, surveys and interviews.

Monitoring and evaluating EAV of international STI cooperation actions and EU-Member State partnerships

Monitoring and evaluating EAV is a challenge. Comparing European actions or partnerships with national (bi- or multilateral) actions and make a judgement about the added value, as we did for the success stories, is not always possible and remains in a way ambiguous. The context, format, objectives and impacts of the different levels of actions will vary to a large extent, and often comparable data are not available, as we argued before. Therefore, it would be more logical to perform an 'EAV test' based on the 5 EAV criteria as developed in this study. This can be done as an ex-ante assessment, or as mid-term or ex-post assessment. When developing the EAV database however, we have encountered a number of existing limitations that are of importance for the success of such a future 'EAV test'.

First, there is still only a small body of evidence of expected and achieved impacts through individual FP activities. A growing number of specific actions and overall instruments, however, are being evaluated, and impact assessments are being commissioned. These should ideally include a clear section on the achieved added value of the cooperation activities. The applications should also include a section on the expected impacts and EAV based on the list of EAV criteria. Many of the actions that have been reviewed do not have international STI cooperation as main objective, but if attention is specifically paid to this element of the STI activities, the body of evidence will increase and can be used for a better analysis of the EAV of international STI cooperation.

Of the actions that were analysed for this study⁴⁸, not many evaluations or impact assessments were publicly available. Also, in the cases where evaluations were available, very few indicators are used with a view to monitor and evaluate the actions with a specific focus on international STI cooperation. For a limited number of actions, however, a number of indicators related to international STI cooperation was monitored.

In the case of the existing evaluation reports, the output indicators most frequently used to grasp impacts of STI collaborations are related to scientific outputs, in particular to project participation, share of co-publications with partners from third countries, and mobility analyses. This way, results and impacts in relation to achieving research excellence, and attracting human resources, are more or less well covered. The other areas of EAV as earlier defined are, however, less often included in the evaluations. The main challenge is thus to find a means to encourage (or strongly recommend) all actors involved in the governance of STI actions to conduct regular output and impact assessments. It is not so much a matter of finding new indicators (a battery of indicators already exists) than establishing realistic and comparable reporting systems amongst different actions that are very different in terms of their activities and objectives, are of vastly different scales and time-spans, involve different actors, different geographies, different governance, different funders, etc.

Moreover, assessing whether the EU (or EU-MS action) addresses one of the EAV criteria and monitoring a number of indicators is not sufficient to understand the mechanism and value of the action or to understand why it has an *added* value compared to the actions taken at the MS level. The challenge is definitely to find a system to compare international STI actions at different levels, in particular to compare the EU/EU-MS level to the MS level. The big issue is that many countries do not routinely collect information about the international activities they carry out with other countries, and the use of specific indicators is actually rare. Overall, one would anticipate EAV to be realised wherever the benefits accruing from EU involvement outweigh those to the sum of the benefits to the MS involved (which also includes a summation of the various barriers, constraints and costs that apply to both sides of the equation). Carrying out in-depth case studies of (selected) specific actions supports a better understanding and help to select the right indicators for measuring and even quantifying the EAV. Much depends on the initial objectives of the action, the mechanisms used to implement it, and the (expected) effects on different domains, countries and types of actors.

⁴⁸ These can be found in the EAV database of international STI action that is a separate deliverable of this study. In this database, over 30 specific actions have been analysed, as well as over 10 broader actions/instruments.

It is crucial in this process to distinguish two types of indicators:

1. Indicators that focus on the impacts of the international cooperation actions in general (e.g. the development of new products). These indicators are useful to understand the outcomes and impacts of the action, but do not themselves tell us much about the added value of organising cooperation at the EU level, or jointly with MS.
2. Indicators that focus on the impacts of the actions on the cooperation itself compared to possible alternatives (e.g.: better, more efficient, faster), possibly measured by existing parameters such as funding data, bibliometrics, and so on.

For each of the defined EAV criteria, a number of indicators could be selected, depending on the objective of the action under assessment. These will be to some extent quantitative, but mostly qualitative of nature. For instance, if a network action is taken to improve the diplomacy between EU countries and Russia, the EAV cannot be exclusively tackled by quantitative indicators such as the number of projects or additional funding pooled. For this purpose, surveys on countries' influence and attractiveness could be useful. The improvement of international relations and the leveraging of 'soft power' could also be measured by the influence over international decisions. Clearly, a qualitative approach is needed to assess the quality and the success of the cooperation.

To give another example: in order to assess the added value of the Marie Curie 'International Outgoing Fellowships' (IOF) action, the results of mobility programmes at the Member State level could be compared with the Marie Curie 'IOF' action. The IOF scheme is an international fellowship for experienced European researchers to gain new skills and expertise while conducting high-level research in a country outside Europe. This comparison will provide information on issues such as *the number of exchanges per Euro invested*, or *the geographical span of reach of the action*. It could be that this analysis shows that the national programme provides a *better chance for the researcher to receive funds for an exchange* for instance, since there is less competition, and selection criteria and administrative burden might be less stringent than for the EU 'IOF' scheme. For the Member State, a national programme might also be more advantageous in the sense that the country can design the action in such a way that the exchange favours the national research system by requiring the researcher for instance to return to its home institute after the exchange, while this is less obvious in a European mobility programme. Hence, the EAV is not obviously following this line of analysis. A different picture however could be drawn when assessing and comparing the outcome of these exchanges at the different levels and relate it to the initial objectives and EAV assumptions and to the actor that actually benefits from it. The EAV assumption then can be that the European Marie Curie IOF action provides *more prestige* for the researcher, and boosts his/her career *better or faster* than if he/she participated in a national mobility scheme. He/she can *better* make use of the European and foreign networks and come up with *better* research results. The knowledge that he/she acquires in a third country will be brought back and used in Europe, for which the researcher will receive an additional funding upon return. This favours the European science base, and the participation in a FP action is seen as a means to ensure that the country's research is achieving certain (international) quality standards. Moreover, the Marie Curie action should lead to *less fragmentation* of the research efforts and systems in Europe with respect to cooperation with countries outside of Europe.

The following table provides an overview of the possible indicators that can be used as a starting point for measuring EAV of specific international STI cooperation actions or instruments. For this indicator scheme, a selection has been made of the EAV assumptions that could be at the basis of the action. Again, it needs to be emphasised that this EAV assumption largely depends on the actor, the country, the domain and the level of application of the science or technology in development.

Thus, other EAV elements might be as important for certain actions or instruments in the future. Therefore, it is strongly recommended to integrate the 5 EAV criteria both in the proposal phase of the actions, as well as during their evaluation through an 'EAV test'. Here, other EAV assumptions can be listed, and later also evaluated, based on tailor-made indicators. Furthermore, we recommend to not only assess whether the action aligns with one or more of these criteria, but also to assess:

1. For whom does the action provide added value (researcher versus policymaker, but also EU versus non-EU)?
2. Is there a difference between the added value for larger and smaller countries, for more and less developed countries?

3. What are the differences between the added value for research versus innovation?
4. Were there any initial EAV assumptions (ideally there should be)? What were they, and have they been achieved?

Figure 18 Examples of indicators for the major areas of EAV

EAV criterion	Initial EAV assumption (based on a number of the major areas of EAV) The project/action...	Possible indicator to measure EAV
Networking	Provides easy access to networks	Increased links with other policymakers, researchers and organisations for the participant
	Leads to new networks and collaborations	Number of new established networks/collaborations throughout the action/project
	Improves diplomacy	Strengthened negotiation position (e.g. stronger influence in decisions)
Facilitating European excellence and capacity building	Organises better consortia with leading minds	Increased number of publications in high-ranking journals for participants Increased number of products/guidelines/theoretical frameworks developed and implemented for participants Increased number of attracted and retained leading minds
	Increases the reputation, position and status for researchers and organisations	Increase in international rankings of persons and organisations Increased number of citations of persons and organisations New knowledge gained by the participant
Coordination of critical mass	Organises stronger commitment amongst all partners	More countries reached with broader commitment; 100% of partners actively participate in joint action
	Coordinates the EU and MS STI potential	Increased knowledge of strengths and weaknesses and complementarities of countries, in and outside EU Increased critical mass for uptake of results organised Increased coordinated use of existing resources, data etcetera
	Adds size and scope to the networks and work	Increased number of participants Increased geographical scope of work Increased investments in research infrastructure or other large-scale initiatives
	Increases visibility of Europe towards third countries	Increase in third country participation in FP and other EU programmes
Fostering mutual learning and harmonisation	Leads to harmonisation and standardisation	Number of new standards and rules implemented across EU-28
	Leads to best practice sharing	Increased knowledge of existing – global - best practices Improvements implemented based on lessons learned Increased mobility
	Addresses framework conditions for research, competitiveness and innovation	Increased productivity per Euro investment made Improved efficiency of procedures for STI
	Supports capacity building in research and project management	Better and more efficient project management
Avoiding redundancies and improving efficiency	Supports alignment of STI cooperation activities	Reduction of overlapping STI activities across all EU-28 with a number of third countries Joint STI agreements signed and number of and increase of concrete actions implemented
	Leverages funding for research	Increase in funding for STI (more than the sum of all)
	Pools funding and resources	Number of and increase of joint programmes and calls Number of and increase in funding available in these joint programmes Number of joint strategies developed

Source: Technopolis Group and Empirica, based on desk work and interviews.

The following framework can be used to carry out the 'EAV test' for individual projects or actions that are under development, but also to compare the level of EAV between the different projects afterwards based on the above-mentioned criteria⁴⁹.

Note that the figure is **an example** of how EAV could be 'scored': For instance, a hypothetical Action type X with name A, scores in this example a 3 for networking, indicating that European Added Value on networking is almost certain and that it is a key objective of the action. It scores a 2 for facilitating European excellence and capacity building, meaning that European Added Value on European excellence is likely and that a strong reference is made to such an outcome in the description or planning of the action, and of its results reporting. This scoring should be based on an independent assessment of the key indicators for each of the criteria.

Figure 19 EAV scoring framework

Criterion	Action					
Hypothetical Type	Type X	Type X	Type Y			
Hypothetical Name	Action A	Action B	Action C			
Networking	3	1				
Facilitating European excellence and capacity building	2	1				
Coordination of critical mass	3	0				
Fostering mutual learning and harmonisation	3	2				
Avoiding redundancies and improving efficiency	3	2				

Scoring
0 = no EAV foreseen
1 = European Added Value potentially (i.e. some reference made to such an outcome)
2 = European Added Value likely (i.e. strong reference made to such an outcome)
3 = European Added Value almost certain (i.e. a key objective of the action)

Source: Technopolis and Empirica, based on framework used by DG Sanco for evaluating EAV in the Health Programme.

⁴⁹ Based on the EAV Framework used for the Health Programme of DG SANCO.

3. FUTURE ORIENTATION

This section deals with the question of what types of actions or measures might be taken at EU level that is potentially most effective to achieve the desired international STI cooperation objectives. In general, the potential EAV could be maximised through a) the identification of a demand for EU involvement, b) the opportunities for operationalising actions and c) the removal of barriers and addressing requirements. This assessment then eventually should allow the design of appropriate instruments and define the operational parameters required.

In our study we have assessed the existing barriers for cooperation that cannot be solved at the national level, to come to the identification of a demand for EU involvement. Moreover, opportunities for future actions will be discussed.

Cooperation barriers that can be tackled by EU (or EU-MS) actions

The survey results show a number of current barriers where, according to the respondents, EU action could help removing them and be of added value. The most important barrier is, not so surprisingly, the lack of financial means to support co-fund mutual research undertakings. Another important barrier mentioned is that the respondents find the pool of human resources for building sustainable relations with other countries too small. They find it difficult to gather knowledge about the other country's strengths and complementarities. Also, they perceive a lack of network or trustworthy relations. Moreover, political barriers were mentioned, as well as administrative burdens of engaging in STI cooperation, and cultural and language barriers. FP7 participants were asked the same question. The results are shown in Figure 20 and Figure 21.

Figure 20 Barriers for EU researchers and stakeholders

Top 3 of barriers most effectively tackled at EU level	<ol style="list-style-type: none"> 1. Lack of financial means to support co-funding mutual research undertakings 2. Administrative burdens of organising STI cooperation 3. Lack of knowledge and information about other country's strengths and complementarities
Top-3 of barriers least effectively tackled at EU level	<ol style="list-style-type: none"> 1. IPR issues 2. Geographical distance 3. High financial risks of joint research projects

Source: RPPS survey (Technopolis Group, Empirica, 2013).

Figure 21 Barriers for third country researchers and stakeholders

Top 3 of most important barriers most effectively tackled at EU level	<ol style="list-style-type: none"> 1. Lack of financial means to support co-funding mutual research undertakings 2. Lack of knowledge and information about other country's strengths and complementarities 3. Administrative burdens of organising STI cooperation
Top-3 of least important barriers least effectively tackled at EU level	<ol style="list-style-type: none"> 1. IPR issues 2. Political barriers 3. High financial risks of joint research projects

Source: RPPS survey (Technopolis Group, empirica, 2013).

Both EU and non-EU FP7 participants ranked lack of financial means to support co-funding mutual research undertakings, administrative burdens of organising STI cooperation, and lack of knowledge and information about other countries' strengths and complementarities (specifically stressed by non-EU countries) as the top three barriers to be tackled at EU level, though in a slightly different order. The barriers the EU FP7 participants thought to be the least effectively dealt with at EU level were IPR issues, geographical distance, and high financial risks of joint research projects. Non-EU FP7 participants agree with two of the barriers on this list, and exchange geographical distance with political barriers.

The interviewees also stressed as major bottleneck the lack of information flow between actors. It has been mentioned that, at the MS level, communication between the departments responsible for internationalisation and departments responsible for European affairs is lacking. In addition, there is a need for a better information flow between departments at EU and MS levels responsible for certain themes such as health, nanotechnology and ICT. Also, information in third countries is missing on for example how the FP works.

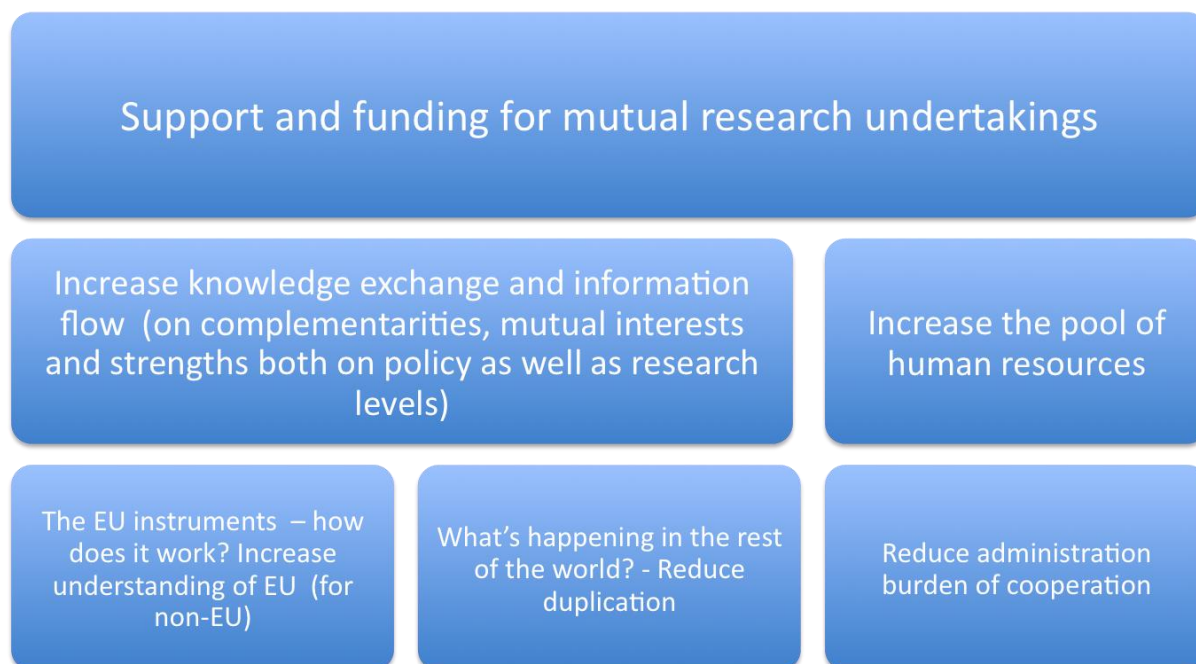
Interviewees see the societal challenges as an opportunity for the EU since it is in these challenges that not only the MS find common ground with each other, but in the cases of the global grand challenges that there is also common ground between the EU and third countries. These challenges can be seen as common goals that all parties involved have an interest in tackling and therefore can act as driving forces behind international STI cooperation. In addition, addressing these complex issues can be done more effectively at the multilateral level. Since there is need for state-of-the-art knowledge and economic impact to achieve solutions, they also provide a guiding framework for international cooperation in both academic research and innovation. Interviewees also see opportunities in an increased focus of EU instruments on standardisation (innovation cooperation) and increased streamlining of existing MS efforts.

During the expert workshop that was organised as part of the study (the agenda as well as the list of participants of the workshop are included in Annex D to this report), the international STI cooperation experts also identified a lack of knowledge at various levels as a major barrier to international STI cooperation with third countries. They also stressed that intelligence on third countries' strengths and weaknesses is lacking. The MS alone does not have the critical mass to gather this information. Also, knowledge of efforts by the different MS in certain areas is missing, leading to duplication of efforts. Finally, there is a lack of information for policymakers on the link between international STI cooperation policy and other types of policy. From the third country perspective a general understanding of the policy instruments is lacking. Moreover, once third countries start to understand them, a new programming period starts with another 'break from the past' very often implying also new procedures. In addition, other barriers were mentioned such as financial issues, the administrative burden, and lack of a legal framework.

A number of the current EU and joint EU-MS actions already attempt to remove these barriers; some with success. The ERA-NETs and INCO-nets, for instance, are perceived as useful international cooperation tools. They help to enhance cooperation, to launch new calls for proposals, and to coordinate policies and programmes. A common process of selection has been much appreciated. Overall, it seems like the utilisation of European instruments aiming at coordination of national programmes has been effective in providing more scale and European impact than some national projects. Furthermore, the Marie Curie actions have been mentioned as very important tools for third countries to become involved in European STI activities and to get a better understanding of the strengths and complementarities of the European countries. Opening up the FP to third country participation was an important element from the perspective of the third countries, including coordinated calls. Finally, respondents in our data collection mentioned the organisation of network events and meetings as very successful instruments or actions organised at EU level.

Insights into these barriers are valuable pointers for future policymaking in the sense that they provide a good overview of needs that could be tackled by EU actions. Translating these barriers into clear needs, the following needs seem to be of large importance according to the study results.

Figure 22 Major needs that can be tackled at EU level or jointly with Member States



Source: Technopolis Group and Empirica based on the surveys, interviews and expert workshop.

Policy implications

Thus, the expectations are that the EU should both strengthen the international STI cooperation by supporting mutual research undertakings, and promote framework conditions underpinning a global 'level playing-field' in research and innovation, as was also stated in a recently published report of the expert group that was established to support the development of an EU strategy for international cooperation⁵⁰. This includes the development of pilots and demonstration projects, infrastructure, increased mobility, setting global standards and norms, addressing grand challenges, harmonising international rules and standards, and having a clear 'one European voice'.

A number of current instruments are very effective, but strategy and operation can be better connected

First of all, the **EU strategy** for international STI cooperation could become even clearer. According to some interviewees, concrete goals are still lacking and the EU could aim for choosing very specific areas for cooperation with certain countries while keeping an eye on the competitiveness interests of the EU. A number of interviewees raised the issue that there is currently no good overview of how the new strategy can be connected to the activities that take place at the thematic level with regards to international cooperation. This implies a pooling of work and knowledge by the different European Commission directorates and thematic areas on international cooperation.

Moreover, interviewees state that there seems to be a gap between the high level policy objectives and activities such as policy dialogues, STI agreements, cooperation agreements and so on, and the implementation of research activities in research programmes by researchers. A clear view is needed of the different interests, and intertwining of these interests. For instance, developing a closer complementarity and articulation through HORIZON 2020 and other initiatives such as the

⁵⁰ European commission (2012). International cooperation in science technology and innovation. Strategies for a changing world. Report of the Expert Group established to support the further development of an EU international STI cooperation strategy (edited by Ms. Schwaarg Serger and Mr. S. Remoe, 2012).

European Development Funds could be used in the design of new programmes and implementation of projects.

In terms of **specific instruments and actions**, interviewees and survey respondents were asked how they see the current EU level mechanisms that would be the most effective to achieve the desired international STI cooperation objectives of the researchers and research organisations in their countries. The outcomes of the surveys are the following:

Figure 23 Effective EU instruments

INCO – NCPs	Research Project Participants
1. Research funding schemes	1. Support to joint programmes or projects
2. Mobility schemes	2. Research funding schemes
3. Support to joint programmes or projects	3. Support to communication activities, dialogue, networking
4. Support to communication activities, dialogue, networking	4. Mobility schemes and support to establishment of an information service, learning platform, observatory
5. Support to establishment of an information service, learning platform, and observatory	5. Support to establishment of STI agreements, specific regulation,
6. Support to establishment of STI agreements, specific regulation	6. Support to set up foreign branches
7. Support to establishment of joint institutes	
8. Support to set up foreign branches	

Source: Technopolis Group and Empirica based on surveys

Other interesting issues in relation to existing EU mechanisms were brought up by the interviewees and workshop participants. It was widely agreed that ERA-NETs and INCO-NETs are important mechanisms. One SFIC member for instance mentioned that the utilisation of European instruments aiming at coordination of national programmes (namely ERA-NETs) has been effective in providing more scale and European impact to some national projects. Schemes inspired of the ERA-NET model but without FP support may offer an interesting tool to reinforce and consolidate collaborative research across national funding agencies and research themes in a flexible mode and variable geometry.

For third countries, as another SFIC member mentioned, a number of current European instruments have provided a visible framework for engagement with third countries. New instruments or further layers of bureaucracy around strategic planning for international STI cooperation are not generally required as the existing EU-MS instruments allow for research area specific strategic development including with third countries. Additional activity would be duplicative and unlikely to add value. However, additional funding to help networking in third countries and to encourage consortium building in actions may be beneficial. Platform activities to link up initiatives and give a useful overview in terms of possible added value from interdisciplinary research may also be worth considering. It was also proposed that EU and joint EU-MS actions should focus on those third countries where EU Member States do not already have strong bilateral STI agreements, or on the 'new' emerging economies. Any activity should complement that of EU Member States rather than compete with them. The effectiveness of STI agreements was largely debated during the expert workshop. One view was that STI agreements open up the discussion with the MS on a shared EU vision of the relationship with certain third countries. The other view was that they are redundant since the agreements are often 'empty' without any funding attached.

Future mechanisms can be effective if a number of challenges can be tackled

A number of challenges and suggestions for future policy making were identified during the expert workshop and by interviewees.

- If new instruments or activities are to be adopted, ownership needs to be established by the involved partners. Therefore, preferably new activities should not be introduced in a top-down manner, but should be developed together with EU-MS partners, giving them time to ensure support from relevant national authorities and institutional bodies (e.g. research councils, foundations and universities). Furthermore, the visibility of the international dimension of ERA for non-EU countries could be enhanced through an effective communication strategy.

- Some interviewees suggested combining instruments to increase their effectiveness. For instance, the coordination of funding of research projects could perhaps be combined with mobility schemes; or research infrastructures with research funding. On the other hand, the simpler the instruments the better so that the combination of instruments does not lead to increased complexity for the participants. Moreover, as far as appropriate, the international dimension of existing initiatives could be enhanced by further opening up to third countries, e.g. in the case of the Joint Programming Initiatives.
- In addition, the sustainability of the international engagement is crucial, since winning trust takes time. Developing longer-term joint or coordinated programmes and activities is however a challenge, and eventually it should also be possible to remove the EU support. For this purpose, outcomes could be better captured, and future policies could be increasingly evidence-based and based on good practices. For instance, best practices could be shared through contact points or peer-learning activities with a country-specific or thematic focus. This is expected to lead to a greater sustainability of the international cooperation.
- Many encouraged continuing the implementation of the joint EU-MS initiatives towards India, China, US, Russia and Brazil and maybe even towards new emerging entities, with the appropriate support to complement and reinforce the already existing bilateral activities and roadmaps with these countries.
- A challenge is to put a large focus on framework conditions in EU-third country collaborations for innovation, rather than identifying areas for joint programme activities with individual third countries. The framework needs to be aligned with the objectives and content of any cooperation in order to be fruitful.
- European Added Value is difficult to measure. MS actions cannot easily be compared with EU measures, and vice versa. EAV can also have a 'negative' value. How to make sure that EU and EU-MS actions are complementary and mutually reinforcing with national activities, will remain the biggest challenge for policymakers at the different levels. A prerequisite is however that there is a good overview of existing measures, activities, and expected outputs and benefits. This requires an improved monitoring system at all levels for EU and MS actions, and an improved dialogue between EU and MS, possibly through the joint EU-MS partnerships that focus on a particular third country, such as the ones already launched by SFIC.

4. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study on the European Added Value of international STI cooperation leads to a number of conclusions.

International cooperation is an increasingly important area for policymaking both at the Member State level and the EU level, and since a couple of years a number of 'joint EU-MS initiatives' have been established.

At the EU level and within FP7, most international cooperation takes place in the 'Cooperation' specific programme, which also includes the largest part of the funding. The predominant areas in which third country participation takes place are Health; Food, Agriculture & Biotechnology (KBBE & OCEAN); ICT and Environment. In the 'Capacities' specific programmes, the INCO projects have the highest number of projects with third country participation. Overall, Europe cooperates most often (in absolute terms) with the Russian Federation, the United States and China. There has also been an increased attention for or by the other BRICS countries over the past years. 12.5% of the total number of participants is from a third country. The majority of these are countries that belong to the EFTA/enlargement/European Neighbourhood Policy group of countries.

Increasingly the EU takes action jointly with MS, such as for instance the pilot actions that have been established by the SFIC towards the USA, China and India, and the EU-Latin American and Caribbean States and EU-Africa Senior Officials Meetings. Other examples are the European and Developing Countries Clinical Trials Partnership (EDCTP), the Joint Programming Initiatives and coordination of national policies and activities of EU Member States and Associated Countries concerning international STI cooperation (ERA-NET and ERA-NET Plus projects).

Individual Member States or groups of Member States have a range of policies and instruments in place to support international STI cooperation, in parallel to what is happening at the EU level. These include in general mobility schemes, open for extra-EU participants; specific international R&D cooperation schemes, including joint R&D projects; opening up of national STI policy instruments to foreign actors; science attachés in foreign countries; and multi- and bilateral agreements.

EAV is a multifaceted and changing concept that can only be understood by relating drivers and objectives of actions to outputs and impacts, and by assessing the additional benefit of collective actions compared to national or 'private' actions.

European Added Value is a multifaceted concept and a condition for Union action. The principle of EAV has evolved over the past years from adding value to national efforts through scale and networking, to playing a role in coordinating Member State policies and taking wider actions in support of EU-level Policy. This is shown for instance by the change of focus of the EU instruments from focus on collaborative research to other areas such as researchers' mobility. Moreover, the concept of EAV has different meanings to different actors. EAV strongly relates to the drivers and motives of these different actors for the specific actions they involve in, and consequently relates to different types of impacts and benefits for them. Thus, first, a clear understanding is needed of the drivers and objectives for policy action. Second, it should become clear who is best suited for developing and implementing the policy action and activities. Third, an understanding is needed of through what modalities the impacts and benefits will likely be the largest. Thus, defining EAV needs to be based on the questions: 1) what are the policy priorities (and for whom: policymakers, researchers, research organisations, or industry?); who should support it (EU or MS/Local/Regional) and in what way should it be done, if on EU level (effectiveness of spending)? Based on the EAV principles, EU action is only justified if there is a clear additional benefit from collective efforts, compared with action by MS. Moreover, the benefits should exceed those that would have been realised in the absence of public expenditure.

EAV can vary greatly, due to a large diversity of rationales for and expected benefits of international cooperation at the EU level depending on the actor, domain and level of application

In the 'narrow' policy paradigm⁵¹, international collaboration dynamics stem from the activities of researchers and research organisations themselves. In this paradigm, the main drivers are to improve the quality, scope and critical mass in science and research by linking national resources and knowledge with resources and knowledge in other countries. The focus is on scientific problem solving, and building up national STI capabilities through international cooperation and integration into international networks of knowledge circulation. In the 'broad' policy paradigm, STI cooperation can be a means to reach other policy objectives, such as improving national STI and economic competitiveness, capacity building in developing countries, creating political stability, and solving global societal challenges, to name a few. Moreover, actors involved in innovation might differ from actors involved in science, and will have different objectives of international cooperation with different expectations of added value.

A number of major areas of added value have been identified

Network building and establishing a cooperation framework are the major reasons and (expected) benefits for international cooperation in European and joint EU-MS STI cooperation actions. It is expected that EU and joint EU-MS actions provide easier access to networks, better connections with leading minds and a certain scale and scope compared to national actions. The national perspective could lead to fragmentation and duplication of research effort, and the EU action provides a more concrete regional approach to the spirit of international research cooperation rather than a bilateral approach. It leads to mutual learning and the avoidance of redundancies.

Specifically for third countries, cooperation at the EU level may have various advantages over national actions. It likely increases the geographic scope and allows outreach to an increased number of countries. This can lead not only to greater networking opportunities but also a higher visibility for the third country, greater market access, and easier (or quicker) access to European research and technology.

The success stories that have been studied further also show that added value often can be found in the up-scaling of activities and increasing the scope of the work, streamlining and harmonising agendas, and exchanging best practices. It is however not possible to draw any conclusions at this stage and with the currently available information on whether joint activities in reality lead to better, faster, or higher impact research outcomes or innovations leading to improved economic growth, health, or other longer-term expected STI impacts. Thus, quantifying EAV has not been possible with the available information.

Circumstances under which the added value seems to be negative are when actions are not responding to local needs, when the competition is too fierce, when the use of the instruments is too time consuming and when there is little freedom to operate.

A new EAV framework for international STI cooperation includes 5 criteria

The five areas are: 1) Networking, 2) Facilitating (European) excellence and capacity building, 3) Coordination of critical mass, 4) Fostering mutual learning and harmonisation in (and beyond) Europe, 5) Avoiding redundancies and acting economically and effectively. By testing new and existing actions based on these criteria, a better view can be reached of the (potential) EAV.

A lack of data prevents currently a good assessment of EAV

The lack of sufficient data prevents a good assessment of EAV for specific actions or groups of actions. There is still only a small body of evidence of expected and achieved impacts through individual FP activities. Also, very few indicators are used with a view to monitor and evaluate the actions with a specific focus on international STI cooperation. Moreover, assessing whether the EU (or EU-MS action) addresses one of the EAV criteria, and monitoring a number of indicators is not

⁵¹ Drivers of International collaboration in research. Final Report. European Commission 2009. ISBN : 978 -92 79-14232-1 Edited by Technopolis Group and Manchester Institute of Innovation Research.

sufficient to understand the mechanism and value of the action or to understand why it has an *added* value compared to the actions taken at the MS level.

Future policymaking at the EU level can tackle a number of barriers for international STI cooperation: a clear added value can be provided

A number of barriers currently prevents deeper international STI cooperation. These could be tackled at EU level, such as the lack of financial means to support co-funded mutual research undertakings; a small pool of human resources for building sustainable relations with other countries; a lack of knowledge about the other country's strengths and complementarities; the existence of duplications in policy; a lack of understanding of the working of the EU instruments; and a large administrative burden for international STI cooperation.

Some of the current instruments are very effective, but strategy and operation can be better connected

INCO-Nets and ERA-Nets are successful instruments, tackling the needs of many. The effectiveness of STI bilateral agreements, however, is debated, as well as the introduction of many new instruments with the risk of increasing the bureaucracy. The link between the EU strategy and high policy objectives, and the activities that take place at the thematic level and in other parts of the EU at the operational level could, however, be stronger.

A number of challenges are still ahead

Existing challenges are related to ownership of the instruments and activities; maintaining a long-term view, taking into account the dynamics various countries are in; the continuation of joint EU-MS partnerships towards new emerging economies; the focus on innovation and framework conditions for this; and more robust evidence-based monitoring and evaluation of EAV in the future.

Main recommendations

A number of recommendations have been provided throughout the report. The five key recommendations are listed here:

1. Continue with successful actions and instruments that support funding for mutual research undertakings. Make sure that long-term planning leads to sustainability of international engagement at the national level, if needed by joint EU-MS partnerships or EU actions for a limited period. A clear vision is needed about supporting sustainable international cooperation, both at the EU and Member State levels.
2. Continue the support of sharing best practices and making information available through contact points or peer-learning activities with country-specific or thematic focus.
3. Explore whether it is effective and efficient to combine existing instruments, perhaps based on a thematic or geographic focus.
4. Increase the focus on the development of framework conditions for innovation in EU-third country collaborations and explore further to what extent there is a EAV rationale for innovation activities, since this is not always obvious in increasingly competitive domains.
5. With regard to future monitoring and evaluation of EAV the following recommendations finally can be made:
 - ✓ Ensure that rationales, objectives, the EAV assumption, inputs as well as outputs and outcomes are captured at the start, mid-term and end of the projects; both for individual projects and at the level of the instruments.
 - ✓ Find a means to encourage (or strongly recommend) all actors involved in the governance of STI actions to conduct regular output and impact assessments with a focus on the international cooperation aspects. It is not about finding new but establishing realistic and comparable reporting systems amongst different actions that are very different in terms of

activities and objectives, of vastly different scales and time-spans, and involve different actors, different geographies, different governance and different funders, etc.

- ✓ Integrate the 5 EAV criteria both in the proposal phase of the actions, as well as during their evaluation phase through an 'EAV test'. Here, other EAV assumptions can be listed and later also evaluation based on tailor-made indicators. Furthermore, we recommend to not only assess whether the action aligns with one or more of these criteria, but also to address the following questions:
 - For whom does the action provide added value?
 - Is there any difference between the added value for larger and smaller countries, for more and less developed countries?
 - What are the differences between the added value for research versus innovation?
 - Were there any initial EAV assumptions (ideally there should be)? What were they, and have they been achieved?

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ANNEX A INTERVIEWEES

Name	Organisation
Laurent Bochereau	European Commission, Directorate General Research and Innovation
Mary Kavanagh	European Commission, Directorate General Research and Innovation
Christoph Elineau	Deutsches Zentrum für Luft- und Raumfahrt
Morten Moller	European Commission, Directorate General for Communications Networks, Content and Technology
Jean-Yves Roger	European Commission, Directorate General for Communications Networks, Content and Technology
Marco Malacarne	European Commission, Directorate General of Enterprise and Industry
Astrid-Christina Koch	European Commission, Directorate General of Enterprise and Industry
Wim Hafkamp	Joint Programme Initiative (JPI), Urban Europe
Philippe Froissard	European Commission, Directorate General Research and Innovation
Didier Gambier & Rosanna D'Amario	European Commission, Directorate General Research and Innovation
Jörn Grünewald & Gerd Rucker	Deutsches Zentrum für Luft- und Raumfahrt
Renzo Tomellini	European Commission, Directorate General Research and Innovation
Iveta Aizbalte	European Commission, Directorate General Research and Innovation
Barbara Rhode	European Commission, Delegation of the European Union of Japan
James Gavigan	European Commission, Delegation of the European Union of Washington
Jessica Mitchell	European Commission, Delegation of the European Union of Japan
Pedro de Sampaio Nunes	Eureka
Ophélie Hemonin & Heather Mckhann	Joint programme Initiative on Agriculture, Food Security and Climate Change (FACCE)
Sylvia Schwaag	Swedish Agency for Innovation Systems (VINNOVA)
Ivan Maric	Geant
Andrew Cherry	CAAST-Net Plus
Paulo César Gonçalves Egler	B.Bice
Olaf Heilmayer	Deutsches Zentrum für Luft- und Raumfahrt
Dominique Aymer	National Centre for Scientific Research (CNRS)
Christofilopoulos Epaminondas	NCP Greece, coordinator Incontact
Dominique Collard	National Centre for Scientific Research (CNRS), EUJO-LIMMS
Claudio Bogliotti	Mediterranean Science, Policy, Research & Innovation Gateway (MED-SPRING)
Monica Silenzi	Alcúe Net
Stephane Hogan	European Commission, Directorate General Research and Innovation

In addition, the SFIC members were asked to provide a number of answers to specific questions in writing about their particular countries. Answers were received from representatives of the research community and policymakers in Belgium, Portugal, the UK, Denmark and Sweden.

ANNEX B INTERVIEW TOPICS

Short introduction to the study on European Added Value of international cooperation in Science, Technology and Innovation (STI) for the interviewee

DG Research and Innovation of the European Commission invited the Technopolis Group and EMPIRICA to carry out a study to investigate the European Added Value (EAV) of international cooperation in Science, Technology and Innovation (STI).

The objectives of the study are:

- To define under which circumstances international STI cooperation objectives and actions carried out at EU level (coordinated or joint EU-MS actions, solely EU actions) will be more effective than if carried out at national or local level (e.g. where scale and scope are a central element to achieve the desirable level of impact)
- To define the means of actions, and types of measures that might be taken at EU level (including and differentiating those which promote EU-MS actions) which are most effective to achieve the desired international STI cooperation objectives.

Add the assurance that individual responses will not be made recognizable. We will report on this study in general terms perhaps mentioning examples of domains where EAV is more evident than in other domains.

Information on the interviewee and involvement in international STI cooperation

- What is your function?
- In what way have you been involved in international cooperation policy making and activities (so: collaboration between EU countries (+associated) with third countries on STI topics?)
- What is it that you currently do in terms of concrete activities in this field? What are their main objectives/goals and benefits?
- Why do Member States not organise these activities themselves?
- What are the differences of funding/organising/managing these activities at the EC level versus the national level, or versus the joint EC-MS level? How do they compare?

Meaning of EAV

- What does the concept of European Added Value mean for you? (From the perspective of your organisation/unit etc..?)
- What are important key words that come to mind?
- When would you say that EAV has been successfully reached within your field of work?
- Can you provide us with examples of clear added value within these dimensions/activities?
- How could EAV be measured?

Major areas of added value

- What major problems / needs in terms of STI cooperation should be addressed at the European level (or EU-MS) rather than the Member State level? Why?
- In your view, which current EU instruments in FP 7 have the greatest potential to address these challenges?
- To what extent is what the EU offers unique? Are there any instruments that have no counterpart in the MS?
- In case there is no comparable national support mechanism in place, for what problem / need does the EU or EU-MS action provide for a solution?

Best practices of added value of EU action

- How in your view are EU instruments/activities more effective than those by one or more Member States in achieving the objectives of STI cooperation (e.g. and cooperation in itself? Can you provide examples?
- How would you measure this effectiveness? Do you have any qualitative indicators for this? Any quantitative indicators?
- Any examples of where this has been analysed and reported on?

Third country perspective and reciprocity

From the perspective of the Third countries:

- Why would third countries participate in EU or EU-MS actions? What would be the benefits for them to participate?
- In what way would EU action or EU-MS action in your view be more beneficial for third countries compared to MS actions?

Future opportunities for policymaking

- What could the EU do better to achieve more effective international STI cooperation?
- Is there a need for a different division of labour between the EU and MS?
- Is there a need for a different role /approach by the MS?

Workshop and case studies

- Could you recommend us a key expert in the field of international STI cooperation or EAV that we should consider to invite in our workshop to discuss the study results?
- Could you recommend us a good 'case study' example of a type of EU or EU-MS action that also is taken at the MS level in order to define and further 'measure' the European Added Value?

ANNEX C SURVEY QUESTIONS

Research Project Participants survey

Motivations for cooperation in science, technology and innovation and using EU instruments

1. What were the most important reasons to collaborate with a non-EU (and non-associated)/EU country/group of countries in this FP7 project?
 - Pursue specific STI goals which need to be addressed on a global basis
 - Improving the chance to attract research funds
 - Network building
 - Establishing a cooperation framework
 - Continuation of existing collaboration and further development of previous joint research activities
 - Further development of previous joint research activities
 - Increase scientific quality and research excellence in own country
 - Access to complementary knowledge, expertise and skills
 - Attracting/retaining/developing human resources for STI in own country
 - Improved access to research infrastructures or other tools (data, specimen, test beds)
 - Sharing of cost and risks
 - Developing common rules and regulations
 - Addressing global grand societal challenges
 - Pursue socio-economic development goals beyond STI (cultural growth, economic growth, growth in jobs)
 - Increasing own impact and visibility through research partner (preferential attachment)
 - Facilitation of capacity building in partner country
 - Access to foreign markets
 - Diplomacy and improvement of international relations
 - Maintenance of historic ties
 - Improving the policy dialogue, agenda setting and collaboration between countries on STI

2. What were the most important reasons for you to choose the EU FP7 mechanism/instrument supporting international STI cooperation with Non-EU countries/EU countries and not a national supporting mechanism to carry out your project?
 - It fills a gap in the available mix of national instruments
 - There was no comparable instrument available on a national scale
 - The project could not have been organised by my Member State alone
 - It is a source of extra funding
 - It is more efficient to use the European instrument than using a national instrument
 - It is more effective to use the European instrument than using a national instrument
 - The EU instrument provided for a better connection with leading minds in the field
 - Using the EU instrument ensures better uptake and implementation of standards and regulations
 - Using the EU instrument reduces research risks
 - Using the EU instrument reduces commercial risks
 - Participating in an EU funded project provides for a better reputation, position and status for participating researchers/organisations
 - The EU instrument provides for easier access to international research communities/networks
 - The EU regulations for this project provide more freedom to operate
 - Participating in an EU project provides for more travel
 - The EU programme conditions are an incentive for inclusion of others than the usual partners

Expected outcomes and impacts of the cooperation

3. In terms of the international collaboration, what are the most important results and impacts (or expected results and impacts where these are not yet visible) of your project?
 - Improved policy dialogue between the participating researchers on STI
 - Improved policy dialogue between the participating research organisations on STI
 - Improved policy dialogue between the participating countries on STI
 - New networks in my domain of work
 - New networks beyond my domain of work
 - Improvement of existing networks
 - Established cooperation framework
 - Developed common rules and regulations
 - Improved research excellence in own country/organisation
 - Improved research excellence in partner countries/organisations
 - Development of joint research infrastructure, research facility
 - Improved mobility inwards
 - Improved mobility outwards
 - Increased competitiveness and innovation
 - Strengthened international relation through science diplomacy

- Improved monitoring and evaluation in place
- Increased dissemination and outreach
- Contribution to solving grand global challenges

The European Added Value of STI cooperation

4. There are different reasons to assume that the European Commission can add value to STI cooperation with its supporting mechanisms. In this section we would like to ask for your opinion on this added value, if applicable to your project. Please indicate if the following statements about the current outcome and impact of the collaboration in your project apply:

- Scale and complexity
 - The project provides or contributes significantly to a research infrastructure
 - The project organises a critical mass of uptake/ users (researchers)
 - The project organises a critical mass of observations/data/research subjects
 - The project connects the field's leading minds globally
- Coordination of the STI potential and capacity building
 - The project has led to better coordination of the STI potential in my country
 - The project helps coordinate resources (funds, researchers, infrastructure, data, samples, patient cohorts) from two or more EU or associated countries?
 - The project helps coordinate resources (funds, researchers, infrastructure, data) from at least one emerging country?
 - The project leads to international standards, norms or rules
 - The project influences international standards or norms
 - The project helps building the regulatory framework for cooperation
 - The project helps building knowledge on cooperation
 - The project supports further networking
 - The projects helps building new infrastructures
- Enhancing the European knowledge base
 - The project enhances the European knowledge base
 - The project helps facilitate mobility of researchers to non-EU countries and vice versa
 - The project facilitates the creation of research and innovation consortia including non-EU countries
 - The involvement of non-EU countries has improved the research activities and outcome in Europe
 - The involvement of non-EU countries has improved the value of research infrastructures in Europe
 - The involvement of non-EU countries has improved the level of competition of Europe in research and innovation
 - The involvement of non-EU countries has improved the attractiveness for other researchers and organisations to join
- Economic impact, efficiency gains and financial impacts
 - On the national level, the project leads to efficiency gains (e.g. simplification and streamlining, pooling and more efficient use of scarce public resources, etc. allowing avoidance of duplication and rationalisation of efforts)
 - The project leads to increased productivity
 - The project reduces research risks
 - The project reduces commercial risks
- Societal/grand challenges
 - The project contributes to addressing specific societal/grand challenges that EU countries share with non-EU countries
- Supporting external policies and European values
 - The project supports global democracy
 - The project supports human and civil rights
 - The project supports gender equality
 - The project supports social inclusion
 - The project supports humanitarian aid
 - The project supports European integration
 - The project complements work conducted within a country on issues and problems which have a European dimension
- Supporting external policies and European values
 - The project leads to improved policy dialogue between the participating countries on STI
 - The project leads to new networks in my domain of work
 - The project leads to new networks beyond my domain of work
 - The project leads to improvement of existing networks
 - The project leads to (a further definition of) a cooperation framework between countries or organisations
 - The project leads to strengthened international relations through science diplomacy

Barriers and opportunities for international STI cooperation

5. What are serious barriers for you to engage in international STI cooperation with non-EU countries that can most effectively be tackled at the European level?

- Lack of financial means to support co-fund mutual research undertakings (e.g. investments in research infrastructures, joint institutes)
- Administrative burdens of organising STI cooperation
- Lack of knowledge and information about the other country's strengths and complementarities
- Lack of network, trustworthy relations
- Lack of legal framework for cooperation

- Too small pool of human resources for building sustainable relations with other countries
 - Political barriers
 - Cultural and language barriers
 - High financial risks of joint research projects
 - Geographical distance
 - IPR issues
6. What mechanisms do you feel would be most effective if taken at EU level to achieve your international STI cooperation objectives?
- Support to communication activities and, dialogue, networking
 - Support to establish STI agreement, specific regulation
 - Support to establish an information service, learning platform, observatory
 - Support to joint programmes or projects
 - Support to the establishment of joint institutes
 - Research funding scheme
 - Mobility scheme
 - Support to set up foreign branches
7. Are there any other actions or measures that are not in this list which you think would be effective?
8. How can these mechanisms further be improved?

INCO NCP survey (EU and non-EU NCP)

NCP Operations

1. Considering the specific STI international cooperation activities within FP7, please indicate the share of effort dedicated to the following support activities in respect to the overall assistance activity (100%) [*Share of effort in %*]
- Guidance on choosing thematic priorities and instruments
 - Advice on administrative procedures, modalities and contractual issues
 - Training and assistance on proposal writing
 - Distribution of documentation (forms, guidelines, manuals etc.)
 - Assistance in partner search
2. Please indicate up to three other support activities you provide, which are not part of this list and specify the share of effort in respect to the overall assistance activity, e.g. IPR assistance. [*Please indicate up to three other support activities*]

The Overall Objectives of International Cooperation with the EU Framework Programme

3. Please indicate whether you agree with the following statements on the overall development of FP7 International Cooperation between 2007 and 2013 [*Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Disagree" to 5, which means "Fully Agree"*]
- The coordination of EU Member States and European Commission actions in strategic STI cooperation and Information Society dialogues with third countries has improved
 - The Framework conditions for the cooperation between third countries and EU players in research have improved
 - The coherence and effectiveness of international cooperation in STI has increased over the course of FP7
 - From the perspective of our national players participating in EU Research and Innovation activities, Europe has become more attractive as an STI partner
 - From the perspective of our national players participating in EU Research and Innovation activities FP7 STI policy cooperation has facilitated access to knowledge, resources and markets worldwide
 - From the perspective of our national players the thematic correspondence of FP7 STI international cooperation activities with national priority themes has increased
 - From the perspective of our national players third country participation of STI actors in FP7 STI international cooperation activities is easier
 - We have the feeling that the overall scientific level of STI cooperation activities has increased over the course of FP7
 - There have been significant knowledge spill-overs from third partner countries to the EU partners
 - There have been significant knowledge spill-overs from EU partners to third partner countries
 - The integration of Europe's neighbours in the ERA has increased
 - The sharing of STI and research support policy best practices has produced more efficient and effective STI international cooperation activities with the EU
 - International Cooperation made it easier for Europe's researchers and universities to work with the best scientists and research infrastructures in the world
4. Please indicate whether you agree with the following statements on STI cooperation activities with FP7 [*Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Disagree" to 5, which means "Fully Agree"*]
- There is a close cooperation between the policymakers of our country and the EU policymakers to develop joint STI international cooperation activities

- There is a close cooperation between the policymakers of our country and the EU policymakers to harmonise the main STI development lines
- We believe that there is a good integration of national (3rd country) STI support policies and EU policies
- There is a good integration of national management procedures and EU FP7 STI management procedures
- It is easy for third country participants to enter FP7 consortia designing and implementing international STI cooperation activities
- There are a significant number of repeating 3rd country participants in FP7 international STI cooperation projects
- It is very frequent that 3rd country participants enter into a stable and continued relationship with EU partners and consortia

Motivations for Researchers/ Research Organisations to Participate in FP7 International Cooperation Activities

5. Based on your own observations and feedback received from researchers and organisations you advice, what are the most important reasons for STI organisations in your country to participate in FP7?/From your perspective, what are the most important reasons for researchers and stakeholders in your country to engage in international STI support mechanisms of the European Commission? *[Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Not at all important" to 5, which means "Most important"]*
 - Facilitating STI development on a global basis and leveraging global knowledge building
 - Pursue specific STI goals which need to be addressed on a global basis
 - STI organisations team up with partners from international (third) countries to comply with a specific requirement of the Framework Programme call
 - Improving the chance to attract research funds
 - Global, regional and local Network building
 - Continuation of existing collaboration and further development of previous joint research activities
 - Further development of previous joint research activities
 - Increase scientific quality
 - Access to complementary knowledge, expertise and skills
 - Improved access to research infrastructures or other tools (data, specimen, test beds)
 - Sharing of cost and risks
 - Addressing global grand societal challenges
 - Pursue socio-economic development goals beyond STI (cultural growth, economic growth, growth in jobs)
 - Increasing own impact and visibility through research partner (preferential attachment)
 - Facilitation of capacity building in partner country
 - Access to foreign markets
 - Diplomacy and improvement of international relations
 - Maintenance of historic ties
6. Do national policymakers in your country participate in FP7, in particular in the Horizontal actions and measures in support of international cooperation (INCO Specific Support Actions under the Capacities Programme)?
 - Yes
 - No
7. What are the most important reasons for policymakers in your country to participate in FP7, in particular in the Horizontal actions and measures in support of international cooperation (INCO specific support actions under the Capacities Programme)? *[Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Not at all important" to 5, which means "Most important"]*
 - Improving the policy dialogue, agenda setting and collaboration between countries on STI
 - Establishing a cooperation framework
 - Network building
 - Increasing reciprocity (e.g. Mutual opening of programmes, mutual funding, mutual visibility). Developing common rules and regulations
 - Improving research excellence in own country
 - Improving research excellence in partner country
 - Attracting/retaining/developing human resources for STI in own country
 - Attracting/retaining/developing human resources for STI in partner country
 - Fostering competitiveness & innovation in own country
 - Fostering competitiveness & innovation in partner country
 - Strengthening international relation through science diplomacy
 - Policy monitoring and learning
 - Information sharing
 - Supporting dissemination and outreach of STI activities and outputs
 - Tackling global grand challenges

Assessment Area: Relevance

8. According to your experience and expertise, please indicate whether FP7 international STI cooperation policies match with the corresponding support policies in your own country. *[Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Limited match" to 5, which means "Complete match"]*
 - Health
 - Food, Agriculture and Fisheries, Biotechnology
 - Information and Communication Technologies

- Nanosciences, Nanotechnologies, Materials and new Production Technologies
- Energy
- Environment (including Climate Change)
- Transport (including Aeronautics)
- Socio-economic Sciences and Humanities
- Space
- Security

Assessment Area: Efficiency

9. Please indicate whether FP7 international STI cooperation rules and management approaches match with the *corresponding* rules and instruments in your own country (only for third country NCP). [*Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Limited match" to 5, which means "Complete match"*]
- Project design rules
 - Funding scheme (co-funding, level of funding, timing of payment, etc)
 - Project evaluation rules
 - Contract setup rules
 - Project initiation
 - Contract management rules
 - Project flexibility rules, changes in STI and research process due to unexpected results and outcomes
 - Administrative rules, activity reporting
 - Contract amendment rules
10. Please indicate whether the applicable FP7 international STI management rules and approaches are suitable to for international STI cooperation activities in your country. [*Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Unsuitable" to 5, which means "Very appropriate"*]
- Project design rules
 - Funding scheme (co-funding, level of funding, timing of payment, etc)
 - Negotiation among partners
 - Project evaluation rules
 - Time frame (time for approval, time to contract, etc)
 - Negotiation with Commission
 - Contract setup rules
 - Project initiation
 - Contract management rules, project review procedures
 - Project flexibility rules to manage changes in STI and research process due to unexpected results and outcomes
 - Administrative rules, Activity reporting
 - Contract amendment rules

Assessment Area: Effectiveness and Impacts

11. Please assess the following statements on international STI cooperation in FP7, possibly considering your experience and the contacts with the STI players of your country or region as regards its programme design. [*Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Completely disagree" to 5, which means "Fully agree"*]
- International STI cooperation policies in FP7 are designed to allow an effective strategic and policy cooperation
 - International STI cooperation policies in FP7 are designed to allow an effective scientific and technological cooperation at thematic level
 - International STI cooperation policies in FP7 are designed to allow an effective scientific and technological cooperation of science and technology players
 - International STI cooperation policies in FP7 are designed to allow an effective scientific and technological cooperation of the EU with other countries leading to significant improvements in scientific and technological knowledge
12. Please assess the following statements on the operation of the NCP system and on the interaction and cooperation with the European Commission. [*Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Completely disagree" to 5, which means "Fully agree"*]
- The network of NCPs is appropriately structured and organised
 - There is an appropriate information flow from the European Commission
 - The EC is an efficient partner to promote FP research in your country
 - There is an effective and high quality communication process with the EC
 - There is an effective and high quality communication within the NCP network
 - There is good awareness of data and information originating from the EC, which is necessary for the proper performance of NCPs
 - There is efficient and timely information by the EC on the outcomes of the proposal evaluation processes
 - The cooperation with NCPs in other countries is facilitated and effective
 - The cooperation with NCPs in other countries produces positive effects for the STI cooperation
 - The NCP operations monitoring system allows a regular improvement, taking account of best practices and shortcomings
13. Can you please indicate whether you agree with the following statements on the impact of international STI cooperation activities in the EU Framework Programme from 2007 – 2013 as regards its programme design. [*Please assess the items*

according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Completely disagree" to 5, which means "Fully agree"]

- FP7 international STI cooperation has improved the capability to attract research funds
- FP7 international STI cooperation has improved the capability to build networks and stabilising STI linkages
- FP7 international STI cooperation has improved the capability to foster the continuation of existing collaboration between international partners
- FP7 international STI cooperation has generated a positive impact on the quality level of scientific activities and research excellence
- FP7 international STI cooperation has generated a positive impact on the access to complementary knowledge, expertise and skills
- FP7 international STI cooperation has generated a positive impact on the access to research infrastructures or specific test beds
- FP7 international STI cooperation has generated a positive impact on the sharing and mitigation of cost and risks
- FP7 international STI cooperation has generated a positive impact on addressing global problems and grand challenges
- FP7 international STI cooperation has generated a significant positive impact on STI capacity building in partner country
- FP7 international STI cooperation has generated a significant spill-over on foreign market access
- FP7 International Cooperation in STI has fostered competitiveness & innovation
- FP7 International Cooperation in STI has improved diplomacy and improvement of international relations
- FP7 International Cooperation in STI has improved the STI policy dialogue, agenda setting and collaboration between countries, as well as the opening of programmes (reciprocity)
- FP7 International Cooperation in STI has supported the development of common approaches, rules and regulations
- FP7 International Cooperation in STI has improved the attractiveness, retention and development of human resources
- FP7 International Cooperation in STI supported dissemination and outreach of STI activities and outputs
- FP7 International Cooperation in STI favoured sustainable scientific and innovation relationships

14. Considering the activities of the European Commission and their approach to programme management. [Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Completely disagree" to 5, which means "Fully agree"]

- Contact with the Commission Services was facilitated and easy to receive information and help with the specific INCO aspects of the proposals
- It was easy and effective to access information on the INCO aspects of the programme and on its previous achievements
- Programme information provided allowed a clear integration of the specific INCO character into the overall thematic outline of the STI research programme

Assessment Area: Added Value of EU action

15. Based on your own observations and the feedback received from researchers and stakeholders in your country, why would the researchers/organisations prefer the EU FP7 mechanisms over the national mechanisms? [Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Not at all important added value" to 5, which means "Very important added value"]

- Fill a gap in the available mix of national instruments
- Complement work conducted within the Member State on issues and problems which have a European dimension
- Could not have been organised by a single Member State
- Provide a leverage of available funding / extra funding
- Provide economies of scale
- Provide a critical mass of uptake/users of the results
- Provide a better connection with leading minds in the field
- Ensure better uptake and implementation of standards and regulations. Reduce research risks
- Reduce commercial risks
- Provide for a better reputation, position and status for participating researchers/organisations. Easier access to international research community / network
- Provide more freedom to operate
- Better ensure the establishment of international consortia
- Source of longer-term funding
- Provide for more travel
- The EU programme conditions are an incentive for inclusion of others than the usual partners
- Address problems arising at Community level

16. Based on your own observations and the feedback received from researchers and stakeholders in your country, why would the researchers/organisation prefer the national mechanisms over the EU FP7 mechanisms? Because national mechanisms to support STI cooperation. [Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Not at all important added value" to 5, which means "Very important added value"]

- Fill a gap in the available mix of EU instruments
- Are better tailored to the existing national barriers and opportunities
- Provide a leverage of available funding / extra funding
- Are less time consuming to apply for
- Involved less fierce competition
- Provide a better connection with leading minds in the field
- Ensure better uptake and implementation of results
- Reduce research risks

- Reduce commercial risks
- Provide for better national visibility
- Provide more freedom to operate
- Source of longer-term funding
- The EU programme conditions are an incentive for inclusion of others than the usual partners

Possibilities for Improvement of EU Action

17. *What are serious barriers in your country for researchers and stakeholders to engage in international STI cooperation with non-EU countries that can most effectively be tackled at the European level? [Please rank your options from highest to the lowest, by dragging the boxes using your mouse]*
- Lack of knowledge and information about the other country's strengths and complementarities
 - Geographical distance
 - Lack of legal framework for cooperation
 - Political barriers
 - Lack of network, trustworthy relations
 - Cultural and language barriers
 - IPR issues
 - Too small pool of human resources for building sustainable relations with other countries
 - Lack of financial means to support co-fund mutual research undertakings (e.g. investments in research infrastructures, joint institutes)
 - High financial risks of joint research projects
 - Administrative burdens of organising STI cooperation
18. *What are, overall, the mechanisms that might be taken at EU level which you think are most effective to achieve the desired international STI cooperation objectives of the researchers and research organizations in your country? [Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Not at all effective" to 5, which means "Most effective"]*
- Support to communication activities and, dialogue, networking
 - Support to establish STI agreement, specific regulation
 - Support to establish an information service, learning platform, observatory. Support to joint programmes or projects
 - Support to the establishment of joint institutes
 - Research funding scheme
 - Mobility scheme
 - Support to set up foreign branches
19. *Please indicate if you agree with the following statements. [Please assess the items according to importance, with No Answer meaning "Don't Know". The scale ranges from 1, which means "Completely disagree" to 5, which means "Fully agree"]*
- The structure of the funding schemes is appropriate to foster international STI cooperation
 - The rules make it easy to negotiate the consortium formation and terms of cooperation
 - The timeframe for evaluation is appropriate for the STI project needs
 - The timeframe for negotiation is appropriate for the STI project needs
 - The programme and project management rules are flexible enough to cater for unexpected results and outcomes of the STI process
 - There is a significant room for reduction of FP7 STI International Cooperation specific administrative burden concerning proposal documents and formalities
 - There is a significant room for reduction of FP7 STI International Cooperation specific administrative burden concerning contract negotiation documents and formalities
 - There is a significant room for reduction of FP7 STI International Cooperation specific administrative burden concerning reporting, evaluation and auditing documents
 - The level of funding is in general appropriate for the purposes of the international cooperation projects
 - The budget allowed an appropriately sized consortium to reach the critical mass for implementing the project and generating the anticipated impacts
 - The programme rules have led to a complex project size with significant transaction costs
 - There is a firm commitment of national stakeholders to cooperate with the EU institutions to strengthen the international cooperation framework and to ensure the sustainability
 - There has been a close cooperation between international partners and the EU to develop the institutional settings for the implementation of the strategic European framework
 - The international partners and the EU have put in place articulate monitoring systems of FP7 STI International Cooperation to provide input to its actual implementation
 - The policy cooperation between the EU and the international partners is supporting the progress of discussions of global issues
20. *Based on your own observations and the feedback received from researchers and stakeholders in your country, how can these mechanisms be further improved?*

ANNEX D WORKSHOP AGENDA AND LIST OF PARTICIPANTS

Agenda

'The added value of EU and joint EU-MS actions for supporting international STI cooperation' Time: 10.30 – 13.30 hrs Location: ORBAN 7.A149 square Frère Orban 8, 1040 Bruxelles	
1.	Introduction of participants
2.	Introduction to the study and workshop Discussion 1. What is European Added Value with regards to International STI cooperation (discussion based on our presented theoretical framework on EAV)
3.	Overview of different level activities, ideas on benefits. Discussion 2. Comparison of EU, MS and Joint EU-MS benefits and impacts based on existing examples
4.	Overview of major areas of EAV, from interviews Discussion 3. Defining major areas of Added Value
5.	Discussion 4. Discussion on effective policy instruments and interventions for the future (e.g. better addressing policy objectives, the selection of instruments or the types of instrument available, longer-term relationships between the EU and third countries, the coherence of European actions, better meeting stakeholder needs)
6.	Sum-up and close

Participants

Name	Organisation/Position	Country
Prof. dr. Erik Arnold	Chairman, Technopolis Group/Professor of International Innovation, University of Twente	UK
Prof. Manfred Horvat	Professor European and International Research and Technology Cooperation, Vienna University of Technology	AT
Dr. Jörn Sonnenburg	BMBF - International Bureau Executive Director; Director: CIS, Africa, Middle East	DE
Mr. José Manuel Leceta	Director EIT	ES
Mr. Arie van der Zwan	Senior Policy Advisor on Research and Innovation Policies, Dutch Ministry of Economic Affairs	NL
Dr. Paul Cunningham	Director and Senior Research Fellow at University of Manchester	UK
Prof. dr. Elisabetta Basile	Professor at University of Rome	IT
Dr. Klaus Schuch	Strategic research manager center for social innovation, Country correspondent Erawatch	AT
Dr. Merja Hiltunen	TEKES, Director, Steering and Networks, Strategic support for innovation funding	FI
Dr. Boekholt Patries	Technopolis Group	NL
Ms. Monique Rijnders-Nagle	Technopolis Group	NL
Ms. Wieneke Vullings	Technopolis Group	NL
Dr. Derek Jan Fickers	Technopolis Group	NL
Mr. Luca Remotti	Intrasoft	IT

ANNEX E DETAILED CASE DESCRIPTIONS

European and Developing Countries Clinical Trials Partnership (EDCTP)

Introduction: background and history

EDCTP

Establishment of the EU activity

The European and Developing Countries Clinical Trials Partnership (EDCTP) was created in 2003, “as a European response to the global health crisis caused by the three main poverty-related diseases of HIV/AIDS, tuberculosis and malaria⁵²”. In 2000 and 2001 the Council of the European Union and the European Parliament⁵³ underlined the gravity of the HIV/AIDS, malaria and tuberculosis epidemics, and the need to step up efforts to increase aid at national, regional and world level.

They also endorsed a Programme for accelerated action on these diseases in the context of poverty reduction, focusing on promoting prevention, encouraging treatment, making essential medicinal products more affordable, and stepping up research and development. Wishing to have a coherent approach at European level and to act effectively against diseases in developing countries, a number of European countries took the initiative, with developing countries, for setting up a R&D programme (what would become the EDCTP), which would enable critical mass in terms of human and financial resources, as well as the combination of additional expertise and resources available in the different countries. In order to increase the impact of this Programme, the European Parliament and the Council decided that the Community should participate by making a financial contribution⁵⁴. The EDCTP Programme was therefore created as the result of a subsequent European Parliament and Council Decision⁵⁵ to pool resources, funding and activities in order to achieve a greater impact against the three poverty-related diseases. It was established under FP6 and was the first ever Article 185 TFEU (ex Article 169 TEC) initiative (relating to the participation of the EU in the joint implementation of research and development national programmes).

The KEMRI-Wellcome Trust Programme

The Kenya Medical Research Institute (KEMRI)-Wellcome Trust Programme is a Member State activity carried out between UK and Kenya organisations. Kenya is one of Africa’s most dynamic countries; the East African nation boasts a population that has swelled to over 39 million. This rise has been accompanied by increasing health challenges. In 1979 KEMRI was established and nowadays it is the national body responsible for carrying out health science research in Kenya⁵⁶. Since the 1940s, it has been working with the UK Wellcome Trust⁵⁷. For the UK Wellcome Trust it is particularly important to support biomedical health research and training in low- and middle-income countries, such as Kenya. The rationale is to support areas of science that have the potential for health benefits for people and livestock in those countries. In particular, for accelerating scientific process in this area, the Wellcome Trust invests in scientists in these countries, ensuring they have the resources needed to carry out their work, and also support the creation of international networks and partnerships focused on health research, which will facilitate the sharing of ideas and resources⁵⁸.

Today, the KEMRI-Wellcome Trust Research Programme has two sites. In Nairobi, a unit is based at the capital's Kenyatta Hospital and has strong links with the Ministry of Health, facilitating the translation of research findings into medical policy. The unit in coastal Kilifi is based in a district hospital, serving over half a million people and linking basic studies to clinical applications with local relevance⁵⁹.

Objectives, input resources, and implementation

EDCTP

Missions and goals of the EU activity

The **mission** of the EDCTP Programme is “to accelerate the development of new clinical interventions to fight HIV/AIDS, malaria and tuberculosis in the developing countries, particularly in sub-Saharan Africa, and to improve generally the quality of research in relation to these diseases⁶⁰”. It aims to “accelerate the

⁵² EDCTP website

⁵³ In Council Resolutions of 10 November 2000 and 14 May 2001, and the European Parliament Resolution of 4 October 2001

⁵⁴ Decision No 1209/2003/EC

⁵⁵ Decision No 1209/2003/EC

⁵⁶ KEMRI website.

⁵⁷ Wellcome Trust website.

⁵⁸ Wellcome Trust website.

⁵⁹ Wellcome Trust website.

⁶⁰ Decision No 1209/2003/EC

*development of new or improved drugs, vaccines, microbicides and diagnostics, with a focus on phase II and III clinical trials*⁶¹.

More specifically, *“the EDCTP Programme has been drawn up with a view to stepping up cooperation and the networking of European national programmes, accelerating clinical trials of new products, in particular drugs and vaccines, in the developing countries, helping to develop and strengthen capacities in the developing countries, including the promotion of technology transfer where appropriate and encouraging the participation of the private sector and mobilising additional funds to fight these diseases, including funds from the private sector”*⁶².

The programme’s strategy is to *“strengthen and integrate the existing national European and African health research programmes... to improve the research environment and infrastructure for carrying out clinical trial activities in Africa, and to promote African leadership in the conduct of clinical trials”*⁶³.

Activities and target groups / beneficiaries of the EU activities

The Community financial contribution is conditional upon the implementation and coordination of the research and development programmes and activities undertaken at national level by the participating EU Member States, and upon the carrying out of certain activities:⁶⁴

1. Activities linked to networking and coordination of European national programmes and the activities carried out in the developing countries.
2. RTD activities linked directly to the development of new products and the improvement of existing products against the three diseases, suited to the specific requirements of the developing countries (i.e. that are effective, easy to use and as affordable as possible).
3. Activities planned to ensure the development, visibility and sustainability of the EDCTP Programme: activities to promote the EDCTP Programme to ensure a high profile at European or international level; activities linked to obtaining the necessary funds, including those from the private sector, to enable the EDCTP Programme to develop as planned, including beyond the period covered by the 2003 Decision; regular reporting on the implementation of the EDCTP Programme with special emphasis on its public-interest value.
4. Basic activities for the EDCTP Programme such as secretariat services and the management of information concerning clinical interventions against the three diseases.

Input resources and contributors to the EU activity

EDCTP is jointly owned by participating EU national programmes and those of developing countries, and creates a framework to synchronise and pool resources. By applying Article 185 (ex. Article 169) of the Treaty of Lisbon, the national commitment of each Member State mobilises their publicly funded organisational and institutional activities within the scope of EDCTP into a joint programme under EDCTP⁶⁵.

The budget of EDCTP is €400 M for 2003-2015, comprising a €200 M contribution from the EC that is matched by funding (in-kind contributions and new money) from the Member States. EDCTP also forms strategic alliances with like-minded organisations in the public and private sector in order to achieve common goals⁶⁶.

Implementation of the EU activity

EDCTP offers large grants that focus on clinical trials (which is the principal function of EDCTP) as the core activity, and use networking and capacity development. EDCTP-funded activities are based therefore on the following components:

- Supporting relevant clinical trials;
- Networking and coordination of European national research and development programmes and with their partners in the south;
- Networking and coordination of African national programmes;
- Strengthening African capacity in this field.

The grants support Integrated Projects that combine clinical trials with networking and capacity development activities. EDCTP also offers grants that focus specifically on networking and capacity strengthening in Africa: Senior Fellowships, Ethics and regulatory capacity, Member States Initiated projects and Networks of Excellence. EDCTP stresses that capacity development gives African researchers the opportunity to ‘learn by doing’, to utilise the developed capacity and to ensure a successful outcome and capacity retention. Networking through north-south and south-south mentorship will create the critical mass that is required for sustainability.

⁶¹ EDCTP website

⁶² Decision No 1209/2003/EC

⁶³ EDCTP website

⁶⁴ Decision No 1209/2003/EC

⁶⁵ EDCTP website

⁶⁶ EDCTP website

The role of EAV in the aims of the EU activity

The Decision to create the EDCTP⁶⁷ explains that Member States were already undertaking individual R&D programmes or activities aimed at developing new clinical interventions to combat the diseases. These programmes or activities, with funds allocated, formed part of long-term partnership with developing countries. However, these R&D programmes or activities that are undertaken individually at national level were not seen as sufficiently coordinated at European level, and did not allow a coherent approach at European level for an effective RTD programme to combat the diseases in the developing countries, or to make it possible to find optimal treatments suited to conditions in the developing countries. With the ambition to have a coherent approach at European level, and to act effectively against the three diseases in developing countries, 14 Member States (and Norway) had taken the initiative, with developing countries, to set up a R&D programme (the EDCTP Programme), in order to obtain critical mass in terms of human and financial resources and the combination of additional expertise and resources available in various countries across Europe and the developing countries.

The EDCTP Joint Programme document⁶⁸ states that: *"clinical research and clinical trials for poverty related diseases, not sufficiently addressed so far, has now been identified as a main priority. Previously, new tools for the prevention and treatment of the three diseases risked remaining stuck in the development pipeline. Because of the restricted market opportunities, the pharmaceutical industry may not be expected to take the necessary investment risks on its own. In addition, many EU Member States and their partners in the developing countries have substantial collaborative research activities in this field. Unfortunately, these programmes are often fragmented and uncoordinated. They are also under funded and lack capacity in the field. New and specific requirements, such as the need for multi-centre protocols, a demanding regulatory environment and universal ethical standards are additional reasons for a well-coordinated, intensified effort in a genuine and innovative partnership with the developing countries"*.

The Joint Programme document⁶⁹ also states in relation to the integration of European research that *"most of the public sector research in Europe is carried out at national levels. A better and more closely coordinated implementation of national programmes may have an important effect on both the impact and results of the research, particularly because of: the scale of the financial and human resources mobilised; the diverse and complementary aspects covered by the national programmes; and the rapid results which could be expected from combining the existing initiatives. In addition, a joint programme includes measures to support the coordination of national research activities and programmes, particularly the networking of national research programmes. This may include activities such as exchanges of information, mutual opening of programmes, different forms of joint activities such as joint calls for proposals and evaluations, training schemes and campaigns to disseminate results"*.

The EDCTP was therefore formed in order to pool resources, funding and activities to achieve a greater impact... *"it combined political will and defined health priorities of both the developing and developed world"*. It is co-funded by the EC and MS under Article 185 (ex 169) of the EU Treaty *"to promote a more integrated approach to health research among European countries"*⁷⁰.

EDCTP is the first joint programme to bring together the efforts of EU Member States aimed at developing and evaluating new and improved drugs vaccines, microbicides and diagnostics against HIV/AIDS, tuberculosis and malaria. It facilitates coordination and integration of EU Member States research activities in collaboration with their developing countries counterparts⁷¹.

KEMRI-Wellcome Trust Programme

Missions and goals of the MS activity

In Africa, the scientific progress is slowed down by a very low research capacity. Many capacity building initiatives failed to address long-term sustainability. Emphasis is often laid on training alone without regard to the full career path needed to generate research leaders. The KEMRI-Wellcome Trust Programme aims to expand Kenya's capacity to conduct multidisciplinary research that is strong, sustainable and internationally competitive. The Programme is based on the following principles:

- to carry out research of the highest international scientific and ethical standards on major causes of morbidity and mortality in Africa;
- to build strong and sustainable internationally competitive, national and regional research capacity;
- to work in a way that facilitates integration and cross-fertilisation of scientific disciplines;
- to conduct intervention research and basic research in parallel and to have a direct input to local and international health policy.

⁶⁷ Decision No 1209/2003/EC

⁶⁸ EDCTP – Joint Programme of the Action: public version

⁶⁹ EDCTP – Joint Programme of the Action: public version

⁷⁰ EDCTP website

⁷¹ EDCTP website

Activities and target groups / beneficiaries of the MS activity

Several activities are carried out by the KEMRI-Wellcome Trust Programme:

1. RTD activities. Researchers at the KEMRI-Wellcome Trust Programme mainly work in 5 areas, even if there is considerable crossover and interaction between the groupings.
2. Research Ethics and Governance, i.e. ensuring that health research is conducted to the highest ethical standards and that research staff are trained in the principles and practice of research ethics and good research practice in all research disciplines.
3. Communication to the media, policy makers and local communities.
4. Clinical Services for children up to the age of twelve years for medical and surgical care and laboratory Services, covering several facilities and technologies that underpin a large portion of the Programme's basic science and clinical laboratory research agendas.
5. Other activities are carried out by departments such as: Finance (fiscal management of the Programme), Health and Safety (attention to working conditions), Human Resources, Information Technology and Maintenance, Housekeeping and Transport.

Input resources and contributors of MS activity

Wellcome Trust is the main funder of the KEMRI-Wellcome Trust Programme. Initially, it built the Research and Training Facilities in Kilifi, at a cost of over 250 million Kenya shillings (about £1.8 million).⁷² In the following years, every five years the Wellcome Trust had reviews of the programme and continued investing in it. The last review was conducted in 2010, where the Wellcome Trust awarded £32.5m to the KEMRI-Wellcome Trust Research Programme to support research activities through to 2015 (between 2005 and 2010 the funding was equal to £12.9 million). The programme has developed a core group of productive researchers who hold £25m of competitively awarded grants and contribute high quality papers to the scientific literature. In 2008, a £9m Wellcome Trust Strategic Award was awarded to help train local researchers⁷³. All in all of the annual budget of approximately £7 million, two-thirds come from the Wellcome Trust⁷⁴. The remainder of the budget is covered by the Kalifi centre itself.

Other contributors of the initiative are KEMRI are several UK organisations such as the University of Oxford, the Institute of Child Health (London), Liverpool University and School of Tropical Medicine and London School of Hygiene and Tropical Medicine. Researchers affiliated with these universities and local researchers conduct research together in the KEMRI-Wellcome Trust Programme facilities in Kilifi.

Implementation mechanisms of MS activity

KEMRI-Wellcome Trust Programme offers fellowships to selected researchers. Open positions are advertised on the website and applications are received from both local and foreigner researchers. African PhD candidates and postdocs are paid at the same rate as their developed-world colleagues⁷⁵.

The aim is that of strengthening the **research capacity** in Kenya in a sustainable way. The programme offers internships, attachments and a School leavers scheme to recent graduates (attract), training to post graduates (train) and post-doctoral support as well as collaborative linkages (retain).

The programme also **conducts basic, epidemiological and clinical research** in parallel, with results feeding directly into local and international health policy.

Reason for MS, rather than EU-level action

The KEMRI-Wellcome Trust Programme is an initiative of Wellcome Trust, and is therefore a Member State action. The action is the output of a relationship between Wellcome Trust and KEMRI that dates back to the 1940s. Moreover, subsequently, other UK organisations have been involved in the project.

Efficiency and effectiveness

EDCTP

Efficiency and effectiveness

With regards to the efficiency with which the Programme is implemented, the most important concerns regard the proposal evaluation process. An independent external review carried out in 2007 pointed out that *"it takes 6 to 9 months, overall, between receiving the proposal and the final decision. The results and reports are accessible to national agencies but not to the general public. Hence, supervision of scientific excellence depends entirely on the Executive Director and the Partnership Board, but cannot be judged by the scientific community at large. The host, NWO, has the impression that EDCTP could have used more intensively the know-how and*

⁷² KEMRI website.

⁷³ Malaria 1990-2009: Portfolio Review, Wellcome Trust, April 2012

⁷⁴ The guardian website, "Medicine man".

⁷⁵ The guardian website, "Medicine man".

experience of NWO/ZonMw in order to gain time and efficiency".⁷⁶ In an internal evaluation based on programme participant assessment conducted in 2009, *"the initial management set up and the present bureaucratic and resource intensive operational structure were criticized"*. Recommendations to manage future challenges included the possibility to:

- explore a possible leaner, less bureaucratic management structure involving fewer EDCTP constituent bodies in decision making processes;
- shorten the time investments to review applications, approve projects and enter contractual arrangements, and make these procedures more efficient;
- better streamline EDCTP activities with African national priorities and programmes in order to avoid duplications.

EDCTP also publishes Key Performance Indicators (KPIs), as quantifiable performance measurements that are used to measure progress against factors that are key to EDCTP's success (effectiveness). EDCTP has identified KPIs to measure the success and progress of EDCTP across its range of activities to 2012, and updates these quarterly on its website. These show:

- The number of clinical trials / integrated project grants signed from 2004 to 2012 = 57;
- The value of EC grants signed from 2003 to 2012 = €195 million;
- The contract negotiation period for new grants, steadily reducing from 19 months (2004) to 3.4 months (2012);
- The number of African countries involved in ongoing projects = 29 in 2012;
- The number of African institutions involved in ongoing project = 156 in 2011;
- The proportion of African coordinators = 75%;
- The proportion of female coordinators = 27%;
- The split of cumulative expenditure by cost category: 83% grants, 14% programme activities, 2% governance costs, and 1% support costs;
- The split of all expenditure between African (67%) and European (33%) countries, by grant receiver.

The independent evaluation carried out in 2012 also finds that:

- The number of projects funded from 2004 to 2009: 141;
- The value of projects funded from 2004 to 2009: €255 million;
- The fund spent on capacity building from 2003 to 2008: € 113 million;
- The split of all expenditure between African (27%) and European (73%) countries, by funds provider.

However, the evaluation indicates that *"in the absence of any a-priori formulated measurable indicators for the expected outcome set at the start of the EDCTP programme, the ex-post evaluation is difficult for economic and social impacts. It can only be "qualitative" (an educated guess) in the absence of indicators that provide baseline data, over a specified time period, against which changes can be measured. The quantifiable evidence base on economic and social impact was limited"*.⁷⁷

As a qualitative indication of the success of EDCTP, preparations are underway for a proposed second phase of the EDCTP Programme (EDCTP2), which is expected to start in 2015 as part of Horizon 2020. This funding programme provides for the renewal of the EU's financial commitment to the EDCTP. Whilst retaining a major focus on HIV, tuberculosis and malaria, phase II and III clinical trials, and sub-Saharan Africa, an expanded scope is proposed for EDCTP2 to include: 1) All clinical trial phases (I-IV) including implementation research on optimisation of health services, 2) Neglected Infectious Diseases (NIDs), 3) Closer collaboration with industry, like-minded organisations, product development partners and development agencies, 4) Collaborative research with other developing countries outside sub-Saharan Africa when possible and desirable⁷⁸.

Benefits to third countries

The external review of 2009 showed that EDCTP created several job opportunities⁷⁹ in Africa: 90 African scientists funded by EDCTP, 21 African scientists have received scholarships for Distance Learning MSc in Clinical Trials and 27 Career and Senior Fellowships have been awarded. In addition 257 African researchers are involved in EDCTP supported projects as investigators receiving their core salaries from their hosting institutions or African governments. Higher numbers are probably needed to create a significant impact, as health professional migration and brain drain has a particular negative effect in Africa.

⁷⁶ EDCTP website, external evaluation of 2007.

⁷⁷ EDCTP website, external evaluation of 2009.

⁷⁸ EDCTP website, internal evaluation of 2009.

⁷⁹ EDCTP website, external evaluation of 2009.

In 2009, the Swiss Centre for International Health (SCIH) of the Swiss Tropical Institute was mandated by EDCTP to conduct an internal assessment on stakeholder group perceptions and expectations related to the EDCTP programme. The aim of the internal assessment was to identify the limitations and progress made regarding the establishment of genuine partnerships between EU Member States and African counterparts. With respect to capacity development, survey participants highly value the training opportunities offered to African scientists, namely the career development schemes and training opportunities offered to junior and senior African scientists through the various fellowships, MSc and PhD programmes. Furthermore, the establishment of new sub-regional centres of excellence networks in Africa, the support for infrastructural development (e.g. lab equipment) and the strengthening of ethical and regulatory frameworks are seen as important contributions to build up sustainable research conditions on the African continent⁸⁰. The external evaluation of 2009 suggests that EDCTP up to 2009 trained at least 45 PhD candidates and 45 MSc⁸¹.

EDCTP contributes to the global effort against certain diseases by funding research for the clinical development of new drugs, drug combinations and candidate vaccines, and has therefore a potential impact on the health of the region. Recent research for instance contributed to the approval and availability of a drug for the treatment of HIV in children, or to the revision of the WHO guidelines on prevention of mother-to child transmission of HIV⁸².

KEMRI-Wellcome Trust Programme

Comparable effectiveness and efficiency

While a formal evaluation of KEMRI-Wellcome Trust Programme has not been carried out yet, some of the KPIs available for EDCTP can be collected also for the KEMRI-Wellcome Trust Programme. In particular:

- The number of clinical trials / integrated project grants from 2008 to 2012 = 14⁸³
- The number of research projects started from 2008 to 2012 = 42⁸⁴
- The value of support to research from 2010 to 2015 = £32.5 million⁸⁵
- The fund on capacity building awarded in 2009: £9 million⁸⁶
- The number of African countries involved in ongoing projects = 1 (Kenya)
- The number of African institutions involved in ongoing project = 2 (KEMRI and to some extent the Kenyan Ministries of Health and Education)
- The proportion of East African research staff = 70% (over 100) in 2009⁸⁷
- The proportion of Kenyan staff = 95% (over 600) in 2009⁸⁸
- The split of all expenditure between African (33%) and European (66%) countries, by funds provider⁸⁹

EDCTP involved a much higher number of African countries and organisations, and also the involvement of these, measured as the proportion of expenditure covered, is much higher than in the KEMRI-Wellcome Trust Programme. While the number of research project started each year is slightly higher for the KEMRI-Wellcome Trust Programme, the value of grants is much smaller. The creator of the Programme, Professor Kevin Marsh, confirms that the problem of the Programme is its scale, which has been "log orders too little"⁹⁰.

A formal comparison of the efficiency with which the two programmes have been implemented is not possible due to the lack of data on the efficiency of the KEMRI-Wellcome Trust Programme. However, evaluations of EDCTP seem to suggest that the high complexity of the programme, in terms of organisations involved, has had negative consequences on its efficiency, resulting in a high level of bureaucracy and long decisional times. These problems are presumably less important for the KEMRI-Wellcome Trust Programme, which is much easier in terms of organisational form.

However, data indicates that EDCTP is likely to be more effective in terms of outputs. EDCTP funds more projects and allocates more funds to both research and capacity development in African countries than the KEMRI-Wellcome Trust programme.

⁸⁰ EDCTP website, internal evaluation of 2009.

⁸¹ EDCTP website, external evaluation of 2009.

⁸² EDCTP website, 2012 factsheet on EDCTP projects.

⁸³ KEMRI Wellcome Trust website.

⁸⁴ KEMRI Wellcome Trust website.

⁸⁵ Malaria 1990-2009: Portfolio Review, Wellcome Trust, April 2012.

⁸⁶ Malaria 1990-2009: Portfolio Review, Wellcome Trust, April 2012

⁸⁷ KEMRI Wellcome Trust website.

⁸⁸ KEMRI Wellcome Trust website.

⁸⁹ The guardian website, "Medicine man".

⁹⁰ The guardian website, "Medicine man".

Comparable benefits to third countries

With respect to capacity building in Africa, the KEMRI-Wellcome Trust Programme from 1989 to 2008 trained 28 African PhDs, over 70 Masters and 100 diploma level trainings for Continuing Professional Development of the technical staff. Besides employing mostly African staff (70% in 2009), the KEMRI-Wellcome Trust Programme has nurtured several prominent African researchers. One of them, Alexis Nzila, won the Royal Society Pfizer award in 2006 for his work on anti-malarial drugs⁹¹.

The Programme also had benefits from the health point of view. Data from numerous clinical studies have fed into National and WHO guidelines on the management of malaria and other common childhood illnesses⁹². Levels of malaria in Kilifi District have declined over the past decade, presumably due to more effective interventions. In particular, over the period 2003-2008, deaths for malaria have fallen by 75 per cent. However there are still unexplained fluctuations in the incidence of disease that underscore the need for vigilance⁹³.

European added value of the activity

The comparison of EDCTP and the KEMRI-Wellcome Trust offers several insights on the benefits of carrying out this type of activity at EU level instead of at Member State level. Figure 24 shows a comparison between the KPIs of the two initiatives.

Figure 24 Comparison of EDCTP's and KEMRI-Wellcome Trust Programme's KPIs

	EDCTP	KEMRI-Wellcome Trust Programme
European countries involved in the project	16	1
African countries involved in the project	29 (2012)	1
African institutions involved in the project	156 (2011)	2
Average value of funds to research per year	€51 million	€7.6 million (£6.5 million)
Average values of funds to capacity building per year	€22.6 million	€10.6 million (£9 million)
Proportion of African staff	75% (coordinators)	70% (researchers), 95% (total staff)
Proportion of expenditure covered by African countries	26%	33%
Average number of clinical trials / integrated project grants per year	8.14	3.5
Average number of research projects funded per year	28	8.4
Trained PhDs and Masters since inception	90 (inception in 2003)	98 (inception in 1989)

Sources: EDCTP website, KEMRI Wellcome Trust website, Wellcome Trust website, guardian website - "Medicine man". Note: figures are approximate and based on an exchange change rate € to £ of 0.85.

Input additionality

Both initiatives are aimed at defeating diseases in Africa and also creating capacity there. However, with respect to KEMRI-Wellcome Trust, EDCTP was formed to pool a higher value of resources, funding and activities to achieve a greater impact against these objectives. EDCTP yearly invests on average €51 million for research and €22.6 million for capacity building. KEMRI-Wellcome Trust only invests €7.6 and €11.6 million, respectively.

Moreover, by involving a much higher number of organisations both in the developing and in developed worlds, EDCTP combines political will and defined health priorities in a more comprehensive way.

In the EU initiative, the capacity building effort is targeted to a wider number of third country organisations and so it is potentially more effective. Lessons learnt in one organisation can be applied to others with similar characteristics. Moreover, success cases can be used as showcases, and increase other organisations' interest in the programme. Resources from more organisations and countries flow into the EU initiative, which overall has a higher budget for its activities.

The two initiatives also differ in their governance. The EU initiative is governed by a European-level unit, the European Economic Interest Group. This ensures, for instance, commitment from the different organisations involved and a strategic use of the funds collected.

Process additionality

The higher number of organisations involved in the EU initiative and the higher value of resources imply a higher number of research projects funded per year. EDCTP funded on average 28 research projects per year, while KEMRI-Wellcome Trust Programme only 8.

By carrying out more projects, and involving more researchers, EDCTP has a better chance than EMRI-Wellcome Trust Programme to generate results which are fundamental for defeating poverty-related diseases in

⁹¹ The guardian website, "Medicine man".

⁹² Fluid expansion as supportive therapy website.

⁹³ Centre for Genomics and Global Health website.

Africa. The effect is leveraged by the different backgrounds of the researchers (in terms of organisations and country of origin), which favour the exploitation of complementarities in the research groups.

Moreover, African researchers working within EDCTP also get in contact with more and more different researchers than in the KEMRI-Wellcome Trust Programme. EDCTP may, in this sense, be more effective in creating capacity in Africa, as African EDCTP researchers are exposed to a richer portfolio of experiences.

Output additionality

The higher scope and scale of the EU initiative also implies a higher extent of the accomplishment of the Programme objectives. Data is for instance available on the results linked with the objective of building capability in Africa. In 7 years (2002-2009), EDCTP trained at least 45 PhD candidates and 45 Master students. KEMRI-Wellcome Trust Programme trained a comparable number of African people (28 PhDs, and about 70 Masters), in a time frame of 20 years (1989-2009).

Reflections and lessons learnt

This example shows the benefits of scaling up in initiatives aimed at international STI cooperation.

Apart from the scientific and public health challenges that EDCTP seeks to address, it has also faced challenges of a political, administrative and institutional nature. The Joint Programme document⁹⁴ discusses some of the challenges that the EDCTP identified and discussed during preparation activities and during the first year of the existence of EDCTP. These include:

- The European National Programmes vary in organisation, scope, focus, collaborative links, scientific and managerial culture. National, institutional and personal agendas play an important role, and there are varying financial, administrative and legal constraints to coordination, let alone integration.
- Within EDCTP, a National Programme currently means the entirety of all publicly funded activities within one country that can contribute to EDCTP. The co-decision implies that the national commitment of each Member State is to mobilise their publicly funded organisations active in the field of EDCTP, and to maintain the levels of support throughout the programme. Each country needs to create appropriate mechanisms to coordinate and preferably arrange their activities in a "National Programme". So far, EDCTP started with an inventory of relevant activities and funding sources. As a follow up, discussions are underway on how countries can contribute to an integrated and coordinated European "Joint Programme".
- As Article 169 is being applied for the first time, some uncertainty exists on how National programmes may integrate to achieve the objectives. However, based on a clear mission to enhance European research integration in partnership with African countries, the political and administrative structures and mechanisms need to be developed during the action.
- EDCTP has moreover the particularity that the "National Programmes" are largely taking place in third (African) countries. A genuine, equal partnership with the African scientists and countries is therefore a condition sine qua non; the subject of clinical trials requires a strong ethical and regulatory environment.
- The African National Programmes are even less structured than the European programmes. As there is a shortage of national resources, they over depend on external collaboration and funding, which are rarely coordinated and often even competing. While there are many scientists and health experts, the institutional capacities are usually weak, working conditions poor and career perspectives bleak.
- While North-North networking is the legal basis for the application of Article 169, and North-South and South-South networking essential for the objectives of EDCTP, a clear, common understanding of and a consistent commitment to its idea is required from all participants.
- To have added value EDCTP should position itself clearly and strongly within the framework programme, the EU accelerated action, and the multitude of international global health initiatives. This benefit not only consists of its scientific niche, but also of the genuine partnerships and the lean efficiency of its management and operations. While focussing on its specific mission and focus, it needs to fit into the larger research and health needs of the developing countries.
- The political, scientific and collaborative agenda of EDCTP is demanding. The governance structure of EDCTP may seem complex, and the stakeholders have different backgrounds, priorities and cultures. While all share the same values and overall goal, bringing these together in a true joint effort will require commitment of all participants and a competent leadership.

⁹⁴ EDCTP – Joint Programme of the Action: public version

EU's relations with Latin America and the Caribbean (EU-CELAC)

Introduction: background and history

The following case study aims at providing a matched comparison between EU-Member State level international STI cooperation activities through the example of the EU-CELAC strategic partnership, and the joint Member States alternative at the multilateral level through the Ibero-American Programme for the Development of Science and Technology (CYTED).

EU-CELAC Strategic partnership background

The EU-CELAC partnership (previously EU-LAC) is a bi-regional partnership covering all countries of the European Union and the European Commission on the one hand, and all Latin American and Caribbean countries on the other hand.

First of all, the EU-CELAC strategic partnership originates from the early 2000. The European Union, together with Latin America and the Caribbean, had enjoyed privileged relationships since the first bi-regional Summit, held in Rio de Janeiro (Brazil) in 1999, which established a strategic partnership. They are natural partners linked by strong historical, cultural and economic ties. They co-operate closely at the international level, and maintain a tight political dialogue at all levels - regional, sub-regional (Central America, the Caribbean, the Andean Community and Mercosur) and, increasingly, at the bilateral level⁹⁵. The close relationship between the EU and Latin America and the Caribbean countries since the Rio de Janeiro Summit has been focused on the promotion of shared interests and values, and was consolidated during the subsequent Summits of Madrid in 2002, Guadalajara in 2004, Vienna in 2006, Lima in 2008, Madrid in 2010 and Santiago de Chile in 2013. In 2010, the LAC side launched the Community of Latin American and Caribbean States (CELAC). From this point on, CELAC has been the EU counterpart in the bi-regional partnership process⁹⁶. The strategic partnership between EU and CELAC is built on mutual respect and shared convictions, so that both sides can benefit from working together. These critical ties exist both at the bi-regional level and between the EU and the individual LAC countries⁹⁷.

With each subsequent Summit, political contacts and dialogue have intensified, and there has been progress in dealing with a wide range of issues including climate change, migration, the fight against illegal drugs, the promotion of human rights, education, cultural issues, as well as in the fields of science and technology⁹⁸.

In addition, a wide range of agreements with individual countries and groups of countries in the region exist, or are in the process of being concluded, including an Association Agreement with Central America; a Trade Agreement with Peru and Colombia; an Economic Partnership Agreement with the Caribbean; trade agreements with Mexico and Chile (which have been up and running since 2000 and 2002, respectively, and have proven very successful; and an EU-Caribbean Joint Strategy. Bilaterally, the EU also has a Strategic Partnership Agreement with Mexico and Brazil⁹⁹.

The Iberoamerican Development Programme for Science and Technology (CYTED) background

As for the multilateral level embodied by the CYTED Programme (Iberoamerican Development Programme for Science and Technology), this is an intergovernmental multilateral Science and Technology cooperation programme. Its aim is to combine different perspectives and visions to promote cooperation in Research and Innovation for the development of the Latin America region¹⁰⁰. The CYTED programme was created in 1984 as an International Framework Agreement signed by 19 Latin American countries and two EU Member States, namely Spain and Portugal. As an intergovernmental instrument of the national science and technology systems, CYTED is a platform for the promotion of multilateral cooperation to transfer knowledge. Its key objective was to contribute to the sustainable development of the Iberoamerican region based on cooperation in science, technology and innovation, and the combination of different perspectives and visions¹⁰¹. Historically, the programme originates from a resolution passed at the second summit of Latin American Heads of State and Government in Madrid, in 1992¹⁰². Since 1993, the CYTED programme has been organising annual preparatory

⁹⁵ <http://eeas.europa.eu/lac/>

⁹⁶ EU and Latin America and the Caribbean, leaflet, 2012

⁹⁷ Review of S&T Cooperation between the European Union and the Republic of Chile 2007-2011, European Commission, 2011 & Review of S&T Cooperation between the European Union and the Republic of Argentina 2006-2010, European Commission, 2011

⁹⁸ Santiago declaration, 5747/13 PRESSE 13, Council of the European Union, 2013

⁹⁹ Review of S&T Cooperation between the European Union and the Republic of Chile 2007-2011, European Commission, 2011 & Review of S&T Cooperation between the European Union and the Republic of Argentina 2006-2010, European Commission, 2011

¹⁰⁰ <http://www.cytcd.org/>

¹⁰¹ Science, Technology and Innovation, International Relations, Argentinean Ministry of Science, Technology and Productive Innovation & Review of S&T Cooperation between the European Union and the Republic of Chile 2007-2011, European Commission, 2011 & Review of S&T Cooperation between the European Union and the Republic of Argentina 2006-2010, European Commission, 2011

¹⁰² Text of the resolution : "In the fields of scientific research and technological innovation, the Conference, in view of the achievements attained since its creation by the Ibero-American Programme for Science, Technology and Development

Scientific Conferences of the Summits of Latin American Heads of State and Government, and is officially included in the Cooperation Programmes at the Summits of Latin American Heads of State and Government.

Objectives, input resources, and implementation

The EU-CELAC strategic partnership

Missions and objectives of the EU activity

More than a decade ago, the EU and its LAC partners decided to consolidate their relationship by creating a Strategic Partnership to convene Summits of Heads of State or Government every other year¹⁰³.

An action plan is defined at each summit for the next two years. The action plan 2013-2015 highlights eight themes¹⁰⁴:

1. Science, research, innovation and technology;
2. Sustainable development, environment, climate change, biodiversity, energy;
3. Regional integration and interconnectivity to promote social inclusion and cohesion;
4. Migration;
5. Education and employment to promote social inclusion and cohesion;
6. The world drug problem;
7. Gender;
8. Investments and entrepreneurship for sustainable development.

The first six themes had already been identified in the framework of the previous action plan 2010-2012. As for "Gender" and "Investments and entrepreneurship for sustainable development", they represent new priorities arising from the last 2013 Summit of Heads of State and government in Santiago de Chile.

Inside each selected thematic, a number of objectives have been highlighted:

- Science, research, innovation and technology
- Sustainable development;
- Regional integration and interconnectivity to promote social inclusion and cohesion
- Migration
- Education and employment to promote social inclusion and cohesion
- The world drug problem
- Gender
- Investments and entrepreneurship for sustainable development

Implementation of the EU activity

In order to support and implement the political and strategic dialogue, a number of operational initiatives have been set up. Indeed, apart from the biennial summits and regular Senior Officials' Meetings, the EU and CELAC are working on a number of specific thematic dialogues and initiatives. Three of the eight above mentioned areas are supported by specific projects:

- The Joint Initiative for Research and Innovation (JIRI), the EU-LAC Knowledge Area

The EU and LAC countries decided to invest in a long-term cooperation in the field of science, technology and innovation in order to increase the development of new knowledge. The main objective of this initiative is to exploit the "knowledge triangle" (education, science and technology & innovation). Later, the Senior Officials Meeting (SOM) Declaration, issued in Salzburg in 2006, reflected the interest of both regions to promote this bi-regional area through the design, implementation and follow-up of joint research and development, as well as mobility and innovation areas of mutual interest.

- The EU-CELAC Structured Dialogue on Migration

Migration has become increasingly relevant for EU-Latin American and Caribbean relationships in recent years. It now appears among the 8 priorities of the 2013-2015 action plan. The EU-LAC Strategic Partnership and the EU and LAC countries are currently actively involved in further developing their

(CYTED), as well as the decision of all the participating countries, approved its expansion and continuity as a valid instrument of integration."

¹⁰³ European Union-Latin America and the Caribbean, Leaflet.

¹⁰⁴ EU-CELAC Action Plan 2013-2015, 5748/13 PRESSE 32, Council of the European Union, 2013

dialogue on migration, as well as enhancing bi-regional cooperation in this area¹⁰⁵. The dialogue introduced a new political framework aimed at identifying common challenges and areas for mutual cooperation in the field of migration. The main objectives of this structured dialogue lie in the identification of common challenges and areas for mutual cooperation, as well as building a stronger evidence base for EU-LAC migration in order to better understand its realities.

More specifically, the main objective of the project is to launch a cooperation process between the EU and LAC countries, and build regional capacities for a permanent exchange of information and good practice.

- The EU-CELAC Coordination and Cooperation Mechanism on Drugs (COPOLAD)

The EU-CELAC Coordination and Cooperation Mechanism on Drugs (COPOLAD) is a partnership cooperation programme between the European Union and Latin America, aiming to improve the coherence, balance and impact of drug policies, through the exchange of mutual experiences, bi-regional coordination and the promotion of multisectoral, comprehensive and coordinated responses¹⁰⁶.

The Iberoamerican Development Programme for Science and Technology (CYTED)

Programme missions and objectives

CYTED is an intergovernmental Science and Technology programme created via a Framework Agreement signed by 21 countries. It is supposed to enhance multilateral cooperation in Research and Innovation focusing on Social and Industrial Development of the Latin-American region through the establishment of cooperation mechanisms among R&D groups (universities, R&D centres, enterprises, technological centres). CYTED is a common instrument of the Science and Technology systems of the nations within the Iberoamerican region.

As an intergovernmental instrument of the national science and technology systems, CYTED is a platform for the promotion of multilateral cooperation for the transfer of knowledge. Its key objective is to contribute to the sustainable development of the Iberoamerican region based on cooperation in science, technology and innovation and combination of various perspectives and visions¹⁰⁷.

This general objective is divided into five specific objectives:

- To promote the integration of the Iberoamerican Scientific and Technological Community, by supporting a joint priority agenda for the region.
- To promote joint scientific research, technical transfer, links between research, development, and investment and exchange of scientists
- To promote participation of the private sector in the innovation process in accordance with the technological development of the Iberoamerican Scientific and Technological Community.
- To promote the participation of Iberoamerican researchers in other multilateral research programmes through agreements.
- To encourage integration between Latin American S&T Communities, promoting an agenda of shared priorities for the region.

At present, thematic priorities are: agri-food sector; health; promoting industrial development; sustainable development, global change and ecosystems; information and communication technology; science and society; and energy.

Programme implementation

Each year, CYTED launches a call to carry out actions in the above-mentioned thematic areas. Among possible actions are: thematic networks; transversal activities; research project coordination activities; innovation projects; and consortia research projects. CYTED organises the annual Iberoamerican Forum for Science, Technology and Innovation (FIBECYT), which attracts a large number of members of the Iberoamerican scientific and technological community. Its key issue is to promote the strengthening of cooperation for the development of scientific and technological capabilities of the Iberoamerican Community of Nations.

The budget is based on a co-funding model that corresponds to the contributions of the participating countries. The Spanish Government guarantees to contribute at least 50% of the overall budget¹⁰⁸, but this share has dramatically decreased over the past few years because of the economic crisis. Other countries' contributions depend on socioeconomic conditions. The maximum amount of financial support available for each project is

¹⁰⁵ From the EULAC Dialogue to the EULAC Project, Olivier Grosjean

¹⁰⁶ <https://www.copolad.eu/en/que-es-copolad>

¹⁰⁷ Science, Technology and Innovation, International Relations, Argentinean Ministry of Science, Technology and Productive Innovation & Review of S&T Cooperation between the European Union and the Republic of Chile 2007-2011, European Commission, 2011 & Review of S&T Cooperation between the European Union and the Republic of Argentina 2006-2010, European Commission, 2011

¹⁰⁸ Review of S&T Cooperation between the European Union and the Republic of Argentina 2006-2010, European Commission, 2011

250,000 USD per year. Since a project may last no longer than 4 years, the total amount available to any individual project is 1.000.000 USD.¹⁰⁹

The EU-CELAC strategic partnership - efficiency and effectiveness

Every EU-CELAC action Plan defines the expected results of each thematic area. EU-CELAC is the implementation of a political dialogue at the levels of Heads of State who come to an agreement on broad common priorities. For 10 years, this process has been working properly, and has been fully satisfactory. It is highly political, and is not primarily intended to lead to concrete results.

It is far too early to assess the efficiency of the EU-CELAC strategic partnership, insofar as all activities undertaken are in progress and not yet completed¹¹⁰. Nevertheless, people interviewed seemed quite satisfied with the work carried out so far, and were confident about next stages.

Overall, the EU-CELAC policy dialogue has so far been effective, and has achieved a number of breakthroughs. Since the beginning of the EU-LAC political partnership, contacts and dialogue have intensified, and progress has been made in dealing with a wide range of topics and issues such as climate change, migration, fight against illegal drugs, as well as in the fields of science and technology.

At the operational level, i.e. among operational initiatives that have been set up in order to support the EU CELAC political dialogue, some results and potential impacts can be tracked down. As initiatives are relatively recent, tangible impacts and outputs cannot be felt at this stage. But from the work already undertaken, a number of expected outcomes and impacts can be highlighted.

Concerning the Joint Initiative on Research and Innovation (JIRI)

The two INCO-Net projects for the Central American and Caribbean region, namely ENLACE and EUCARINET, will finish in 2014. It can already be confirmed that ENLACE significantly has strengthened the National Contact Points network in the Central American and Caribbean region, developing thematic dialogues and promoting training, staff exchanges and travel grants. It has in this way strengthened the ties between researchers from the regions, and enhanced international cooperation¹¹¹. The work of ENLACE and EUCARINET will be closely linked with ALCUE-Net, which will also take over.

As for the ALCUE KBBE project (which supports the political dialogue of the Senior Officials Meetings in the food and bio-economy area), it has carried out activities such as the coordination of stakeholders, mainstreaming topics in political agendas, identification of road maps. Furthermore, the production of a wide array of position papers, policy briefs and concept notes has generated a stakeholder community in the bioeconomy area in Latin America, the Caribbean and Europe.

The AMERICAS project has supported the political dialogue in the field of ICT for societal challenges by facilitating the implementation of the working group's findings and linking them with the ICT communities in EU and CELAC.

The ENSOCIO-LA project started in May 2013, with a focus on climate change, resource efficiency and raw materials. It is expected that the project will succeed in gathering ongoing and past EU-CELAC research projects in environment, and will feed the results into the political dialogue, mapping the gaps, linking initiatives and proposing strategic actions to support the JIRI.

Finally, the EU-LAC Health project is supposed to develop a road map for policy makers and stakeholders in the health research area. The project has already encouraged consultation and discussion processes in order to better coordinate health research efforts in Latin America, the Caribbean and Europe, identify common needs and opportunities, reduce the fragmentation and formulate a global strategy.

Concerning the EU-CELAC Structured Dialogue on Migration:

The project "Strengthening the dialogue and cooperation between the EU-LAC to establish management models on migration and development policies" contributes first of all to the improvement of knowledge on the migratory situation¹¹². In particular, the core of this project is to improve capacities of national and regional structures for collecting, processing and sharing migration data.

¹⁰⁹ http://www.cyted.org/cyted_informacion/en/consorciados.php

¹¹⁰ Interviews

¹¹¹ EU-CELAC Joint Initiative for Research and Innovation, III. Senior Officials Meeting (SOM), 16-17 april 2013, Brussels, Final Minutes

¹¹² European Union-Latin America-Caribbean, Information Sheet, "Strengthening the dialogue and cooperation between the European Union -Latin America and the Caribbean to establish management models on migration and development policies"

The expected results of the project are threefold¹¹³:

- A better knowledge of migration flows via data collection, processing and sharing on migration for countries with significant migration towards the EU, including the training and capacity building of national administrations to produce and update data and analyses;
- Sound migration management through the implementation of reintegration policies for migrants considering a voluntary return to their community of origin;
- To promote alternatives to the use of remittances for direct consumption (better use of private monetary flows).

Even if many activities are still under development, a number of activities have already been carried out.

In the framework of component 1 ("Strengthening data collection-processing and sharing on migration"), work has been effectively carried out and several workshops, courses and meetings have been organised. Three migration profiles have been launched (Jamaica, Ecuador, Peru) since the beginning of the project¹¹⁴. In addition, a number of documents and studies have already been produced.

As for Component 2 ("Building capacity for promoting sound migration management through the implementation of reintegration policies") related to Migration and Employment, 4 training courses and 2 internships on exchange of experiences on labour migration management have been performed since the beginning of the project. Moreover, 5 descriptive institutional analyses and a manual on migration policies and employment have been released¹¹⁵.

Component 3 ("Promoting the productive use of remittances") has made less progress than the other components, but one workshop ("How to incorporate remittances and Diaspora involvement in development policies") was organised in 2013. Two kinds of activities are under development, namely a Manual on Remittances and Development, as well as the organisation of various training workshops¹¹⁶.

The project has a significant impact in terms of strengthening the bi-regional dialogue on the topic of migration. This kind of discussion and information sharing between countries from both regions was not as structured before the implementation of the project. Beyond these considerations, it is premature to try to measure impacts insofar as actions are underway. However, interviewees have the feeling that the project will be a success, and that expected results will be reached at the end of the project.¹¹⁷

Country studies that have been conducted within the project have been useful in filling the gap in some countries, which did not have these data, and in this way they supported their national migration policies by strengthening their ability to understand their own problems.

In the long run, the expected impact of the project is to move towards a common policy in terms of migration.

The EU-CELAC Coordination and Cooperation Mechanism on Drugs (COPOLAD)

COPOLAD's general objective is to improve the coherence, balance and impact of drugs policies, through an exchange of mutual experiences.

COPOLAD was launched in 2011, and it is therefore too early to be able to identify tangible results and impacts. COPOLAD is supposed to indirectly benefit professionals working in the field in Latin America, vulnerable groups and people exposed to the risk of social exclusion, and therefore the Latin American society as a whole.

Before the launch of COPALAD, an initiative related to EU-LAC Drug treatment had been carried out: the EU-LAC Drug Treatment City Partnership (2007-2010). In March 2011, Universalia evaluated the project. It appears that the project was considered highly relevant in relation to the strategic objectives. In a relatively short time, the project achieved most of the planned results¹¹⁸. In addition, it contributed to raising awareness about the importance of public policies. This EU-LAC project also successfully organised several capacity building events in order to improve the policy-making capacity of cities, as well as the capacity of treatment service of delivery agencies, and to promote treatment alternatives to incarceration.

¹¹³ European Union-Latin America-Caribbean, Information Sheet, "Strengthening the dialogue and cooperation between the European Union -Latin America and the Caribbean to establish management models on migration and development policies"

¹¹⁴ <http://www.migracion-ue-alc.eu/index.php/en-GB/activities/data-on-migration>

¹¹⁵ <http://www.migracion-ue-alc.eu/index.php/en-GB/activities/migration-employment>

¹¹⁶ <http://www.migracion-ue-alc.eu/index.php/en-GB/activities/productive-investment-of-remittances>

¹¹⁷ Interview

¹¹⁸ Final Evaluation of the EU-LAC Drug Treatment City Partnerships, Final Evaluation report, Universalia Management Group, 2011

The Iberoamerican Development Programme for Science and Technology (CYTED) - efficiency and effectiveness

CYTED's activities are divided into 7 thematic areas: i) Agri-food; ii) Health; iii) Promoting industrial Development; iv) sustainable development, global change and ecosystems; v) information and communication technology; vi) science and society; and vii) energy.

The CYTED programme supports a number of activities, such as:

- Thematic Networks
- Research Project Coordination Activities
- Consortium Research Projects
- Actions of Transfer of technology to the business area
- Innovation Projects

The programme also supports some specific activities: strategic regional activities (collective R&D activity); research seminars; innovation seminars; annual IBEROEKA¹¹⁹ Innovation Forum; and IBEROEKA Miniforums.

Even if no formal impact assessments are available, from a scientific perspective, especially in terms of number of projects and partnerships generated, the results of the CYTED programme are seen as very positive.

Indeed, the CYTED Programme has so far created 278 Thematic Networks, 197 Coordination Activities, 6 Consortium Research Projects, 3 Actions of Transfer of technology to the business area, and 671 certificates IBEROEKA Innovation Projects, involving the participation of over 8,300 research groups and over 27,400 Latin American scientists and technicians. More than 10,000 researchers have been involved in the different CYTED instruments.

From 2005 and 2012, most of the projects carried out in the framework of the CYTED programme were coordinated by Spain (84 projects), Argentina (26), Brazil (21), Cuba (19), Mexico (14) and Columbia (13).

18 of the 21 CYTED countries co-ordinated one action out of the 217 approved during the period 2005-2012. The areas where geographical participation was more diverse are "Promotion of Industrial Development", "Agri-business", and "Sustainable development, Global change and Ecosystems", in which more than half of the countries have been coordinators. By contrast, in Area 5 "Information Technology and Communication", there were only six countries, where Spain can be highlighted with two thirds of the actions.

More than 3000 scientific teams of all 21 CYTED countries have taken part into actions in each of the seven areas, except Area 5 "Information Technology and Communication" in which no group from Honduras has been involved.

More than 16,000 researchers from the 21 CYTED countries participated in the approximately 200 actions. The number of researchers per country varied between nearly 100 for some of the Central American and Caribbean countries, and over 1000 in Argentina, Colombia, Cuba, Spain and Mexico.

So far, the CYTED programme has essentially been supported by Spain. Given the current critical economic situation, Spanish funding has decreased dramatically. The success of the programme has to be based on its sustainability, hence on available funding and on a future increase in other countries' contributions in order to counterbalance the decrease in the Spanish budget¹²⁰.

Comparing EU-CELAC and CYTED

Prior to the creation and implementation of the strategic partnership between the EU and CELAC, CYTED was the only and privileged area of cooperation between Latin American countries, in particular between Spanish-speaking countries. The EU-CELAC strategic partnership initiative is broader in terms of topics addressed, means of action and geographic spectrum.

The two programmes are rather difficult to compare since their scope is quite different: whereas the CYTED programme primarily aims at funding partnership research projects, the essence of EU-CELAC cooperation lies first of all in the political dialogue established and in media networking projects.

With the association of non-Spanish-speaking EU member states and the addition of a very political dimension, the EU-CELAC strategic partnership expands the range of activities covered by CYTED.

European added value of the activity

In terms of added value of the EU activity, the EU-CELAC strategic partnership and activities have clearly been established with a view to supporting policy dialogue and priority setting. The EU-CELAC partnership was

¹¹⁹ The IBEROEKA Innovation Projects, launched in 1991, are designed to promote cooperation in technological research and development between companies of the industrial sector.

¹²⁰ Interview

formed to increase the ability to speak with one voice. In this respect, the EU activity seems to be on the way to reach this goal. This objective can be achieved only thanks to a collective EU effort, not through the action of a few Member States.

The EU-CELAC European Added Value is related to scale and complexity, insofar as the EU-CELAC strategic partnership involves a large number of countries from two different continents, and makes it possible to reach a critical mass of countries in order to be more efficient in tackling major common challenges. Indeed, the EU-CELAC is also dedicated to addressing identified major challenges shared across European and Latin American countries such as the fight against drugs and issues related to migration. The EU-CELAC initiative is also a means to better coordinate the EU, MS and third countries' STI potential within a global context.

The European Added Value is mainly related to what can be referred to as "process additionality". By involving a much higher number of countries and representatives, in particular EU Member States, the EU-CELAC partnership sends a strong signal of political will, and allows more legitimate and more acceptable decisions. Participating countries join forces to define more relevant priorities and act more effectively in a common direction.

Compared to the CYTED programme, EU-CELAC activities started quite recently. This is why it is unlikely that the European Added Value related to "output additionality" has been achieved in such a short period of time. However, EU-CELAC has made good progress.

Indeed, EU-CELAC has created a space for dialogue between EU and CELAC, which did not exist before. EU-CELAC is now a forum to discuss major common challenges and to exchange information between the EU and LAC countries. Both regions can now interact in a focal and common direction. EU-CELAC is considered a quite powerful tool to make joint decisions and an incredible opportunity to move things forward in the long run. Through EU-CELAC activities, the European Commission supports networking activities and is trying to build something sustainable.

The EU-CELAC activities are generally considered as a complement, but in no way as a replacement for, bilateral or multilateral initiatives.

Compared to CYTED, the EU-CELAC initiative is broader, and its added value lies in the participation of EU non-Hispanic countries in the political dialogue with Latin America (based on the interviews). Involving non-Hispanic countries is one of the major interests of the EU-CELAC partnership compared to the CYTED programme.

Reflections and lessons learnt

Concerning the EU-CELAC partnership, although much progress has been made, the major challenge for the future is to get the largest possible number of partners and countries around the table. In particular for the EU-CELAC Joint Initiative for Research and Innovation (JIRI), the challenge is to increase interest and convince EU Member States to be more active and to be aware of the EU-CELAC added value.

One of the challenges to be addressed is to improve and enhance the coherence of actions carried out within the EU-CELAC partnership and the CYTED programme. The issue is to find the best way to structure both initiatives so that the EU-CELAC and CYTED complement each other harmoniously¹²¹. The communication between both is meaningful.

It is important that the EU-CELAC partnership could benefit from the CYTED's huge network and long experience¹²². The knowledge acquired by CYTED over the years is invaluable, and could benefit the EU-CELAC Science & Technology partnership¹²³.

Contacts between both initiatives have already been established, e.g. in the framework of the EU-CELAC JIRI working group on renewable energies. Indeed, the creation of LAC Technological Platforms in renewable energies has been considered by this working group. This will integrate the scientific and industrial communities working together to solve the problems linked to a secure and sustainable use of and access to energy. In this context, initial talks with CYTED to implement a pilot public-private partnership are planned.

In addition, the EU-CELAC JIRI working group on ICT for meeting Societal Challenges has implemented specific activities, including the creation of an observatory on ICT communities, stakeholders and projects of a Latin American and Caribbean Network of Living Labs. In this framework, the existing instruments and projects, such as RedCLARA, ECLAC and CYTED, have been considered significant counterparts in the work of the group.

A meeting will take place in October 2014 between EU-CELAC and CYTED in order to discuss the best ways to complement each other¹²⁴.

The Senior Official Meeting (SOM) on the EU-CELAC Joint Initiative for Research and Innovation (April 2013) highlighted the importance of a road map as a document to be used to determine, recognise and monitor the impact of STI cooperation between both regions in order to enhance political visibility. There was a general call

¹²¹ Interviews

¹²² Interview

¹²³ Interview

¹²⁴ Interview

for increasing the definition and application of performance indicators, and the need for an enhanced political visibility of activities and achievements. It was decided that the road map would be reviewed in terms of producing a streamlined and focused document that could be monitored in terms of impact and performance.

Europe-Japan Opening of Laboratory for Integrated Micro-Mechatronic Systems (EUJO-LIMMS)

Introduction: background and history

Overview of the EU activity

EUJO-LIMMS (Europe-Japan Opening of LIMMS) is an international cooperation initiative between the Institute of Industrial Science of the University of Tokyo (UT-IIS) and four European partners:

- The National Centre for Scientific Research (CNRS) in France,
- The Ecole Polytechnique Federale de Lausanne (EPFL) in Switzerland,
- The Department of Microsystems Engineering of the University of Freiburg (IMTEK) in Germany, and
- The Technical Research Centre (VTT) in Finland.

EUJO-LIMMS is a follow-up and expanded initiative from an initial bilateral activity between the French and Japanese organisations. It is now partially funded by the European Commission under the FP7-INCO-LAB programme.

Partners in EUJO-LIMMS conduct research at the academic level in the fields of micro and nanotechnologies, and develop joint research projects for new applications in flexible electronics, optics, nanotechnology, molecular and cellular bio-engineering.

History of the EU activity: from LIMMS to EUJO-LIMMS

The EUJO-LIMMS initiative stems from the Laboratory for Integrated Micro Mechatronic Systems (LIMMS); an International Joint Unit created between UT-IIS (Japan) and the Department of Science for Engineering within CNRS (France). The LIMMS laboratory is physically hosted by UT-IIS in Tokyo. It was established in January 1995 and, since 2000, it was supervised by the Department of Information and Communication Sciences and Technologies of CNRS.

The LIMMS was initially used by CNRS to learn about the new technologies of Micro-Electro-Mechanical Systems (MEMS) from the University of Tokyo and transfer this knowledge to CNRS institutions. However, eventually, the relationship became much more mutual and collaborative, involving the mobility of both French and Japanese researchers. In 2004, the laboratory acquired the status of International Research Centre from both CNRS and UT-IIS, becoming eligible to apply for French, Japanese and European research funding and grant-aid. Between 2004 and 2010, 110 researchers (107 from CNRS and 3 from the Japanese Society for the Promotion of Science, JSPS) were welcomed at the LIMMS facility.¹²⁵

In order to enhance the hosting capacity of LIMMS, the founding organisations (UT-IIS and CNRS) decided to increase the number of organisations involved in the project. Three new European partners were identified for inclusion in the consortium: EPFL (Switzerland), IMTEK (Germany) and VTT (Finland). These institutions had already been in contact with CNRS and UT-IIS via the International Research Network NAMIS. The expanded consortium applied for European funding to support the European expansion of the initiative.

This European extension of LIMMS is typically referred to as EU-Japan Opening of LIMMS, or "EUJO-LIMMS". The re-titled EUJO-LIMMS laboratory initiative was launched in February 2012 in Tokyo, and was the European Commission's first international laboratory in Japan. EUJO-LIMMS is co-funded by the European Commission INCO-LAB initiative and the Core-to-Core programme of the Japan Society for the Promotion of Science (JSPS). Finally, nano-tera.ch, a research-funding programme in Switzerland, provided support to the initiative.

European and Japanese researchers from the EUJO-LIMMS institutions are hosted by a Professor in UT-IIS for a visiting period, during which they can use the LIMMS facility to work on their research projects. Initially (under the original bilateral activity), visiting researchers were affiliated to CNRS and JSPS, or were contract researchers hired by CNRS (light blue and violet area). With the European extension (EUJO-LIMMS), EPFL, IMTEK and VTT can also hire contract researchers to be involved in research at the LIMMS facility (dark blue area).

Rationale of the EU activity: International STI cooperation

The European Commission considers Japan as a high-priority partner for STI collaboration. A formalised EU-Japanese collaborative relationship started in 1991 with a Joint Declaration of cooperation¹²⁶, based on the common interest and shared responsibility to contribute to international peace, security and prosperity. The collaboration was then confirmed and strengthened in 2001, with an Action Plan to "shape a common future".¹²⁷ The aim of this Action Plan was to increase policy co-ordination and set up joint initiatives to address together the challenges that Japan and the EU confront. One of the objectives of the Action Plan was to "Bring people together", with a particular focus on the academic communities. Actions that were promoted included:

¹²⁵ From LIMMS to EUJO-LIMMS presentation.

¹²⁶ Joint Declaration 1991

¹²⁷ Action Plan 2001

- Reduction of obstacles to the mobility of teachers, administrators and students,
- Encouragement of ‘twinning’ between schools in Europe and Japan, and
- The identification of appropriate higher education institutions and research institutes, which might link and promote intellectual exchange in specific areas.¹²⁸

Finally, in 2011, the “Agreement between the European Community and the Government of Japan on cooperation in science and technology” was signed.¹²⁹ The agreement aimed at further promoting the existing relations between the European Union and Japan in the scientific area, in order to exploit the benefits of bilateral and international cooperation. Direct cooperative activities promoted through the agreement included the exchange of information, visits and exchange of scientists and the implementation of cooperative activities.

Within this context, it is therefore unsurprising that Japan was one of the designated countries of the FP7 INCO-LAB initiative that was launched by the European Commission in 2010. INCO-LAB is a programme within the framework of the EC international cooperation specific activities (FP7). Its objectives were to establish European laboratories in third countries that would serve as a catalyst to structure and increase the cooperation with those countries. The laboratories that have been established under the programme are typically joint research institutes, involving one or several Member States and are located in Brazil, China, India, Russia, and the USA, in addition to the EUJO-LIMMS in Japan.¹³⁰

In the pool of proposals submitted for INCO-LAB funding, the EUJO-LIMMS proposals was ranked first for those targeted at Japan and one of the best overall.¹³¹ The INCO-LAB initiative began its funding of EUJO-LIMMS at the end of 2011, with a project of 4 years, to increase collaboration between the European Union and Japan, based on the use of the LIMMS facility.

With the launch of the EUJO-LIMMS project, CNRS and the UT-IIS have opened up LIMMS to three new European partners: EPFL, IMTEK and VTT. This has significantly expanded and strengthened the collaboration and research activities being undertaken between Europe and Japan.

Objectives, input resources and implementation

Missions and goals of the EU activity

The mission of the EUJO-LIMMS initiative is to reinforce research collaboration between Europe and Japan, in order to tackle new challenges in micro- and nano- technologies (a field in which Japan is considered a leader).¹³² The strategy involves opening the existing international laboratory activity, the LIMMS in Tokyo, to other European partners.

The scientific challenge being addressed by the initiative is to “push the frontiers of micro- and nano- systems technology... capitalising on the complementary expertise of the University of Tokyo and European partners.”¹³³ The longer-term aim is to apply micro- and nano- systems technology to a range of applications, including in electronics, communication systems, molecular and cellular bioengineering (drug discovery) and low cost technology (nanometer size / large area).

The objectives of the partners involved are:

- To define and develop a series of joint projects combining the expertise of new members with that of LIMMS,
- To have one or more of their researchers hosted in Tokyo for a long stay to develop and complete the selected joint project,
- To establish an interaction with the EUJO-LIMMS consortium for an extended collaboration plan,
- To become an actor of long lasting international collaborative actions between Japan and Europe.¹³⁴

¹²⁸ Action Plan 2001

¹²⁹ Agreement of 2011

¹³⁰ FP7 Capacities Work Programme: Activities of International Cooperation 2011, pages 10-13.

¹³¹ CNRS website

¹³² E-CORDIS website. EUJO-LIMMS description.

¹³³ EUJO-LIMMS website.

¹³⁴ EUJO-LIMMS website.

Activities and target groups / beneficiaries of the EU activity

The activities carried out in EUJO-LIMMS closely mirror the objectives of the initiative. The consortium members recruit researchers to be involved in the EUJO-LIMMS projects through an open call published on the EUJO-LIMMS website. Open-calls are typically targeted to Post-Doc fellows. The EUJO-LIMMS partner formally hires successful researchers with a research contract, but they mostly work in the LIMMS laboratory located in Tokyo, hosted by one of the UT-IIS professors.

In the LIMMS facility, research at the level of technology development is conducted in the form of research projects, in which a team of visiting and local researchers work under the supervision of a host Professor. Single researchers are also supervised by a Professor at the European partner organisation.

Input resources and contributors to the EU activity

The total cost of the EUJO-LIMMS project is estimated to be €2.35 million. The EC contribution to the total is €2 million. EUJO-LIMMS has also received funding by the Japanese Society for the Promotion of Science (JSPS), Core-to-Core Programme. The objective of the JSPS Programme is creating world-class research hubs through networking to advance multilateral collaboration in cutting-edge fields of science. Funding was targeted at the USA, Canada, Austria, Belgium, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland, the UK, Australia and New Zealand. EUJO-LIMMS received funding of ¥16 million (about €123,000) per year for 5 years through this programme to support the mobility of researchers of University of Tokyo towards the EUJO-LIMMS partners in Europe.

Single research organisations also financially contribute by hiring researchers that will be working at the LIMMS facility. The University of Tokyo covers the salaries of the host group Professors, provides the technological platforms, and covers the operational costs.

Implementation of the EU activity

Most of the activities carried out within the EUJO-LIMMS initiatives were already part of the French-Japanese LIMMS, although extended to other countries through the FP7 project. The activities of the EUJO-LIMMS FP7 project are formally organised in 7 work packages:

- WP1 covers the management of the project, and is carried out by the historic partners of LIMMS (CNRS and UT-IIS), who have expertise and experience in project management and joint laboratory work.
- WP2 relates to hosting activities. Old (CNRS, UT-IIS) and new (EPFL, IMTEK, VTT) institutions recruit researchers to work on particular research projects in the field of micro and nanotechnologies. The laboratory is physically located in Komaba Campus (UT-IIS), Tokyo, Japan. UT-IIS is in charge of selecting researchers, officially hosting and accommodating them in Japan and training them on LIMMS rules.
- The three central work packages (WP3, WP4 and WP5) are aimed at increasing research cooperation with the three new partners: EPFL, IMTEK and VTT, respectively. These work packages consist of identifying research areas that are interesting for all the parties involved and carrying out research activities in these areas.
- WP6 aims at defining the communication and dissemination strategy, organising events to disseminate results and raising awareness of the EU-Japan collaboration. In 2012, EUJO-LIMMS organised several dissemination events, including two kick-off meetings / press conferences, one in Paris at CNRS headquarters and one in Tokyo in the presence of the EU Delegation to Japan. A further InfoDay in Lausanne was attended by more than 90 participants from the micro and nanoscience community in Europe.¹³⁵ In 2012, the University of Tokyo also launched a programme for 'a global university', encouraging students to take part in international activities. The programme funded a EUJO-LIMMS Winter School in Science and Humanities, during which students visited IMTEK, EPFL and a company in Switzerland.¹³⁶
- As a conclusion of all the work conducted as part of this project, an integrative feasibility study for the institutional opening of the LIMMS will be presented as the final deliverable of WP7.

The role of EAV in the aims of the EU activity

LIMMS was extended to its European form (EUJO-LIMMS) in order to enhance its international collaboration potential. Before the extension, only researchers hired by CNRS (PhDs or contract researchers) or JSPS post docs had the possibility to work in LIMMS. Now also EPFL, IMTEK and VTT can hire researchers and send them to the Tokyo laboratory.

European partners in EUJO-LIMMS brought the complementary expertise to LIMMS to tackle challenging projects: *"The combination of EPFL's unique skill in Micro/nanofabrication technology for soft-matter and UT-IIS's outstanding experience in microsystems will lead to an original approach for soft matter MEMS and stretchable electronics circuits. Capitalizing on state of the art achievement of IMTEK on smart probe technology with counterpart expertise of UT-IIS in high-density cell chip will lead to unprecedented MEMS platform for monitoring extracellular and intracellular potentials in the central nervous system and of individual*

¹³⁵ LIMMS Booklet 2012/2013.

¹³⁶ LIMMS Booklet 2012/2013.

cell, respectively. VTT brings its long-term vision on future application, and pushes new concepts in high throughput cell based drugs screening, graphene biosensor and large area roll-to-roll technologies. This vision perfectly meets the UT-IIS expertise in MEMS integration, to really demonstrate this new device generation".¹³⁷

Comparison with the Member State activity

Before the introduction of the three partners from Switzerland, Germany and Finland, LIMMS was just a France-Japan initiative focussed on research activities in the micro and nanotechnology field, carried out in the laboratory in Tokyo. Its mission, goals and activities were similar to those of the later EUJO-LIMMS, but of course on a smaller scale. Research was also conducted at a slightly earlier stage of development (applied research) in the original initiative.

The initiative has received funding from JSPS since its inception. LIMMS also obtained 6 Kakenhi (around €300,000) - a form of financial support coming from MEXT, the Japanese ministry of education, culture, sports, science and technology. The French *Agence Nationale de la Recherche* (ANR)¹³⁸ and STIC of CNRS also contributed financially. The European FP contribution adds to these, and significantly increases the scale of the initiative.

Today, the original France-Japan LIMMS structure is still active, with the EUJO-LIMMS seen as an extension to this – adding additional Member State partners to the original structure.

Efficiency and effectiveness

Efficiency and effectiveness of LIMMS and EUJO-LIMMS

The efficiency and effectiveness of the EUJO-LIMMS initiative (and indeed the wider INCO-LAB programme) has not been formally evaluated or assessed. However, several considerations can be made on the potential of its success.

With regards to the efficiency with which the initiative has been implemented, the preconditions are optimal. Before its extension, LIMMS was already a well-oiled machine with 15 years of experience in international research collaboration. LIMMS is evaluated every 4 years to maintain its status as an International Research Centre by an International panel and regulating body representative. The implementation of EUJO-LIMMS was able to build on this experience and prior development and improvement. For instance, CNRS and UT-IIS had already had to work to overcome cultural differences between France and Japan, creating a laboratory in which collaborative research and knowledge exchange are facilitated. Moreover, UT-IIS already had facilities in place to offer accommodation to visiting researchers, staff to supervise them and procedures to teach them the LIMMS rules.

With the EUJO-LIMMS initiative, the participation of additional institutions did however increase the complexity of the collaboration. From the point of view of research, the specific interests of EPFL, IMTEK and VTT also needed to be integrated into the LIMMS research activities. However, the alignment of interest was a prerequisite of the inclusion of these organisations and was ensured by 16 years of fruitful collaboration and a steady interaction in the framework of NAMIS network.¹³⁹ Moreover, specific work packages within the FP7 project were created to manage this issue.

No formal evaluation of the effectiveness of EUJO-LIMMS has been carried out, but one can expect that an ex-post assessment will be made. For this, the use of indicators can help track the activity's output, outcomes and impacts.

The outputs of EUJO-LIMMS can be measured as the number of research projects carried out at the LIMMS facility. Since 2009/2010, the number of projects has increased steadily, and the EUJO-LIMMS project has contributed to this growth. The EUJO-LIMMS projects are carried out by visiting researchers that come from the organisations that were not involved in LIMMS before the European extension; namely EPFL, IMTEK and VTT. These researchers started two new projects in 2011/2012 and another two in 2012/2013.

The number of publications is a widely used measure of outcome for academic research. Between 2004 and 2011, research carried out at LIMMS resulted in 153 publications in journal papers and 226 conference proceedings.¹⁴⁰ This corresponds to a yearly average of about 22 and 32 publications of the two types, respectively. In 2011/2012 the new publications were at about the same level. However, in 2012/2013 it increased substantially (+38% of publications in academic journals and +42% of publications in conference proceedings). Part of this increase is likely due to the four additional research projects that started within the EUJO-LIMMS research framework. Moreover, it is possible that the presence of researchers coming from EPFL, IMTEK and VTT also had an impact on the research projects already in place at LIMMS, and on their publication rates, with knowledge transfer between groups facilitated by the physical proximity of researchers.

¹³⁷ EUJO-LIMMS website.

¹³⁸ LIMMS Booklet 2012/2013

¹³⁹ LIMMS Booklet 2011/2012

¹⁴⁰ LIMMS Booklet 2011/2012

As the research conducted is at the stage of technology development, it may also be the case that the number of patents is a good indicator of project outcome. Unfortunately there is no data on this indicator to be presented here.

The impact of the EUJO-LIMMS initiative can potentially materialise in several ways.

The first and most important potential impact arises from the fact that EUJO-LIMMS can successfully promote International STI cooperation beyond the boundaries of the initiative itself. Researchers that had a LIMMS experience can continue their relationship with the research group even after the single research project has ended. Examples of these impacts are offered by the LIMMS initiative before its European expansion. Former LIMMS researchers extended their collaborations with their host-Japanese groups and their CNRS laboratories in France (3 SAKURA programs, 1 PICS). More than 15 new research teams, often with complete technology transfers from LIMMS, were created by former members coming from CNRS. The LIMMS has also been the seed to launch active international research networks: the Centre for International Research on Micro Mechatronics (CIRMM/IIS), the Global Research Network of UT-IIS and the NAMIS (Nano Micro Systems), which created the first link of CNRS and IIS with EPFL, VTT, and IMTEK before the EUJO-LIMMS started.¹⁴¹ While these examples relate to the earlier Member State-level initiative, they are a good indication of the potential impact of the more recent European expansion of LIMMS.

Moreover, the outcomes of the initiative can have an impact on businesses. In particular EUJO-LIMMS research projects tackle either the development of very versatile nanotechnology, or advanced integration of heterogeneous processes. The combination of leading know-how in these areas allows targeting of new applications toward flexible electronics, optical system and molecular and cellular bio-engineering. Advanced devices such as stretchable electronic circuits, mechanically flexible smart intracortical neural probes and labs on chip for biological cell trapping and testing, illustrate the application oriented topics foreseen in EUJO-LIMMS.¹⁴² Several patents have already been filed in this sense.

Overall, it would appear at this early stage that EUJO-LIMMS is an effective initiative, conducted efficiently despite its complexity, and which has led to an increase in the effectiveness of the LIMMS facility. The potential impact on both the academic and the industrial areas is considerable. However, formal evaluations would be needed (in the future) to measure the extent to which this impact has already materialised.

Benefits for third countries involved

The EUJO-LIMMS initiative especially benefited the Japanese partner, UT-ISS. A representative of this institution is formally involved in each research group working at the LIMMS facility, so presumably all the outputs and impacts of the research conducted in the laboratory benefit UT-ISS substantially.

The benefits however go beyond the academic area. The EUJO-LIMMS is an initiative well known and supported by the local community. For instance, students of the University of Tokyo participated in a EUJO-LIMMS Winter School, carrying out laboratory activities at IMTEK and EPFL.¹⁴³ Local businesses in the third country are also likely to benefit from the location of the joint international laboratory.

European added value of the activity

Input additionality

The founders of LIMMS, CNRS and UT-ISS decided to extend the initiative to other European partners in order to reinforce research collaboration between Europe and Japan in the micro and nanotechnologies sector (input additionality)¹⁴⁴.

While the collaboration between France and Japan was already beneficial to both partners, organisations acknowledged that the potential European Added Value of LIMMS was much more interesting, and they decided to pursue it by opening up LIMMS to EFPL (Switzerland), IMTEK (Germany) and VTT (Finland).

Process additionality

By opening up to Europe more widely, the EUJO-LIMMS project increased the number and heterogeneity of organisations involved in the International STI cooperation. This can potentially bring an increase in the performance of the cooperation itself (process additionality). The performance of the cooperation can be expressed by the extent to which the laboratory has reinforced research collaboration between Europe and Japan in the field of micro and nanotechnologies, with the final aim of having "capitalised the complementary expertise of University of Tokyo and European partners."¹⁴⁵

The European Added Value can materialise in this sense at different levels.

¹⁴¹ LIMMS Booklet 2011/2012.

¹⁴² NANO.TERA.CH website.

¹⁴³ LIMMS Booklet 2012/2013.

¹⁴⁴ E-CORDIS website. EUJO-LIMMS description.

¹⁴⁵ EUJO-LIMMS website.

- At the level of institutions: Professors at the new European partner organisations (EPFL, IMTEK and VTT) can benefit from LIMMS and create a more formal collaboration with CNRS and UT-ISS. In particular, visiting researchers hired by European organisations work as an information and knowledge transfer bridge between the European and Japanese organisations.
- At the level of researchers: A higher number of the organisations involved in the initiative had a direct effect on the number of individuals that can come in contact with it and eventually be selected and visit the LIMMS facility. A higher number of visiting researchers, especially if they come from different backgrounds, increase the possibilities of knowledge transfer and research collaboration.

All in all, more and different research performers at different levels are having the possibility to exploit the potential of the LIMMS facility, pursuing their own research projects but also collaborating with other researchers and learning from them.

As previously noted, the process additionality of the European initiative can be measured as the extent to which the laboratory has reinforced research collaboration between Europe and Japan in the field of micro and nanotechnologies.

The number of research projects carried out at the LIMMS facility is a measure of the intensity of the research collaboration between Europe and Japan. However, only projects conducted by researchers coming from the new organisations (EPFL, IMTEK and VTT) are “additional” and can be considered an expression of a European Value Added.

Output additionality

The results of the research performed by the enlarged STI collaboration should be compared with those of the original LIMMS initiative, to understand whether there has been output additionally. The difference consists in the outputs of the research carried out by researchers hired by the three new European organisations: EPFL, IMTEK and VTT, i.e. the 4 EUJO-LIMMS projects.

As 2 of them started in 2011/2012 and the other 2 in 2012/2013, it is unlikely that the full European Value Added due to output additionality has yet fully materialised in such a short time. However an increase is shown in the research output of the laboratory in 2012/2013 with respect to its track record, expressed as the number of publications. Part of this increase could be due to the European Value Added. On the one hand, it is likely that the four additional research projects that started within the EUJO-LIMMS generated new publications. On the other, it is possible that the presence of researchers coming from EPFL, IMTEK and VTT also had an impact on the research projects already in place at LIMMS. Being exposed to the ideas of these researchers, the productivity of existing LIMMS researchers could also have been increased. A measure of the two effects would provide quantitative evidence of European Value Added.

Reflections and lessons learnt

The aim of the EUJO-LIMMS initiative is to reinforce research collaboration between Europe and Japan to tackle new challenges in micro and nanotechnologies.¹⁴⁶ The strategy consists in opening the activity of an international laboratory, the LIMMS located in Tokyo, to European partners, and facilitate researchers' mobility towards the LIMMS facility. Five organisations, four coming from European countries and one from Japan, are involved in this initiative.

Despite the cultural difference between partners and the organisational complexity of the initiative, the preliminary evidence suggests that EUJO-LIMMS is successfully achieving its objectives. The EUJO-LIMMS laboratory was launched in February 2012 in Tokyo, and it is the European Commission's first international laboratory in Japan. Different research projects are currently carried out at LIMMS facility as a result of the opening up to Europe, and some of the results of the research are already being realised.

Some features of the approach used by EUJO-LIMMS to overcome the challenges of collaboration should be taken into consideration as a best practice.

- The collaboration was carried out gradually, with increasing levels of complexity. Initially, LIMMS was an initiative of the French CNRS and the Japanese UT-ISS. After 15 years of success, these organisations decided to open up to three other European organisations: EPFL, IMTEK and VTT. In the summer of 2013, the selection for a fourth additional organisation started.
- The collaboration was based on strong previous relationships. LIMMS historical partners have been working with EPFL, IMTEK and VTT for 16 years before inviting them to join in the EUJO-LIMMS initiative. This guaranteed that the collaboration was smooth and the research interests of all the consortium partners were aligned.
- The collaboration was always strongly supported on the Japanese side by local organisations. UT-IIS took care of logistic issues and also granted the support of hosting professors to visiting researchers. Moreover, the Japan Society for the Promotion of Science (JSPS) played a key role, by co-funding the initiative and therefore increasing the credibility of the project in Japan.

¹⁴⁶ E-CORDIS website. EUJO-LIMMS description.

These key points were success factors for the realisation of EAV and the management of the costs associated with the presence of heterogeneous partners.

When considering future international STI collaboration initiatives, the EC could therefore think about whether:

- There is a strategy for managing complexity,
- The collaboration can be extended and some criteria for doing this are in place,
- The collaboration is the result of existing strong relationships,
- There is a local support of external organisations.

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This document is the final report of the study *'European Added Value of EU Science, Technology and Innovation actions and EU-Member State Partnership in international cooperation'* commissioned by European Commission Directorate-General Research and Innovation and carried out by Technopolis Group in cooperation with Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH.

The study objectives are to 1) define under which circumstances international Science, Technology and Innovation (STI) cooperation objectives and actions carried out at European Union (EU) level will be more effective than if carried out at national or local level, and make suggestions for defining and measuring this added value; and 2) to define the means of actions, and types of measures that might be taken at EU level that are most effective in order to achieve the desired international STI cooperation objectives. Based on desk research, interviews, surveys and case studies conclusions have been formulated on the concept of European Added Value (EAV) and a number of major areas of added value have been identified. Furthermore, a new EAV framework for international STI cooperation is proposed. Finally, recommendations are being made for the improvement of future policy making and specific instruments.

Studies and reports

