

Mutual Learning Exercise (MLE) on National Strategies and Roadmaps for International Cooperation in R&I

Tools for International Cooperation
STI Agreements

Challenge Paper No 2



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Tools for International Cooperation STI Agreements

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1 INTRODUCTION

1.1 The purpose of the Challenge Paper

This *Challenge Paper* on Tools for Internationalisation has been written to support the second Country Visit (Bucharest, 16 and 17 September 2019) in the Mutual Learning Exercise (MLE) on National Strategies and Roadmaps for International Cooperation in Research and Innovation.¹ The aim of the paper is to take stock of the know-how on Science Technology and Innovation (STI) agreements, their critical success factors and to raise a number of questions for debate, with a perspective on possible lessons for now and in the future.

The Challenge Paper complements two more Challenge Papers that are being produced in the context of this MLE. The first was published in May 2019 on the topic of internationalisation strategy design and development in preparation of the first MLE workshop. For the third and last Country Visit a challenge paper will be prepared on the topic of framework conditions for internationalisation.

The aim of the MLE is to foster a policy exchange on the various national approaches towards international cooperation in research and innovation. Thus, the activities of the group of MLE participants are focused on learning from each other and taking these lessons 'back home' to implement good practices and good ideas within the national context.

1.2 The focus on STI Agreements

The Challenge Paper is not intended to provide a comprehensive overview of the STI agreement landscape as it exists in the EU today. On the topic of STI Agreements a comprehensive evidence basis has already been developed by the Strategic Forum for International Cooperation (SFIC), in particular the Toolbox Working Group that produced its report in December 2018. This report focused on six types of policy instruments for international cooperation, one of which is STI agreements. The report elaborated the purposes and objectives for cooperation instruments including meeting global challenges; achieving scientific excellence; leverage funding; exploring competencies and complementarities; attracting talents and STI investments; access to new markets; capacity building; regulating IPR; science diplomacy and international cooperation as a goal in itself. Simultaneously with this MLE, SFIC is conducting a benchmarking exercise on strategies and roadmaps for international cooperation in R&I. The MLE papers and discussions complement the work of this Benchmarking Working Group.

The added value of the MLE is to delve deeper into the success factors of STI agreements and engage in concrete operational policy learning by the participants. The discussions amongst the participants in the MLE kick-off meeting (Brussels, 20 March 2019) came to a number of conclusions regarding the scope of Topic 2 of the learning exercise:

- Overlap with recent and current activities in SFIC regarding tools and instruments should be avoided and coordination to exploit synergies ensured.
- A choice was made for 'deepening' rather than covering a broad array of tools.
- The type of tool that all MLE participants can learn from is STI Agreements. In order to make the exercise relevant for all Ministries and Agencies taking part in the MLE, the

¹ See for more information: <https://rio.jrc.ec.europa.eu/en/policy-support-facility/mutual-learning>

definition of what type of STI Agreement we will look at should not be too narrowly defined.

- To add value to existing stock of knowledge and ongoing work by SFIC to compare from each country a 'good practice case' and a case where participants have doubts about effectiveness and efficiency. Two templates were developed, one to describe successful STI agreements, and one quite similar template to describe non-successful STI agreements. They covered general characteristics, implementation, evaluation and impacts, key success and non-success factors and views on the future.

We asked each participating country to describe the two examples according to the templates provided. The definition of an STI Agreement (e.g. legal status, type of signatories) was kept very open to ensure that each country and type of MLE participant can draw on relevant national examples. This means that the cases that MLE countries have provided include intergovernmental bilateral and in one case multilateral agreements as well as Memorandums of Understanding between different types of legal entities (e.g. Agencies and Ministries). The remainder of this report will refer to STI Agreements as the general term that encompasses different kinds of agreements or contracts between two or more international partners with the intent of facilitating cooperation in research.

The definition of 'success' or what an 'effective' Agreement as well as a 'non-effective' STI Agreement is, was also left open to ensure that MLE participants can find examples that fit to these categories according to their national standards. This paper is for a large part based on the templates that have been filled in by the MLE participants complemented with a short review of the literature on Internationalisation and STI Agreements in particular. It was agreed that the templates with the examples remain confidential. MLE participants could opt to describe a particular case without identifying which specific STI agreement it related to.

We received templates from 13 MLE countries and some countries provided more than one case. Of the sample of 15 success cases 12 have identified the specific STI agreement so the geography of those cases is known. Three cases have either synthesised the findings of a number of successful cases or have not revealed the specific partner country. Of the sample of 14 non-successful cases (from 11 MLE countries) 9 cases included information on the partner country so the geography was known. Three MLE countries made a synthesis of several agreements that are not functioning well without disclosing the partner countries. Two MLE countries described a specific agreement not naming the specific partner. One MLE country with a limited number of STI Agreements reported that they are all successful so they could not provide a non-successful case.

The following Chapter 2 gives a short summary of recent literature on STI Agreements as a tool in internationalisation and in particular their success factors. Chapter 3 elaborates the analysis made on the basis of the success and non-success cases provided by the MLE participants. Chapter 4 provides some debated topics on the future of STI Agreements, partly based on the results of this analysis but also on the wider debates in the MLE workshops and papers. Ultimately this paper mostly serves as food for thought for the debates in the second Country Visit in Bucharest (16 and 17 September 2019). The outcomes of this two day workshop will be synthesised in the Final Report on Topic 2 Tools for Internationalisation.

2 STI AGREEMENTS IN THE INTERNATIONAL COOPERATION TOOLBOX

2.1 The use of STI Agreements in EU countries

The STI Agreements represent a frequently used policy tool in the wider STI cooperation toolbox in all European countries. As the SFIC Working Group Report (2018) on Tools for STI cooperation noted, they frequently constitute important mechanisms for promoting

and facilitating international cooperation, often by forming legal bases and platforms for further cooperation.²

The literature on STI agreements is mostly focused on providing an overview on the types of STI agreements and their use in international cooperation by European Member and Associated States. A EUROHORCS3 study of 2009 found that a great majority of its members (European research funding agencies and organisations) have cooperation agreements with countries outside Europe, and ten of their members had more than ten agreements. The German Research Foundation (DFG) topped the list with 60 agreements, followed by the French CNRS with 50 agreements at that time.⁴ In 2009 the top partner countries were (in order of frequency) China, USA, Japan, India and Russia.

In the same year a report on Drivers for International Collaboration in Research (2009) found that for activities beyond Europe, bilateral agreements are the most common types of interventions by far, although not necessarily the type of instrument that attracts the most research funding. Often the agreement functions as an umbrella, which hosts a multitude of collaboration modes: grant and fellowship programmes, exchange programmes, joint research programmes, etc. Information on the amount and type of bilateral agreements is far from transparent let alone the funding which is attached to them. The report also noted that very few of them are terminated.⁵ At that time, few countries had developed a good impact assessment and measurement system to evaluate whether international collaboration policies have desired effects. Furthermore, there were large gaps in the data provision that could support these assessments.

Vullings et al (2012) have described the use of STI agreements by a selection of EU countries that are the most active in international cooperation. The study elaborated on their rationales and the geographical orientation. Here again the most frequent EU partner countries identified were USA, Brazil, India and China. The purpose of the report was to propose a EU wide monitoring system for international cooperation. The report concluded that there are significant data gaps regarding internationalisation activities and poor financial data and made suggestions and recommendations on how this could be improved in the future.⁶

A report by Fikkers and Horvat (2014) gives an extensive summary of the use of bilateral STI agreements.⁷ The report describes the rationale for signing these agreements, their thematic priorities, implementation and the framework conditions that affect them. The report also looks into the impact of the STI Agreements in so far as they have been evaluated. Fikkers and Horvat do not find the overall landscape of STI agreements very promising in terms of their effectiveness. They conclude that: *"In general, agreements signed by EU Member States are of relatively little weight in comparison to agreements signed by the EU. Due to the investment needed for signing new agreements, many are relatively old, and therefore not specific enough. The impacts of the agreements are modest. Their evaluations show that they usually contribute to an increased bilateral participation at project level, but also that in terms of reciprocity impacts are still low; that the mobility of researchers increases only slowly; that awareness of the agreements*

² SFIC Working Group, (2018), Overview of Tools for International Research Cooperation in Science and Technology Matters, Brussels

³ Transformed into Science Europe in 2011

⁴ EUROHORCS, (2009), Creating the ERA "bottom-up". Cross-border Research Cooperation in Europe – Contributions from National Research Organisations

⁵ Boekholt, P., Edler, J., Cunningham, P. and Flanagan, K. (2009), Drivers for International Collaboration in Research, Report for the European Commission, DG Research, Brussels.

⁶ Vullings, W., Boekholt, P., van Til, J., Steinz, H., Cunningham, P. and Flanagan K. (2012), Overview of international science, technology and innovation cooperation between Member States and countries outside the EU and the development of a future monitoring system, ERAWATCH Report on behalf of DG Research, Brussels.

⁷ Fikkers, D. and Horvat, M. (2014), Basic Principles for effective International Science, Technology and Innovation Agreements, report for DG Research and Innovation, Brussels

amongst policy makers and the STI community is still too low, and that the intensity of the policy dialogue decreased shortly after the signing of the agreement.”⁸

The sample of MLE success cases shows that there are quite some well-functioning and strong STI agreements in place (see Chapter 3). The cases also show that their success does not necessarily depend on the weight of the formal agreement itself. Nevertheless, it is good to have a critical reflection on the role and function of STI agreements today and in the future.

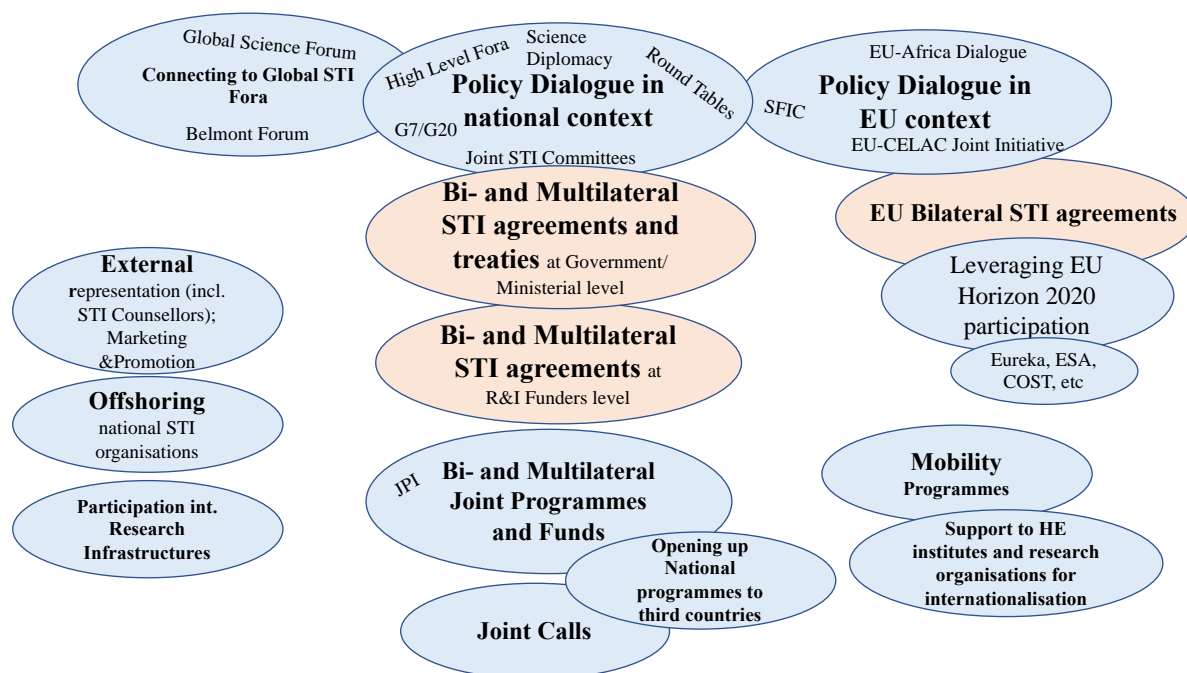
Thus, the European oriented literature mostly sketched the European landscape of international STI cooperation policies and positioned the STI agreements in a quite central place in the cooperation toolkit. The focus is mainly on their rationales, how they relate to wider national strategies for internationalisation and their geographical orientations. There has been much less attention in the literature on the interaction of these formal STI agreements with other tools for international cooperation. For instance, how the STI agreements are used to mobilise existing R&I funding, to what extent mobility hurdles are eliminated, whether they are used to support RPOs and HEIs to invest in partner countries or the question of what makes them work or not work.

In more recent years international collaboration with third countries has gained momentum and attention for its tools has increased. The Strategic Forum for International Cooperation (SFIC) has delved more deeply into the role of tools for internationalisation and set up a working group in the autumn of 2015 to develop a toolbox for the implementation of international STI cooperation activities. The 2018 SFIC report that resulted from this Working Group distinguishes among different types of STI agreements, according to their contracting parties: a) EU level agreements, b) intergovernmental multilateral agreements, c) bilateral STI agreements at the ministerial (or governmental) level, and d) bilateral (or multilateral) STI agreements at the level of public research funding agencies. They are all not strongly binding in the legal sense, according to the SFIC report. The survey on behalf of the 2018 SFIC report showed that the most frequently cited partner countries of EU Member States (MS) and Associated Countries (AC) are China, India and the USA, followed by Japan, South Africa, Russia, South Korea, Brazil and Israel. Thus, the picture in 2018 is not much different from what was found in the EUROHORCS report in 2009. Indeed, the majority of case studies include one of the above-mentioned partners.

Figure 1 gives an overview of the set of tools that are mentioned in today’s reports on international cooperation. STI Agreements are placed quite centrally as they are a tangible demonstration of cooperation activities between two or more partner countries. As aforementioned, so far not much has been written on how these instruments interact with each other. This is highly dependent on the governance structure of countries and the different responsibilities for internationalisation across STI decision makers and funders. While some countries connect the bilateral agreement with existing funding and policy programmes, others have funding dedicated to a specific STI agreement and again many others have no ex-ante earmarked budget to implement the agreement.

⁸ Ibid, page 41.

Figure 1 The STI Toolkit with a central place for STI Agreements



There is no indication from the debates so far that STI agreements are an instrument of the past. On the contrary, there are clear signals that the numbers of them have exploded and the administrative burden to maintain all them is becoming a problem for many countries, particularly the smaller ones with limited human resources in the implementation bodies. Simultaneously the concept of Science Diplomacy could even increase the number of signed agreements and increasingly with countries outside the core group of partner countries that have been targeted for many years. A critical review of the role and functioning of STI agreements is therefore timely.

3 WHAT MAKES STI AGREEMENTS SUCCESSFUL?

3.1 The success cases of the MLE countries

The 15 participating MLE countries were asked to provide information on their successful STI agreements in a template that was similar for all cases. We have received 15 cases of successful STI agreements.

The sample of 'successful STI agreements' is quite heterogeneous and each agreement has a **different definition of what success means**. Seven types of anticipated success were put forward by the MLE participants as their criteria for success:

- Successful implementation (fast and straightforward, smooth cooperation, good communication, professional implementation, increasing number of agency/ministry staff involved in cooperation)
- The number and quality of the proposals received and their success rates
- The number of projects initiated or volume of mobility achieved

- The continuation of cooperation between the project partners (e.g. in a Horizon 2020 project, planned joint events in future)
- Positive feedback from scientists, more opportunities for young researchers, market access for companies
- More co-publications, improved science
- The improved quality of the policy relationships with the partner country (strong financial commitment, increased co-operations between the countries and agencies)

Thus, success is connected with a mix of input, throughput, output and a few impact related indicators.

The three features that stand out in being mentioned as **critical success factors** behind the agreements are the following (in order of importance):

1. Mutual interests of the beneficiaries in the thematic areas of co-operation
2. The relationship and alignment between the implementing agencies
3. Political commitment (and budgets) to support the cooperation

By far the most mentioned feature is the '**mutual interest of the beneficiaries in the thematic areas**', regardless whether they are research organisations or companies. Striking is that when asked whether the agreement is specific (with a specific focus on a theme or sector) or general, in the majority of cases the STI agreement with a partner country is rather general and open to all sciences/topics. In only 3 cases the Agreement or MoU itself was focused. This can be explained by how most agreements are implemented: the agreement or MoU functions as a general framework or umbrella, these are subsequently elaborated by (thematically oriented) national funding agencies. There is one example where larger public research organisations are involved in the decision making and take part in the biannual joint meetings with the partner countries. In that country national thematic meetings are held to discuss the interests of the research community in a particular STI agreement. It would be interesting to explore further how other agencies and ministries identify the interests of the potential beneficiaries and whether this is done prior to signing the agreement or afterwards and whether we can share good practices. An interesting example of using foresight techniques for international cooperation and particularly the development of a joint research programme in the ERA-NET on wood material research WoodWisdom-Net is described in Brummer et al. (2008).⁹

The second set of success factors concern the implementation of the agreements and particularly the **relationship and alignment of the agencies/ministries** on both sides that have the responsibility to manage the joint activities. Regular and open communications are mentioned multiple times, the partner agency having similar missions, processes and project evaluation methods, dedicated staff at both sides and the professionalism of the partner organisations are all considered as key success criteria. One case mentioned an earlier ERA-NET where the agencies got to know each other while others mentioned the importance of building on previous networks between agencies. In one case the common language and culture was seen as important.

In eight of the success cases, the STI agreement was implemented by an R&I funding agency on the European side, in two cases by a Ministry and one case by a dedicated

⁹ Brummer, V., Könnölä, T. and Salo, A. (2008), Foresight within ERA-NETs: Experiences from the preparation of an international research program, *Technological Forecasting & Social Change* 75 (2008) 483-495.

international cooperation agency. On the partner country side the majority were also R&I funding bodies (8) and in three cases a Ministry.

This finding corresponds with what the 2018 SFIC report concluded about the design of an STI Agreement: "*The parties should also have capacities to deliver on the obligations undertaken in the STI agreements in question*". The fact whether the counterpart has a similar status (e.g. either ministry or agency) is less important than whether they both have the (human) capacity and resources to deliver on an agreement.

Political commitment, regular high-level meetings and related to that the availability of budgets are also mentioned more than once, but nearly not as often as the previous two features. One explanation for the finding that the availability of budgets is not top on the list, as one might expect, could be that in many cases the official agreement is only the 'shell' or the general framework, which needs an annual or multi-annual programme or sets of calls that need to be elaborated by the implementing agencies. There are quite some examples where the budget comes from regular programmes or general budgets from the implementing agencies and/or the ministries involved. Thus, the financial commitments needed to keep the collaboration alive is not always directly dependent on high level (inter-governmental) political support.

The above three broad features are interrelated and reinforce each other (see below).

Other features that were described in the templates, stand out less in the horizontal analysis of cases.

Governance features are difficult to compare as each country has different structures and divisions of labour, particularly between ministries and agencies. The cases show different models. Some are high level agreements at the intergovernmental level, where representatives of ministries meet with their counterparts regularly to discuss the progress and direction of the STI agreement. In other examples, ministries have delegated the responsibility to agencies and the regular meetings between partners take place at funding agency level. And a third model is characterised by agencies taking initiatives with little involvement at the governmental level.

One feature that is described in almost all cases is the functioning of a **Joint Committee** (or a similar management team) that meets regularly (from once every two years to several times a year). In these committees, decisions are often taken on priorities, budgets and assessments made of the progress of the agreement. In one case the Joint Committee was reported to decide on the proposals for projects thus acting as review panel, however in most cases these Joint Committees deal with high-level considerations leaving the daily management to the agencies. While the functioning of these Joint Committees is not mentioned as a critical success factor, the regular and smooth communication that is considered key as aforementioned relies on such well-functioning joint platforms to discuss the STI agreements. Indeed, the non-successful cases reported the absence of such Joint Committee Meeting or a failure to keep the committee active.

Other features mentioned as key success factors are:

- Easy procedures for the beneficiaries
- A common understanding of the added value of the agreement
- Reciprocity
- Having an agency on the ground in the partner country
- Flexibility of the agreement (the contents can be adapted when needed)
- Agreement allowing access to new partners

Indeed, **reciprocity**, although not explicitly mentioned very often, seems to be an essential element in the success cases. In all cases there is an explicit agreement that the partner country also provides a budget for the cooperation activities. In most cases beneficiaries are paid by their own organisations. So this means that the budgets on both sides could differ if one partner country has allocated more funding than the other, particularly when the co-operations focus on mobility. Some mention that this disbalance is not a problem and it is foreseen that partners either have less or more resources. For other cases this is considered to be a problem, particularly in agreements that support joint R&I projects that need ample investments from both sides.

There are a number of features which are less pronounced as influencers of the success of the agreements.

In our small sample of success cases, the agreements have different types of legal status. A majority (9) are bilateral intergovernmental agreements, while there are four success cases based on Memorandums of Understanding (MoUs) and one case of a multilateral intergovernmental agreement. The sample is too small to suggest that bilateral intergovernmental agreements are more successful, as they are also the most frequently used STI tool. And indeed, the non-successful cases are also in majority bilateral intergovernmental agreements (7) followed by bilateral MoUs (5).

Another set of undecisive characteristics is whether the cases are focused on (public) research only, a combination of research and innovation or only on innovation (and companies as beneficiaries). The sample of success cases has a mix of all these types of collaborations. In half of the cases companies are excluded in the STI cooperation activities, while two of the examples were solely focused on cooperation between companies.

As aforementioned in a vast majority of the STI agreements in the sample, the official agreement itself is **very general and open to all topics and S&T domains**. In two cases the official agreement mentions specific areas of interest and in three cases the STI agreement is only focused on specific domains. However, during the operational implementation of the general S&T agreements, specific themes are mostly defined in:

- annual cooperation plans,
- by teaming up existing (thematic) national programmes of the implementing agencies,
- the decentralisation of the agreement to (thematic) national agencies or,
- through the definition of specific thematic calls as part of the agreement.

It seems that a well-functioning pattern is one where a high level 'umbrella' agreement that is quite general (often for a period of 3-5 years) is combined with active implementation mechanisms that can adapt the focus of cooperation in a more flexible manner on a yearly or ad hoc basis. The challenge here is: how to get the implementing bodies (most often agencies) motivated to keep the cooperation active. This finding corresponds to what was reported on the Final Report on Topic 1 for this MLE that it is common practice that the broader defined themes in the STI agreements are broken down into narrower sub-themes for joint calls within S&T agreements.¹⁰

There is **no clear pattern of geography** in the success cases. Most of the MLE inputs have specified the partner country of the STI agreement, although in three cases there is no specific partner country information and one is a multi-lateral agreement. China was the partner in three cases and India in two of the success cases. All other success stories had different partners from different parts of the world (Africa, Asia, North and South America, Middle-East and Europe). Of the cases that identified a specific partner country,

¹⁰ Schuch K. (2019), National Strategies and Roadmaps for International Cooperation in R&I, MLE Final Report on Topic 1, Brussels.

five have an R&D investment lower than 1% of their GDP, four have an R&D spending of more than 2% of their GDP and two partner countries an R&D spending of more than 3% of their GDP.¹¹ Thus, success does not so much depend on partnering with world leaders in science and technology according to the sample of cases presented.

Interestingly, two MLE countries had both one success and one unsuccessful case with the same partner country. The difference between the success and non-success of agreements with the same partner country was related to the lack of implementation mechanisms (no joint committee, not enough personnel resources, restructuring at the partner side) in the first case and a mismatch in the understanding of the objectives of the MoU and a lack of interest from the beneficiaries in the second case. Thus, implementation was the key factor in both those cases, not the relationship with the country as such.

The types of collaboration activities to be funded are already explicitly stated in about half of the success cases. In most instances this concerns mobility of researchers (5 cases), funding for networking (2) and/or funding for joint research and innovation projects (4) or a combination of these. There is no clear pattern standing out that defines success. In the cases of agreements that concern mobility only the financial hurdles are less pronounced as the budgets remain modest for both sides.

There is no explicit mentioning of a positive or negative role of IPR in the STI agreements and in only one case the importance of ethics standards is mentioned.

Even the successful cases have flaws and risks. The most frequently mentioned ones are maintaining the commitment for budgets (on both sides) and related to that: changes in the priorities and political swings in the partner country. Other issues mentioned are the long time to take decisions (in the case of big agreements), the narrow scope of the agreement (e.g. mobility only) or that without repeated measures the agreement becomes an empty shell. For five success cases no flaws or risks are anticipated.

3.2 The non-successful cases of STI agreements

Similar to the success cases the majority of un-successful cases are bilateral intergovernmental agreements and again almost all have a broad generic S&T coverage which could be elaborated in thematically focused domains in the actual implementation of the agreement. There is little difference with the success cases in this respect.

The stated objectives of the unsuccessful agreements are similarly general (typically '*to establish and promote STI co-operation between the countries*') as those of the successful examples and in some cases exactly the same. A noted difference is that the successful ones have often elaborated the objectives in more operational terms, whereas these are not reported in the unsuccessful cases. This is likely as there have been little efforts made to elaborate the operational side of the agreements. The beneficiaries of the non-successful ones are again similar as the success cases, albeit with slightly more agreements that focus on the mobility of researchers. This could be explained that this is the first step into international co-operation with a new international partner.

What is different from the success cases is the **geography** of the STI agreements. Two partner countries also featured in the success cases (China and Israel), the other partner countries – with the exception of one additional R&D developed country– are mostly countries with medium to low R&D development levels. Of the cases which identified a bilateral partner, six cases were with a partner with an R&D expenditure lower than 1% of their GDP, the other three cases had an R&D spending of respectively more than 1, 2 and

¹¹ Using global R&D data from www.uis.unesco.org with data extracted on 29 August 2019.

3% of their GDP.¹² In three cases partner countries have in recent years experienced political and/or economic turmoil.

The main reasons why the STI agreement was not a success can be divided in three categories (in order of importance):

1. **Politics and high-level policy.** The most frequently mentioned reason behind the failure was that the agreement was signed for **diplomatic reasons only**, often done too quickly and with no clear idea what the collaboration was meant to do. In two cases as too many national policy stakeholders were involved, the agreement became a broad wish list with subsequently no owner to ensure the follow up. In one case it is stated that there was no intention to follow it up. So, these are the so called 'empty shell' type agreements. In a few other cases, the intention was there to implement cooperation; however, a shift in the political priorities on the partner side, an unstable political environment or the lack of budgets for cooperation prevented the agreement to become operational.
2. **Implementation.** In about four of the cases, management teams or joint committees were foreseen and agreed, implementation mechanisms defined, but they simply were not made active. The reasons were lack of human resources at the partner side, changing political situations, failing to meet budget requirements in final negotiations, and a lack of interest from the R&I community. The large majority of the cases do not have a joint management team or committee, and no budgets are foreseen to implement the agreement. In these cases, the STI agreement never got beyond the signing of the papers. There is the open question whether a better implementation process would have been able to mobilise more interest from the R&I community.
3. **Lack of demand for cooperation.** In a majority of cases, the agreement had no visibility in the research and innovation community and there was little interest in the thematic areas. One case mentioned that stakeholders from the R&I community were not involved in the process and more than once it was stated that the research capacities in the partner countries were low. Two of the cases went through the process of launching calls but came to the conclusion that there was no sufficient support from the R&I community. In one case the implementation was set up, joint calls were even launched but not enough eligible proposals were received. This particular agreement was subsequently terminated because of lack of interest from the R&I community. Some of the responses stated that the R&I capacities of the partner countries were simply too low to make the cooperation viable. There was no chance of developing any reciprocity in these cases. That is likely in the cases where the partner country has considerable R&I capabilities.

3.3 Monitoring, evaluation, results and impacts

Many reports on international cooperation and STI agreements have commented on the lack of good data and evaluations of the impacts of STI agreements, as described in Chapter 1.

In our sample of 15 success cases, five have reported that inputs and outputs are monitored (at the activity level, e.g. mobility volume, collaborative projects, scientific outputs) and another two do this at the level of the agreement itself (satisfactory progress). Three have stated that there is no monitoring and in another three cases no information is given.

¹² Using global R&D data from www.uis.unesco.org with data extracted on 29 August 2019.

Only three STI agreements have been evaluated, while two more MLE countries have indicated that evaluation is done at a high-level of international co-operation but not on a specific agreement. In three cases evaluations are foreseen in the future, while in the remaining five cases no evaluation has taken place nor is foreseen. The evaluated agreements reported quantitative and qualitative results and impacts:

- joint publications, continuation of collaboration between researchers and career improvement for young researchers
- improved quality of R&D by bringing together complementary skills, experience and infrastructure
- access to new markets
- engagement in new R&D networks in Europe
- establishment of joint infrastructures
- improvement of diplomatic relations and intensified policy cooperation between the partner countries

One evaluation of an industry-oriented agreement has also analysed the numbers of jobs created and patents filed as a result of the calls under the bilateral agreement.

Another effect reported was that cooperation allows the implementing agency to benchmark its own procedures with those of the partner country.

For the 15 non-successful cases the situation is quite different. In most cases non-success means that no STI collaboration activities have taken place. So, there is simply nothing to monitor or evaluate. In a few cases normal monitoring of the small number of activities is carried out as usual but none of the STI agreements is evaluated.

The MLE survey has not specifically delved into the financial weight of the public funding that these STI agreements generate or mobilise, nor in the administrative costs needed to maintain them. That will be a difficult task as quite some of these agreements are high-level umbrellas that are subsequently 'mainstreamed' and decentralised across various agencies. One successful case reports a considerable budget available for the collaboration projects (approx. €10 million for two years) and subsequently its evaluation shows considerable impacts. Judging by the number of proposals and projects that have been reported in quite some other successful cases, the number of people and organisations that have benefitted from these STI agreements remains relatively small. *This raises a more general question whether the potential impact of the STI agreements on the science and technology eco-systems, in relation to their administrative costs, are in balance.* An external evaluation of the Austrian bilateral science and technology agreements conducted in 2013 also raised this issue of efficiency concluding that administrative costs in relationships to the research and innovation funds being mobilised was about 1:4.¹³ This was considered to be relatively high administrative costs for STI support, mostly because the amount of public funding involved in the bilateral agreements was low. This particular evaluation is a good example of using a multidisciplinary approach to assess qualitative and quantitative impacts of STI cooperation.

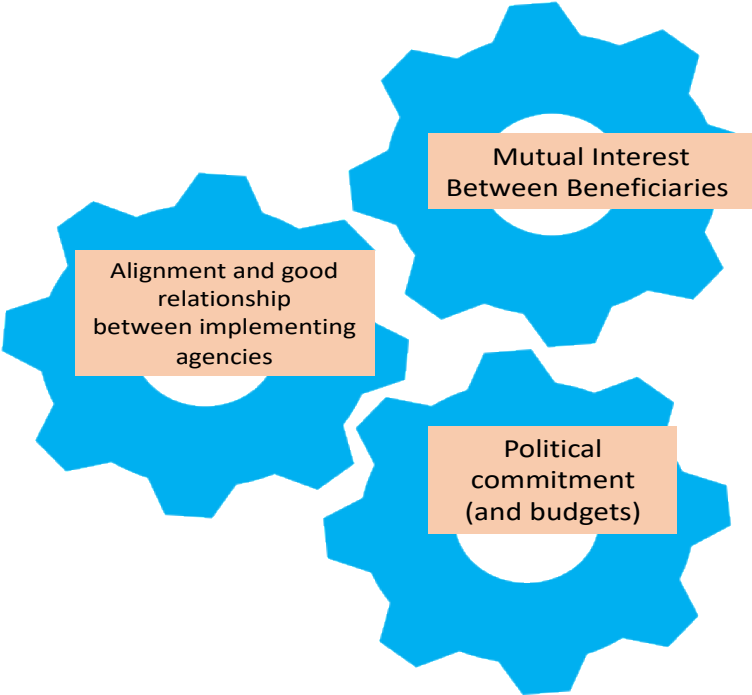
¹³ Schuch, K. Smoliner, S. Wagner, I., Degelsegger, A and Dall, E. (2013): Evaluierung der Forschungsk Kooperationen im Rahmen der bilateralen wissenschaftlich-technischen Abkommen und Vereinbarungen. Wien:Zentrum für Soziale Innovation. Studie im Auftrag des BMWF.

Given the fact that of the sample of 15 success cases only three have been previously evaluated and another three have indicated that this will happen in the future, it seems that there is still more work to be done to collect evidence on the effects of STI agreements.

3.4 Summing up

Comparing all the cases presented by the MLE countries suggests that there are three necessary elements in the 'engine' of STI agreements that are strongly interrelated. These three 'gears' are graphically depicted in Figure 2. We have to realise that the sample of MLE cases is relatively small and more research could be done to further test these findings.

Figure 2 The three 'gears' of successful STI Agreements



Political commitment is a necessary starting point to open the dialogues, define the rules of the game, provide the mandates to organisations in the STI landscape to deliver on the agreements and in some but not all cases allocate funding. However, this is not a sufficient condition for STI agreements to work well. Without the good relationship and alignment of agencies/ministries on both sides to implement the STI agreement there is a great risk of creating 'empty shells'. These two together are again not a sufficient condition for successful agreements, if the interest from the research and innovation community to cooperate with a specific partner country is low (or if the visibility of the STI agreement is poor). There is a risk of a certain circularity in finding causes while assessing why a certain agreement is not working. For instance, the fact that Joint Committees are not meeting even though this was agreed can be attributed to a lack of political commitment, alternatively to a lack of implementation capabilities of one or both partners or more likely a combination of both.

If indeed the findings of these MLE templates are representative for STI agreements in a wider sense and (thematic) interest of the research and innovation is the most important factor for success, then we should pay more attention on how and when policy makers and R&I funders identify the interests of the stakeholders. Some of the cases indeed highlighted processes to involve the stakeholders in the dialogues with a (future) partner. In one case representatives of RPOs are present when the high-level dialogues take place discussing the direction of the STI agreement. Other cases report networking, joint seminars and brokerage events so that beneficiaries can meet each other. But these usually take place after the agreement has been signed and the implementation plans developed.

Questions for debate:

- *In how far is the combination of three 'gears' recognisable for your country?*
- *What can we do to increase our strategic intelligence of the potential interests of stakeholders from both sides of the partnership? Do we have good practice examples?*
- *How can we do this early in the decision process so that it can inform geographical location or thematic priorities?*
- *Do mobility schemes need as much strategic intelligence as other types of collaboration?*
- *How to keep the communication with the partner country alive in periods where there is little cooperation activity?*
- *To what extent are the Joint Committees or joint management teams essential for keeping the momentum in the partnership?*
- *What is the appropriate level of flexibility in the implementation cooperation? Do annual implementation plans provide the right dynamic?*
- *Do we have examples of good practice of building a working relationship with the counterparts in the partner country?*
- *If political commitment fails, what can be done to revive it?*

The wider lessons that MLE participants draw from their success and non-successful case studies which they would like to share with other countries are also very interesting and are mostly in line with the above summary. The lessons from the MLE participants, as phrased in their survey answers, are listed as follows:

- *By agreeing on fundamental aspects of the cooperation in the MoU and defining details of calls for joint projects in separate documents, the flexibility for a long term cooperation is assured;*
- *Make sure to have an open and transparent communication with the foreign funding institution so you can clarify and openly discuss the various calls as well as framework conditions;*
- *Try to have a joint panel for the evaluation and selection of the projects (this panel is composed of experts from both partner countries);*
- *When partner funding institutions have more or less the same mission and procedures (e.g. peer review, evaluation criteria, ...) a smooth implementation of the STI agreement is facilitated;*

- *Reciprocity: equal financial contribution and/or scientific contribution (two-way exchange of expertise);*
- *The agreement strikes a balance between being flexible and precise on thematic areas. It covers the whole STI-ecosystem in both countries. It makes it possible for all of the ministry's stakeholders to take part;*
- *It is positive to collaborate with research and entrepreneurial community of neighbouring countries;*
- *Our success stories here, as in many other cases, are largely based on close ties within the national research and innovation field. Ministries, agencies, research institutes and universities as well as large companies have unproblematic contacts and there are incentives to cooperate. In the bilateral STI cooperation contexts, this means in the best case that we can offer the partner larger joint initiatives, which combine research and business components, supported flexibly by government actors;*
- *In the perspective of a stronger and more unified approach of the EU on a global scale, it may be of interest for representatives of EU ministries in charge of R&I (as well as Commission) to know more about their reciprocal approach towards international partner countries;*
- *Openness to new forms of cooperation and dedication of the implementing bodies are important;*
- *The easiest way to collaborate is the one based on mobility. When having a limited budget important is to offer the right instruments to stimulate dialogue and partnership between collaborative partners in order to access much more easily a more complex frame of cooperation;*
- *Agreements are mainly political instruments to bring countries closer together as one of several instruments;*
- *Good cases can learn that interpersonal relations are very important in establishing a successful cooperation in various fields, including STI;*
- *After the signature of this bilateral MoU there has been a permanent phase of inactivity on both sides but which has to be avoided from the early beginning of the implementation of the MoU. It is important to stay continuously in touch with your counterpart persons/organisations to keep the agreement alive. Agreed modes of cooperation and working procedures have to be followed;*
- *It is important to stay in touch with the relevant contacts, monitor the changing R&I environment in the country and seek windows of opportunity for reviving cooperation efforts;*
- *Never try to sign a document with not enough time;*
- *Scientific reasons should dominate instead of political ones when signing scientific agreements;*
- *The importance of collaboration being at a sufficiently advanced stage before entering into a bilateral agreement;*
- *The Governmental Agreement sets the framework of the bilateral cooperation and the willingness of both countries to cooperate. The Agreement implementation mechanism through the bilateral programme has shown that a set of common criteria on the profile of the project partners, evaluation of the project proposals are compulsory in addition to common forms, common areas of interest, impact or partnership agreement;*
- *If there is a need on political level to sign an agreement it should be followed by assignment, and directed funding, that funding agencies are required to work together;*
- *There needs to be interest on both sides, both in the research community and at ministry/agency level, for an agreement to actually be followed up;*
- *It is good to have agreements with countries that are interested. It is better, for small countries, to have STI agreements with states that are more developed and thus can*

be a catalyst to improve research capabilities in smaller countries. Common research interests can stimulate a better cooperation.

The above findings and lessons raise a number of **questions for the debate**:

- *Can we allow ourselves sufficient time to prepare an STI-agreement, build relationships with the counterpart and – if necessary – mobilise the consent of our funding agencies before being faced with a 'fait accompli' of a politically signed STI agreement?*
- *Do we have the appropriate connections and ties with the STI community (from public and private sector) in our own countries and information on your partner country to seriously assess the potential interest in cooperation?*
- *Should the high-level policy makers involved in science diplomacy be better informed by the STI (policy) community on what works and what does not work?*
- *Should governments refrain from signing new STI agreements if no budgets can be allocated to its implementation?*
- *Should intergovernmental agreements with countries with a very low level of R&D capacity be supported from a development policy perspective rather than a science and technology policy perspective?*

4 THE FUTURE OF STI AGREEMENTS

The exercise with the successful/non-successful cases focused very much on what exists in the STI landscape today. For all cases of successful agreements there is no doubt on the validity of the rationale in the coming 3-5 years and the agreements are expected to continue or being renewed. Some noted considerations such as the fact that it depends on interest from the research/business community and future reviews. Flexibility of the agreement is mentioned several times as a reason for the agreement having a long-term rationale: if priorities change, the agreement allows a change of focus. This would support an approach for a relatively general framework agreement (risking to become an empty shell) combined with more frequent implementation plans that can be adapted more frequently.

The findings of the non-successful cases raise some questions for science diplomacy. Clearly many of these cases can be described as 'empty shells' or agreements that were created from a political motive, but with no clear idea on how this should be implemented, combined with low levels of interest /visibility from the research and innovation community. A question that needs to be raised is whether Science Diplomacy is going to create even more empty shells in the future? Could this be avoided through better preparation by assessing the potential interest in the R&I community beforehand and designing the implementation mechanisms to make the cooperation operational?

A related question this raises is whether having the 'empty shells' is a real problem. In the template responses there seem to be different views on that. From the perspective of the **ministries** involved, the dormant agreements are mostly an opportunity for the future: they keep the door open if in the future more interest arises for cooperation. In addition, one response was that at least the STI agreement has set the Framework for Cooperation which can be used in the future. From the perspective of the **implementing agencies** there seems to be more concerns about the efforts needed for keeping the communications going and renegotiating the agreements. Thus, here the human resources that have to be invested for something that is 'not working' is an issue. Across all non-success cases many suggested that the political damage to close down or not renew an agreement was too big.

Hope for future revival of the non-successful cases is still there for most of the MLE participants. Nevertheless, governments should be beware of the negative aspects of keeping alive 'empty shells' and minimise the burden for their administrators (often agencies) to continue and renew them.

The MLE workshop in Bucharest should also address the future of STI agreements in a wider context and by looking at the situation 10-20 years from now. Very few STI agreements are terminated (Vullings, et al, 2012) while new agreements are constantly prepared.

The global arena is in turmoil today. The increasing trade conflicts between some of the world's largest economies will likely have an impact on the position of Europe. Will this affect the geography of Europe's partnerships? Global challenges and particularly climate change are becoming more urgent. Should we refocus on multilateral agreements instead of fragmenting efforts on a bilateral scale to have bigger impact? These challenges ask for a transitional change and systemic solutions that need to involve multiple policy domains. How this can be integrated into international cooperation for science, technology and innovation is a challenge ahead.

Questions for debate:

- *What will the landscape of STI agreements look like 10 years from now? Do we still need them? Can we still afford them? What should change?*
- *What is the tendency: bi-laterals, multi-laterals, more/less of them?*
- *To what extent can we continue to proliferate the STI agreement landscape?*
- *Should we have a different type of Science Diplomacy to avoid more empty shells?*
- *Should intra-EU agreements still exist in future? Can this not be done without a legal framework?*
- *To what extent can European level STI agreements serve as the legal framework for setting cooperation standards and procedures (replacing high level political national agreements), followed by more focused implementation at national or even regional level?*
- *In order to address global challenges, should STI cooperation be developed from a multi-policy perspective rather than STI and foreign policy alone? How do we start this process?*
- *How do we take into account new topics such as Artificial Intelligence, 5G, Quantum Computing but also urgent global challenges?*
- *Should all EU countries have one common set of regulations and standards towards certain regions (e.g. an all-European China STI-collaboration policy)?*
- *What will be the role of EU STI agreements in relation to national agreements?*

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The paper serves as a background document for a workshop organised under the Mutual Learning Exercise (MLE) devoted to national strategies and frameworks for international cooperation in R&I. The focus of this paper is on STI agreements as significant tools for international cooperation.

Studies and reports