



From Opportunities to Strategies: Improved Effective International Collaboration for Research and Innovation

SECAS Position Paper on the Next EU Common Strategic Framework

- Date** 15 May 2015
- Scope** This position paper presents conclusions of the SECAS initiative concerning international co-operation in the EU's next Common Strategic Framework Programme. The focus of this position paper is ICT RTD co-operation with industrialized third countries. It is based on an analysis of EU research cooperation with Singapore, Australia, and New Zealand in the area of Information and Communication Technologies. The SECAS project has analysed policy frameworks, co-operation experiences, and potential priority areas, as well as barriers and opportunities for deeper strategic cooperation between the EU and these countries.
- Editor** Dr. Erich Prem, eutema Technology Management GmbH & Co KG
prem (at) eutema.com
- Authors** The SECAS Project: D.Sanchez, E.Barron, National ICT Australia; Prof. Desai Narasimhalu, A.T.T.Loong, Singapore Management University; Erich Prem, eutema Technology Management GmbH & Co KG (AT); Ian Morgan, Optimat Ltd. (UK)

SECAS is an initiative of eutema Technology Management GmbH & Co KG, Austria (co-ordinator), Optimat Co Ltd. (UK), National ICT Australia, and Singapore Management University. SECAS is co-financed by the European Commission's ICT programme in FP7 as project nr. 247774. The views presented in this paper are solely those of the authors and not of the European Commission.

Introduction

In February 2011, the European Commission presented a Green Paper on a Common Strategic Framework (CSF) for future EU research and innovation.¹ The paper proposes major changes to EU research and innovation funding to make participation easier, increase scientific and economic impact and provide better value for money. In particular, the Green paper addresses the topic of international co-operation.²

This SECAS position paper is in response to the CSF Green Paper. It provides input to the CSF discussion on international research and technological development (RTD) co-operation with *industrialized countries* in the areas of future strategic orientation, instruments, and more generally, policies. It is based on the results of the SECAS initiative which focused on strategies for international Information and Communication Technologies (ICT) RTD collaboration between the European Union on the one side and Australia, New Zealand, and Singapore on the other. These countries are important strategic partners of the EU with strong trade and cultural relations. They are industrialised countries with a solid research base and are relevant for European industry aiming at Asia-Pacific markets. Not surprisingly, a number of policies for EU cooperation with these countries exist and several are relevant for research and technology co-operation.

SECAS has collected and reviewed existing policies to identify potential opportunities and priorities for further improvements. The project has also studied experiences of the EU and overseas partners involved in collaboration and performed an analysis of ICT research capabilities in the three 3rd countries. An analysis of ICT RTD cooperation strengths, weaknesses, opportunities, and threats resulted in practical and strategic recommendations for researchers and policy makers. Many of the findings are valid beyond the ICT domain and many are relevant for the of design future EU and member states programmes including, of course, the forthcoming CSF.

International cooperation

The last decade has seen an unprecedented expansion of international collaboration in RTD. Many countries have recently developed specific measures for improving international RTD collaboration to globally source knowledge, boost economic development, or satisfy an increasing domestic demand for RTD personnel with the help of access to international experts. This has reached a level where there are *no longer purely national innovation systems*.

This is particularly true for innovation in ICT where nearly all products and services face international competition. ICT research has been a focus in many countries world-wide and there are pockets of excellence in ICT research all around the globe. Also, innovative companies have started to exploit the potential application of novel ICT world-wide. The resulting creation of wealth has in turn motivated many governments around the globe to further invest in ICT RTD. This is one reason to collaborate across country borders, but there are many others: ICT RTD has become a precursor to economic collaboration, for the creation of joint ventures, and an entry point into foreign markets.

¹ From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding, EC Green Paper, February 2011, European Commission.

² In particular in its Question 26 ("How should international cooperation with non-EU countries be supported e.g. in terms of priority areas of strategic interest, instruments, reciprocity (including IPR aspects) or cooperation with member states?"). Other questions that relate to international cooperation aspects are questions 1, 2, 20, 23.

For many of the world's nations, ICT RTD has also become a way of working together to tackle the world's largest challenges such as sustainable growth, ageing populations, or climate change. And, of course, ICT is a major facilitator of the internationalization of RTD cooperation based on increasing speeds of data exchange and dramatically decreasing costs of communication.

Reasons for international RTD collaboration

There are very different reasons for research and technology collaboration ranging from economic to academic, personal, and public motives. It is important to keep these different characteristics in mind – in particular in view of designing the next CSF.

Economic drivers of international research collaboration are diverse. They range from cooperation as a means of tapping into expertise not available elsewhere and attracting scientists and engineers, to adapting products for new markets, gaining access to local knowledge and competences to enter new markets. RTD cooperation across borders is an important preparatory action for European industry before entering new markets.

Industrialized third countries typically are important economic partners of the EU. As an example, the EU is Australia's second-largest market for exports with particularly strong UK trade links:

- AU\$151 m of telecom equipment and parts from Sweden
- AU\$23 million in telecom equipment and parts from Poland
- AU\$196 million of computers from Ireland
- AU\$185 million in telecom equipment and parts, \$33m in computers and \$29 million in electrical circuits equipment from Hungary
- AU\$51 million in telecom equipment and parts from Finland

Table 1 Key imports from Europe in 2009 in the areas of ICT. Source: Austrade.

In Singapore, the EU accounted for 11.2% of total external trade, purchasing 10.2% of Singapore's exports and providing 12.4% of its imports, putting it ahead of China, the U.S. and other ASEAN neighbours. Vice versa, the EU exported €22 billion worth of goods to Singapore or 1.7% of the EU's total exports. Negotiations between the EU and Singapore are ongoing over a Free Trade Agreement which when concluded is expected to further boost trade and investment.³

At the *academic research* level, important drivers to collaborate across country borders are the exchange of knowledge between peers in the field, as well as gaining access to students and young researchers and engineers or increasing the reputation and recognition as a researcher or as an institution. International benchmarking, stimulation of new ideas, and simply enjoyment are even more reasons for academics to co-operate internationally.

Finally, at the level of *public policies*, the main drivers to promote international research collaboration include diplomatic considerations such as strengthening the relations with another country or

³ Singapore is the first ASEAN country with which the EU launched bilateral FTA in February 2010.

accompanying the implementation of other, non-RTD related policies. Furthermore, research and technological development often plays an important role in developmental aid and in solving identified national problems based on solutions from other countries. International RTD collaboration is also used as a means of attracting capital and human resources, thus playing a central role in fiscal and economic policies in many developed countries.

- Today, Europe lacks a targeted international collaboration strategy that clearly differentiates between the different reasons for international collaboration. Such a strategy must include targeted policies to work with the world's top RTD performers and regions of economic growth for mutual benefit.
- The design of the next Common Strategic Framework should carefully consider the changing role of international cooperation over the last decade. The many different reasons for collaborating in research and innovation will require different strategies.

Europe's position

Europe is excellently positioned for international ICT RTD collaboration. In the past few decades, the participants and managers of European ICT RTD programmes have acquired substantial experience with cross-border RTD collaboration. A large number of dedicated policies for international collaboration have been designed, implemented, and also evaluated. Another result of this decade-long experience with international collaboration is that a choice of different instruments ranging from student and researcher exchange programmes to dedicated international collaboration projects are available today. These capabilities, experiences, policies, and instruments are a profound European strength.

- The EU Framework Programme (FP) is internationally unique in facilitating international multi-partner projects including partners from industry, academia, research, small business, international organizations and even individuals. Europe should build on the existing strengths in the areas of experience, policies, and instruments to fully exploit the social and economic potential of international collaboration.

In Europe, there have in the past been very different political motives for international RTD collaboration. FP priorities were based on diplomatic consideration and on general policies in the area of developmental aid. Cohesion policies have also been important drivers of international collaboration including the case of potential accession countries.

- The next CSF should clearly distinguish between cooperation with developmental and regional objectives and strategic research cooperation with industrialized countries. The former will be more oriented at development and roll-out while the latter may cover the whole range from innovation to foundational research activities.

Policies for RTD cooperation with industrialized countries

The EU and its member states have concluded science and technology (S&T) agreements with several industrialized countries including Australia, New Zealand and Singapore.⁴ All three countries have

⁴ The S&T agreement with Australia was in fact the first ever such agreement that the EU had concluded with a 3rd country in 1994. It has been renewed and expanded in the meantime. Similarly, a formal Memorandum of

strong dedicated policies to foster research and technological development, but also ICT in general and all put in place policies targeting international collaboration in RTD. However, these policies have not always been followed-up and resulted in concrete actions for RTD cooperation.

Examples of EU member states that concluded bilateral agreements with Singapore, New Zealand or Australia include Germany, Finland, Hungary, UK, the Netherlands and Italy. Germany and France have a range of targeted initiatives with Australia though bilateral agreements with European nations, but they are not a major mechanism for collaboration. Bilateral agreements are important collaboration drivers in Singapore which is reflected by the extensive number of agreements, e.g. with France.

- The EU and its member states should continue the dialogue with international partners to follow-up on established collaboration policies with concrete actions.
- The preparation of RTD collaboration policies and agreements and follow-up activities should include thematic know-how (e.g. through the involvement of researchers and industry) to increase the likelihood of concrete action.

A strategic view

Currently, Europe lacks a coherent, sustainable, and effective international ICT RTD collaboration strategy. At the national level, only a few member states have developed clear strategies for international co-operation – although a few have concluded bilateral cooperation agreements with developed nations. Similarly, only a few industries in Europe and even fewer academic institutions have devised clear priorities and strategies for collaborating internationally. However, trans-national RTD has become an element of business co-operation strategy and the trend to internationalization will continue.

- The European Commission should consider ways of improving co-ordination and support for the member states and Europe's industry and academia to develop and implement international cooperation strategies. Instruments similar to the Support Actions of FP7 should be expanded to support the member states, industry, and academia.
- A CSF will require instruments that help identify key actors and potential priority topics based on RTD capabilities, improve mutual knowledge and help to make general agreements more concrete. Coordination and Support Actions have proven useful to further international RTD collaboration.
- Targeted actions should in particular address special RTD topics, industry needs, or specific regions – depending on the strategic objectives. The EU should put in place coordination mechanisms to ensure that support actions and strategy projects are complementary and create synergies across thematic fields, types of cooperation, and regions.

Many developed countries invest in large-scale projects and infrastructure that are of interest to the

Understanding concerning ICT co-operation was signed between the EU and Singapore in 2009. New Zealand and the EU signed an STC Agreement, which entered into force on the 30th of January 2009.

European Union as a whole or to its member states, EU industry, and society. Current examples include sizeable programmes such as the National Broadband Network and Bionic Eye initiatives in Australia.

- The CSF should provide instruments to leverage major international RTD initiatives, communicate the potential advantages for European partners, and provide ways to participate.
- From a more economic point of view, the EU should facilitate policies and programmes to allow the inflow of 3rd country RTD results for exploitation within the EU.

EU outgoing strategies

Outgoing strategies need an improved identification of ICT collaboration opportunities addressing not only technology and policy, but also societal issues and markets. Previous studies and projects funded by the EC have helped to clarify the important role that RTD cooperation plays in business collaboration.⁵ For example, European ICT industry set-up cooperation with Chinese researchers to prepare market entry, get to know partners and authorities, and establish distribution networks.

- The EU should consider international RTD as a component of its economic co-operation strategy. Europe should foster co-operation with the world's growth regions for Europe's economic benefit and secure and expand funding schemes for international collaboration.
- In the area of ICT research, Europe and its partner countries should focus on countries and regions with significant critical mass in ICT RTD.
- The CSF should foster collaboration with countries facilitating exploitation of ICT RTD results. The EU should recognize the importance of 3rd country investments in significant RTD projects and establish mechanisms for EU partners to benefit from such initiatives. The EU should establish policies for addressing "bottom-of the pyramid" opportunities.
- Europe should establish market-oriented policies and programmes such as innovation vouchers or communication platforms for promoting joint development of ICT RTD results in target countries.

EU outgoing strategies

Incoming strategies have in the past been successful in attracting researchers and students. However, in Europe we still underestimate the difficulties for our international partners to understand European programmes, access the right personal networks and establish cooperation with the right partners.

- Continue existing awareness-raising initiatives and increase knowledge of access points and key players for EU programmes. But also, more effective mechanisms are required to facilitate light-weight cooperation as well as more structured, long-term and sustainable ways of working together.

⁵ As an example, the SPICE project has studied this phenomenon for ICT RTD cooperation with China.

Current limitations of working with industrialized nations

Despite the good cooperative environment, there are also significant challenges when working with industrialized nations. For example, Australian universities have limited capacity to engage in larger-scale collaboration. The benefits of tackling larger problems and working with domain-users and transferring research into products are thus more difficult to achieve. Existing collaboration patterns suggest that links are mostly researcher-to-researcher and do not continue to other projects. Many funding mechanisms and policies (in particular those of EU member states) in place today are based on geography rather than on a research area. Schemes for conferences and research exchange are important, but not sufficient to stimulate larger-scale collaboration.

In Singapore, the main challenges are funding for RTD collaboration and mutual industry-focused initiatives. Funding for Singapore-led research is not formally endorsed in the EU Framework Programme and no automatic co-funding mechanism for Singaporean participation in EU projects currently exists. On the other hand, the Economic Development Board of Singapore has in the past funded European firms to set up R&D operations in Singapore, but such arrangements are not usually mutual.

In general, top-down government initiatives and bilateral agreements need to be supported by an understanding of the capabilities and priorities for cooperation to go beyond the single researcher level. An important gap in all three countries; New Zealand, Singapore and Australia, lies in access to intelligence on the main players in ICT sub-sectors in Europe and how to raise their awareness of the domestic capabilities in order to be seen as a desirable partner in ICT RTD.

- The EU should recognize that the needs of industrialized and – for the case of ICT research – developed ICT nations are significantly different from other countries. These countries would require support for intangibles, e.g. partnering, personal networks, etc. They can often provide substantial resources, such as infrastructure or access to unique RTD competencies, even when co-funding a project financially is not possible.
- It is necessary to layout easy access mechanisms to engender productive collaborative opportunities. Efforts have already been initiated on this front. For example, the EU delegation in Singapore has been expanding the RTD collaboration network through the Euraxess initiative. More such coordinated efforts are necessary to engender easy access mechanisms.
- Reciprocity must not be overemphasized. In areas of strategic economic importance or where Europe's international partners provide unique competencies, the strategic funding of collaborations must remain possible. A purely financial view of reciprocity is too narrow, e.g. because reciprocal funding of projects or calls requires complicated synchronization.
- While individual collaborations are important, it is of strategic importance to leverage co-operation at institutional level to facilitate longer-term cooperation.
- In the cooperation with industrialized countries it is important that rules for dealing with Intellectual Property remain flexible.

Long-term strategies for achieving RTD impact

It is necessary to acknowledge the fact that establishing trust and practical ways of collaboration requires time and patience. Therefore, long-term strategies are needed. The call-based schemes available in FP7 are a good way of kick-starting collaboration, but they require a huge effort on the side of the policy makers and research managers. This is why they have not been widely used. More importantly, such call-based schemes in their current form cannot guarantee long-term collaboration.

- Europe should define CSF to include a coherent, sustainable, and effective long-term international ICT RTD collaboration strategy to overcome the current ad hoc call scheme.
- While it may be important to continue programme-level cooperation such as joint calls between countries in selected cases, it is important to develop instruments for longer-term co-operation, e.g. joint labs and joint programmes.
- Deepen existing connections through longer-term exchanges and larger scale activities such as team collaboration and the set-up of joint laboratories.
- General information dissemination of information on cooperation opportunities are best maintained through existing local networks in developed countries (and in the EU). However, special information in priority areas on cooperation partners and opportunities requires targeted action, preferably with a solid technical background.

It has to be recognized that there can be prejudice and misconception concerning international collaboration. In the past it has not always been clear whether international collaboration is considered beneficial for a project. Frequently, there are fears that research collaboration with other nations leads to exploitation of results from outside Europe. It is necessary to study further the economic effects of international collaboration and to clarify the important role that research plays in economic relationships. While mutuality and reciprocity in international collaboration policies are important goals, there are also clear benefits for Europe's researchers and companies when entering foreign growth markets that do not depend on the mutual opening of research programmes.

People are key

There are clearly a large number of policies and initiatives in place to support research ties between the EU and Singapore, New Zealand or Australia and there are also established links in trade relations. The cultural ties imply good professional networks of 3rd country researchers with their colleagues in Europe. While countries, organisations, and institutes may conclude collaboration agreements, it is in the end people who work together across country borders. This is why policies and actions to support international collaboration must in the end consider the individual researcher.

- Exploit and leverage good personal networks that exist in many industrialized countries. The opportunities to exploit the presence of EU individuals in these countries for strengthening RTD should be better used, e.g. by facilitating project submissions by expats and other instruments for these individuals.
- Continue to develop networks in 3rd countries across universities, research institutes and corporate labs. Existing instruments for supporting researcher exchange should be

maintained and where possible expanded and simplified. Student exchange can be an important precursor to long lasting RTD collaboration.

Support actions for international collaboration including but not limited to SECAS have recently produced a wealth of knowledge on collaboration experiences, lessons learned and good practices.

- The design of new instruments in the CSF should consider the lessons learned from previous research cooperation taking into account both the European view and the experiences of Europe's strategic international partners.