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of the strategy for international cooperation in research and innovation

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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE
COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE
COMMITTEE OF THE REGIONS**

Implementation of the strategy for international cooperation in research and innovation

{SWD(2016) 329 final}

1. CONTEXT

The strategy for European Union international cooperation in research and innovation (R&I) published in 2012¹ supports the objectives of strengthening the EU's R&I excellence, attractiveness and economic and industrial competitiveness, tackling global societal challenges, and supporting the EU's external policies. It is a building block of the 'Open to the World' priority of the EU's R&I policy.

These objectives apply in different ways depending on the international partner country or region. For EEA, EFTA and EU enlargement countries, the focus is on fostering integration into the European Research Area (ERA). For European Neighbourhood Policy countries, the objective is to support a Common Knowledge and Innovation Space, bringing together R&I cooperation, mobility for academics, and capacity building. For industrialised countries and emerging economies, the objectives include increasing competitiveness, joint tackling of global challenges and increasing participation in international value chains. For developing countries, the emphasis is on promoting their sustainable development and addressing global societal challenges. In all cases, the areas for cooperation are identified on the basis of R&I capacities, market access opportunities, the contribution to international commitments, and the R&I framework conditions in place.

The strategy is structured around six main areas of action: (i) opening up the EU's flagship R&I programme, Horizon 2020, to researchers and innovators from across the world and supporting targeted activities on the basis of priority areas for cooperation with international partner countries and regions; (ii) improving the framework conditions that underpin international cooperation; (iii) playing a leading role in multilateral fora and working with international organisations; (iv) reinforcing the partnership with Member States; (v) intensifying synergies with the EU's external policies; and (vi) widening communication and strengthening monitoring.

This document is the second biennial report on the implementation of the strategy and its structure follows that of the strategy itself. The conclusions from the first report² were as follows: international cooperation must be better integrated in the Horizon 2020 strategic programming and work programme (WP) development; work on removing obstacles to cooperation must continue; global approaches are needed to tackle global challenges more effectively; sustained focus is needed on improving synergies with Member States and with EU external policies; the communication strategy should be refined; and quantitative indicators should underpin the monitoring of the effectiveness of the strategy. This report highlights the action taken in response to these conclusions in terms of concrete deliverables, such as the new co-funding mechanism launched by the EU and China to support research and innovation projects in strategic areas of common interest.

2. PRIORITIES FOR COOPERATION

Over the past two years, a new impetus has been given to global R&I cooperation in the strategic planning of governments and companies. One of the European Commission's (EC) top priorities is to make the EU 'A Stronger Global Actor', and being 'Open to the World' is at the centre of the EU's policy on science, research and innovation. The EC aims to translate the Union's strengths in science and technology into a leading voice in global debates and to

¹ COM(2012)497

² COM(2014)567

engage more in science diplomacy so as to help enhance the EU's global outreach. This means using the universal language of science to maintain open channels of communication and ensuring that the EU keeps pace with globalisation by enhancing international cooperation in R&I so as to be able to solve global challenges.

Challenges in areas such as health, food, energy, water, climate change and the circular economy are global, and the EC is leading the way in a range of multilateral R&I partnerships to address these issues in the most effective way. The EC strongly encourages international cooperation as this fosters new knowledge production, increases scientific quality, and improves the competitiveness of R&I systems³. At the same time, internationalisation boosts the productivity of investments in R&D by enabling companies to gain more knowledge from international markets, to participate in new value chains and to reap greater benefits from growing markets outside the EU.

The experience gained in implementing policies to build the ERA is being used to shape dialogues and interactions in an international context, and for the EC to form a vision of a 'Global Research Area' where researchers and innovators are able to work together smoothly across borders, and where researchers, scientific knowledge and technology circulate as freely as possible.

The EC has continued to hold regular Science and Technology (S&T) cooperation dialogues with its main international partners and high level policy dialogues with the main world regions. These dialogues make an important contribution to the systematic identification of opportunities for cooperation which, when combined with differentiation by country/region, support priority-setting. The priorities are reflected in the updating of the multi-annual roadmaps for targeted international cooperation with twelve countries and six regions, as presented in the accompanying Staff Working Document⁴.

3. REINFORCING THE INTERNATIONAL DIMENSION OF HORIZON 2020

The updating of the roadmaps for international cooperation has been synchronised with the Horizon 2020 strategic programming cycle. As a result, Horizon 2020 WPs strongly encourage international participation in consortia and the number of topics flagged as particularly relevant for international cooperation has increased, from 12 % of topics in FP7 to over 27 % in the 2014-17 WPs.

Most international cooperation is implemented through participation in Horizon 2020 projects, but also through joint calls⁵ and twinning of projects funded by international partners to exchange knowledge and exploit synergies. In addition, many WP topics contribute to the implementation of multilateral programmatic initiatives designed to tackle societal challenges with the participation of the EC, national and regional funding agencies.

Despite the increase in the number of topics flagged for international cooperation, the results from the first two years of Horizon 2020 show that the share of participations of entities from non-associated international partner countries in grant agreements for collaborative actions has fallen from 4.9 % under FP7 to just 2.4 % under Horizon 2020⁶. Only 11.7 % of Horizon

³ European Commission: Science, Research and Innovation Performance of the EU 2016

⁴ More detailed roadmaps are provided here: <http://ec.europa.eu/research/iscp>

⁵ Ten joint calls and eleven twinning calls launched to date

⁶ Includes all Horizon 2020 actions, except those under ERC, MSCA, Access to risk finance, EIT, JRC, and topics using the SME Instrument

2020 grant agreements include one or more partners from outside the EU Member States (MS) and the Horizon 2020 Associated Countries (AC), compared to 20.5 % under FP7. The EU contribution to non-MS/AC entities has fallen from 2.0 % of the budget under FP7 to 0.7 % under Horizon 2020. Likewise, the total budget invested by entities from international, non-associated partner countries in cooperating in Horizon 2020 projects has fallen from €60 million to €29 million a year.

The fall in international participation in grant agreements seen between FP7 and Horizon 2020 can be partly explained as a combination of: the change of funding rules for Brazil, Russia, India, China and Mexico; recent conflicts and socio-political developments in the EU neighbourhood; and Ukraine becoming associated to Horizon 2020 while it was not in FP7. Another main difference with respect to FP7 is that, despite the increase in the number of topics flagged for international cooperation, there are only very few for which international participation is mandatory. Lastly, the programme's increased focus on closer-to-market activities has required finding an appropriate balance between engaging in international cooperation and safeguarding the interests of the EU's companies.

With regard to the level of mobility of individual researchers, 2.6 % of all European Research Council (ERC) Principal Investigators have come to EU MS/AC from non-associated international partner countries. A number of early-career scientists have been supported by non-MS/AC funding agencies to temporarily join research teams run by ERC grantees through implementing arrangements now in place with seven countries⁷. Under the Individual Fellowships part of the Marie Skłodowska-Curie Actions (MSCA), non-associated international partner countries have received 280 researchers from EU MS/AC, while 521 researchers from these countries have obtained fellowships in Europe, corresponding to 20 % of all grantees of Individual Fellowships. Moreover, entities from non-associated international partner countries participate 459 times in RISE (International and Inter-sectoral Cooperation through R&I Staff Exchanges) and 209 times in ITN (Innovative Training Networks), corresponding to 29 % of all RISE participations and 5 % of all ITN participations.

International cooperation remains an important aspect of all Euratom activities and continues to be implemented under the various multilateral frameworks (e.g. OECD/NEA, IEA, IAEA, GIF) and through the bilateral Euratom cooperation agreements with third countries (TC). A new approach to fusion research promotes enhanced integration across EU MS/AC in order to ensure the success of ITER.

4. IMPROVING THE FRAMEWORK CONDITIONS FOR ENGAGING IN INTERNATIONAL COOPERATION

The EC has continued to be proactive in addressing the obstacles for worldwide cooperation in R&I.

A priority has been to encourage and assist industrialised countries and emerging economies in setting up mechanisms for funding the participation of their researchers in Horizon 2020 actions. There are currently mechanisms in place in several countries, including South Korea, Mexico, China, Russia, Japan, Australia, India, regions of Brazil and the province of Quebec, Canada, and work is continuing to broaden their scope of application.

⁷ USA, South Korea, Argentina, Japan, China, South Africa, Mexico

In some cases dialogues have addressed reciprocal access to R&I funding programmes, mutual access to resources and cooperation in pre-normative research and standardisation. For example, at the EU-China Innovation Cooperation Dialogue held in June 2015 the parties agreed to ensure reciprocal access to respective R&I funding programmes through participation rules based on equal treatment, timely and clear information to participants and regular exchange of data.

The EC is also carrying out a review of immigration regulations with a view to making it more effective in attracting talent to the EU. In particular, it is looking at supporting highly skilled entrepreneurs interested in setting up businesses in the EU.

Moreover, global multilateral fora in different thematic fields have addressed framework conditions such as open access to research data and infrastructures in their respective fields. For instance, in 2015 the Belmont Forum, currently co-chaired by the EC, adopted principles for data derived from global environmental change research to be discoverable, accessible, understandable, well-managed and properly conserved. Such policy of openness is paving the way for funding agencies collaborating internationally to reinforce the excellence and integrity of science and to facilitate innovation.

The multi-annual roadmaps for cooperation contain more detailed information on framework conditions in place for each country/region and the priorities for future improvements.

5. LEADING MULTILATERAL INITIATIVES AND WORKING WITH INTERNATIONAL ORGANISATIONS TO TACKLE GLOBAL SOCIETAL CHALLENGES

The increasing scope and interconnectivity of societal challenges require more than ever international collaboration across disciplines and sectors and call for more programmatic cooperation around common R&I agendas.

In health R&I, global multilateral initiatives are important instruments for cooperating internationally. For example, the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R) brings together funding organisations worldwide in order to ensure an effective research response to major outbreaks of infectious diseases with pandemic potential. When the first reports of the Zika outbreak appeared in November 2015, GloPID-R mobilised its members to identify funding gaps, facilitate synergies and optimise the investment in research with a view to meeting public health needs. In parallel, the EC launched calls to set up a research network across the Latin America region to facilitate, coordinate and implement urgent research against the Zika outbreak, and lay the foundation for a preparedness research network against any future emerging severe infectious threats.

Under the first Horizon 2020 WPs the EC has invested nearly €250 million in topics that contribute directly to the objectives of a range of global health partnerships⁸. It is estimated that the overall non-EC investment in these is close to €850 million over the same period, leading to a significant global impact. The EU is also providing up to €683 million for the second European and Developing Countries Clinical Trials Partnership (EDCTP) under which 14 European and 14 African countries are supporting collaborative research that accelerates the clinical development of new or improved interventions to prevent or treat HIV/AIDS, tuberculosis, malaria and neglected infectious diseases in sub-Saharan Africa.

⁸ IRDiRC, IHEC, IHMC, IKMC, ICGC, InTBIR, GACD, GloPID-R, GTBVP

In R&I for climate action and the environment, the first Horizon 2020 WPs included several topics designed to contribute to fulfilling commitments made under the Belmont Forum and the Group on Earth Observation (GEO) and to provide input to the Intergovernmental Panel on Climate Change (IPCC). In many cases, these international activities are supported by Horizon 2020 through ERA-NETs. The total Horizon 2020 budget for these topics is close to €200 million, and the total investment by all partners in these initiatives is estimated at three to four times this amount for the same period. These are important to deliver effective solutions to the challenges of global environmental change and to link Earth observation resources world-wide across multiple areas, such as disaster resilience and sustainable urban development.

In the area of bioeconomy, emphasis has been placed on international cooperation for sustainable food security. This has included initiatives with China, East-Asian countries and Africa, and blue growth that supports the implementation of the Atlantic Ocean Research Alliance and the BLUEMED initiative on marine and maritime R&I for the Mediterranean. An International Bioeconomy Forum is also being organised with the participation of global R&I partners. To date, Horizon 2020 WP topics worth more than €180 million have supported these initiatives, and first results of this investment can now be seen. For example, new maps have been produced of seabed features that are important for defining favourable habitats for fishing, critical sites for conservation, and safe navigation for shipping.

The international Group of Senior Officials on Global Research Infrastructures has developed further opportunities for practical collaboration and has launched a number of case studies designed to identify best practices from different research infrastructure internationalisation processes. The Group is also seeking to identify common ground for policies to be developed at international level related to access to research infrastructures, data management and the innovation potential of research infrastructures.

The results of EU R&I have contributed to the development and implementation of a number of international commitments such as the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, the Habitat III Conference on Sustainable Urban Development, a number of environmental agreements, and various resolutions of the World Health Organisation. For instance, more than one thousand publications from FP7 projects contributed to the fifth Assessment Report of the IPCC that provided the evidence base for negotiations at the United Nations Climate Change Conference held in Paris in 2015. Similarly, systems and services such as the Knowledge Centre for Disaster Risk Management and the Copernicus Emergency Management Service implemented by the EC underpin the realisation of a number of these commitments.

The EC has continued its active role in a range of international bodies dealing with R&I policy, notably in various OECD bodies and in meetings of the G7/G20. For example, in October 2015 and May 2016, the EC attended meetings of the G7 Ministers of Science, who agreed to step up cooperation in research on global health, the future of the seas and oceans, research infrastructures, inclusive innovation, gender and open science, and to cooperate on clean energy in the context of Mission Innovation.

Many of these international fora are continuing to expand their membership, and this is crucial to their success. For example, GloPID-R now has 23 members from 16 countries, and the Belmont Forum now includes 21 funding agencies and four international fora.

6. REINFORCING THE PARTNERSHIP WITH THE MEMBER STATES

Deepening and strengthening the partnership between the EC and the Member States (MS) is an important aspect of the strategy.

Cooperation with MS takes place through several fora. It is very often the case that both the EC and several individual MS participate in global multilateral initiatives. Another example of cooperation is when the EU participates in MS' joint R&I programmes and calls, such as through initiatives under Article 185 TFEU. The 'Partnership for R&I in the Mediterranean Area' (PRIMA), focussing on innovative solutions for food and water challenges, is a sound example of the work done towards enhancing the partnership between the EU and MS through Article 185 TFEU. The EC is also encouraging the strengthening of internationalisation activities of Joint Programming Initiatives including through Coordination and Support Actions. Furthermore, the EC and MS cooperate in thematic platforms such as the Strategic Energy Technology Plan, in order to ensure a coherent EU strategy vis-à-vis international partners.

As an advisory body, the Strategic Forum for International S&T Cooperation (SFIC) has continued to play an active role as an exchange platform and in networking with stakeholders. It has thus contributed to the implementation of S&T cooperation agreements and has provided sound and timely advice to the Council and the EC. Structured policy coordination between the EC and SFIC has taken place in view of Joint S&T Cooperation Committee meetings and high level policy dialogues with international partner countries and regions. SFIC has also provided input to the updating of the multi-annual roadmaps, and country-specific Working Groups (for the USA, China, Brazil and Russia) have contributed to creating a more coherent strategy for R&I cooperation with these countries. Moreover, a new SFIC Working Group is developing an overview of instruments and best practice for international cooperation for use by MS, Associated Countries and the EC. The Forum has also contributed to the ERA Roadmap priority on international cooperation that is founded on the development of joint strategic approaches and actions determined on the basis of MS' national priorities⁹.

The external dimension of the ERA serves as a paradigm for the EC to gradually shape a vision of a 'Global Research Area' with priorities varying according to the EU's specific objectives for each region or country. For instance, the EU-CELAC¹⁰ 'Common Research Area' was declared a common objective at the Summit held by the two regions in June 2015, with the aim of increasing the level and intensity of cooperation. It builds on three strategic pillars: improving the mobility of researchers; promoting access to research infrastructures; and jointly addressing common challenges such as climate change, sustainable urbanisation, health, the bioeconomy, and ICT.

7. INTENSIFYING THE SYNERGIES WITH THE EU'S EXTERNAL POLICIES

The external and internal aspects of the challenges facing the EU today are increasingly interlinked, and the urgency and magnitude of these challenges require swift political decisions and joint international responses. The strategic importance of international cooperation in R&I is often a central issue in the EU's general policy dialogue with its main international partners, as reflected in the conclusions reached at many recent international summits.

⁹ ERAC-SFIC 1354/16: 'SFIC opinion on the Commission's 'Open to the World' agenda'

¹⁰ Community of Latin American and Caribbean States

Science diplomacy is an important part of the strategy. It has a particular added value in areas of conflict and crisis where science cooperation can help build bridges between people and nations. For instance, the EC is supporting the Synchrotron-light for Experimental Science and Applications (SESAME) project where science fosters a culture of peace and cooperation in the broader Middle East. The EU was granted SESAME observer status in 2015 and has made a major contribution to the project, notably by providing a state-of-the-art magnet system for the main storage ring and through support to training capacities. Another example is the high-level dialogues following up on the Joint Comprehensive Plan of Action with Iran that are paving the way for closer cooperation between the EU and Iran, including on R&I in areas such as renewable energy, climate change and bioeconomy.

The strategy is also closely coordinated with EU neighbourhood and enlargement policies. The focus of the EU's R&I cooperation with pre-Accession countries (the Western Balkans and Turkey) is to promote their integration into the ERA, including through their association to Horizon 2020. Recently concluded agreements with Ukraine, Tunisia, Georgia and Armenia will take the total number of Horizon 2020 Associated Countries to sixteen.

A further dimension of science diplomacy is when scientific evidence and advice are used to anticipate needs, prevent conflicts and disasters, and for policy-making related to global challenges. EU-supported projects are making a significant contribution. For instance, the EU is one of the largest contributors to Arctic research and plays a critical role across all the priority areas of the integrated EU Arctic policy¹¹. The EC has also set up a mechanism for providing high quality, timely, independent scientific advice that is contributing to the continued pursuit of the best possible evidence-based policy.

The new Migration Partnership Framework for reinforced cooperation with non-EU countries highlights the need for the EU to increase its efforts to address the root causes of irregular migration. Research helps address the challenges and supports policymakers and societies adjust to new trends in migration. It allows gaining a better understanding of the root causes, to assess the effectiveness of actions and to help design strategies that will make integration more successful. The PRIMA initiative would contribute to tackle many of the root causes of migration from the Southern Mediterranean countries.

The EU is committed to fully implementing the 2030 Agenda for Sustainable Development. This includes support through Horizon 2020 that is expected to contribute at least 60 % of its budget to sustainable development and 35 % to climate action. Projects from the 2014-15 WP call on water innovation, for example, are strengthening international cooperation with emerging economies, especially China and India, where they are also creating links with initiatives such as the China-Europe Water Platform and the Clean Ganga initiative, and are contributing to the India-EU Water Partnership, launched in 2016.

The EC has also supported sustainable and equitable development by providing significant resources for addressing the scientific divide and strengthening the S&T capacities of lower middle-income economies. This has encouraged regional and international R&I networks to create synergies between main actors in the innovation value chain in these countries and to increase their institutional R&I capacities. Notably, the European Development Fund has contributed to three successive intra-ACP¹² research capacity programmes worth €70 million in total. With an indicative allocation of €60 million the EU has renewed its commitment until

¹¹ JOIN(2016)21

¹² African, Caribbean and Pacific Group of States

2020 to upgrade the ACP's research capability and improving skills development systems to support innovation. In parallel, €17.5 million in African Research Grants are promoting R&I along the food value chain.

In the same way as innovation processes are increasingly organised in global networks, trade and investment policies are now more closely intertwined with innovation and industrial policies. The EC has continued to take steps to ensure that free trade agreements open up new areas to competition and innovation.

8. REFINING THE COMMUNICATION STRATEGY

Ensuring global awareness of the EU's strengths in S&T, its role in international R&I cooperation and the international openness of its initiatives is crucial for the success of the strategy.

The EC has continued its 'Horizon 2020 – Open to the World' communication campaign to ensure that the programme is known worldwide. It has also improved visibility and guidance on the Participant Portal and the international cooperation website, notably by providing information for each country about the local support available to Horizon 2020 participants, including the co-funding mechanisms in place, the current priorities for cooperation and the contact points.

The EU delegations have contributed to promoting the EU strategy with relevant government departments and among the R&I actors in the partner country or region, and by presenting the EU's R&I policies and programmes at events and in the media. The Horizon 2020 National Contact Points and other multipliers in the EU, Associated Countries and international partner countries have continued to provide guidance and advice to researchers and to assist them in partner search.

Furthermore, a series of bilateral policy support projects with partner countries and regions have carried on with awareness raising and training activities, partnering events and meetings in support of policy dialogues, and analysis and monitoring of cooperation. The EC is setting up a facility that will build on the networks created by these projects and provide services to support further policy development, priority-setting and implementation of the strategy.

9. CONCLUSIONS

The objectives of the strategy and the need for coherent action are even more relevant today than when the strategy was issued four years ago. While the globalisation of R&I is not a new phenomenon, it has become increasingly visible, particularly in terms of collaborative research, international technology production, and the international mobility of researchers and circulation of knowledge. Openness to the world remains a strategic priority for the EU, as it is essential for excelling in science and technology, getting research results to market faster and creating new business opportunities for R&D-intensive industries. It is also crucial for contributing to solving global societal challenges and for allowing the EU to have a leading voice in global debates and developments.

The quantitative indicators that underpin the monitoring of the impact of the strategy show there to be significant room for improvement, both with regard to using Horizon 2020 as a vehicle for international cooperation (with more relevant WP topics; increasing participation

in grant agreements; higher investment from international partners; and more mobility of researchers) and beyond (notably through multilateral programmatic initiatives)¹³.

S&T policy dialogues and cooperation roadmaps shall continue to serve as a basis for priority-setting in Horizon 2020 programming, and the international dimension of WPs shall match the political ambition to reach the FP7 level of international cooperation activities. Additional action shall provide for WP topics of sufficient scale and scope that are specifically devoted to international cooperation and for strengthening the international dimension of innovation actions, of public-private partnerships, and of research infrastructures of global interest.

The EC shall remain proactive in ensuring good framework conditions for international cooperation within a vision of a 'Global Research Area', which will include co-funding mechanisms for an increased number of countries and more topics, reciprocity of access, and R&I-friendly visa schemes.

Further action shall also be taken to widen international participation and strengthen the EU's role in global multilateral fora and international organisations to push for more investment in developing innovative solutions to the global challenges that are at the top of the EU's priority list.

Stronger synergies with the actions of Member States shall also be sought including by means of structured policy coordination, opening joint programmes to international participation, analysis and mutual learning. SFIC will continue to play an important role in reinforcing the partnership between the EC and the Member States.

Science diplomacy shall be used more extensively as an influential instrument of the EU's external policies to build bridges in times of conflict, help prevent crises and disasters, better understand complex issues and develop shared strategies for good stewardship of our planet. It shall also be used for developing common standards for better market access and improving trade. EU diplomacy must leverage the elevated language of science for its remarkable uniting power.

In conclusion, over the past two years clear progress has been made towards achieving the objectives of the strategy, but more needs to be done to tap the full potential of the 'Open to the World' policy priority.

¹³ In Horizon 2020, for collaborative actions: share of WP topics mentioning at least one TC or region; share of TC participations and budgets; share of grant agreements with at least one TC participant; budget invested by TC organisations; budget contributing to international multilateral initiatives and their leverage effect; and for ERC and MSCA: share of researchers from TC in grants.