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**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

**Annual Report on Research and Technological Development Activities of the European
Union in 2015**

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1. BACKGROUND TO THE ANNUAL REPORT ON RTD ACTIVITIES

The Annual Report on research and technological development activities of the European Union (EU) is prepared pursuant to Article 190 of the Treaty on the Functioning of the European Union (TFEU). The purpose of this report is to provide a concise and non-exhaustive overview of key measures undertaken in the reporting year.

2. THE BROADER POLITICAL CONTEXT IN 2015

The year 2015 marked the first year of Jean-Claude Juncker's Commission. At the beginning of his mandate, President Juncker said this would be a new start for Europe and introduced his Agenda for Jobs, Growth, Fairness and Democratic Change, focused on ten political priorities, the key challenges that face both the economy and society. This Agenda shaped the trend of the new political approach, concentrated on the "big things" where citizens expected Europe to make a difference¹, and where Research and Innovation (R&I) is called to play a key role.

The defining events of the year – from the slower than expected recovery of European economies, to the migratory pressure on its external borders, the unprecedented terrorist attacks on European soil – have reinforced the need to maintain focus on these priorities.

In fact the moderate economic recovery in the euro area and the EU as a whole continued in 2015 for its third year. Growth was largely backed by temporary factors including declining oil prices, accommodative monetary policy and a relatively weak external value of the euro. Although the economic recovery was resilient and widespread across Member States, it remained slow and uneven, calling for determined policy responses in 2016 in the shape of investments and structural reforms.

The Commission's €315 billion Investment Plan for Europe, with a new European Fund for Strategic Investments (EFSI), was brought to life and is up and running. The Fund is operational and delivering high quality investments to further boost the European economy, including in research and innovation and for innovative SMEs and small mid-caps.

At the same time, throughout the year and underpinned by the Commission's new Better Regulation Agenda, proposals were made that put in place the building blocks of the Energy Union, the Digital Single Market, the Capital Markets Union, the European Agenda on Security, the European Agenda on Migration, the Action Plan for Fair and Efficient Corporate Taxation, the new Trade Strategy and last but not least proposals to deepen and strengthen the Economic and Monetary Union.

The Five Presidents' Report presented an ambitious and yet pragmatic roadmap for deepening the Economic and Monetary Union followed by a set of legislative measures.

The Refugee crisis, one of the most pressing challenges Europe is currently facing, required a determined concerted action by the European Union and there was a continuous work towards a coordinated European response on the refugees and migration front.

¹ http://ec.europa.eu/priorities/state-union-2015_en

The EU has also mobilised substantial political, financial and scientific resources to help the people affected by the Ebola virus and to contain, control, treat and ultimately defeat it. The EU's total financial contribution to fight the epidemic is over €1.2 billion. This includes funding from Member States and the European Commission.

At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement, due to enter into force in 2020, sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C. The EU was a lead player and the European Commission announced a new Research, Innovation and Competitiveness Strategy of the Energy Union in order to galvanise research and innovation for achieving global climate goals.

3. POLICY FRAMEWORK

Creating and supporting an Open Innovation ecosystem encourages dynamic knowledge circulation and facilitates the translation of that knowledge into socio-economic value. During this reporting year the foundation was laid for the development of a Pan-European Venture Capital Fund(s)-of-Funds initiative to be launched in 2016; the 'seal of excellence'² was announced; and the discussion around the creation of a European Innovation Council was kick-started. The Commission established a new Scientific Advice Mechanism (SAM)³, so that a diverse group of leading European experts can be called upon to inform EU policymaking with independent scientific advice.

In the context of the new EU agenda on better regulation⁴, launched in May 2015, work has started to evaluate the impact of existing or proposed EU regulation on innovation in order to maximize its support to innovation (InnovRefit)⁵. A further approach to be explored within InnovRefit is that of Innovation Deals⁶. They will address regulatory uncertainties identified by innovators, which can hinder innovation within the existing legal framework. As a first step, a pilot action in the Circular Economy is foreseen for 2016 to help innovators facing regulatory obstacles by setting up agreements with stakeholders and public authorities⁷.

Open Science describes the on-going transitions in the way research is performed, researchers collaborate, knowledge is shared, and science is organised. It is enabled by digital technologies, and driven by the enormous growth of data, the globalisation and enlargement of the scientific community including new actors (e.g. citizen science). In the short term, Open Science may offer more transparency, openness, inclusiveness and networked collaboration. In the long term, it may make science more efficient, reliable and responsive to the grand challenges of our times as well as foster co-creation and Open Innovation. It will also foster research integrity, which, as stressed by the Council in its conclusions of 1 December 2015⁸, is the foundation of high quality research. As one concrete follow-up measure the Horizon 2020 Model Grant Agreement was updated to reflect the importance of research integrity. Discussions on improving open access to

² <https://ec.europa.eu/research/regions/index.cfm?pg=soe>

³ <https://ec.europa.eu/research/sam/index.cfm>

⁴ COM (2015) 215 final "Better regulation for better results – An EU agenda"

⁵ SWD (2015) 298 of 15.12.2015 Commission Staff Working Document Better regulations for innovation-driven investment at EU level

⁶ <https://ec.europa.eu/research/innovation-deals/index.cfm>

⁷ http://ec.europa.eu/priorities/jobs-growth-investment/circular-economy/docs/communication-action-plan-for-circular-economy_en.pdf

⁸ <http://data.consilium.europa.eu/doc/document/ST-14853-2015-INIT/en/pdf>

research results and the underlying data also progressed substantially, as well as the development of a European Science Cloud.

During 2015 the Commission strengthened its international research and innovation cooperation with national and regional partners on the basis of common interest and mutual benefit. Openness to the World will help leverage Europe's strengths to make it a stronger global actor and increase the excellence of European research, the competitiveness of European companies and more effectively address societal challenges. The Commission continued focusing on enhancing synergies with external policies, coordinating Horizon 2020 actions with those carried out through other instruments, as well as with the EU Member States particularly via the SFIC⁹. Relations with international organisations, such as UNESCO, have been strengthened and initiatives to contribute to the overall objectives set by the Communication 'A European agenda on migration' were initiated.

As a founding member of the Group on Earth Observation (GEO), the Commission has subscribed to the 2015-2025 implementation plan of the Global Earth Observation System of Systems (GEOSS), that will provide open access to earth observation data from anywhere in the world to decision makers, researchers and innovators. The Atlantic Ocean Research Alliance launched its first trans-Atlantic mapping. The EU supported the SESAME research and technology Centre in Jordan that uses science to foster a culture of peace as well as S&T excellence in the broader Middle East.

The European Commission launched the 'science4refugees' initiative for asylum-seeking and refugee scientists and researchers, to enable a match-making process between refugees and asylum seekers with a scientific background and the scientific institutions that voluntarily declare themselves as "refugee-welcoming organisations".

In 2015, a set of country-specific recommendations addressing research and innovation (R&I) issues were adopted in the context of the European Semester of economic policy coordination. All the European Semester Country Reports integrated substantial analyses of the Member States' R&I systems, with a clear identification of the main R&I challenge(s) and an assessment of the policy responses to the challenge(s)¹⁰. This permitted a subsequent in-depth dialogue with the Member States on the basis of the R&I chapters in the Country Reports. The European Research Area (ERA) Roadmap 2015-2020 has been developed to serve the purpose of facilitating and reinforcing the efforts undertaken by the Member States.

The Horizon 2020 Policy Support Facility (PSF) was launched in March 2015 as a new instrument that gives Member States and countries associated to Horizon 2020 practical support to design, implement and evaluate reforms that enhance the quality of their R&I investments, policies and systems. Such reforms concern, for example, the stimulation of stronger and closer links between science and business or the introduction of performance-based funding of public research institutes.

The PSF provides Member States and countries associated to Horizon 2020 with access to independent high-level expertise and analyses through a broad range of services such as Peer Reviews of the national R&I systems, support to specific reforms or project-based mutual learning exercises. In addition, the PSF offers a Knowledge Centre via its website: <https://rio.jrc.ec.europa.eu/en>.

The Horizon 2020 PSF is a demand-driven facility that responds to requests made by national authorities on a voluntary basis. Three pilot PSF activities were successfully

⁹ Strategic Forum for International Science and Technology Cooperation

¹⁰ See sections on the European Semester at <https://rio.jrc.ec.europa.eu/en/country-analysis>.

undertaken in 2015: a Peer Review of the Bulgarian R&I system¹¹, a pre-Peer Review of the Hungarian R&I system¹² and a mutual learning exercise on policies to foster business R&I investments. Several other activities were launched in 2015 i.e. Peer Reviews of the national R&I systems of Hungary and Moldova; specific support to Malta for the monitoring of the country's R&I strategy; mutual learning exercises on ex-post evaluation of business R&D grants, R&I tax incentives and evaluation of complex PPP programmes. The outcomes of those activities are expected in April-September 2016. In addition, a rich pipeline of PSF activities is foreseen to be launched in 2016, covering all PSF services.

Finally, work was undertaken to strengthen evaluation methods to measure the impact of R&I investments at EU and national level, including through the improvement of current macro-economic models so that they can account more realistically for how research and innovation funding translate into economic growth and societal progress.

4. IMPLEMENTATION OF HORIZON 2020

Horizon 2020 has been aligned to the Commission's agenda through its work programmes. In a difficult political and economic context, it is all the more important to maximise the Framework Programme's contribution to deliver on President Juncker's priorities, notably the Digital Single Market, the Energy Union, the Circular Economy, the European Fund for Strategic Investments (EFSI) and reinforcing Europe's place in the world. Equally Horizon 2020's implementation will contribute to enhancing the delivery of Commissioner Moedas' agenda.

Lessons learned from the first calls were essential for the preparation of Work Programme 2016-2017, launched in October 2015, with a total investment of €16 billion.

On 25 September 2015, the Commission launched an online survey to gather opinions from stakeholders on the impact of the simplification measures introduced in Horizon 2020, and to ask for new ideas on future simplification. The survey confirmed that a significant proportion of users are satisfied with the simplification measures introduced in Horizon 2020.

While the Horizon 2020 Work Programme covers the large majority of the funding available under the Programme, it is complemented by the separate Work Programmes for the European Research Council, Euratom, the Joint Research Centre, as well as the Strategic Innovation Agenda for the European Institute of Innovation and Technology (EIT).

The EIT budget for the 2014 to 2020 period is EUR 2.38 billion as set out in the Horizon 2020 Framework Programme. In 2015, the first wave of EIT's Knowledge and Innovation Communities (KICs), namely EIT Digital, Climate-KIC and KIC InnoEnergy, have steadily grown in terms of budget, activities, and results, while the second wave of KICs, namely EIT Health and EIT Raw Materials, were in their start-up phase.

Synergies with European Structural and Investment Funds (ESIF) continued to be promoted. Under the Work Programme 2016-2017 applicants are invited to identify the smart specialisation fields of their EU Member State or region and explore the potential for synergies with the relevant Managing Authorities in charge of the ESIF in their territory¹³. A 'seal of excellence' will be provided as of 2016 to above-threshold, not-funded proposals under the SME instrument. The 'seal of excellence' will allow countries / regions to recognise the quality label awarded to promising proposals submitted under Horizon 2020

¹¹ <https://rio.jrc.ec.europa.eu/en/library/horizon-2020-policy-support-facility-peer-review-bulgarian-research-and-innovation-system>

¹² <https://rio.jrc.ec.europa.eu/en/library/horizon-2020-policy-support-facility-pre-peer-review-hungarian-research-and-innovation>

¹³ http://ec.europa.eu/regional_policy/indexes/in_your_country_en.cfm

and promote their access to different funding sources like the ESIF and other national or regional investment programmes. This action will be complemented by a ‘mobilisation’ campaign towards regions/countries to include SME-instrument friendly funding schemes in the context of implementation of their ESIF Operational Programmes.

The first steps for the strategic programming for the last Work Programme cycle were taken with the renewal of Horizon 2020 Advisory Groups and foresight exercises.

4.1 Response to calls

By the end of 2015, nearly 200 Horizon 2020 calls were concluded, with 84 793 proposals submitted. The number of retained proposals was 7 121 and the requested EU contribution to retained proposals was €14.18 billion. Just in 2015 a total of 5 234 grant agreements were signed with an EU financial contribution of €9.2 billion.

The share of private sector participation in the calls since the beginning of the programme and until the end of the reporting year amount to 32.2%. In pillars 2 and 3, excluding "Access to risk finance" 42.17% of all beneficiaries in the signed grant agreements are coming from industry.

Furthermore, in January 2015 the new €200 million Fast Track to Innovation (FTI) pilot initiative was launched, with the underlying objective to promote innovation by reducing the time it takes to bring innovative ideas to market. Out of a total of 498 proposals received, 31 received more than €68 million in funding. Almost half the project participants were SMEs.

4.2 Key features in Horizon 2020:

Small and Medium Enterprises (SMEs)

23% (EUR 1.7 billion) of the 2014-2015 combined budgets for Leadership in Enabling and Industrial Technologies (LEIT) and Societal Challenges was allocated to SMEs.

Thanks to EFSI frontloading on InnovFin SME Guarantee product, almost 45% of the target set regarding access to debt financing for innovative SMEs and small midcaps have already been achieved by the end of 2015, with no less than €4 billion of loans volume available on the market.

Social Sciences and Humanities (SSH)

In 2015 efforts were stepped-up to strengthen the interdisciplinary relevance of the calls for proposals, with particular attention given to SSH research. There were 81 topics in 2015 with SSH relevance and they are framed with the SSH as an integral part of the research question. Moreover SSH experts took part in the respective evaluation panels - and targeted guidelines were given to experts and moderators.

In addition, SSH played a major role in the Societal Challenge 6 ‘Europe in a changing world - Inclusive, Innovative and Reflective Societies’ where topics with SSH relevance reached 80%.

Gender dimension

Work progressed for a better integration of the gender dimension in Horizon 2020 and in the Work Programme 2016-2017 the visibility of gender has been improved, not only in quantitative terms but also in quality. Gender equality has now its own page on the Horizon

2020 website¹⁴ and greater efforts have been made so that gender is taken into account. In addition, almost 40% of the Horizon 2020 expert evaluators contracted in 2015 were female.

Climate Action and Sustainable Development

The monitoring of climate action and sustainable development expenditure across Horizon 2020 against the respective 35% and 60% spending targets set out in the Horizon 2020 Regulation is ongoing.

The final figures for 2014 show that these targets are not being met in the first year of Horizon 2020. The DGs responsible for Horizon 2020 implementation have therefore agreed on a set of actions to promote mainstreaming of climate action and sustainable development, to improve the tracking method and to increase Horizon 2020 investment in support of these objectives in future years. These figures for Horizon 2020 expenditure tracked in 2014 (corresponding to €8,317 million) are 24% for climate action and 46% regarding sustainable development.

Widening Participation

Alongside the already mentioned Policy Support Facility (PSF) or the 'seal of excellence', in 2015 31 projects were selected under the Teaming instrument, to help improve research performance and increase investment in countries with lower research excellence rankings. The projects received up to €500,000 each (€14.2 million in total) to prepare operational plans for new Centres of Excellence or for upgrading existing ones. Fourteen universities, technical institutes and private organisations in those parts of Europe that have not done as well as they could in research and innovation were awarded up to €2.5 million each in EU funding to boost their research capacity through the appointment of "ERA Chairs". A call on Twinning was launched with €66.24 million which resulted in 66 funded projects. In addition, support continued to be provided for COST (European Cooperation in Science and Technology).

International Cooperation

Due partly to the discontinuation of some dedicated international cooperation instruments, the change of the funding conditions of BRIC-M countries¹⁵, as well as to the socio-economic turmoil in Southern Neighbourhood countries, the share of participations of non-associated third countries halved in Horizon 2020 with respect to FP7. In response, more topics in the Work Programme will be identified as particularly relevant for international cooperation. As a first step, the Work Programme 2016-2017 contains around 10% more flagged topics than those of the Work Programme 2014-2015. In addition, co-funding mechanisms have been set-up by China, Japan, Korea, Mexico, Russia, Taiwan, Australia and regions of Canada and Brazil, to fund participation of their researchers in Horizon 2020 projects. Further measures will be required to reverse this dramatic decline, e.g. in our Neighbourhood.

Communication activities and targeted partnering events were strengthened in particular through the "Horizon 2020 – Open to the World" campaign, focusing on the promotion of the Excellence of the EU's Research and Innovation landscape, 'Destination Europe' events promoting research career opportunities in Europe; and contributing to the corporate campaign of the "European Year of Development".

¹⁴ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/promoting-gender-equality-research-and-innovation>

¹⁵ Brazil, Russia, India, China and Mexico

In the course of 2015 Ukraine became associated to Horizon 2020 and the agreement associating Tunisia, applicable as from 1 January 2016, was signed.

5. SEVENTH FRAMEWORK PROGRAMME

In November 2015 the report of the independent High Level Expert Group (HLEG) that has evaluated the EU's Seventh Framework Programme for Research and Technological Development (FP7)¹⁶ was made public.

The High Level Group looked at the achievements and impacts of the full range of actions financed by FP7 between 2007 and 2013. While the central focus of the report is on evaluating FP7, it also contains recommendations regarding Horizon 2020.

The Commission issued a Communication on the response to the High Level Expert Group Report in 19 January 2016¹⁷ where it welcomed the HLEG recommendations. Many were already taken up into the 2016-2017 Horizon 2020 Work Programme and will serve as a bridge to the Horizon 2020 interim evaluation which is due by the end of 2017.

6. JOINT RESEARCH CENTRE (JRC)

In 2015, the JRC's work programme was fully in line with, and supported the Commission's priorities. Key JRC activities contributed to such priorities as: a new boost for jobs, growth and investment; a resilient Energy Union with a forward-looking climate change policy and resilience to disaster; a deeper and fairer Internal Market with a strengthened industrial base; a deeper and fairer Economic and Monetary Union; the European Agenda on Migration and Nuclear Safety and Security (Euratom programme). Support has been provided to the Commission's efforts on the Better Regulation Agenda and to the Impact Assessment activities, by providing tools for the Better Regulation Toolbox and by supporting policy DGs in impact assessments, evaluation and fitness checks. The JRC also continued to deliver on its existing longer term obligations such as the development of standards, whilst also developing its competences in areas such as anticipation, foresight and behavioural sciences. In order to meet its objectives, the JRC worked in close cooperation with the Member States¹⁸, academia and the research community, as well as various international partners¹⁹.

7. DISSEMINATION, EXPLOITATION AND COMMUNICATION

Activities to disseminate and exploit results from research and innovation projects, and to evaluate the performance of EU funding as well as carry out communication activities, are an important and integral part of Horizon 2020. In 2015 around €7.45 million were devoted to these activities, including the provision of CORDIS services, which is the European Commission's primary public repository and portal to disseminate information on all EU-funded research projects and their results. The Commission implements activities by means of specific calls for proposals, coordination and support actions, and public procurement to provide targeted assistance to projects and consortia to optimise the exploitation and dissemination of results.

The supported actions must develop and implement a comprehensive dissemination plan to ensure the maximum impact of results. Secondly, following Horizon 2020's open access policy, beneficiaries must ensure that peer-reviewed scientific publications resulting from Horizon 2020 funding are deposited in repositories and made open access i.e. free of charge

¹⁶ https://ec.europa.eu/research/evaluations/pdf/fp7_final_evaluation_expert_group_report.pdf

¹⁷ Communication COM (2016) 5 final, 19.01.2016.

¹⁸ <https://ec.europa.eu/jrc/en/working-with-us/collaboration-member-states>

¹⁹ <https://ec.europa.eu/jrc/en/working-with-us/international-cooperation>

online access for the user. Beneficiaries must also aim to deposit at the same time the research data needed to validate the results presented in scientific publications. Thirdly, the Open Research Data Pilot, launched with the Work Programme 2014-2015, aims to improve and maximise access to and re-use of research data generated by projects. Based on the signed grant agreements, by the end of 2015 around 64.4% of projects in the core areas participate in the Pilot. While this Pilot concerns selected areas of Horizon 2020 progress was made to further strengthen open access to research publications and data so that open access to data becomes the default rule in the Work Programmes as of 2017.

The importance of monitoring and evaluation in the strategic programming and policy cycle has been strengthened with the adoption of the Better Regulation Package.

8. OUTLOOK FOR 2016

The outlook for 2016 reflects the continued response to the political priorities and to the pressing challenges Europe is currently facing.

In alignment with the new Commission's agenda, the Work Programme for 2016-2017 will contribute to the Jobs, Growth and Investment Package helping to strengthen Europe's global competitiveness, create new and sustainable jobs and promote growth.

The budget dedicated to the SME Instrument will be increased by 50%, reaching almost €750 million for the period 2016-2017. Further investments through InnovFin financial instruments, targeted in particular to small and medium-sized enterprises (SMEs), will contribute to the availability of a wider range of debt and equity financing products and facilities to support research and innovation; a stronger venture capital and wider equity industry; the increased involvement of business angels, crowd-funding platforms and philanthropic foundations in funding research and innovation; and more investment in technology transfer. Synergies with the European Fund for Strategic Investments (EFSI) will continue to be promoted, as well as with European Structural and Investment Funds (ESIF).

The strategic programming for the Horizon 2020 last Work Programme cycle was initiated paving the way to encompass, alongside the areas identified in the Specific Programme that still need to be covered, new emerging priorities and challenges resulting from the evolving nature of research and innovation trends or the arising challenges and political drivers such as migration issues, security, physical meets digital, the energy challenge and fighting against climate change, health threats, e.g. the Zika virus, and the overall priority of delivering innovation.

The interim evaluation of Horizon 2020 is due to be completed after summer 2017. The Commission expects, on the basis of the priorities identified through various consultations and on the basis of the recommendations in the interim evaluation of Horizon 2020, to develop the content of the 2018-2020 work programme in the first three quarters of 2017 with the adoption and publication of the calls for proposals not earlier than autumn 2017.

Following the FP7 ex post evaluation report, the Commission already committed to: implement a new strategic focus for Horizon 2020 in order to maximise its contribution to 'open innovation, 'open science' and 'open to the world'; maximise the synergies between R&I in thematic priorities of societal challenge areas and new and emerging digital and key enabling technologies and infrastructures; explore the need for, and the feasibility of, a European Innovation Council as a means to boost innovation and streamline existing instruments; evaluate the JTIs in terms of inter alia their openness, transparency and effectiveness; facilitate the elaboration of important projects of common European interest, which can foster vast deployment of research into mature technologies.

2016 marks the roll-out of many policy actions within the Commission's three strategic priorities on Research and Innovation. As part of the 'Open Innovation' goal and with the

primary objective to raise Europe's capacity to generate and scale up breakthrough innovations, a Call for Ideas on the setting up of a European Innovation Council was open from 16 February to 29 April 2016.

The Commission is committed to capitalise fully on the means at its disposal to report and communicate more effectively on the results and impact of Research and Innovation and has set as priorities to deliver on the European Open Science Cloud, as well as on improving open access to research results and the underlying data, thus delivering on 'Open Science'.

Last but not least, being 'Open to the World' will remain high on the agenda. The agreements associating Georgia and Armenia to Horizon 2020 were signed in April and May 2016 respectively. The second report on the implementation of the Strategy for International Cooperation in Research and Innovation will be issued in September. A Service Facility in Support of the Strategic Development of International Cooperation in Research and Innovation will be set up by the end of 2016. International cooperation in research and innovation is an instrument of soft power and a mechanism for improving relations with key countries and regions²⁰, building bridges in time of conflict, preventing crises, understanding better complex issues and developing shared strategies for good stewardship of our planet. The relevance of international cooperation in research and innovation has been exemplified by success stories, such as the European Organisation for Nuclear Research (CERN), which also provided a blueprint for regions with similar ambitions, such as the Middle East, where the Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME) is currently under construction in Jordan following a forward-looking fruitful cooperation between the EU and UNESCO. The association of now five neighbour countries to Horizon 2020 supports the European Neighbourhood Policy.

²⁰ Communication COM(2012)497 "Enhancing and focusing EU international cooperation in research and innovation: A strategic approach"