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**EUROPEAN RESEARCH AREA
AND INNOVATION COMMITTEE**
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– ERAC –
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NOTE

From:	ERAC Secretariat
To:	ERAC Delegations
Subject:	ERAC Annual Report 2017

Delegations will find annexed to this Note the ERAC Annual Report 2017 as adopted by written procedure.

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The European Research Area and Innovation Committee (ERAC)
2017 ANNUAL REPORT

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Key points

Below are the key points and achievements from 2017 for the Council to note:

- Two new ERAC Standing Working Groups were established on gender in R&I and human resources and mobility, thereby successfully completing the process of bringing the ERA-related groups under the Council's remit as per the Council conclusions of December 2015.

- The dialogue and co-ordination between the ERA-related groups continues to improve; for example, in 2017 the ERAC Standing Working Group on Gender in R&I and SFIC together prepared a report on a gender perspective in international cooperation in Science, Technology and Innovation and issued a position paper with recommendations to various stakeholders.

- Several groups are working on pressing current issues. For example GPC organized two workshops on the future of joint programming to address societal challenges and on the issue of partnerships and their relation with mission-oriented programmes; ESFRI published reports on long-term sustainability of research infrastructures and on innovation-oriented cooperation of research infrastructures; the ERAC Standing Working Group on Human Resources and Mobility elaborated two reports related to open science (education & skills and rewards & recognition); and both ESFRI and the ERAC Standing Working Group on Open Science and Innovation collaborated closely with the Commission on the project of the development of the European Open Science Cloud.

- ERAC prepared an Opinion on the Interim Evaluation of H2020/next Framework Programme, with all groups contributing.

- Most ERA-related groups are analysing the ERA National Action Plans and Strategies and working on the monitoring of the national progress vis-à-vis their respective ERA Priorities, thus supporting Member States and Associated Countries in managing their national research and innovation system more effectively.

ERAC Co-Chairs: Robert-Jan Smits and David Wilson

                                                   (Christian Naczinsky replaced David Wilson
                                                   as from 22 September 2017)

GPC Chair: Leonidas Antoniou

ESFRI Chair: Giorgio Rossi

Until 30 June 2017: SGHRM Chair: Conor O'Carroll

As from 1 July 2017:

SWG Human Resources and Mobility Chair: Cecilia Cabello Valdés

Until 30 June 2017: Helsinki Group Co-Chairs: Marcela Linkova and Ana Arana Antelo

As from 1 July 2017:

SWG Gender in R&I Chair: Marcela Linkova

SWG Open Science and Innovation Chair: Clara Eugenia García García

SFIC Chair: Rozenn Saunier

Introduction

ERAC is a strategic policy advisory committee whose principal mission is to provide timely strategic input to the Council, the Commission and Member States on research and innovation issues that are relevant to the development of the European Research Area (ERA).

Throughout 2017, for each of ERA's six priorities, the ERA-related groups took responsibility for specific development and implementation and reported to ERAC. This Annual Report[1] has been prepared by ERAC and summarises challenges faced by the ERA-related groups and their achievements in 2017 as well as plans for 2018 and beyond.

The main achievements of the ERA-related groups are summarised below. Full individual reports from each of the groups are presented in the **Annex**.

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[1]   The Council conclusions on the review of the ERA advisory structure, adopted on 1 December 2015, state that the ERA-related groups "will provide a short annual update to ERAC on progress and impact against the ERA Roadmap and that ERAC will annually report to the Council to ensure that Council is regularly and comprehensively sighted on progress".

Key achievements by ERA-related Groups

1.   *Cross-cutting issues*

The Council conclusions of December 2015 asked that all ERA-related groups should be brought under the oversight of the Council before the first scheduled review of ERA governance in 2018. The Steering Group on Human Resources and Mobility and the Helsinki Group on Gender in Research and Innovation (both previously Commission expert groups) consequently took up their new status as ERAC Standing Working Groups on 1 July 2017.

The above change further improved the efficiency and effectiveness of the advisory structure for the implementation of the ERA. The Chairs of all the ERA-related Groups are members of the ERAC Steering Board, which has clearly helped dialogue, mutual understanding and co-ordination between the groups. Furthermore, since the December 2017 Plenary meeting, the information flow from the ERA-related groups to ERAC has been improved: a compilation of written contributions by the ERA-related groups on the results of the recent work by the groups, with focus on impact, is submitted to ERAC for information and possible discussion prior to each Plenary meeting. To increase transparency of the Steering Board's operations, it was agreed that ERAC Delegations could observe its meetings. Based on the relevant practical arrangements, several ERAC Delegates have already availed of this opportunity.

Most ERA-related groups are analysing the ERA National Action Plans and Strategies (ERA NAPs) and working on the monitoring of the national progress vis-à-vis their respective ERA Priorities. This work is done to support Member States in managing their national research and innovation system more effectively. Furthermore, it will allow Member States and Associated Countries to have more insights on national activities and to exchange best practices. Moreover, the ERAC ad-hoc Working Group on Measuring the Impact of EU Framework Programmes for Research and Innovation at National Level finalised its work. ERAC adopted a respective report with a template which provides a series of indicators, databases and methodologies for the different impact dimensions which can be used by Member States in their own national impact studies.

2. ***ERA Priority 1 – More effective national research systems, led by ERAC***

- The follow-up on the implementation and the monitoring of the impact of the ERA National Action Plans was continued in 2017 in the form of two further ERA workshops, scheduled back-to-back with ERAC Plenary meetings respectively in March and in September (the latter in the format of three subgroups). Delegations felt that the sharing of lessons learned was very useful, thus it was proposed that the following workshops should have the same format.

- ERAC prepared Opinions on the Horizon 2020 Interim Evaluation and the preparations of the next Framework Programme for Research and Innovation as well as on Streamlining the Research and Innovation Monitoring and Reporting Landscape.

- ERAC started the preparations for the triennial review of the ERA advisory structure due in 2018. This should be seen as an opportunity to enhance the work of ERAC in fostering more effective national R&I systems, anchor ERAC's work in the European Semester and prepare the steps for a more inclusive and transparent governance.

3. ***ERA Priority 2a – Optimal transnational cooperation and competition, led by the High Level Group for Joint Programming (GPC)***

- The GPC's work in 2017 focused on fostering the Joint Programming Process and strengthening the public debate on the future of Joint Programming (JP).

- The GPC organised two workshops with the aim to provide opinion on the future of JP to address societal challenges and recommendations on the issue of partnerships and their relation with mission oriented programmes.

- The GPC organised a systematic process in collaboration with the 10 JPIs for the preparation of their Long Term Strategies and contribution to the WP 2018-20 of H2020.

- The GPC adopted a report on the "ERA NAPs and Strategies Analysis for Priority 2a", as well as a mechanism for monitoring the national progress in annual basis.

4. *Priority 2b – Research infrastructures, led by European Strategy Forum on Research Infrastructures (ESFRI)*

- The 2018 update of the ESFRI Roadmap was launched in 2017, including a call for proposals, progress assessment of ongoing ESFRI Projects, pilot review of ESFRI Landmarks, and Landscape Analysis.

- ESFRI published a report on Long-term Sustainability of Research Infrastructures, proposing 7 high-level and 35 specific recommendations , comprehensively covering the identified pre-conditions.

- ESFRI published a report on 'Innovation oriented cooperation of research infrastructures', which provides a comprehensive analysis of the collaboration potential between RIs and industry, identifies concrete opportunities and makes a broad set of recommendations on how to overcome the existing bottlenecks.

- ESFRI prepared its position on the planned European Open Science Cloud (EOSC) in December 2017 indicating the willingness of ESFRI, according to its scope and mandates, to contribute to the shaping of the EOSC project.

5. *Priority 3 – Open labour market for researchers, led by the Steering Group on Human Resources and Mobility/ERAC Standing Working Group on Human Resources and Mobility (SGHRM/SWG HRM)*

- The SGHRM elaborated two reports on "Providing researchers with the skills and competencies for practicing Open Science (Education & Skills)" and "Evaluation of Researchers practicing Open Science (Rewards & Recognition)".

- The SGHRM prepared a preliminary analysis of NAPs in Priority 3.

- The Standing Working Group on Human Resources and Mobility (SWG HRM) was established in 2017 which plans further build on the work done by the SGHRM.

6. *Priority 4 – Gender equality and mainstreaming in research, led by the Helsinki Group (HG)/the ERAC Standing Working Group on Gender in Research and Innovation (SWG GRI)*

- In 2017, the HG/SWG GRI advanced the implementation of the ERA Priority 4, including actions in line with the December 2015 Council Conclusions on Advancing gender equality in the ERA. In cooperation with the Commission it completed the Guidance to facilitate the implementation of targets to promote gender equality in research and innovation.

- Together with SFIC, the HG/SWG GRI drafted a report on a gender perspective in international cooperation in Science, Technology and Innovation and issued a position paper with recommendations to various stakeholders.

- The HG / SWG GRI also presented an analysis of the NAPs in Priority 4.

- The HG published a Position Paper on the Interim Evaluation of Horizon 2020 and the Next Framework Programme.

7. *Priority 5 – Optimal circulation, access to and transfer of scientific knowledge, led by the ERAC Standing Working Group on Open Science and Innovation (SWG OSI)*

- During 2017, the SWG OSI continued working on the implementation of ERA priority 5, particularly as regards exchanging information and best practices at national level with a particular focus on open science in line with the request from the Council through the December 2016 Council conclusions on open science to assess the actions set out in the Amsterdam Call for Action.

- The SWG OSI also advised and worked closely with the Commission and Member States on the complex and challenging project of the development of the European Open Science Cloud, focusing its attention on issues that relate to the governance of the Cloud.

8. *Priority 6 – International Cooperation, led by Strategic Forum on International Cooperation (SFIC)*

- SFIC adopted an opinion on international cooperation in the context of the mid-term review of Horizon 2020 and the preparation of the 9th EU Framework Programme for Research and Innovation.

- SFIC also prepared an opinion on the second progress report presented by the Commission on the implementation of the strategy for international cooperation in research and innovation.

- Together with the ERAC SWG GRI, the SFIC prepared a report on a gender perspective in international cooperation in Science, Technology and Innovation and issued a position paper with recommendations to various stakeholders.

- For the use of the INCO Service Facility in support of the strategic development of international cooperation in research and innovation, SFIC worked on several requests proposing activities in support of international cooperation.

- For the development of a toolbox for the implementation of international S&T agreements and other international S&T cooperation activities at EU and national level, the SFIC Working Group on a Toolbox organized a stakeholder workshop on best practice examples in international cooperation.

Full reports from each ERA-related Group

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Priority 1: More effective national research systems

ERAC is responsible for Priority 1 of the ERA Roadmap. The top action corresponding to ERA Priority 1 is 'strengthening the evaluation of research and innovation policies and seeking complementarities between, and rationalisation of, instruments at EU and national levels'. In 2017, ERAC continued to focus on the best way to achieve the top actions defined in the ERA Roadmap and adopted by the Council in May 2015.

As agreed at the first ERA workshop in September 2016, the follow-up on the implementation and the monitoring of the impact of the ERA National Action Plans was continued in 2017 in the form of two further ERA workshops. These were scheduled back-to-back with ERAC Plenary meetings respectively in March (Malta) and in September (Estonia), the latter being organised in three sub-groups as proposed by ERAC Delegations. The new format allowed for an active and fruitful discussions and -given its success- Delegations proposed to have further workshops with the same format, as it was felt that the sharing of lessons learned was very useful.

As a follow-up to the ERAC Opinion of April 2014 and to the Council conclusions of December 2015 on the review of the ERA advisory structure, on 2 March 2017 ERAC adopted its Opinion on Streamlining the Research and Innovation Monitoring and Reporting Landscape. The Opinion recommended *inter alia* that guiding principles should be agreed for R&I monitoring and reporting and that a regular ERAC dialogue should be established with the Commission services on adequate planning on monitoring and reporting issues. This should ensure a minimisation of the administrative burden, a maximisation of the effectiveness, and the generation of added value for the monitoring and reporting efforts at both national and EU level. Furthermore, there were recommendations on the process and on the impact of R&I monitoring and reporting.

As part of its role as strategic policy advisor to the Council, the Commission and Member States, ERAC adopted an Opinion on 7 July 2017 on the Horizon 2020 Interim Evaluation and the preparations of the next Framework Programme for Research and Innovation. In this Opinion, ERAC recognised that the Framework Programmes for research and innovation (FPs) represent the main drivers for competiveness, wellbeing, as well as environmental and social resilience, particularly in pointing out social challenges together with excellence. At EU level, FPs generate an outstanding EU-added value, notably by teaming up and by driving collaborations of R&I ecosystems through all Europe. FPs are also enabling the achievement of the European Research Area, consistently with all its priorities, which is a common goal as well as a shared competence of the Member States/Associated Countries and the European Union. Beyond the significant successes of the FPs, ERAC nevertheless identified further improvements to be delivered.

In 2017, ERAC also started the preparations for the triennial review of the ERA advisory structure due in 2018. According to the mechanism for the review, the procedure starts a year before the review with a discussion in ERAC at Director-General level on the strategic landscape for research and innovation in Europe. This discussion aims at identifying the key strategic priorities that will require attention by the research and innovation community. Based on the exchanges of views at the ERAC plenaries in March, June and September 2017, the ERAC Steering Board had prepared the discussion of the Directors-General that took place at the ERAC plenary meeting on 5 December. Furthermore, the participants in the informal meeting of the Research Policy Group (RPG) in October in Oslo also had an exchange of views on the broader strategic landscape for research and innovation in Europe. The conclusion from the discussions at ERAC and at the RPG was that the review of the ERA advisory structure in 2018 should seek a light, evolutionary approach. On this basis, the ERAC Steering Board was tasked to identify the scope of the review and define the terms of reference at its meeting in January 2018. Details of the review and its results will be given in the next Annual Report. This review should be seen as an opportunity to enhance the work of ERAC for priority 1 by fostering more effective national R&I systems, anchoring ERAC's work in the European Semester and preparing the steps for a more inclusive and transparent governance.

Priority 2a: Optimal transnational cooperation and competition

The High Level Group for Joint Programming (GPC) is responsible for Priority 2a "Jointly Addressing Grand Challenges" of the ERA Roadmap.

The new GPC mandate and Work Programme 2016-2018 reflects the decision that ***"the focus of the GPC should shift from the JPIs to the Joint Programming Process (JPP)".*** When undertaking its activities[2], the GPC seeks to contribute to the progress of ERA, both at national and European levels. The main actions of the GPC during 2017 were:

1. Fostering the JPP and Empowering the Interplay Between the Stakeholders

Based on the approach of its new mandate and following the recommendations of the GPC WG on *"Fostering Relationships among the JPIs and the GPC"* and the Hernani Report[3] (2016) the GPC decided to have a much more active role in creating a favourable environment for the implementation of JPP.

Therefore, representatives of the 10 JPIs, other P2P initiatives, the European Commission (EC) and relevant national, European and international stakeholders representing a wide spectrum of interests have been invited to participate in the GPC meetings, WGs, workshops and events in order to strengthen the public debate on Joint Programming, as well as the co-operation between the different stakeholders.

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[2] The main activities of the GPC are promoted through the work done by Working Groups (WG), Implementation Groups (IG), Task Forces (TF) and Rapporteurs (RA).
[3] Produced (March 2016) by the Expert Group (chaired by prof. H. Hernani) that was established by the European Commission (EC) to carry out the evaluation of Joint Programming to address grand societal challenges.

2. Contributing to the Discussion on the Future of JPP

A strong focus of GPC's work in 2017 has been on the future of the JPP, following the evaluation of JP and in the context of the interim evaluation of H2020 and the preparation of the next FP.

GPC Opinion on the "Future of Joint Programming to Address Societal Challenges"

On 9 February 2018, a workshop was organized, with the participation of representatives from all the JP main initiatives and stakeholders, in order to discuss the general concept of JPP, the main prerequisites to tackle societal challenges, as well as several important components (MS/AC commitment, governance and secretariat, funding support from EC) related to the implementation of JPIs. The conclusions of the workshop were used as a basis for the preparation of the **GPC opinion on the future of JP** which was adopted by the GPC in June. The Opinion included, among others, the main challenges of the JPP, as well as the suggested measures to meet these challenges. The Opinion considered the idea of a *«JP Roadmap»* with regular evaluations in order to achieve sustainability for the overall JPP.

These discussions were also used to feed the ERAC opinion on the FP which was adopted in the same period. Based on the conclusions from the GPC and ERAC opinions, the EC started to elaborate on scenarios for the future of P2Ps in the next FP, taking into account feedback from MS/AC and stakeholders.

Tackling Societal Challenges and Related Missions

Following the developments in the informal Council and ERAC meetings for the future of JP, the GPC organised, in collaboration with the 10 JPIs, a workshop on 7 November 2017. The main objective of this workshop was to **open the public discussion on the issue of partnerships in the European R&I landscape, as well as on the issue of missions**. The main goal was to take a next step towards a reflection of existing partnerships and their missions against requirements of future mission oriented - programmes.

Parallel sessions were organised to bring together the JPIs, other initiatives tackling similar challenges and EC representatives and allow thematic in-depth discussions on **how to improve coherence of the partnership landscape and strengthen the delivery** of partnerships on tackling specific societal challenges and related missions. After the thematic sessions, a plenary discussion took place between several stakeholders on the issue of rationalization of European R&I partnerships in view of the next FP and the relation with the future missions.

ERAC Ad-hoc Group on Partnerships

Moreover, several GPC delegates, as well as the GPC Chair and Vice-Chair, are participating to the ERAC ad-hoc group on partnerships which was launched in December.

Long Term Strategies of the JPIs and the JP

Following the recommendations of the Hernani Report, the GPC organize a systematic process allowing the JPIs to prepare their **Long Term Strategies** (LTS) for the next years. All JPIs delivered and presented their LTSs in June 2017. The JPIs' LTS were submitted to the European Commission and served as important inputs for the preparation of the next FP.

The GPC established a WG on "Long Term Strategy of Joint Programming" with the aim to: (i) prepare an analysis of the Long Term Strategies of the JPIs, (ii) provide advice to the JPIs, and also the GPC and the ERAC, of individual good practices and challenges as well as cross-cutting issues identified in the LTSs, both with regard to actual JPI activities and to how the work is presented, (iii) further draw from the rich material of the ten LTSs to give JPIs pointers to attractive activities, solutions and ways to develop the reports, and (iv) provide information on commonalities, dissimilarities, patterns and synergies that may serve as a platform for a future extended evaluation of the broader questions of JP, JPP, Partnerships in the next FP.

3. GPC and JPIs input to the Horizon 2020

In the context of the GPC WG on future of Joint Programming, and following the inputs from JPIs on the elaboration of the 10 JPIs' contribution for the Work Programmes 2018-20 of H2020 were presented and discussed in the GPC plenary and subsequently submitted (2017) by the GPC to the EC, as a contribution to the preparation of the last WPs of H2020.

4. Measuring the Progress and Implementation of Priority 2a of the ERA Roadmap

According to the ERA Progress Report (2016), the indicators related to Priority 2a had the highest growth rate among all priorities (8%), which is considered as a significant progress. In 2017, a GPC TF prepared a report on the **"ERA NAPs and Strategies Analysis for Priority 2a"**, as well as a monitoring mechanism. Both of them were adopted by the GPC. The report provides an analysis of objectives and actions set-up at national level for Priority 2a in the context of the ERA roadmap and allows GPC delegates to have more insights on national activities and to exchange best practices.

The monitoring mechanism will ensure a proper follow-up of national actions in this area at an annual basis. The output of this first monitoring exercise, as well as best practises on implemented national measures will be presented and discussed during the next GPC meeting in March 2018.

5. Improving Alignment and Interoperability

To promote the recommendations of the IG on "*Improving Alignment and Interoperability*", the GPC in collaboration with the EC, launched (2016) a **Mutual Learning Exercise** (using the PSF of H2020), which supported the participating countries by developing solutions for increased MS/AC and EC commitment to the JPP, including enhancing the alignment of strategies and improving interoperability among MS/AC and EC instruments.

Many GPC delegates were involved in the Mutual Learning Exercise on Alignment which ended in 2017. This exercise allowed an in-depth discussion on national practices to enhance alignment in the context of Joint Programming. The final deliverable was a report focusing on main issues, national actions and best practices, which is of strong interest for all GPC delegates in order to improve alignment at national level, for instance through better coordination at national level, or better dissemination of information.

More generally, the constant dialogue between MS/AC and the EC through the GPC ensures a continuous enhancement of alignment at European level.

6. Setting up a New Framework for Evaluating JPIs

The GPC IG on 'Monitoring and Evaluating JPIs' developed a multi-dimensional set of criteria and a relevant mechanism for the assessment of new and existing JPIs. According to the new framework, JPIs have to provide sufficient information to the GPC to compose an informed advice to the Competitiveness Council on whether to start a new JPI or maintain an existing one. This had an effect at European level by opening formally the possibility to select new JPIs. It also provides a set of criteria to be used from national authorities in order to decide about supporting ideas for new JPIs and participating in existing initiatives.

7. Migrants, Migration and Integration (MMI) Challenge

Following the discussions in 2016, the GPC TF "Migrants Migration and Integration (MMI)" presented its final report "Towards a proposal for a new JPI on Migration, Migrants and Integration" on the feasibility of a JPI on MMI. The GPC considered that the presented proposal did not fulfil at this stage all the minimum criteria for a new JPI under the terms of the then newly adopted JPI assessment framework developed by the GPC Implementation Group 3. The TF was requested to reflect on further steps for the proposal on the basis of the comments in order to possibly present a new version of the proposal at a later stage.

8. Increasing Awareness

During 2017, GPC representatives promoted the goals of the Priority 2a of the ERA Roadmap, the GPC activities in several occasions (e.g. ERA-LEARN 2020 activities, JPIs' Governing Boards meetings and events, international conferences, events and workshops etc) in order to increase public awareness about the idea of JP and the need for joint action in European level to address the grand societal challenges.

Priority 2b: Research infrastructures

The European Strategy Forum on Research Infrastructures (ESFRI) is responsible for Priority 2b of the ERA Roadmap.

Within its general mandate to support a coherent and strategy–led approach to policy making on research infrastructures in Europe, during 2017 ESFRI contributed to the progress of the ERA through the following actions:

1.   ESFRI Roadmap 2018

ESFRI launched the 2018 Roadmap update process in Malaga on 17-18 January 2017 with a dedicated Info Day and an Exchange of Experience Workshop on 'Monitoring of ESFRI Projects and Pilot Review of Landmarks'. The Info Day gathered over 180 participants setting the scene for the Roadmap update, which includes a call for new proposals, update of the research infrastructure landscape analysis, progress monitoring of Projects and on the ESFRI Roadmap and pilot review of ESFRI Landmarks. The Exchange of Experience Workshop served as a discussion forum with the research infrastructures from the ESFRI Roadmap about the objectives and scope of the progress monitoring exercise and the pilot review.

Call for proposals

The Malaga Info Day launched the Call for Proposals for new pan-European research infrastructures which would play a strategic role in the ERA in the next decades. The Call closed on the 31st of August, with 12 proposals submitted by national governments. The evaluation of these proposals was ongoing until the end of 2017 and was finalized by June 2018.

Monitoring of ESFRI Projects

Research Infrastructures included in the ESFRI Roadmap have 10 years to enter the implementation stage. ESFRI regularly monitors their progress to review the current situation, identify the most important challenges and facilitate their implementation.

During 2017 ESFRI carried out the monitoring of six Projects which entered the Roadmap in 2010. In result of this exercise ESFRI issued tailored recommendations to all the six Projects on how to improve their science case, impact on the ERA and boost their implementation in order to become fully-fledged research infrastructures within the next two years. ESFRI also observed in general, that carrying out the monitoring exercise in itself served as an important mobilizing factor and led to important organizational changes in some of the Projects.

This year ESFRI also started the monitoring exercise of 2008 Project, but the process was only concluded in March 2018.

Pilot review of ESFRI Landmarks

The Competitiveness Council on 27 May 2016[4] requested ESFRI to 'periodically assess the scientific status of ESFRI Landmarks'. In order to establish an effective methodology for this process, which would be both useful to national governments and would bring an added value to ESFRI research infrastructures themselves, a pilot review was carried out in collaboration with four selected Landmarks that agreed to participate in the process. Initial conclusions have been discussed in the Forum and will feed into the elaboration of a general approach.

Landscape Analysis

For the 2018 ESFRI Roadmap, the Strategy Working Groups prepare an update of the landscape analysis of the European research infrastructures ecosystem, identifying the main facilities and initiatives, trends as well as the emerging areas where new research infrastructures could be needed in the future.

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[4]   Council Conclusions on 'FP7 and the Future Outlook: Research and innovation investments for jobs, growth and solutions to societal challenges', 3470th Council meeting, 27 May 2016.

2. Long-term sustainability of research infrastructures

ESFRI created a Working Group on Long-term Sustainability of Research Infrastructures in order to comprehensively respond to the Competitiveness Council Conclusions of 27 May 2016, which underlined 'the importance of ensuring Long-Term Sustainability of Research Infrastructures and invites the Commission to prepare together with ESFRI and relevant stakeholders a targeted action plan'.

The Group issued a report approved by the Forum in June 2017, which was published as ESFRI Scripta vol. 2[5], proposing 7 main recommendations covering the key aspects of this topic. These recommendations are expanded into 35 specific points covering issues such as securing of highly qualified and motivated human resources, realizing a robust transfer of information to society from the research infrastructure via a quality-controlled e-Infrastructure, building an effective interface between RIs and innovation activities, understanding the actual value of the diverse benefits to society, addressing the optimal governance and management structure and promoting coordination among RIs.

3. Relationship of research infrastructures, industry and innovation

In the course of 2017, ESFRI updated the report of its Working Group on Innovation, which was adopted by the Forum in early 2016. The report, entitled 'Innovation oriented cooperation of research infrastructures', was published as ESFRI Scripta vol. 3. describes the different forms of industry and Research Infrastructure collaboration that generate innovation: industry as supplier for the construction / upgrade of the RIs, being instructed and guided in developing new technologies or production protocols; industry as partner of RIs and industry as user exploiting the specific dedicated access modes as well as through the academic access supported by research grants.

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5   http://www.esfri.eu/esfri-publications-0

The open innovation model does include Research Infrastructures at the supply side of new knowledge and also as effective testbeds of innovative devices that can be benchmarked against mature technologies in performing research. Detectors of particles, X-rays, neutrons, and their associated ultrafast, low noise electronics are developed first and qualified later by their adoption by RI for advanced research, yielding very direct innovation in all field of applications in medical, environmental, information, production monitoring. Reference signal sources, from light emission devices to precision clocks, are again developed and qualified by adoption at RIs. In the bio-medical sector RIs make available samples, images, protocols that continuously enrich the knowledge basis for open innovation to flourish. In the broad-band communication of data and high power / high throughput computing, as well as in environmental observation and modelling, or in societal studies, the RIs provide again the most advanced testbeds for innovation. Updates statistics of the easily measureable facts, like usage by industry of analytical or medical-sciences RIs, show a larger and larger impact of RIs on innovation activities. Key aspects of the link between research infrastructure and innovation are also the training of scientists and research engineers and their mobility to and from basic science at the RI and innovation in the society. The growth of large hubs of science and innovation around large scale RIs are one of the effective models of open innovation, attracting economic activities and generating value.

4. ESFRI mandate on e-Infrastructure

On 20 February 2017, the Council of the EU approved ESFRI recommendation on coordination of Member States' investment strategies in e-infrastructures[6]. In this light, a discussion was developed by ESFRI on the issues connected with the development of an optimal e-Infrastructure for science in Europe. Notably the proposal for the establishment of a European Open Science Cloud (EOSC Declaration) was analyzed in view of ESFRI's role of strategy hub of funders of RIs that does include the large effort in data management and data access infrastructure and related policies. A 6-bullet-point position on the EOSC was prepared by the Forum in December 2017 welcoming an ambitious and very important goal of the initiative, with potential structuring impact on European science and beyond. It was recognised that a close and effective dialogue between EOSC and ESFRI is needed at the strategy level as well further collaboration at all levels of implementation in order to ensure and enhance synergies and effectively promote convergence to advanced commons in science.

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[6] List of 'A' items, Non-legislative activities, 3519th meeting of the Council of the European Union, 20 February 2017, Brussels.

Priority 3: Open labour market for researchers

The Steering Group on Human Resources and Mobility/ERAC Standing Working Group on Human Resources and Mobility (SGHRM/SWG HRM) is responsible for Priority 3 of the ERA Roadmap.

The Steering Group on Human Resources and Mobility (SGHRM) was terminated as an ERA-related group and Commission expert group as of 30/6/2017 and as of 1/7/2017 the ERAC Standing Working Group on Human Resources and Mobility (SWG HRM) was constituted, building on and in some cases continuing the work of the SGHRM.

1. **Providing researchers with the skills and competencies for practicing Open Science (Education & Skills Report) (report prepared by working group of the SGHRM)**

   A survey was conducted by the SGHRM between March and May 2017 to assess the current situation. A total of 1,277 answers were received by researchers across Europe, of which nearly 50% were doctoral candidates (R1). The remaining 50% were distributed across career stages, from the postdoctoral to the very senior research career levels. A majority of researchers are unaware of the concept of Open Science. What is most known is open access publishing, and there is a very high interest in open access data management practices. Researchers indicate that training opportunities for open access and open data are not yet widely offered. 3 out of 4 researchers indicate that they have not yet participated in any open access or open data course but would like to. Although an even higher proportion of researchers deem data management relevant for their research, there is insufficient data archiving support and infrastructures at the institutional level. Given that research data production, documentation and archiving is essential for a majority of researchers, it is crucial that they are aware of, trained and supported with the best technologies to enable and enhance professional conduct.

The skills necessary for Open Science are identified and include; open access publishing; data management and open data; enabling professional research conduct; citizen science. An overview of the current Open Science skills provision landscape is given in the report. The need to engage researchers at all levels in Open Science is discussed, and a European Skills and Qualifications Matrix for Open Science proposed. The importance of embedding Open Science in ERA policy is treated and the specific cases of the Innovative Doctoral Training Principles and the European Framework for Research Careers are presented.

The following are key recommendations to enhance open science skills in the research community:

- **Open Science policy**; including the analysis of ERA policy through the lens of Open Science, and making Open Science skills an integral part of the next framework program (FP9) with dedicated funding.

- **Guidelines to implement Open Science,** which include a revision of the major European Guidelines and Frameworks concerning researchers' skills and career development to include Open Science, i.e. the European Framework for Research Careers, the Human Resources Strategy for Researchers (HRS4R), and the Innovative Doctoral Training Principles (IDTP). This also includes the development of FAIR institutional guidelines, in particular for Open Access publications and Open Data.

- **Raising awareness of Open Science** policy initiatives, institutional and funding agency guidelines, as well as the broader value of Open Science practices at the personal, professional and societal levels.

- **Training Researchers for Open** Science ensuring career stage appropriate accredited and modularized Open Science skills training and professional development (covering R1-R4 researchers) regarding open access publishing, open data and data management, professional research conduct and broader citizen science skills.

- **Providing Support for Open Science**, including aspects related to infrastructure, technical, legal, professional and implementational support from institutions.

- **Career development for Open Science**, such that Open Science activities are recognized by funders as part of grant evaluation criteria, are accounted for in the recruitment and progression of researchers, and are recognized and rewarded (see also recommendations of the Rewards Working Group under SGHRM) with the highest degree of visibility (skills visibility and transparency).

2. **Evaluation of Researchers practicing Open Science (Rewards & Recognition Report). Report prepared by working group of the SGHRM.**

   The conclusions and recommendations are the following:

Conclusions

For the practice of Open Science to become mainstream it must be embedded in the evaluation of researchers at all stages of their career (R1-R4). This will require universities to change their approach in career assessment for recruitment and promotion. It will require funding agencies to reform the methods they use for awarding grants to researchers. It will require senior researchers to reform how they assess researchers when employing on funded research projects. This is about changing the way research is done, who is involved in the process and how it is valued; evolving from a closed competitive system to one that is more open and collaborative. Overall, a cultural change is needed in organizations and in the research community for the promotion of and engagement in Open Science.

Evaluating a researcher cannot be reduced to a number because their merits, achievements, usefulness are a complex set of different variables, impossible to be summarized by a single figure. It should be made clear that a multi-dimensional approach to the evaluation is by far more reliable than the 'single figure' one and it provides a more realistic proxy of the measurement of quality. It should be done through multi-dimensional evaluation criteria. The OS Career Assessment Matrix (OS-CAM) can be used for this purpose, taking into consideration what is expected from a researcher and what is relevant for the specific post, grant or career advancement.

This new approach will take time, needs to be well-planned and its implementation continuously monitored and improved. The outcome of this change must be to improve the quality of science in its own right in a manner that ensures research integrity and greater peer and public engagement in research. Most importantly, it must mainstream the practice of Open Science through incentivizing researchers with recognition and rewards.

This will require feasibility studies and pilot exercises to ensure that the approach achieves the desired outcome. It must be recognized that there cannot be a one size fits all approach, given the difference between disciplines and institutional structures.

Recommendations

a) To change the culture and further engage the entire researcher community in the practice of Open Science a more comprehensive recognition and reward system incorporating Open Science must become part of **the recruitment criteria, career progression and grant assessment procedures** for researchers at all levels (R1-R4).

b) Where needed, there should be a review of **ERA policies, ERA roadmaps and National Action Plans through the lens of Open Science**. If necessary, policies must be updated in order to ensure compatibility with Open Science.

c) At European level all means to **encourage and incentivize researcher participation in Open Science** through support and funding mechanisms should be pursued. This should include:

  –   The **Human Resources Excellence in Research Award (HRS4R)4** integrating Open Science assessment criteria for researcher recruitment, career progression and grant evaluation;

  –   Open Science activity by researchers should become **a cross cutting theme in all of the Work Programmes of Horizon 2020 and, most importantly, in the future Framework Programme, FP9**.

  –   At **national, regional and institutional** level, best efforts should be made to integrate the recognition and rewards for researchers engaging in Open Science into existing and future funding mechanisms.

d)   The assessment of researchers during recruitment, career progression and grant evaluation should be structured to encompass the full range of their achievements including Open Science. This **multi-dimensional approach could be implemented using the instrument OS-Career Assessment Matrix** that takes into consideration the full range of achievements to reflect diverse career paths. There should also be a validation process on the content and feasibility of the OS-Career Assessment Matrix (CAM) in researcher assessment at European, national, regional and organizational level as well as taking into account the wide spectrum of disciplines, research funding and research performing organizations.

3.   National Action Plans for ERA Roadmap Priority 3:

A preliminary analysis of national ERA roadmaps revealed a great number of similarities across groups of countries with regard to their thematic priorities under the ERA Roadmap for Priority 3. The analysis identified important policy issues regarding priority actions which contribute to the implementation of ERA, as well as possible synergies in actions to be implemented. The areas identified include: Cross-sectoral mobility, attraction of foreign researchers and international mobility; promotion of Marie Curie Actions (H2020), promotion of HR Excellence in Research and implementation of HRS4R , Open, transparent and merit based recruitment procedures (OTM-R), Program Innovative Doctorate Training and career development, gender/ Equal opportunity initiatives and also support/promotion of EURAXESS. Further analysis is needed next year to continue the work and contribution to monitoring Priority 3.

Priority 4: Gender equality and mainstreaming in research

Helsinki Group on Gender in Research and Innovation / The Standing Working Group on Gender in Research and Innovation is responsible for Priority 4 of the ERA Roadmap.

The Helsinki Group on Gender in Research and Innovation (HG) was terminated as an ERA-related group and Commission expert group as of 30/6/2017 and as of 1/7/2017 the ERAC Standing Working Group on Gender in Research and Innovation (SWG GRI) was constituted, building on and in some cases continuing the work of the HG.

Actions contributing to the progress of ERA at the European level

Gender perspective in international cooperation in STI: In line with the Council Conclusions on advancing gender equality in the ERA of 1 December 2015, a draft report on a gender perspective for international cooperation in STI was prepared jointly by rapporteurs from HG/SWG GRI and SFIC. A survey undertaken among representatives of national authorities and Research Funding Organizations for this purpose facilitated an understanding of the limited extent to which gender issues are currently addressed in international cooperation in STI. The answers also show that there is willingness among relevant stakeholders to take up gender aspects in international cooperation in STI provided that a certain level of support is available. A position adopted by the SWG GRI and SFIC outlined recommendations for MS and the EC.

Gender balance in decision making and among professors: In line with Council Conclusions on advancing gender equality in the ERA of 1 December 2015, the HG in cooperation with the Commission drafted Guidance to facilitate the implementation of targets to promote gender equality in research and innovation. The Guidance was adopted by the HG at its last meeting in March 2017. The Guidance was then submitted by the Commission for consultation to the ERA Stakeholder Platform, and finalized by the Commission in cooperation with the chair of the SWG GRI. Members of the SWG double-checked and revised country examples provided for the Guidance.

Best practice exchange and mutual learning on implementation of NAPS: Under HG, a subgroup worked to improve collaboration between ERAC delegates and ERA groups at national level. The work of the subgroup made a valuable contribution to a first analysis of ERA roadmaps on priority 4, which was presented at a workshop on 15 March 2017 organized back to back with the ERAC Plenary. Best practice exchange and mutual learning have been identified by the SWG GRI as a key element around which upcoming work of the SWG GRI will be structured.

Advice to the EC and MS on gender issues in Horizon 2020 and the next Framework Programme, as the main instrument to build the European Research Area: The HG made a contribution to the ERAC Opinion on the Interim Evaluation of Horizon 2020 and the Future Framework Programme, and presented these recommendations at a workshop organized in March 2017 back to back with the ERAC Plenary. On 28 June 2017 the HG published its Position Paper on the Interim Evaluation of Horizon 2020 and the Next Framework Programme. In the Position Paper the HG recommended that the current provisions in place to address gender issues under H2020 should be reinforced, with proper measures put in place to ensure their integration by grant applicants, and in evaluation, project review and monitoring. Evaluation and monitoring were particularly stressed. The HG also recommended that institutional change through Gender Equality Plans and other instrumental projects for Gender Equality in R&I organizations and policies should be retained and reinforced. Specific recommendations focused on the three priority areas of gender balance in decision making, gender balance in research team and gender dimension in research and innovation.

Fostering Priority 4 in ERAC: SWG GRI presented proposal for the integration of gender topics in the work carried out by groups under ERAC, including *inter alia,* contribution to the debate on research integrity or the report of the ERAC Ad-hoc Working Group on Measuring the Impact of EU Framework Programmes for R&I at National Level etc.

Actions contributing to the implementation of ERA priority 4 at national level

Contribution to the development of the NAPS in Priority 4 at national level: HG / SWG GRI delegates are involved in the implementation of the national ERA Roadmaps and Action Plans. The adoption of NAPS fostered cooperation and coordination at the national level between HG/SWG GRI delegates, national ERAC delegates and delegates in the other ERA-related groups. The newly constituted SWG GRI agreed a format for the organization of its meetings to facilitate good practice exchange on identified priority topics.

Cooperation with relevant stakeholders in Priority 4 at national level: HG / SWG GRI members were engaged in networking with relevant stakeholders at Priority 4 at national level, to exchange information on activities and recommendations and vice versa.

Priority 5: Optimal circulation, access to and transfer of scientific knowledge

The ERAC Standing Working Group on Open Science and Innovation (SWG OSI) is responsible for Priority 5 of the ERA Roadmap: optimal circulation, access to and transfer of scientific knowledge.

The ERAC SWG OSI's work has focused on the following three main items during 2017:

1. **Opinion on the Interim Evaluation of Horizon 2020 and preparations for the future Framework Programme**

   The ERAC SWG OSI adopted its Opinion in June 2017, as a contribution to the overall ERAC Opinion. The SWG OSI highlighted that open science and open innovation represent highly dynamic and rapidly evolving policy arenas and consequently there were different visions and positions at national level as regards open science, innovation and open innovation that were difficult to consolidate into a common course of action. The Opinion however acknowledged the role of Horizon 2020 in the promotion of open access to publications, and welcomed further initiatives in next Framework Programme. Moreover, the ERAC SWG OSI considered that better conceptual understanding, in particular for open innovation, was needed in the context of the next Framework Programme to define the appropriate set of incentives and policy tools.

2. **Assessment of the Amsterdam Call for Action on Open Science:**

Following the invitation from the Council in the May 2016 Council conclusions on 'the Transition towards an Open Science system' for the ERAC SWG OSI "to assess the proposed actions on the Amsterdam Call for Action on feasibility, effectiveness and prioritisation, and to report on this" and in order to carry out the assessment, two questionnaires were sent to delegations in November 2016 and June 2017, covering the following issues: Open Research Data and e-infrastructures, Open Access, Open Science implementation and monitoring, Citizen Science, Rewards, Text and Data Mining, IPR and transparency. On the basis of inputs from delegations, the Chair and Vice-Chair analysed the answers and drafted the assessment which was discussed extensively at various meetings of the ERAC SWG OSI and was finalised in early 2018. The assessment gathered evidence on the diversity across national research systems as regards the implementation of open science policies as well as the main policy, institutional and behavioural constraints identified at national level. Furthermore, The assessment is expected to provide guidance to the Commission, Member States and stakeholders as regards the twelve actions identified in the Amsterdam Call in order to guide future policies in this field.

3. **European Open Science Cloud:**

Throughout 2017, the SWG OSI has been cooperating closely with the Commission on the development of the European Open Science Cloud (EOSC). The Chair, Vice-Chair and a number of delegations participated in the EOSC summit organised by the Commission in June 2017, followed by a workshop with the Commission in September 2017, mainly to discuss the governance and financing of the EOSC and an informal meeting in December 2017 to discuss and advise on the different models under consideration for the EOSC Strategic Implementation Plan, particularly as regards its governance, on the basis of the national positions that have been collected from delegations. The ERAC SWG OSI finalised its Opinion on the EOSC governance models and Strategic Implementation Plan in early 2018, supporting the two stages approach for the EOSC governance (phase 1 & 2 pre and post-2020) proposed by the Commission but stressing that further clarity is needed on the different components of the EOSC and there is no consensus among delegations as regards the model to follow for the governance structure of the EOSC.

Other items:

Due to the heavy workload of the ERAC SWG OSI with the Assessment of the Amsterdam Call for Action on open science and the EOSC, the SWG has not been able to focus on the issue of Open Innovation but will be on the agenda for 2018, including sharing information and best practices national initiatives and strategies in this field.

Priority 6: International cooperation (SFIC)

The Strategic Forum for International S&T Cooperation (SFIC) is responsible for Priority 6 of the ERA Roadmap: International Cooperation.

Also in 2017, SFIC contributed actively both to setting up the ERA Roadmap implementation and monitoring process and to facilitating the further development, implementation and monitoring of the international dimension of ERA[7]. In this role SFIC remained a key forum for the exchange of information and discussion on the objectives and activities at EU and national level towards third countries, and the framework for cooperation between the Commission, Member States and Associated Countries to improve structured policy coordination and dialogue in the area of research and innovation.

SFIC provided sound and timely advice to the Council and the Commission. It notably adopted an opinion on international cooperation in the context of the mid-term review of Horizon 2020 and the preparation of the 9th EU Framework Programme for Research and Innovation (FP9) which took note of the significant drop in the participation of third countries in Horizon 2020 when compared with the participation in the 7th Framework Programme for Science and Technology, identified a number of shortcomings to understand the causes of the lack of involvement of third countries, and proposed corrective measures to increase international cooperation, both in the perspective of the mid-term review of Horizon 2020 and the preparation of FP9.

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[7]   It is worth noting that SFIC's contribution to ERA Roadmap Priority 6 is not the exclusive remit of SFIC's activities, as many initiatives are covering areas of action not specifically touched upon by the ERA Roadmap (e.g. initiatives by SFIC country-specific working groups).

SFIC also adopted an opinion on the second progress report presented by the Commission on the implementation of the strategy for international cooperation in research and innovation which acknowledged the progress made towards achieving the objectives of the strategy, but stressed that more needed to be done to tap its full potential. In its opinion, SFIC encouraged initiatives to boost the participation of third countries in Horizon 2020 actions, in particular by ensuring good framework conditions for international cooperation, such as co-funding mechanisms, reciprocity of access, research and innovation-friendly visa schemes, but also by defining focused topics of sufficient scale and scope specifically devoted to international cooperation and by strengthening the international dimension of innovation actions like public-private partnerships and research infrastructures of global interest.

Moreover, in reply to a request by the Competitiveness Council in its conclusions of 1 December 2015, SFIC - together with the recently created ERAC Standing Working Group on Gender in Research and Innovation - prepared an opinion on developing joint guidelines on a gender perspective for international cooperation in science, technology and innovation (STI). This opinion aims at providing an input for the preparation of the next multiannual framework programme for research and innovation. The opinion was based on a survey carried out by SFIC between April and June 2017 among government representatives and funding agencies to explore the current situation at national and organisational level. The survey results demonstrated the existing difficulties in including gender issues in international STI cooperation and showed the importance of developing joint guidelines on gender aspects.

Furthermore, SFIC provided regular proactive input for the use of the INCO Service Facility in support of the strategic development of international cooperation in research and innovation. In the course of 2017, it worked on a number of requests for topical work to be carried out in the margins of the Service Facility, *inter alia* on a foresight study on the Global Research Area, on a conceptual framework for monitoring international cooperation based on appropriate indicators, on a data repository for international cooperation, and on a new dedicated platform providing programme and country-specific information. In parallel, SFIC members promoted the requested activities among stakeholders with the aim of creating synergies, if possible, with similar actions at national level.

The SFIC working group on a "Toolbox for international cooperation" continued its work on developing a practical overview for Member States, Associated Countries and the Commission on the implementation of international STI agreements and other international STI cooperation activities at bilateral and multilateral level, on the basis of information collected by the Working Group in a survey, as well as a stakeholder workshop organised on 7 December 2017. The Working Group intends to present its final report and its recommendations for relevant instruments, including on the possible logistical contribution via the INCO Service Facility or other pre-existing instruments in support of ERA, in the course of 2018.

The country-specific working groups on the cooperation with Brazil and China completed their mandates during the year 2017. SFIC took note of the information provided by both working groups on relevant projects and processes. Furthermore, SFIC initiated a discussion on the characteristics of future thematic or geographical working groups, underlining the importance of providing them with a clear mandate, realistic and achievable objectives, and for a dedicated limited time span, and developed a set of conditions for the establishment of new working groups.

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