



Alliance4Life

Life Science Alliance: Closing Research and Innovation Divide in the EU

H2020-SC1-2017-Single-Stage-RTD -779303

D3.1 White Paper containing recommendations from Inventory of best practices

Work Package: WP3
Task: T3.1
Deliverable due date: 31/07/2019
Responsible partner: UT
Editors: All partners
Deliverable number: D3.1
Deliverable type: Report
Dissemination level: Public
First Created: 16/04/2019
Last Updated: 28/06/2019
Version: 3.0



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1 Introduction

The *D3.1 White paper containing recommendations from Inventory of best practices (White paper)* is the first public deliverable of the Alliance4Life project work package *WP3 Strategy & Policy*. According to the Work Plan, the *D3.1 White paper* falls under *Task 3.1 Policy implications of good practice inventory*.

The objectives of *WP3 Strategy & Policy* are the following:

- To identify joint issues and steer the operation of the Alliance4Life Focus Groups to address commonly occurring peculiarities of EU13 countries identified in WP2;
- To create individual strategies and action plans of involved institutions proposing transformative changes and effective approaches leading to strengthening the R&I capacities of involved institutions in order to help close the research & innovation divide in the EU;
- To supply policy makers with examples of good practice in management of synergies between structural and investment funds (ESIF) and for creation of synergies with H2020 applicable for formulation of new policies relevant to FP9.

The *D3.1 White Paper* is an essential part of the project Work Plan. The recommendations to the institutions and national governments in the *D3.1 White Paper* are targeted mainly towards EU13 Member States but many of them are relevant to all institutions and Member States. It acknowledges as a basis that collaboration is mutual and therefore it is essential that EU15 institutions and governments also incentivise the cooperation with EU13 institutions and governments.

2 State of participation of EU13 Member States in Horizon 2020

The 13 Member States who joined EU from 2004 (EU13 countries) represent 8,6% of GDP, 20% of the population¹ and 17% of European scientists and engineers and they account for 10% of applications and 4,8% of total funding in Horizon 2020².

Raising the level of participation in the Framework Programme of the Member States who joined after 2004 is a long-term pervasive complex issue that has proven itself to be difficult to solve. One of reasons can be that the issue is even more complex than expected. As with other Member States who joined the EU at different points in time, a certain transition period was expected for EU13 Member States when participation is lower due to system learning and integrating into networks after which the participation starts to increase. In the case with EU13 Member States this transition period seems to be still ongoing after 15 years as the increase in obtained funding is very low. The transition period is even more complicated because there has been a clear trend of severely decreasing collaboration with EU13 participants in FP7 with no simultaneous decrease in excellence. The trend of collaboration has reversed in Horizon 2020 but has not reached its original level.

Even though excellence is one of the most important evaluation criteria in Horizon 2020, it does not predict a country's or institution's participation with full accuracy and there are many other factors involved. For example, the research excellence of UK is well recognised but its participation has sharply declining after the Brexit referendum – UK's share of obtained funding peaked at 15,9% in

¹ Eurostat, 2018

² European Commission, Monitoring Flash "From Horizon 2020 to Horizon Europe", August 2018

2015³ but has now declined to 14,3% over the whole Horizon 2020⁴. The independent High Level Group on maximising the impact of EU Research & Innovation Programmes in 2017 acknowledged that the complexity of the Framework Programme risks increasing transaction costs and diluting excellence by favouring a “competition among those in the know”, excluding those who may be excellent but unfamiliar with the system⁵

Horizon 2020 looks very different to various country groups. The overall share of funding going to EU13 is 4.8% but it varies largely by action type (Figure 1) from 0% in Public Procurement of Innovation (PPI) to 16.7% in Coordination and Support Actions (CSA)⁶. In addition to CSAs, the EU13 performs significantly over its average in ERA-NET Cofund (9.2%) and SME Instrument (7.6%). Only 1.7% of European Research Council (ERC) funding goes to institutions in EU13.

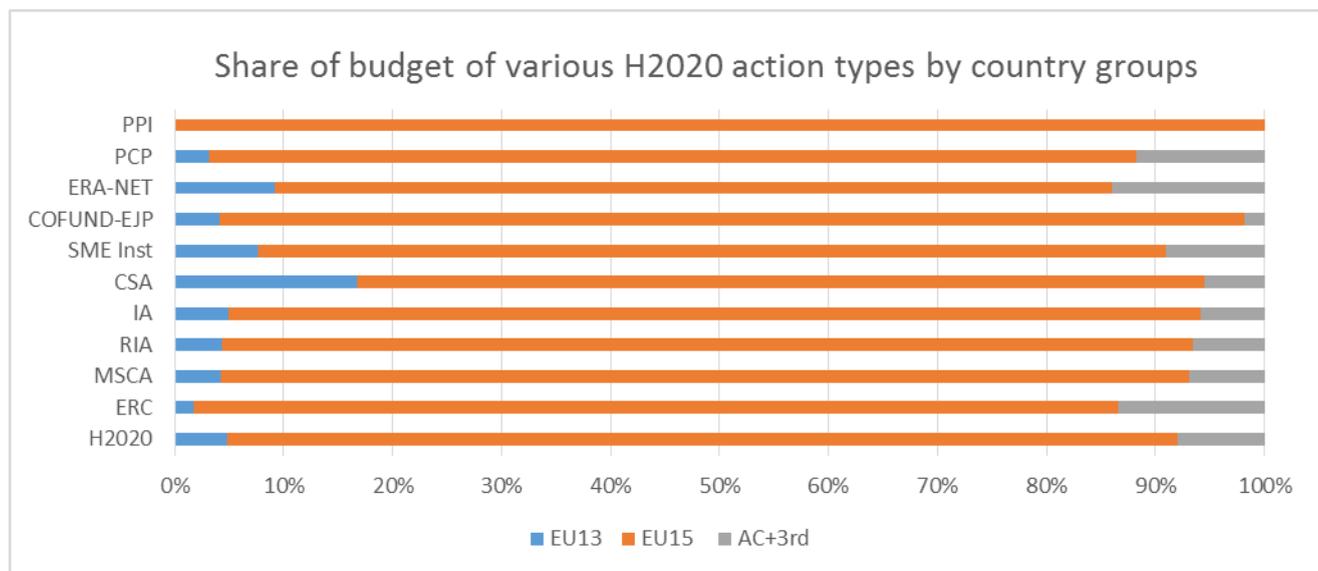


Figure 1. Share of allocated funding of various Horizon 2020 action types by country groups. Authors' calculations based on data in European Commission Monitoring Flash “From Horizon 2020 to Horizon Europe”, August 2018

Therefore, some project types are disproportionally represented in the funding allocations to EU13 than others (Figure 2). ERC is severely underrepresented: it is 20.9% of allocated Horizon 2020 budget, but it comprises only 7.5% of the funds going to EU13. CSA and SME instrument are overrepresented: in case of CSAs 6% of total budget compared to 20.7% of funding to EU13, in case of SME Instrument 4.2% compared to 6.7%.

³ European Commission, HORIZON 2020 in full swing: Three years on

⁴ From here onwards, if not otherwise specified, all the data is from European Commission, Monitoring Flash “From Horizon 2020 to Horizon Europe”, August 2018

⁵ “LAB – FAB – APP Investing in the European future we want”

http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/hlg_2017_report.pdf

⁶ All major Widening Participation actions (Teaming, Twinning, ERA Chairs) are funded through CSAs

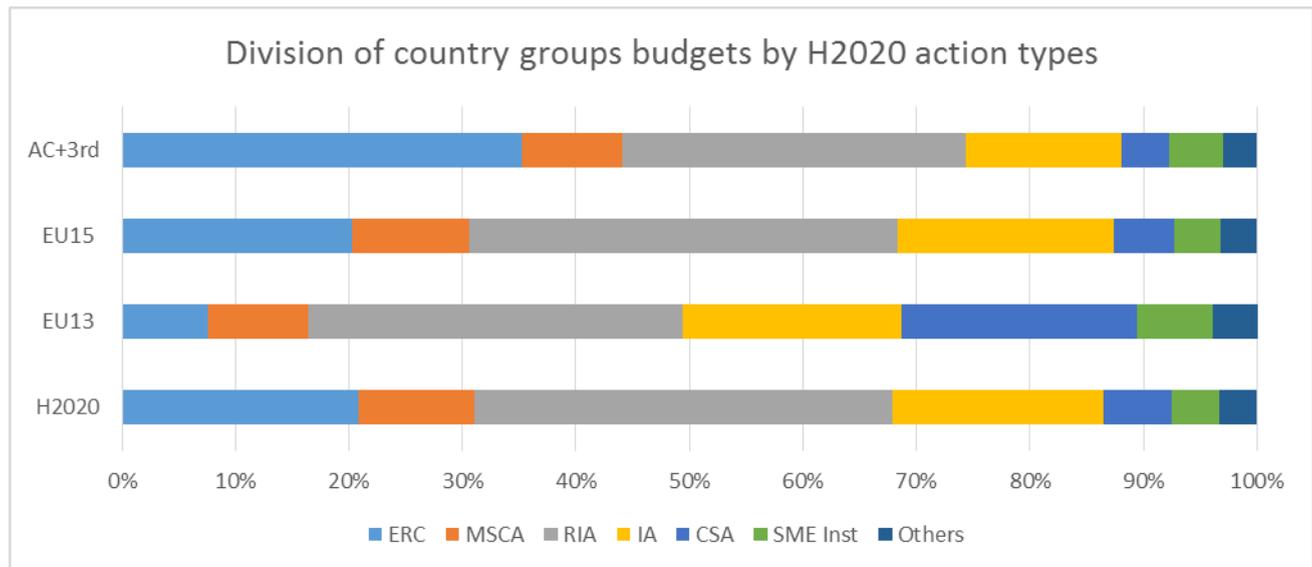


Figure 2. Contribution of Horizon 2020 action types to the budgets of different country groups. Others includes ERA-Net Cofund, Cofund-EJP, PCP and PPI. Authors' calculations based on data in European Commission Monitoring Flash "From Horizon 2020 to Horizon Europe", August 2018

Even in the instruments, the EU13 participation can vary significantly by thematic areas. For example, in the SME instrument EU13 companies perform below its average 6.7% of funding in a number of areas including Biotechnology, Blue growth and ICT for Health but are much more successful in Eco Innovation and Raw Materials, ICT and Nanotechnologies⁷.

EU13 performs below its average in SC1: they receive 3,81% of the total funding. A recent study⁸ shows that only 3,1% of funding of Health-related project allocated to EU participants in FP7 and the three first years of Horizon 2020 went to EU13 participants. The concentration on funds is high: the top five countries with the most total funding (the United Kingdom, Germany, the Netherlands, France and Italy) received 68.2% of the total EU healthcare grants. EU13 organisations participate less frequently (2.1 vs 3.6 times over the studied period) and get less funding per project (217,031 EUR vs 475,048 EUR which is a 118,9% difference). The grant amount increases with following participations for EU15 participants (from the average 386,064 EUR in the first project to 508,788 EUR in subsequent projects that is 31.8% increase) but there is no similar increase for EU13 participants. In grants where only EU-15 beneficiaries participated, the average grant amount per beneficiary was 515,317 EUR, while it was 411,590 EUR per EU15 beneficiary in grants when they collaborated with at least one EU-13 beneficiary.

The EU13 **share of applications** has slightly increased in Horizon 2020 to 10% from 9.6% in FP7, but EU13 applicants tend to apply less frequently than the EU15 applicants (3.8 against 6.5 applications per distinct applicant). One of the explanations for this might be the relatively high participation of EU13 companies in the SME Instrument. The application activity is not evenly distributed among EU13: Cyprus, Slovenia, Malta and Estonia are among the top five European countries – together with Greece – but Poland is the last.

Even though all country groups witnessed a strong drop in the **success rates** of applications between FP7 and Horizon 2020, from 21.7% to 14.7%, the success rate of EU13 has decreased the most from 18% to 11.8%. Bulgaria, Slovenia, Hungary, Croatia and Lithuania are the 5 Member States with lowest success rate and there are no EU13 Member States among the 5 with the highest success rate.

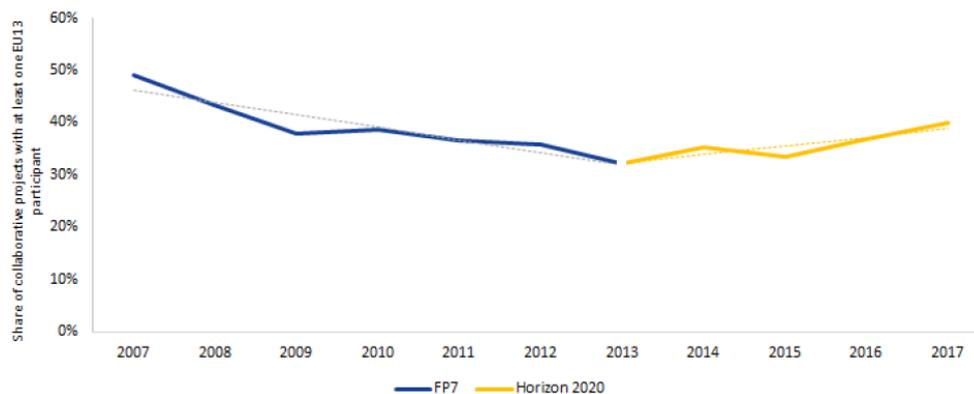
⁷ Authors' calculations based on data retrieved from EASME SME Data Hub <https://sme.easme-web.eu/> on 19 February 2019

⁸ Is there a fair allocation of healthcare research funds by the European Union? Z. Kalo et al, PLOSOne <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0207046>

In Horizon 2020, health and life sciences are funded mainly in Societal Challenge 1 Health, demographic change and wellbeing (SC1) and to a lesser extent under LEIT-ICT. These two parts are very competitive with average success rates of 9.1% and 8.1%⁹. Also, the share of high-quality proposals retained for funding are near average in these field, correspondingly 31% for SC1 and 26.9% for LEIT-ICT¹⁰.

The share of **EU13 evaluators in Horizon 2020 is 16%** (total number 3454) which is proportionally much higher than the share of EU13 applications but it is proportional to its share of researchers. In SC1, the share of EU13 evaluators has decreased from 20.4% in 2015 to 14.5% in 2017 (latest available year) and the average share of EU13 evaluators is 17.7%¹¹

One of the possible reasons for low participation of EU13 is the **openness of collaboration networks**. There has been a decrease of collaboration between EU15 and EU13 during FP7 and some improvement in Horizon 2020 but it has not reached the original level. This is confirmed by the decreasing share of FP7 multi-beneficiary projects with at least one EU13 participant from 49% at the beginning of the programme (2007) to 32% at its end (2013) (Figure 3). In health-related projects in FP7 and first 3 years of Horizon 2020, 31,4% of projects involved at least one participant from EU13¹².



Source: European Commission, DG RTD, based on CORDA data, cut-off data 1 July 2018

Figure 3. Share of multi-beneficiary projects with at least one EU13 participant in Horizon 2020 and FP7 in total number of projects

This data has only recently been published by the European Commission and there is no clear explanation for this dynamics yet. All three types of multi-beneficiary collaboration schemes in Horizon 2020 are included in this data but unfortunately, the data is aggregated and does not enable differentiating the trends for different type of collaboration. Hence, a thorough and multifaceted analysis that could be a solid basis for evidence based interventions in the Framework Programme is not possible. Figure 1 shows a clear over-representation of CSA and ERA-NET-Cofund schemes in EU13 funding. It could be expected that with time and experience EU13 participants could increase their participation in RIA and IA activities.

⁹ Interim Evaluation of Horizon 2020 Staff working Document p. 86, <https://publications.europa.eu/en/publication-detail/-/publication/fad8c173-7e42-11e7-b5c6-01aa75ed71a1/language-en/format-PDF/source-77918455>

¹⁰ same

¹¹ Authors' calculations based on data retrieved from European Commission website on 3 June 2019 <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/reference-documents>

¹² Is there a fair allocation of healthcare research funds by the European Union? Z. Kalo et al, PLOSOne <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0207046>

A similar trend can be observed in EU15-EU13 connections. In FP6, the percentage of connections between EU-15 participants and EU-13 participants was 15.3% of all collaborations from EU-15 participants. This percentage decreased to 13.1% during FP7 and increased again to 14.5% in Horizon 2020. In terms of dynamic, EU-15 participants seem to have reduced their collaborations with EU-13 participants during FP7, but they appear to have opened up to EU-13 participants in Horizon 2020, although not to the level of FP6.

The latest data¹³ has provided new information about the participation patterns of Member States in FP6, FP7 and Horizon 2020. The network of participations to the Framework Programmes seems to be very dynamic over time, but the **collaboration network is more dynamic for EU-13 countries than for EU-15 countries**. EU-13 countries participants seem to have a higher propensity to be involved in new collaborations than participants from EU-15 countries, which is especially true in Horizon 2020. It may indicate that it is difficult for EU13 participants to find a more permanent place in existing stable networks and they are included more in peripheral positions in the networks.

When analysing the collaboration patterns of all participants in Horizon 2020 while taking into account the size of countries, it is possible to observe that some countries “punch above their weight”: the most central country in Horizon 2020 is Finland, followed by Slovenia. While 4 new Member States (Cyprus, Estonia, Malta and Slovenia) are as central as EU-15 countries, all other EU-13 countries remain at the bottom of the connectivity ranking since FP6 with changes in ranking only inside this group.

So far there is no clear explanation for the dynamics of collaboration with EU13 countries in the current and previous Framework Programme. Figure 4 shows that it can't be explained with the dynamics of excellence. There is a small decrease both in international co-publications and the share of publications that belong to 10% most cited from 2007 to 2009 but this is much smaller than the almost 30% decrease in collaboration in FP7 projects (Figure 3). There is a steady increase in both indicators from 2010 onwards and by 2015 both are at least at the level of 2007 or higher but collaboration is still practically at its lowest level.

¹³ Monitoring flash November 2018 “Dynamic Network Analysis
https://ec.europa.eu/info/sites/info/files/research_and_innovation/knowledge_publications_tools_and_data/documents/h2020_monitoring_flash_112018_0.pdf

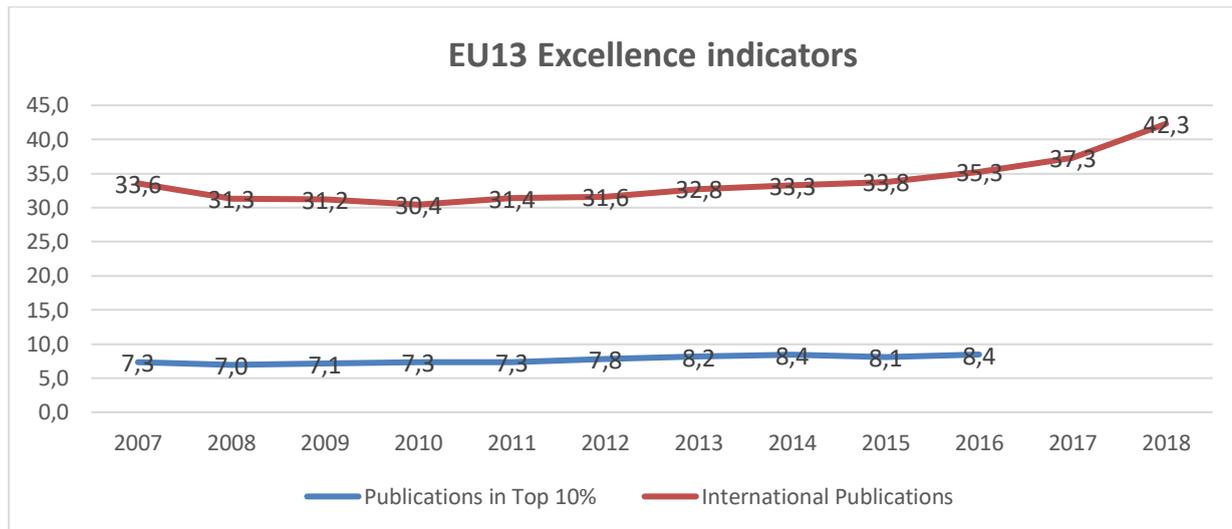


Figure 4. Share of publications with international co-authors and share of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country. Source: Web of Science publications in years 2007-2018 with 1-1001 authors.

3 Widening participation in EU Framework Programmes

Widening participation in the EU Framework Programmes is a shared responsibility to be addressed on the individual, institutional, national and at EU level in complementary and synergetic ways taking into account role of each level and the available possibilities.

Many experts have analysed the problem from different angles and numerous measures and actions for all levels have been proposed and a number of them implemented. All EU13 Member States have used Structural Funds to invest in capacity building of the RDI system via developing infrastructure and equipment in universities and research institutions, developing science parks and other infrastructure but the intensity has varied. Also, especially in the current programme period, an increasing share has been invested in developing human resources and mobility. Due to various limitations ESIF can be used only in limited ways to fund international research collaboration and increase successful participation in the Framework Programmes, for example: there is a 15% limit on the share of funds that can be spent outside the programme area.

As the data presented in the previous section shows, one of the central issues of widening participation is access to networks. All the currently existing Widening measures target this problem to a varying degree and new measures will be introduced under Horizon Europe.

4 Policy recommendations

The recommendations below, which have been developed during the project “Alliance4Life” build also on the work of other preceding projects like RegHealth and MIRRIS.

The recommendations are addressed at three levels that have the largest impact on participation in Framework programmes: institutional, national and EU level. The bulk of research cooperation takes place between individual researchers and research groups, but it is the joint task of institutions,

national administrations and the EU institutions to create the environment that facilitates this cooperation.

The specificity of health policy has to be taken into account. When in many areas the scientific knowledge is transformed into new products and services for people directly, in EU, the national governments are usually the largest spenders on healthcare. Therefore, it is crucial that they are open to new opportunities in all aspects of healthcare and health research to improve public health outcomes and maximum efficiency of public spending.

4.1 Recommendations to universities and research institutions

1. Implement an institutional process to evaluate the scientific performance.
 - The process of evaluation – peer review, bibliometric analysis, benchmarking or a combination of them - must always be i) transparent, ii) reproducible, iii) regular, and iv) expectable.
 - Every party involved in the process of evaluation must be aware of the terms, rules, and possible consequences of the evaluation results in advance.
 - Indicators, mechanisms of data collection and processing must be well defined and described, and only values collected under the same conditions may be compared. Regular and long-term data collection can provide a realistic picture of the development of the performance.
 - Rewarding quality over quantity should be a horizontal principle when evaluating any aspect of research or the work of researchers (bibliometric, industry-academia collaboration, science communication etc.)
 - When using bibliometric, the quality of publications should be assessed by the position of the journal in Tier (T) or Quartile (Q), rather than Impact Factor (IF) as they are differentiated for research areas. The type of the authorship (i.e., first, corresponding, or co-authorship) should be examined and taken into account within the evaluation.
2. Build a life-long career model based on evaluation of scientific and other outputs and following general research policies (research ethics and integrity, open access etc.). The process must form an integral part of the general institutional process of evaluating science. Reward industry-academia cooperation (creating spin-offs, advising companies, performing contract research etc) and contribution to society (science communication, developing clinical treatment guidelines, participation in policymaking and governance etc.).
3. Create conditions for the establishment of talented young researchers as research group leaders and enable them to develop their ideas as principal investigators of ambitious projects while fulfilling principles of research excellence.
4. Implement open, transparent and merit-based recruitment policy and procedures, including proactive open international recruitment.
5. Create an attractive work environment for all employees. Develop “Welcoming services” and “on boarding” guidance for all employees and students to help them settle in new environment. Provide all necessary information in English to international staff and students and ensure that all staff interacting with international staff and students has the required level of competence in English. Provide opportunities to learn the local language and culture.

6. Incentivise researchers to participate in applications for competitive funding both on national and international level (additional remuneration, matching funding etc). Offer the necessary training to PhD students and faculty and facilitate peer-to-peer best practice and experience sharing. Offer tailor-made pre-award services like mapping grant and networking resources, advice during the proposal preparation and reward high quality projects that don't receive funding. Consider providing individual or group based strategic Grant Plans based on the strengths and development stage of the individual or group. Implement clear and well communicated internal procedures for the preparation of grant applications.
7. Prioritize international cooperation on all levels: academics, leadership, administration, support structures. Build cooperation and alliances with other institutions and participate in international interest organisations.
8. Invest in continuous system learning – develop and increase the capacity of support systems (competent administrative staff with necessary qualifications and experience with competitive funding programmes, including the rules of participation of Framework programmes, consortium agreement negotiations, IP rights, knowledge transfer etc) and the administration (networking, lobbying of topics and pre-intelligence, opening doors to various networks and cooperation platforms). Support the career development and remuneration systems of research administrators and managers and their participation in professional networks and EU associations.
9. Participate actively in solving the grand societal challenges in various ways: encouraging researchers to contribute as experts to policymaking and advice, prioritize thematic fields or topics that are relevant to the region or country, support efficient and quick transfer of knowledge to the private and public sector, engage with the public.
10. Create an environment that facilitates research integrity and ethics by offering courses and training materials on research ethics and integrity, strengthening Research Ethic Committee (REC) capacity to provide consultancy for ethical issues for grant writing, defining standard operating procedures that include a clear set of rules for financing, and avoiding institutional and personal conflict of interest, including social science research methods in ethics review and implementing transparent and clear procedures for handling research integrity cases.
11. Develop core research infrastructures in accordance with a strategic development plan that is an integral part of the general strategy of the institution. Increase knowledge of research infrastructure management and implement efficient and transparent management processes. Increase the visibility and awareness of benefits of core facilities among researchers including sharing of equipment, sharing design of experiments. Offer training on open science, including data management and stewardship to enable better use and preservation of research data.
12. Develop the institutional framework for science communication in line with the general strategy of the institution to engage the public and show the wider impact of science. Support and incentivise scientists to communicate via the PR office but also to be socially active, to share their scientific achievements and news. Embrace the principles of open science and RRI that impact communication - i.e. focus on public engagement and citizen science. Use targeted messages and channels for different audiences in the private and public sector and general public.

4.2 Recommendations to national governments¹⁴

1. Increase the investments in Research, Development and Innovation (RDI) in line with national policy and research priorities. Implement evidence based R&I policymaking and design of support measures. Engage international experts and use the international system evaluation opportunities, but avoid “copy-paste” of whole policies or measures and adjust the best practice to national, regional, local and needs and the institutional ecosystem.
2. Develop the evaluation systems for academic institutions and research funding by putting more emphasis on international peer-review and high-level scientific publishing to reward “quality over quantity”. The periodicity of evaluation should be regular and the mission of the institution must also be considered. The process of evaluation must also be transparent, reproducible, regular and expectable. Great care must be taken to avoid conflict of interest. Take into account the specificity of health research: medical professionals who are also engaged in academic teaching and research, the importance of clinical and applied research etc.
3. Develop transparent remuneration systems that incentivises excellent teaching and research, international collaboration, industry-academia cooperation, support to policymaking and science communication. Increase flexibility of remuneration based on performance. Universities and research institutions should have more autonomy and responsibility in designing and implementing their remuneration systems.
4. Support talented young researchers by targeted funding programs or institutional funding with conditions for their improved living standard and opportunities for their professional development into independent group leaders. Stimulate reintegration of young research leaders into national research network by providing complex infrastructure for their further career development based on research excellence.
5. Increase the R&I policy design capacity of the public sector and especially the ministries. Develop evidence based health policies and engage researchers in policy development. Define national R&I priorities and fund research programmes addressing the specific health challenges including social sciences and humanities to develop solutions that are fit to each country. Implement evidence based public health interventions and prevention programmes that are developed in cooperation with researchers and based on the latest available knowledge.
6. Support access to international collaboration networks on different levels: students, researchers, academics, universities, companies, policy makers etc. Support networking and mobility measures, including for system learning on all levels. Actively promote awareness about opportunities to become an evaluator in international programmes, including the Framework Programmes.
7. Increase the capacity of actors involved in FP design and programme development: facilitate cooperation and information exchange between policymakers, agencies, universities and research institutions, researchers, companies, NCPs and Programme Committee members and support the creation of well-functioning and well-connected NCP network to ensure well-prepared representation of national interests.
8. Explore ways to better adapt and align European and national initiatives to ensure maximum impact and synergies.

¹⁴ This includes all levels of national administration and actors involved in national RDI policy design and implementation

9. Reduce the research-hindering bureaucracy and administrative burden introduced by national bodies far beyond the EU rules and requirements for implementations of research projects. Streamline formal funding requirements of different funding providers. Adjust public procurement conditions and procedures to better reflect specific needs of researchers and research-performing institutions.
10. Coordinate the activities of policy and decision makers to better represent the interests and particularities in the EU policy development process e.g., the EU Health programme and the Health related parts of Horizon 2020.
11. Support the transfer of scientific knowledge into practice in the public health system and private sector.
12. Develop support measures and incentives to facilitate the creation, growth and scaling up of R&D intensive companies taking into account the specificities of life sciences and health research. Provide opportunities for small scale testing and piloting of new health technologies in the health system, developing “regulatory sandboxes” if needed.
13. Incentivise the development of novel public interventions, treatments, technologies and all other system improvements, also by using Public Procurement of Innovation.
14. Exchange best practices with other countries about health and R&I policy, including use of European Structural and Investment Funds for comprehensively developing national health and R&I systems.
15. Develop and enable well-functioning synergies between national funding, ESIF and Framework Programmes but avoid overlaps to enable maximum impact with minimum administrative burden for implementing agencies and participants and to ensure efficient use of public funds.

4.3 Recommendations to the European Commission

1. Develop the concept of excellence to better reflect the various aspects of research (potential for application, societal impact, pan-European relevance etc).
2. Analyse in depth the participation patterns of the Member States, including the effect of widening measures, to provide an evidence base for policy design. Current level on analysis (for example about EU13 participation in collaborative projects) does not provide enough level of detail to analyse the dynamics of EU13 participation in RIA, IA and CSA type of actions and therefore to really evaluate the dynamics of collaboration networks. Also, analyse the development of excellence in all Member States and correlation with participation patterns. Make this information regularly available and easily accessible.
3. Be receptive to suggestions from EU13 about adjusting and improving the measures designed to support widening participation – for example including research expenses as eligible cost in Twinning and ERA chairs took a number of years.
4. Pilot various new measures to support widening participation to evaluate their effectiveness before launching on a larger scale. Develop previous or new measures to support opening up of networks like hop-on schemes and increasing EU15-EU13 collaboration because the EU13 participation in multi-beneficiary projects has regained only half of the decline that occurred during FP7. When designing new initiatives and partnerships, more inclusive formats and set-ups should be developed to ensure pan-European participation.

5. Promote wide participation in projects that give input to policy design on EU and national level to ensure the relevance of the project results to the whole of Europe.
6. Build the understanding in the Commission of EU13 specific (health policy) issues to facilitate their inclusion in EU programmes.
7. Ensure relevant participation of EU13 evaluators in all parts of the Framework Programme.
8. Promote widening participation similarly to gender equality by ensuring proportionate representation of EU13 researchers, entrepreneurs, policy makers etc. on all levels of the EU R&I Policy and in the Framework Programme including decision-making bodies, expert groups, speakers at events etc.
9. Pilot new approaches in the evaluation process in order to avoid bias so that first the scientific merit of the idea is evaluated and then the excellence of the proposers/consortium composition etc.
10. Support the training, networking and best practice exchange of NCPs and allocate sufficient resources for that. Awareness raising of EU13 specific issues and supporting open networks should be included in the training.
11. Develop, enable and support well-functioning synergies but avoid overlaps between various funding sources of RDI (e.g., Framework Programme, ESIF, InterREG, InvestEU) to enable maximum impact with minimum administrative burden for both implementing agencies and participants and to ensure efficient use of public funds. Facilitate exchange of best practices of synergies and encourage implementation of measures that have proven their effect in other regions.

5 ANNEX I – Abbreviations

Cofund-EJP – European Joint Programme Cofund Action;
CSA – Coordination and Support Actions;
D – Deliverable;
ERA-NET – ERA scheme for NETworking and opening of transnational research programmes;
ERC – European Research Council;
ESIF – European Structural and Investment Funds;
EU – European Union,
FP – Framework Programme;
GDP – Gross Domestic Product;
H2020 – Horizon 2020;
IA – Innovation Action;
MSCA – Marie Skłodowska-Curie Actions;
PCP – Pre-commercial Procurement;
PPI – Public Procurement of Innovation;
RIA – Research and Innovation Action;
R&D – Research and Development;
RDI – Research, Development and Innovation
R&I – Research and Innovation;
SC1 – Horizon 2020 Societal Challenge 1 Health, demographic change and wellbeing;
SME Inst – SME Instrument;
WoS – Web of Science; and
WP – Work Package.