

LERU'S INTERIM EVALUATION OF HORIZON 2020

LEAGUE OF EUROPEAN RESEARCH UNIVERSITIES

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About LERU

LERU was founded in 2002 as an association of research-intensive universities sharing the values of high-quality teaching in an environment of internationally competitive research. The League is committed to: education through an awareness of the frontiers of human understanding; the creation of new knowledge through basic research, which is the ultimate source of innovation in society; the promotion of research across a broad front, which creates a unique capacity to reconfigure activities in response to new opportunities and problems. The purpose of the League is to advocate these values, to influence policy in Europe and to develop best practice through mutual exchange of experience.

Key messages

This paper is LERU's contribution to the Horizon 2020 Interim Evaluation. It is structured according to what is expected to be the structure of the Terms of Reference for the Interim Evaluation. The paper focuses very much on Horizon 2020 itself. LERU will publish a paper on the future, the next framework programme for research and innovation, in the first quarter of 2017.

Horizon 2020, of which LERU and its members are strong supporters, is the most important pan-European programme for research, not only in size, but also in terms of leveraging excellence, international, intersectoral and interdisciplinary collaboration. We have a number of recommendations. The most critical are:

EU ADDED VALUE

- Excellence, the quality of the proposed work in research and innovation projects, must remain the single most important criterion for awarding Horizon 2020 funding. The programme's Europe-wide climate of competition for excellence has, and continues to have a positive influence on national, regional and institutional reform of R&I policies, and will result in an improved quality of research, research-based education and more effective transfer of knowledge.

IMPLEMENTATION AND STATE OF PLAY

- Horizon 2020, as the most successful programme which contributes directly to Europe's competitiveness, must have its budget protected and all earlier budget-cuts undone.
- The very low success rates are threatening the reputation of Horizon 2020. The programme needs more budget. LERU asks the European Commission (EC) to consider the following options to reduce oversubscription: recurrent call topics, additional budget, for the next work programmes for topics/programmes that have the lowest success rates.
- In the context of addressing oversubscription, LERU also recommends the EC maintains the challenge-based, non-prescriptive approach and narrows down the expected impact of projects to what is more realistically achievable within the projects' lifetime.
- LERU supports the continuation of Twinning and Teaming initiatives, and calls on the EC to also explore other opportunities for closing the innovation divide, such as assigning a small part of the Structural Funds to create synergies with Horizon 2020.

RELEVANCE

- LERU recommends further actions to stimulate open access through Horizon 2020, for example, the EC should take a more active role in aligning the different, and occasionally conflicting, open access policies.
- LERU is convinced Europe requires continued efforts to promote research integrity and suggests that future Horizon 2020 grant agreements could reasonably require, for example recipient organisations to have developed their own research integrity code or adopted a national or other recognised code.
- LERU supports the actions taken so far in H2020 to foster gender balance in research teams, ensuring gender balance in decision-making and to integrate the gender dimension in research and innovation content, and wishes to see them strengthened.

EFFECTIVENESS

- Pillar I 'Excellent Science' is well organised and are resources well spent. LERU has only few recommendations on this pillar, one of which is the implementing of a federated system of mid-range infrastructures.

- Innovative research is the basis for innovation. To address this LERU asks for more collaborative research opportunities early in the innovation pipeline (see also: LERU, 2016a).
- LERU recommends the EC keeps closer track of funded projects and investigates how to better and more consistently organise cross-project networking throughout Horizon 2020, such as joint events/workshops/conferences funded by the EC.
- LERU suggests the EC investigates the possibility of providing short term follow-up funding for collaborative research projects to allow the projects to be taken to a next step or higher level.
- LERU recommends introducing bottom-up initiatives for early-stage collaborative research and to continue funding for bottom-up initiatives for more advanced collaborative research as was done through the Fast Track to Innovation Pilot.
- To address problems in society, research across all disciplines is required, especially from the Social Sciences and Humanities. LERU asks that all services of the EC ensure this is better reflected in all work programmes and calls.

EFFICIENCY AND USE OF RESOURCES

- LERU emphasises that streamlining, simplifying and optimising the current EU bodies and instruments dedicated to innovation should be a priority of the EC's systemic approach to innovation and of the European Innovation Council (EIC).
- The Horizon 2020 evaluation procedure needs to change. LERU recommends introducing standing panels per area for the evaluation of collaborative research, in combination with remote refereeing.
- LERU welcomes the simplification measures introduced in Horizon 2020, especially those related to the funding model, the use of electronic tools and the participant portal, but emphasises that problems related to internal invoicing and equipment costs require urgent action.
- LERU recommends the EC provides clear and detailed instructions to auditors, to secure consistency between different audits and in different countries and to avoid full internal procedures tests at each visit, especially where there are several visits within a short period of time.
- LERU asks EC to trust beneficiaries more.
- LERU calls for a completely transparent process for developing work programmes, with consultations and open discussions on content.
- LERU questions the effectiveness and coherence of Joint-Technology Initiatives, especially related to transparency of its procedures and impact towards the creation of jobs and benefit to SMEs in particular, and looks forward to their evaluation. No new JTI or PPPs should be created and inefficient and ineffective ones should be discontinued.

Introduction

LERU has always been a strong supporter of the European Research and Innovation Framework Programmes and the LERU member universities were and still are amongst the institutions who participate(d) the most. Based on the huge amount of expertise present within its membership, LERU has engaged intensively in recent years to make recommendations to the European Commission (EC) to improve FP7 and Horizon 2020 and has published a number of papers and notes related to these issues. A first evaluation of Horizon 2020 was made in the autumn of 2014, followed by a more elaborated paper in October 2015 "KISS Horizon 2020" (LERU, 2015a) as a response to the EC' simplification consultation. LERU is also looking towards the future and will presents its views on FP9 in the first quarter of 2017.

Universities, especially research-intensive ones, are important participants in framework programmes as they not only perform high quality research and bring together researchers from many different disciplines, they also train the next generation based on the research performed, engage with society and contribute directly and indirectly to the economy, for example through the creation of spin-outs (LERU, 2014a). The 2015 report "The Economic Contribution of the LERU Universities" (LERU, 2015b) shows that for each €1 in GVA directly generated by the LERU Universities, there was a total contribution of almost €6 to the European economy and that every job directly created by the LERU universities supported almost 6 jobs in the European economy. LERU calls upon the EC, but also on European policy makers in general not to underestimate the importance of universities for "jobs and growth", and to continue to provide opportunities for universities to participate in important research and innovation funding programmes such as Horizon 2020.

A. What is Horizon 2020's added value for Europe? Why is it relevant for the Union?

The enormous number of proposals submitted clearly show that Horizon 2020 is an important contributor to the European research funding landscape. Together with its predecessors it has also put Europe on the map globally, not only as a continent with excellent universities and research organisations, but also as a reliable, innovative funder of research and innovation.

Horizon 2020 is a crucial tool for the EC to motivate researchers, organisations and businesses to realise the European Research Area and move towards a more 'Open Science', 'Open innovation' and 'Open to the world' focus. The programme should be used to implement new policy initiatives and decisions of EU policy makers on issues such as gender, research integrity, open access to publications, open access to data and the European science cloud. In this context the influence it has on pushing other R&I funders to head in a certain direction should not be underestimated.

Horizon 2020 is also an important component of the Europe 2020 strategy for growth and jobs. It not only tries to bridge a gap between research and the market, and so stimulate the European Economy, it also funds research activities in institutions such as LERU universities that have proven to contribute more than what they actually cost (see introduction). Investing in research and innovation is essential if Europe wants to move forward, realising its goal to become a true knowledge-based economy. The EU should continue to set the right example by dedicating a considerable part of their budget and efforts to the European Research and Innovation Framework Programmes.

The creation of the European Research Council (ERC) has attracted global attention and is held in high esteem. The ERC is and should remain a cornerstone of the European Research and Innovation Framework programme. Alongside the ERC, the structuring effects of the Marie Skłodowska-Curie Actions on the training of researchers, on the quality of doctoral education, and the outreach of science to society is also well received. These elements, along with FET and the collaboration opportunities offered by pillar 2 and 3 of Horizon 2020 provide the best options for researchers from different disciplines and sectors to collaborate. It enables researchers to not only generate knowledge, but to bring results to society and economy, thereby creating value for Europe and its citizens.

The most notable output the consecutive Framework Programmes have delivered, is the drive for excellence, implemented through open calls for proposals and international evaluations. The best consortia, performing high quality research and using innovative ways of delivering results to society, win the grants. Interest in recent years in the Horizon 2020 programme and calls has increased massively, as illustrated by the high number of applications submitted to date. This Europe-wide climate of competition for excellence, has influenced national, regional and institutional reform of R&I policies, and will result in improved quality of research, research-based education and more effective transfer of knowledge. The EC should not step away from this principle of competition to achieve excellence science in Europe.

B. Implementation and state of play

B.1. What is the state of the budget implementation?

LERU supported the European Parliament proposal to dedicate 100 billion euro to Horizon 2020, but it is safe to say that the European institutions showed strong ambition when a budget of 80 billion euro for Horizon 2020 was agreed in 2013. Supporting research and innovation is key to creating a successful knowledge economy and to bringing (back) growth to Europe. However, if the European institutions are serious about the EU's long-term goals, they need to stand up for programmes such as Horizon 2020 and protect it from budget cuts in the course of the whole budgetary cycle. Unfortunately the opposite is happening. In the two years since the launch of Horizon 2020 the budget has been undermined three times. First there was the transfer of Horizon 2020 funding to the European Fund for Strategic Investments (EFSI) ("Horizon 2020 is not a lemon", LERU, 26/11/2014¹), then there was the cutting of the 2016 H2020 budget by the Economic and Financial Affairs Council (ECOFIN) ("Give research a break", LERU, 31/08/2015²) and now the Council repeats itself in its position on the 2017 annual budget. This is unacceptable for a European Union that wants to move forward instead of backwards. It is time for the European Institutions to show more ambition and to increase the Horizon 2020 budget instead of cutting it. The review of the Multiannual Financial Framework (MFF) is an excellent occasion for doing this, starting by undoing the EFSI-related cuts and restoring the initial budget foreseen for Horizon 2020. LERU fully supports the European Parliament's call for this³. The EC's proposal for the MFF, including 400 million euro more for Horizon 2020 is very much welcomed, but should not change the goal of reversing the EFSI-related cuts.

B.2. What are the main participation patterns, including newcomers, geographical trends and success rates/oversubscription and balance between large and small projects, use of instruments and the balance of their use, third country participation etc.?

B.2.1. Oversubscription

LERU is very concerned about the oversubscription and consequential low success rates in many parts of Horizon 2020. We believe that oversubscription threatens the reputation and impact of the programme. It should be noted that oversubscription to some topics may be a sign of an urgent need for research in those areas and that more funding should be made available to address them properly. A solution would be recurrent call topics, additional budget and flexibility in approach for the next work programmes (WP).

In general we believe success rates are likely to gradually improve, but this will be because many potential applicants are discouraged by the extremely low success rates. The very best researchers and entrepreneurs are already hesitant to apply because of the intrinsic complexity of the European R&I programme. If the success rates remain low, or even decrease, they will never be persuaded to submit high quality, high impact proposals. LERU asks the EC to urgently explore different options, as a pilot if necessary, to identify and maintain the most effective solutions.

In the "KISS Horizon 2020" (2015a) LERU called for the wider use of a two-stage submission process with a more acceptable success rates in the second phase (30-40%). We are pleased the EC has moved in this direction and look forward to seeing the results.

1 <http://www.leru.org/index.php/public/news/horizon-2020-is-not-a-lemon-stop-squeezing-it/>

2 http://www.leru.org/files/general/2015_08_31_give_research_a_break.pdf

3 See <http://www.polcms.europarl.europa.eu/cmsdata/upload/7edce439-d317-4d90-a7d8-6f4co25e1e22/Recommendation%20for%20Trilogue%20-%20FINAL.doc>

Other organisations have suggested the narrowing of call topics. To continue to foster creativity, flexibility and choice of consortium setup, LERU would rather see the narrowing of the expected impact. As we have stated on numerous occasions, the expected impacts in the call text need to be clearer. The current approach leads to overly complex projects which require cross-disciplinary, cross-sectoral consortia, whilst also working along the entire innovation value chain. This structure is difficult to apply and difficult to participate in. With so many different issues being addressed in one project, the EC is at risk of watering down the subject. We ask that the EC allows more focused directed projects. Impacts must be realistic, measurable and clear. There must be clear delineation between short-term impact (impact of the concrete output a project can generate) and long-term impacts (related to the future vision or technology, the 'dream' a project can initiate and on the long-term lead to). LERU also recommends the EC provides clear guidance on what is meant by impact so that all involved have the same interpretation to hand.

Alongside this a clearer indication of the Technology (or Society) Readiness Level (TRL) achievable in the time-frame of the proposed project, will help to reduce the number of mismatched projects. It is our expectation that this change in approach will have an immediate impact on the effort required by evaluators to review projects, and will reduce frustration of applicants on the low success rates (see also section D.I.I.).

B.2.2. Crossing the innovation divide

LERU is very worried about the low participation rate of many EU Member States in projects funded by Horizon 2020. This is problematic because Horizon 2020 quite rightly prioritises excellence by seeking to fund the best projects, the brightest ideas and the most talented researchers and entrepreneurs. There is plenty of talent in these regions but they do not always match the Horizon 2020 requirements. In an attempt to counter this, LERU institutions and their researchers are reaching out and increasingly collaborating with counterparts in lower performing EU regions.

There are different reasons for the lower participation rate in one half of the EU Member States. The most important require reforms at national or institutional level. It is up to individual member states to make these changes, but the EU could consider incentives to encourage

them to make them sooner rather than later. Financial incentives should not come from Horizon 2020 budgets but from the Structural Funds. Other reasons for the low participation rate are indirectly linked to national priorities. One of the drivers for the introduction of the Twinning and Teaming schemes was to address this. The LERU universities are supporters of, and very active participants in these schemes, and support its continuation for the remainder of Horizon 2020. In the long run, we are however not convinced that the current schemes are the most effective way to address the low participation of EU13 beneficiaries in H2020. We suggest that the EC starts looking at alternatives, such as using a small percentage of the Structural Funds to create synergies with Horizon 2020, for example by providing top-ups to include some additional PhD students (from EU13 countries) in MSCA ITNs. In this context LERU welcomes the fellowships launched by the ERC in September 2016 to encourage potential ERC grantees. LERU emphasises however that Horizon 2020 is not the appropriate programme for funding all activities related to crossing the innovation divide since the Structural Funds are available for this purpose.

For Europe to continue to be a major global player in the field of research and innovation it is important to cross the scientific and innovation divide between Member States as soon as possible. This should however not be done by introducing quotas or moving away from excellence as the main criterion for funding projects in Horizon 2020. If that were to happen, European research will never be or remain able to compete globally.

B.2.3. The use of (financial) instruments

In 2016 an increased use of loans was suggested by the EC. LERU broadly supports this but asks the EC to be cautious as a balance is required. Financial instruments (loans, risk capital) and subsidies (grants) are complementary across the entire TRL scale, and are both effective measures to stimulating innovation. The EC should investigate using loans complementary to grants. The use of loans vs. grants should also depend on the type of beneficiary. LERU emphasises that universities must always be able to work with grants in Horizon 2020, irrespective of the TRL level of the project in which they are participating. We underline that there should not be a specific budget ring-fenced to be spent on loans.

C. Relevance

C.1. Do the objectives still correspond to the needs of the EU, the Europe 2020 Strategy and the European Research Area?

As mentioned above (point A) Horizon 2020 is a crucial tool for the EC to motivate researchers, organisations and businesses to realise the European Research Area and move towards a more ‘Open Science’, ‘Open innovation’ and ‘Open to the world’ focus. Horizon 2020 plays an important role in stimulating mobility of researchers, within or to Europe. The Marie Skłodowska-Curie Actions play an important part in this, as does the ERC, through the portability of its grants and the work to attract non-EU grantees. There is however still much work to be done to reduce barriers in Europe, especially at member state level. As mentioned in the LERU paper “An ERA of Change” (LERU, 2014b) there are additional focus areas requiring action to realise ERA that are not being sufficiently prioritised at the moment, such as better linkages between education, research and innovation. LERU calls upon the EC to continue working towards the realisation of ERA, to develop synergies between the open science agenda and ERA and to use the European semester to incentivise member states to take action.

How Horizon 2020 can stimulate ‘open innovation’ is addressed elsewhere in this paper. LERU’s views on Horizon 2020’s role in ‘open science’ and in ‘responsible research and innovation’ are set out below.

C.1.1. Towards Open Science

LERU believes that open access (OA) to scientific publications and the optimal reuse of research data are vital for the development of open science. Given the importance of Horizon 2020 as part of the EC’s role as a scientific funder, effective actions are essential in order to push open access forward.

LERU values the fact that open access to peer-reviewed scientific publications is mandatory in Horizon 2020, allowing both “Gold” and “Green” open access. However, given the divergence and large number of OA policies across Europe (currently 466⁴), the EC should take a

more active role in aligning the different, and occasionally conflicting, open access policies. Horizon 2020 projects such as PASTEUR4OA⁵ are very much welcomed, but more needs to be done in terms of policy alignment.

When following the “Gold route”, Article Processing Charges (APCs) are currently eligible for reimbursement as part of the grant. However, the offsetting of APCs should be mandatory for publishers where APCs are being paid with EC funding. Open Science should also stimulate and test new OA publishing models and presses, encouraging the exchange and sharing of ideas. To that end, Horizon 2020 should introduce funding rounds to facilitate take-up of these new publishing paradigms (e.g. funding research into new ways of disseminating research outputs, reputational gain, reward systems, incentives and evaluation schemes). The EC and the Member States should come to an agreement with publishers that publications funded by H2020 and submitted to any European repository be made open access within 6-12 months after the date of publication.

Funders such as the Wellcome Trust and the U.S. National Institutes of Health have high compliance rates for their open access mandates due to practical enforcement measures. The EC, Member States and OA stakeholders should encourage optimal compliance with Horizon 2020 provisions for open access to scientific publications (e.g. uploading the open access full text to a platform such as OpenAIRE as a condition of evaluation or withholding parts of grants in case of noncompliance). Also, it is important the OpenAIRE infrastructure, as a service to advance open access and open data, can be operated on a sustainable basis. To achieve this, OpenAIRE needs to develop a long-term business plan which will deliver that sustainability.

LERU values the introduction of an Open Research Data Pilot in Horizon 2020 and the fact that open research data will be the default option (while ensuring opt-outs, “as open as possible, as closed as necessary”) for all new H2020 projects from 2017 covering all areas of Horizon 2020. We also welcome the fact that costs associated with data management, including the creation of a data management plan, can be claimed as eligible costs in any Horizon 2020 grant. We call on the EC to continue to

4 <http://roarmap.eprints.org/dataviz.html> (consulted on 28 July 2016)

5 <http://www.pasteur4oa.eu/>

make these costs eligible for funding in Horizon 2020. We believe Horizon 2020 projects such as LEARN⁶ play an important role in developing research data management policies and practices.

Finally, LERU welcomes the European Cloud Initiative while reiterating the importance that the 2,2 billion euro coming from Horizon 2020 are judiciously spent, with a governance structure which is transparent and engaged with the European research community.

C.1.2. Responsible Research and Innovation

LERU supports the EC's efforts to foster Responsible Research and Innovation (RRI), covering public engagement, science ethics, science education, gender equality, open access and governance. Ongoing and future H2020 projects to support the development and uptake of RRI are welcome with their results widely disseminated and carefully considered for future policymaking.

As stated in our press release of 28/9/2015⁷, LERU is convinced Europe requires continued efforts to promote research integrity. Future Horizon 2020 grant agreements could reasonably require recipient organisations to (a) have developed their own research integrity code or adopted a national or other recognised code, (b) take responsibility for dealing effectively with concerns or alleged research misconduct, (c) respond promptly to any concerns raised by other parties directly with the EC and referred onwards and (d) keep the EC informed about the outcomes of cases, wherever appropriate. Handling/investigating allegations and taking action in proven cases should remain the responsibility of the universities and other research providers.

Therefore, LERU welcomes the revision of article 34 on ethics and research integrity in the Model Grant Agree-

ment of H2020. At the same time we urge the EC to avoid excessive regulation that would make H2020 projects unattractive for researchers and increase red tape (see E.2.1 and E.2.2 below). LERU has provided extensive input on the initiative to update the "European Code of Conduct for Research Integrity" (ALLEA/ESF, 2011), which will serve as a useful reference document for H2020 projects where needed.

On gender equality and gender mainstreaming, the EC has been at the forefront of pushing for change. LERU supports the actions taken so far in H2020 to foster gender balance in research teams, ensuring gender balance in decision-making and to integrate the gender dimension in research and innovation content, and wishes to see them strengthened within their existing dedicated funding lines, for example with initiatives to commit organisations' leadership. While the "gender vademecum" has been a useful tool to inform applicants on gender equality in H2020, even more practical guidance and successful case studies would be welcome. We urge the EC to step up its efforts to recruit more gender experts for evaluating project proposals.

LERU does wish to highlight one area which requires urgent review relating to maternity and family leave provisions. Whilst H2020 allows for the costs of such leave to be charged to the grant, it does not provide any additional funding to recruit a cover post or to extend the research period, in collaborative projects. This puts pressure on the consortium's ability to successfully complete the research project, which has been shown to act as a disincentive primarily to employing women and may even influence women to leave research. It fails to support Horizon 2020's aim of promoting gender balance in research teams. We urge the EC to address this issue urgently, which has been tackled successfully by some national research funding bodies.

6 <http://learn-rdm.eu/en/about/>

7 http://www.leru.org/files/general/2015_09_28_Europe%20needs%20ongoing%20efforts%20to%20promote%20research%20integrity.pdf

D. Effectiveness

D.1. What progress is made towards achieving Horizon 2020's specific objectives?

D.1.1. Horizon 2020's focus on innovation

LERU is a strong supporter of 'innovation' and, as such, very much welcomes the EC's attention to it. We are, however, worried about the focus of the EC's innovation activities and funding, which is too narrowly on technology and on close-to-market activities.

Real innovation can only result from new ideas and insights. In many cases, innovation is fundamentally bound to frontier research. This should be better reflected in Horizon 2020. At present there is a lack of fundamental research opportunities for collaborative research. By focusing more strongly on the 'market readiness' with high TRL projects and less on the early, critical part of the innovation pipeline, this pipeline is at risk of running dry. LERU strongly recommends the EC takes a more balanced approach and to spread its funding for collaborative research over all stages of the innovation pipeline and fund them accordingly. More funding is required for projects at lower TRL levels, especially in the societal challenges. LERU has published a detailed view on this in the note "The strength of collaborative research for discovery in Horizon 2020" (LERU, 2016a). Although we refer to TRL levels in this paper, we wish to emphasise that LERU is not in favour of maintaining TRL levels to categorise research and innovation projects.

A concrete suggestion already made by LERU is for the EC to offer funding at the different stages of the innovation chain by introducing broad, challenge-based topics that "harvest" projects at different TRL levels at the same time. The EC could divide call topics into multiple projects instead of one or two large projects: (1) low-TRL projects aimed at "understand disease", for example, (2) medium-TRL projects with "targets to beat disease" up to proof of concept in live environments, and (3) high-TRL projects to pick up the results and bring them to the market, for example for "beating disease" (similar in concept to 'Fast Track to Innovation'). This "three-stage rocket" type of call could be recurrent, enabling high-TRL projects to harvest results from previous low-TRL projects, thereby creating more and directly visible

impact from EU-funded projects (also important for point D.1.2).

The EC must also reconsider its focus on technical innovation. Other forms of innovation such as social innovation are not given sufficient emphasis in the calls, despite these being vital to innovation in society. Moreover, as also stressed in D.3., real innovation can be provided by encouraging truly interdisciplinary research, too often considered as not cutting-edge research. This is indicative of a broader need for the EC to reflect on what types of innovation are needed at an EU level. As stated above there certainly needs to be a clearer acknowledgement of the need for 'innovative research' and not just 'innovation as market exploitation'.

In general, LERU would like to express extreme caution because Horizon 2020 is expecting too much in a single project's life time (see also point B.2.1). In combination with alarmingly high levels of oversubscription, worrying trends are emerging. Applicants feel under pressure to promise unrealistic impacts to improve their chances of success and are selected on the basis of those promises. LERU recommends the EC delivers work programmes and topics with more realistic expected impacts, designed for the real life-time of a project. It should also seriously review the quality and structure of its evaluations (see below).

D.1.2. Increasing impact of H2020 funding

LERU welcomes the initiatives announced by Commissioner Moedas in the framework of a European Innovation Council (see also point E.1.1.), announced in his talk at the ITRE Committee at the European Parliament on 12 July 2016. We believe one of the measures which could increase the impact of Horizon 2020 projects is the better tracking of funded projects. This should be done throughout Horizon 2020. We suggest the EC goes further and investigates how to best organise cross-project networking, making it the norm rather than the exception in the future. For topics that are of immediate interest to the wider public or have a political urgency, the EC should organise open conferences to which all related projects are asked to contribute. For example establish a (bi-) annual conference among all the funded projects in a specific topic/focus area to share and exchange best

practises. For other topics, the EC should at least work on advertising these projects together on an attractive, possibly interactive, website. We are convinced bringing people together working on different but related projects will result in new ideas, create visibility for the results and trigger better use of the outcomes of EU research funding. The EC should allow for these different consortia to re-form over time based on the combined outcomes of their projects and to apply for additional funding to explore future possibilities (see below).

LERU also suggests the EC look into the option of providing follow-up funding for collaborative projects. The follow-up funding should be short term, for example 6 to 18 months, and specifically aimed at bringing the project's output to the next stage in the innovation pipeline or, more generally, allow the project to achieve a much better output or higher impact.

Another EIC-measure LERU looks forward to, is the work of the 'innovation experts' which will advise the EC on innovation policy. As emphasised in "the LERU response to the EC's call for ideas" (LERU, 2016b), these experts should come from business, ventures and finance institutions, but also from academic sectors. They need to focus on the three interrelated innovation issues: policy design, innovation funding and policy coordination.

D.2. To what extent is the challenge-based approach taken up? What balance between top down programming and bottom up action?

As was already stated in the KISS Horizon 2020 paper (LERU, 2015a), LERU strongly supports the openness of the Work Programmes and recommends strengthening this further in future. We recommend maintaining the challenge-based, non-prescriptive approach. The broader, more open topics provide opportunities for more creativity, different ideas and approaches to be brought to bear in the respective areas, and require the involvement of a wide range of stakeholders in activities.

As stated in point D.1.1. LERU is convinced that Horizon

2020 needs more early stage collaborative research opportunities. It is however important that calls for earlier stage projects are also sufficiently bottom-up, to allow for the brightest ideas and the best consortium to get funded. More bottom-up opportunities would also enhance a more transparent process of work programme design (see also below point E.2.3) and limit the influence of various lobby efforts. It is important for the researchers to set the agenda, at least for a reasonable part of the collaborative research funding opportunities.

Bottom-up initiatives are however not only important in earlier stage projects. LERU believes it is also important to provide bottom-up funding for close to market activities. Although we realise that there are some concerns regarding the Fast Track to Innovation pilot (FTI) on whether it has reached its goals/the right beneficiaries, we are in favour of continuing FTI in the future, perhaps after some fine tuning of the eligibility criteria.

D.3. Does Horizon 2020 promote inter-disciplinary cooperation and does it integrate social sciences and humanities?

LERU has always been a supporter of the inter-disciplinary approach taken in Horizon 2020. Interdisciplinary research plays a crucial role in addressing the current and emerging complex challenges faced by interconnected societies. Funding interdisciplinary research opportunities for researchers from all disciplines is necessary, but brings its own challenges. Both the formulation of research questions and the evaluation of project proposals require clear engagement with/from researchers that have either good interdisciplinary expertise or a larger set of experts with very different backgrounds/ from different disciplines (see below for proposals on evaluation).

Addressing today's global challenges needs the involvement of a wide variety of scientific disciplines, including those that investigate humans, their culture, history and behaviour. It is not enough to try to engage researchers from Social Sciences and Humanities (SSH) once a challenge has been identified by others. SSH researchers

E. Efficiency and use of resources

should be engaged from the very beginning of the development in collaboration with researchers from the natural and life sciences.

LERU recognises the EC has made some progress in increasing opportunities for SSH researchers in all challenges. We also acknowledge that SSH researchers themselves need to put in genuine effort to link up to other sciences, to get to know their way around Horizon 2020 and to create more and better opportunities for themselves. But unfortunately this is difficult if SSH research is limited to identifying legal boundaries, developing or assessing business plans and market opportunities or to investigating if a certain technology would be acceptable to consumers. In the interest of all of science, SSH cannot and should not be limited to an incidental role.

The problem related to SSH integration is very much linked to the issues mentioned in the section on 'Research and Innovation'. Genuinely integrating SSH research should be more straightforward if there are more bottom-up opportunities for early-stage, collaborative research and if the EC embraces other types of innovation, alongside the technological one.

E.1. To what extent has Horizon 2020 been cost-effective?

E.1.1. Pillar I "Excellent Science"

In this paper we make few recommendations on pillar I of Horizon 2020 'Excellent Science' which includes the European Research Council (ERC), the Marie Skłodowska-Curie Actions (MSCA), the Future and Emerging Technologies (FET) and Research Infrastructures. This is certainly not because LERU believes this pillar is less important. On the contrary, these are the parts of Horizon 2020 the LERU members participate most intensively in. We make few recommendations on these because we are convinced they are very well organised and are resources well spent without the urgent need to further improve them.

We do, however, have some minor recommendations. Firstly FET, it is clear that the success rates need to be improved with FET open calls hugely oversubscribed. The EC needs to look into options of increasing the budget for these calls. As mentioned above, LERU recommends the EC provides more bottom-up, early-stage funding opportunities in Pillars II and III. This would also ease some of the pressure on FET.

For research infrastructures there currently is an access gap for medium size infrastructures ranging from 1–10 Mio EUR (figures vary depending on scientific field). Because of rapid technological development, those infrastructures tend to become a commodity, even during depreciation times after acquisition. LERU therefore recommends implementing a federated system of mid-range infrastructures, with publicised tariffs and access rules, allowing Horizon 2020 participants to broaden the use of such infrastructures as well as adding to the economic value of each infrastructure.

As mentioned in point A on 'EU added value' LERU is especially a staunch supporter of the ERC and MSCA, which have proven to be highly valuable programmes for European research but also innovation and education. We will provide specific recommendations on MSCA and the further development of the ERC within our paper on FP9.

E.1.2. Horizon 2020's innovation instruments - EIC, EIT and framework conditions for innovation

EU investment in innovation is strong, but complex and often confusing. Horizon 2020 has different instruments to improve the impact of the research it funds: Proof of Concept (via ERC), Innovation Launchpad (through FET), Fast Track to Innovation (within Societal Challenges), Innovative SMEs scheme, Innovation Actions in pillars 2 and 3 and Access to risk finance (pillar 2). A coordinating effort to make these innovation instruments more visible and accessible would be beneficial. As stated in "the LERU response to the EC's call for ideas" (LERU, 2016b), streamlining, simplifying and optimising the current EU bodies and instruments dedicated to innovation should be the first and foremost goal of the EC's systemic approach to innovation. Therefore, LERU recommends the EC simplify, streamline and optimise these instruments while developing the various initiatives announced by Commissioner Moedas in the framework of a European Innovation Council.

As mentioned in point D.2, LERU is in favour of extending the Fast Track to Innovation (FTI) programme. In general LERU is convinced that funding smaller scale projects is likely to generate more results in the long run than dedicating ring-fenced budgets to non-transparent Joint Undertakings (see also point F.1) LERU calls upon the EC not to increase the number of joint undertakings, which are not the right tools to link research outcomes with the market or to support early start-ups and SMEs, and to discontinue inefficient and ineffective ones.

LERU reiterates the importance of adequate framework conditions for research and innovation and, therefore, very much welcomes the EC's Better Regulation Agenda and the conclusions adopted by the research Ministers in May 2016⁸ on research and innovation friendly regulation. Such a framework would enhance the impact of Horizon 2020 financing instruments. For this to happen, putting forward an "innovation principle", to anticipate impacts on innovation to be assessed and addressed in policy or regulatory burdens, is vital towards an innovation-friendly regulatory framework. Next to this principle, LERU calls for the adoption of a "research principle"

in order to ensure that regulatory and policy developments are also fit for research purposes.

As part of the better regulations for innovation-driven investment at EU level, LERU welcomes the pilot phase of the Innovation Deals for a Circular Economy in that they will help innovators to identify and overcome the regulatory obstacles that are impeding their innovations.

In the context of the EC's innovation instruments, LERU wishes to highlight the role of the EIT, the European Institute of Innovation and Technology. As was stated in the report of the European Court of Auditors⁹, the EIT needs to be reformed. LERU supports several recommendations made by the Court of Auditors. We wish to emphasise, however, that the need for a reform should not be used as an excuse to further decrease the budget of the EIT. The budget needs to be maintained, if not deliverables and deadlines become impossible. LERU recommends policy makers give the EIT sufficient time to deliver and to evaluate the EIT on its deliverables in due course. LERU's detailed views on the way forward for the EIT will be published in November 2016 in the LERU response to the consultation on the Interim Evaluation of the EIT.

E.1.3. Evaluation procedure

A thorough and robust evaluation process to review proposals is essential to select the best projects and to ensure a cost-effective framework programme. Currently the very low success rates turn researchers away as they feel the Horizon 2020 is becoming a lottery. Researchers are also expressing distrust with the current model of evaluation of collaborative research. LERU urges the EC to act quickly to restore the faith of the scientific community in the system.

With the more challenge-based approach taken in Horizon 2020 and more open topics, LERU appreciates it is difficult to find suitable evaluators who fully comprehend what is expected from the topic, and this is reflected in the Evaluation Summary Reports. To ensure the quality of evaluation remains as high as in FP7 and is consistent between the different Work Programmes, we

⁸ <http://www.consilium.europa.eu/en/press/press-releases/2016/05/26-conclusions-better-regulation/>

⁹ http://www.eca.europa.eu/Lists/ECADocuments/SR16_04/SR_EIT_EN.pdf

suggest more attention is given to the selection of evaluators and their performance be monitored more closely. The recently introduced self-assessment to be completed by evaluators on their proven expertise to review specific proposals and to also give a judgement on fellow evaluators is a step in the right direction. Reaching a consensus amongst the minimum number of qualified evaluators is essential to ensuring the evaluation has been appropriate and fair. We ask that better instructions and briefings for evaluators be provided to improve the consistency of evaluation further.

LERU members acknowledge they also have a responsibility to stimulate their expert researchers to become evaluators. However unlike being on an ERC or national funding panel, evaluating mainstream Horizon 2020 proposals is not seen as prestigious and is less attractive to researchers. The standing panel structure mentioned below would change this.

As suggested in the KISS Horizon 2020 paper (LERU, 2015a), LERU advocated revising the evaluation procedure considerably. We propose setting up standing panels of about 15-20 people per area, combined with a greater number of remote referees. The suggestion would be for 4-6 remote referees to review and comment on proposals, followed by 2-3 referees from amongst the standing panel. The entire panel would then meet to discuss the ranking (based on average score by both the remote referees and the individual panel members) and additionally consider aspects of interdisciplinarity and impact. We suggest these standing panels are rotated, using the ERC model as a benchmark and that the panel members are formally appointed which will help to attract the best scientists and entrepreneurs to the role. In this context consensus should be reached at the higher standing panel level, to save time and effort. Being members of such a standing panel will be considered an honour, as it is for the ERC panels, which will enable the EC to attract very excellent scientists, innovators and entrepreneurs.

LERU is aware the EC is looking for alternatives to the current evaluation system. LERU recommends the above suggestions be investigated as soon as possible and certainly within the lifetime of Horizon 2020 to avoid further frustration for applicants.

E.2. Have the Horizon 2020 funding model and simplification measures been effective?

E.2.1. Funding model and simplification

We acknowledge the effort the EC has made in the past few years to streamline and simplify the Framework Programme, from its accessibility to the management of its funds. LERU has already provided a thorough analysis of this simplification in October 2015 (LERU, 2015a). As mentioned in that paper LERU considers the single reimbursement rate and flat rate for indirect costs as one of the main simplification achievements of Horizon 2020 and would certainly urge the EC to retain this in the future. LERU members are also very happy with the introduction of e-signature and the many improvements made to the participant portal.

Unfortunately not all changes introduced in Horizon 2020 have led to simplification. Major issues which still need to be tackled or clarified are (1) monthly hourly rates as an alternative to calculations based on the last closed financial year, (2) internally invoiced costs and (3) full capacity for calculation of equipment costs.

The EC introduced the option of monthly hourly rates as an alternative to calculating an annual hourly rate based on the last closed financial year in the update of the Model Grant Agreement published mid of July, after criticism of many stakeholders regarding the last closed financial year reimbursement model (see also LERU, 2015b). LERU welcomes the introduction of monthly hourly rates and believes this is one alternative. There is still a lack of clarity around the switching between using annual hourly rates for closed financial years and using monthly hourly rates for ongoing financial years and these remain a practical concern. LERU calls upon the EC to publish an update of the annotated MGA with further practical examples and explanations on this issue as soon as possible.

Other issues mentioned above have not yet been addressed. Discussions on making internally invoiced costs eligible are still ongoing between DG R&I and stakeholders, but have not yet led to a workable solution. We are also waiting for the EC to identify a solution for

problems related to full capacity for calculation of equipment costs. These two problems require urgent action as they leave beneficiaries puzzled as to how to report these costs correctly and is creating financial uncertainty. LERU calls upon the EC to continue to engage with stakeholders to identify the right solutions, and not to introduce alternatives without further discussion.

Although few Horizon 2020 audits have been held so far, LERU recommends having clear and detailed guidelines in place for auditors to use. Those guidelines should be made public. Consistency between different audits for similar projects and in different countries is very important. LERU also suggests auditors use the information held on file about each institution from the last visit and only check if anything needs updating, instead of doing full internal procedures tests each time they visit. This would save time on both sides and adds value to the audit process.

When it comes to administrative burden linked to new rules and policy initiatives, e.g. related to ethics or research integrity, LERU asks that all EC procedures have proportionality checks built into them; doing so would avoid adding unnecessary burden. LERU also suggests the EC keeps track of its projects, identifies projects that can be presented as best practices on how they dealt with ethics and/or research integrity and explores the possibility of opening up a database with these practices, accessible to new applicants. In addition, the EC should facilitate networking and information exchange amongst researchers. These two suggestions could be combined with the creation of a new (digital) platform for knowledge exchange (similar to Euraxess, but focused on ethics and integrity instead of mobility). The ultimate objective is to make ethics an integral part of a project, not an isolated issue. LERU members feel it would, for instance, be useful if the EC produced a list of data/ethics approval requirements and keep track of relevant ethical committees in third countries.

E.2.2. The issue of trust

LERU once again requests the introduction of a mechanism whereby nationally accepted and audited institutional practice be accepted by the EC. As already set out in the KISS note (LERU, 2015a), LERU calls for the EC to introduce 'a seal of excellence for research management'. By awarding this seal to a beneficiary the EC would

acknowledge the organisation's internal practices and control mechanisms are sufficiently robust and efficient to allow a beneficiary to monitor its own internal practice. The most urgent area for action relates to financial management and reporting, this includes reporting of staff costs, calculating annual productive hours, having internal charging systems for facilities, infrastructures and services. This could also be extended to cover other important areas such as recruitment (equality and diversity), gender, ethics, and research integrity. A system of accreditation, based on existing best practice, will not only ensure a minimum standard but will also help monitor progress and identify bottlenecks for less-experienced institutions. The introduction of such a 'seal' will save time for both applicants and EC staff.

E.2.3. Work programme design

LERU calls for a much more transparent process for developing work programmes, with more consultations and open discussions on content. Draft work programmes should be made available for consultation at an earlier stage of development. Foresighting work undertaken by the EC needs to be more easily accessible. The transparent and participatory approach that DG Connect is using to prepare topics for FET Proactive calls, for example, could serve as a benchmark. This approach includes open consultations and open discussion meetings for stakeholders to identify the themes which will define the next topics.

The EC promised at the start of Horizon 2020 that it would have two- or three-year work programmes. However, the current approach of two- or three-year work programmes still leaves applicants in the position where there is a gap in calls as we await the next work programme to be prepared and unless they have access to unofficial draft texts, they are already behind the curve when the work programmes are finally officially published. We strongly support the multi-annual approach but ask this to be truly multi-annual with rolling two-year work programmes with no gaps, e.g. 2014 to 2015; 2015 to 2016; 2016 to 2017 etc.

We also ask that the EC considers having regular fixed deadlines to help applicants in their planning and to avoid deadlines during or immediately after holiday seasons.

F. Coherence

F.1. To what extent are Horizon 2020 and its different instruments coherent internally?

LERU wishes to signal the lack of coherence between the Horizon 2020 public-private partnerships and the other Horizon 2020 funding streams. Calls or funding opportunities for these PPPs should be easier to find and announced within the participant portal as well as networking and call topic development opportunities. LERU calls for more transparency and a better interaction of the funding opportunities for PPP and the rest of Horizon 2020.

A similar lack of coherence occurs in the different Joint Programming Initiatives (JPI's). The EC and Horizon 2020 are only indirectly involved in these collaboration vehicles between Members States' R&I funding agencies, through the funding of instruments like ERA-Net+. However, the EC could request the agencies involved follow a harmonised set of procedures for announcing calls and evaluating applications. Moreover, separate JPI's are only relevant if they are complementary to what is already funded by Horizon 2020 or other pan-European programmes. We call upon the EC and the Members States to thoroughly assess the impact of the JPI's, and not to hesitate to discontinue underperforming initiatives.

F.2. To what extent is Horizon 2020 coherent with other EU programmes such as the ESIF funds?

LERU encourages the EC to explore and develop more synergies between Horizon 2020 and the Structural Funds and we hope problems (related to 'state-aid') that currently block these synergies will be solved in Horizon 2020's lifetime. LERU advises against the actual mixing of funding from Horizon 2020 and the Structural Funds as this would result in unnecessary complexity, unless there is agreement on one set of rules for the management of the funding from both sources.

In addition, LERU calls on the EC to harmonise the rules and procedures between Horizon 2020 and its various other research & innovation programmes (e.g. calls for research proposals from DG Justice, DG Home, DG Health, DG Employment, DG Environment,...). Several of these calls have been included in the participant por-

tal. The financial and administrative rules of these programmes are diverse, and participation in these projects poses difficulties to beneficiaries, e.g. in the Horizon 2020 rules of participation each beneficiary is responsible and liable for its own activities while in projects from other DGs the coordinator is liable for all partners' activities. This complexity prevents LERU members from taking part in the research-related calls for proposals from these DGs, and others. LERU recommends the EC extends its simplification agenda by streamlining the rules of participation of all research granting programmes in line with the Horizon 2020 rules.

G. Concluding statement

LERU and its members continue to be staunch supporters of and active participants in Horizon 2020. We call on European policy makers to continue to support this important cornerstone of the European research and innovation landscape.

LERU is looking forward to discussing the findings set out in this paper with policy makers and to contributing to the work of making Horizon 2020 even better in the future.

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