

CESAER

conference of european schools
for advanced engineering education
and research

HOW YOU CAN BOOST WORLDWIDE RESEARCH AND INNOVATION

PAPER ON 9TH EU FRAMEWORK PROGRAMME FOR RESEARCH & INNOVATION

Leuven, 27th June 2017

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KEY MESSAGES

The Conference of European Schools for Advanced Engineering Education and Research ([CESAER](#)) with this paper underlines the importance of the EU Framework Programmes for Research & Innovation ([FPs](#)) for our universities of science & technology and presents its advice on FP9. Our Members translate scientific research and technological and social development into innovative solutions for the benefit of society, educate and train future generations, transform the world and contribute to solving the challenges of tomorrow. Based on the intense collaboration with business, industry, public services and citizens, and on the strong culture of entrepreneurship within our Members, their activities encompass higher education, research and innovation. They thus bridge between academia, state, market and society. They bring open education, open science and open innovation into practice and are open to the world. On FP9, CESAER advises the European Union (EU) to:

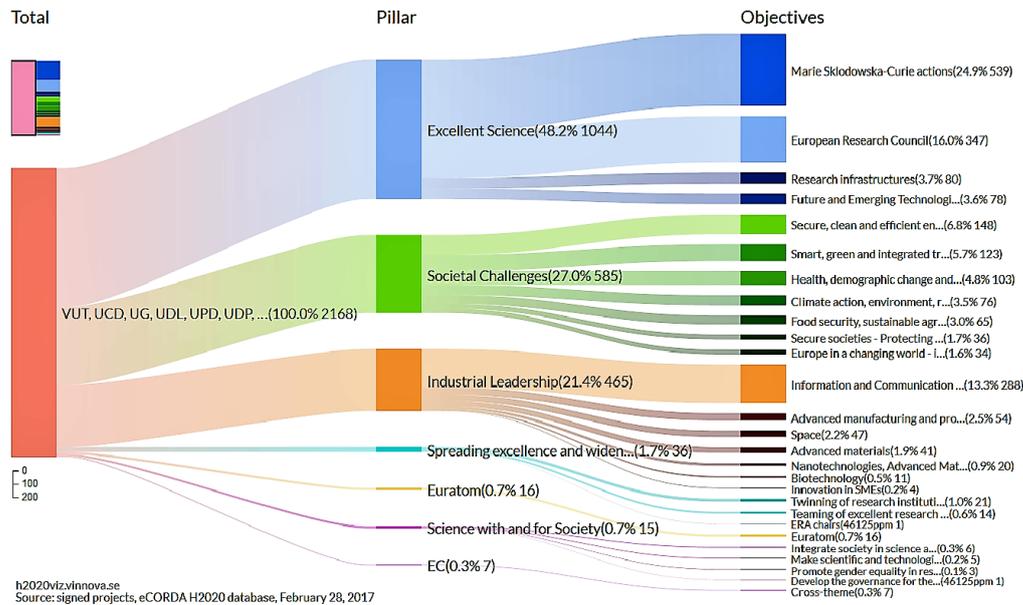
- demonstrate ambition, assume leadership and look beyond Europe to realise [knowledge societies](#) and contribute to achieving the [sustainable development goals](#);
- provide new momentum, dynamism and equity to the European Research Area ([ERA](#)) and deepen European integration in education, research and innovation;
- commit to country-specific targets for investments into research and innovation also enacting more and better synergies between FP9 and other EU funding instruments;
- structure FP9 along four parts, i.e. I) Excellent Science, II) Societal Challenges and III) Innovation Leadership underpinned by IV) a Proof of Concept (PoC) scheme;
- widen participation and spread excellence through ring-fencing funding for research and innovation in the European Structural and Investment Funds (ESIF);
- apply excellence as key criterion and refrain from geographical distribution of budgets;
- fund research-based disruptive innovation and more collaborative bottom-up activities avoiding high Technology Readiness Levels (TRLs);
- ensure one single set of simplified EU rules for participation to safeguard a level playing field and increase acceptance of usual accounting principles and institutional practices;
- make FP9 simpler and more transparent bringing more opportunities for newcomers, less serving vested interests and allowing for more bottom-up research;
- abandon Work Programmes (WPs) and allow researchers and their partners to upfront and jointly define the impact of their research and innovation projects in response to broad and mission-oriented bottom-up calls;
- allocate at least €130 billion for civilian research and innovation for seven years and ensure that EU funding leverages more public and private under the EU rules for participation instead of covering R&D activities substituting own investments;
- introduce an ERA TOP-UP intervention scheme whereby the EU funds additional activities of excellent research and innovation projects selected and funded at national level;
- merge all current (innovation) co-funding actions into one effective and coherent COFUND intervention scheme;
- establish a new and uniform ethical, legal and financial framework for association to FP9 to any industrialised country allowing for the direct participation of institutions, scientists and innovators from such associated countries in FP9.

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1. IMPORTANCE FPS FOR UNIVERSITIES OF SCIENCE & TECHNOLOGY

Universities of science & technology translate scientific research and technological and social development into innovative solutions for the benefit of society, and educate and train future generations. Scientific engineering education transforms the world in which we live and contributes to solving the global challenges. Based on our intense collaboration with business, industry, public services and citizens, and on the strong culture of entrepreneurship within our institutions, our activities encompass scientific education, research and innovation and we strongly bridge towards state, market and civil society. We bring open education, open science and open innovation into practice on a daily basis and we are open to the world. The FPs are powerful tools to create jobs and boost smart, inclusive and sustainable growth. Although limited in size, they are crucial for us as they stimulate us to deliver highest scientific excellence, boost our attractiveness worldwide, promote collaboration with all sorts of partners and allow our scientists and innovators to contribute to tackling societal challenges across borders. As such, the FP are essential for realising our institutional development strategies.



We participate prominently in all actions of Horizon 2020 and coordinate many projects. We thus constitute a key stakeholder in the ERA and in shaping FP9. Universities of science & technology actively generate new scientific outputs and are the breeding ground for innovations and breakthrough technologies. This among other things makes us strategic partners in supporting and collaborating with business, industry, public services and citizens to deliver demonstrators and close-to-market developments. Fifty-one leading doctorate-granting universities of science & technology from twenty-six European countries united within CESAER with this paper offer their collective input and advice for FP9. The views expressed do not necessarily fully cover all the views of the individual Member institutions.

- CESAER is committed to cooperate with the European Commission (EC), Member States (MS), Associated Countries (AC), the European Parliament (EP) and other stakeholders to improve the working of the FPs and to boost worldwide research and innovation with FP9.

2. ASSUME LEADERSHIP AND LOOK BEYOND EUROPE

We are living in crucial times with only thirteen years to achieve the [sustainable development goals](#) and with the ongoing [debate on the future of Europe](#) feeding into the elections of the EP in 2019 and the new EC.

- The EU must demonstrate high ambitions, assume strong leadership and look beyond itself to realise [knowledge societies](#) and contribute to achieving the sustainable development goals. To safeguard a brighter [future for humanity](#), Europe must advance FP9 beyond debates on the future Europe and short-term political, electoral and financial considerations. Therefore, the design of and the negotiations on an ambitious FP9 need to be leading in the design of the next Multi-annual Financial Framework (MFF) and other EU funding instruments, notably the European Structural and Investment Funds (ESIF).

It is against this urgent and global setting, that we present our views on the European policy context and advice on generic considerations for FP9 described in this chapter.

PROVIDE NEW MOMENTUM FOR ERA

With a view on the 60th anniversary of the [Treaty of Rome](#), we express our firm conviction that more and better Europe is needed and that the ERA must be realised fully in order to safeguard the boundary conditions enabling us to contribute to solving the grand societal challenges and to achieving the [sustainable development goals](#).

The establishment of the FPs and the European Research Council ([ERC](#)), and the inclusion of the ERA and related 5th Freedom (free circulation of knowledge) in the Treaty on the Functioning of the European Union ([TFEU](#)) are the most important and tangible achievements of European integration in the leading domain of research and innovation. After a long and hesitant start, [some progress](#) to implement the ERA has been made. However, the lack of a fully established ERA [has been estimated](#) to cost €3 billion annually and the scale of work yet to be undertaken in order to fulfil the TFEU obligation is a significant concern. The successes of European integration in education and innovation have been more limited due to a lack of shared competences.

The lack of sense of urgency and of national and EU investments, post-factual politics, populism, authoritarianism, protectionism and nationalism threaten the free circulation of knowledge and its bearers (i.e. students, teachers, researchers and inventors), the international orientation and cooperation of our institutions and in some cases academic freedom and institutional autonomy. War, terrorism, climate change and related migration are topping these crises. Alarming, these threats to the fundamental core values of science also occur within countries that earlier paved the way [towards knowledge societies](#). Intolerance of divergent opinions and political interference with academia jeopardise the ability of science to act in the public interest and to take full societal responsibility.

Universities and research performing and funding organisations in the ERA deliver knowledge and, as such, still constitute the strongest science system in the world. Knowledge is indispensable for long-term sustainable economic and societal benefit to European citizens and the rest of the world.

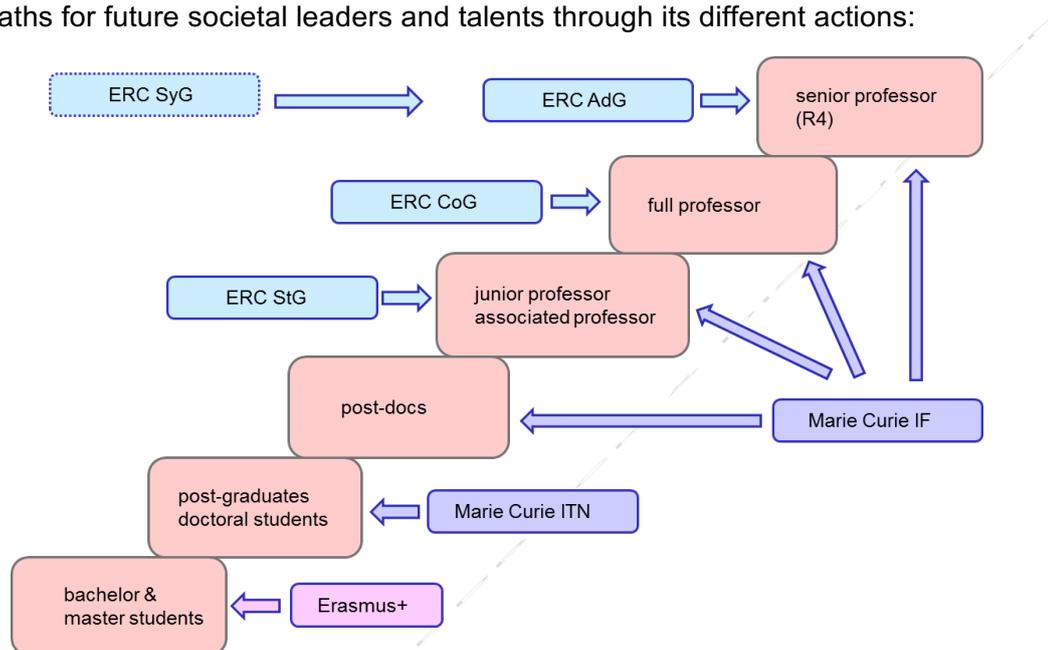
- Acknowledging Europe's s achievements notwithstanding current threats, we call upon the EU to provide new momentum, dynamism and equity to the ERA composed of the MS and AC. The EU must deepen European integration in knowledge, i.e. education, research and innovation to achieve this.
- We must build upon Europe's achievements, put knowledge back at the heart of EU policymaking and - finally - invest more into cooperation and competition in these fields at all levels, as essential drivers for the future of Europe. There is an immediate call for action upon the EU to safeguard the respect for the rule of law and human rights, freedom from political interference, tolerance of divergent opinions, democratic citizenship, evidence-based policymaking, free circulation of knowledge and its bearers, academic freedom and institutional autonomy.
- The EU must create a stronger, visual and future-oriented brand. `Science made in Europe` has been a roaring success. It is this domain that is most closely associated with future economic and societal success, attraction of talent and exciting jobs. Europe must now capitalise on its scientific achievements to attract global talent, collaborations and investment into the ERA and European Higher Education Area (EHEA), and to develop a stronger brand for science in Europe.
- Europe needs to increase its efforts to combat fragmentation and make sure differences in national policies and legislation do not represent obstacles to research collaboration in any form. We firmly believe that addressing the remaining challenges to the ERA and fully realising it, is the best way forward to gain an estimated amount of €16 billion annually and to serve European citizens. Essentially, the EU policies and funding programmes for knowledge should complement institutional, regional and national efforts safeguarding supranational benefit and creating international momentum for knowledge societies.
- The EU should lead the dialogue with partners and citizens, identify shortcomings, gaps and opportunities, inspire all partners to set more ambitious goals and priorities and continuously monitor the progress achieved. Evident emerging topics concern - amongst others - safeguarding fundamental core values and the long-term sustainability of research infrastructures, assuring the leading position of the European knowledge worldwide, strengthening science integrity, increasing excellence in education and research, boosting science-based disruptive innovation and increasing the scientific, social, economic and societal impact of European science.
- Funding for science should be increased and improved in delivery, both at European and national level. Governments in the ERA and the EHEA should stop cutting budgets for knowledge and finally meet the Barcelona objective to increase investment in research and development to 3% of the Gross Domestic Product (GDP). Importantly, the EU should move towards collecting own means and allocate more funding to its knowledge programmes.

BETTER LINK HIGHER EDUCATION, RESEARCH AND INNOVATION

New momentum for the ERA should be reflected in the EHEA. Improving the synergies between them will increase:

- the impact of the FPs and the EU funding programme for education, youth and sports;
- the strategic use and quality of European higher education cooperation as the strategic possibilities offered by Erasmus+ beyond mere mobility of students and staff are limited.

By bringing the ERA and EHEA closer together, the EU will foster the role of universities in peaceful and prosperous knowledge societies in Europe and beyond and enable attractive career paths for future societal leaders and talents through its different actions:



- The Erasmus Mundus Joint Master Degrees, currently combining policy objectives in both education and external relations, should be brought in line with the European research and innovation policy. The Strategic Partnerships should be re-centralised at European level to increase the European benefit and to raise the selection chances. Erasmus+ and the Marie Skłodowska-Curie Actions (MSCA) need to focus more on deeper cooperation and quality to boost career paths next to educating European citizens. This will allow us to implement institutional development strategies even better.
- The EU should enable universities to implement attractive career paths through participation in the different programmes by better recognising prior achievements in other EU programmes.
- In Horizon 2020, entrepreneurial education has been a main topic of the European Institute for Innovation and Technology (EIT) and executed through its Knowledge and Innovation Communities (KICs). Given the moderate success of the EIT and the importance of strengthening entrepreneurship and innovation aptitude in Europe, we propose that the EIT is fundamentally reformed and its different tasks are distributed to other funding instruments such as the successor of Erasmus+ and the emerging EIC. In such a scenario, the entrepreneurship education would nicely fit into an extended Erasmus+ programme, particularly true for the EIT labelled Master and Doctoral Programmes.

RE-ENFORCE SSH

As complex social problems, behaviour, and interaction with technologies are essential to solving the global challenges, a thorough understanding of social and human contexts to address these challenges is required in order to [end poverty, protect the planet and ensure peace and prosperity for all](#). Although the EC is striving for multidisciplinary across all research disciplines in the FPs and some progress has been achieved regarding the inclusion of Social Sciences and Humanities (SSH) in Science, Technology, Engineering and Mathematics (STEM) projects, more is needed. Approximately 20% of the projects funded under SSH flagged topics [do not demonstrate](#) any involvement of SSH disciplines hindering the integration of SSH in the FPs. The TRL-approach might be a useful concept, though certainly risks oversimplification. Equally, the proposed Social Readiness Level (SRL) might allow for moving forward. However, the [dangers](#) of top-down authoritative approaches such as the Social Citizen Score are imminent and we need more human and citizens-centred approaches to increase social acceptance and impact of scientific results and new technologies rather than incremental steps.

- To reach the full potential of multidisciplinary research, it is key to recognise SSH as an integral part of research activities. The potential benefit of SSH is not limited to an add-on for STEM research and innovation. SSH researchers deserve better than merely being invited somewhere along the way in the formation of a consortium to do an impact-, market-, or feasibility study essentially being considered as less crucial parts of a project. SSH research can support evidence-based policymaking and generates new insights in understanding societal, political, economic and technological issues. Similar to co-creation processes with stakeholders in order to increase research impact, SSH researchers should be more fundamentally and effectively involved from the start in defining the solutions to the societal challenges and in drafting project proposals.
- High quality and fully embedded and dedicated SSH activities must become substantial in FP9 and deserve a targeted and dedicated 10% of its total budget across all actions.
- When creating embedded SSH research opportunities, it is essential to broaden significantly the range of SSH disciplines contributing to the FPs. SSH expertise incorporates high societal value creation demonstrating cultural, social, policy and economic impact. Bottom up approaches involving Small and Medium-sized Enterprises (SME), business, industries, public services and citizens (quadruple helix) can solve complex societal challenges.
- To support multidisciplinary cooperation of STEM and SSH researchers, the definition of impact should take into account all kinds of impact, i.e. scientific, social and societal next to economic. The definition must do justice to the wide variety of impact created by SSH research and assessment tools may not be limited to quantifiable indicators, but should also include qualitative descriptors.

ESTABLISH MORE AND BETTER SYNERGIES

Acknowledging the delineations, complementarities and sometimes synergies between the EU funding programmes from 2014 to 2020, we flag the dramatic oversubscription and very low success rates resulting in efforts and time wasted and a decrease of attractiveness of the FPs. The lack of success of effectively using other EU funding programmes - notably the ESIF - for education, research and innovation is greatly disappointing.

- The EU should step up its efforts to effectuate 'seals of excellence' for projects proposed to the knowledge programme and evaluated above the quality-threshold, but below the funding line, to be funded under alternative funding sources, including private and national and other EU funds.
- The Council of the EU should commit to country-specific targets to make better use of and allow for more and better synergies between the knowledge programmes (i.e. Erasmus+, Horizon 2020 and Creative Europe) and the other EU funding programmes (e.g. ESIF, the European Fund for Strategic Investments, the Common Agricultural Policy, the European Territorial Cooperation Programmes, the European Neighbourhood Instrument, the Instrument for Pre-accession Assistance and the LIFE Programme). The lesser performing regions thus can use the ring-fenced budgets in other EU funding programmes to fund results achieved under the knowledge programmes to widen participation and to spread excellence in education, research and innovation.

SIMPLIFY EVEN MORE

The integration of several programmes under Horizon 2020 and the streamlining of the instruments under the Financial Regulation have clarified and simplified the application, administration and reporting procedures and reduced the administrative burdens for the beneficiaries.

However, the plethora of different (industry-driven) co-funding and programming initiatives - i.e. Public-Private partnerships (PPPs), Public-to-Public Partnerships (P2Ps), Joint Technology Initiatives (JTIs), Joint Programming Initiatives (JPIs), European Technology Platforms (ETPs), European Innovation Partnerships (EIPs), ERA-nets etc. – often under different sets of rules have fragmented the EU research (innovation) funding actions landscape, made it overly complex and inaccessible for innovators and other new entrants. While the aims of the three parts structure are self-explaining and known from Horizon 2020, the current working with detailed WPs do not provide researchers, businesses, industries and public services with sufficient agility because so much is fixed long in advance and in detail. Essentially, the WPs evolve from a highly technocratic and opaque structure incentivising MS, AC and lobbyists to insert topics along their interests into the WPs.

- FP9 should be structured along three vertical parts, i.e. I) 'Excellent Science', II) 'Societal Challenges' and III) 'Innovation Leadership' rather than 'Industrial Leadership' therewith underlining the need for disruptive and research-based innovation rather than serving vested industrial interests.
- One single set of simplified EU rules for participation is essential to safeguard a level playing field across borders given the big differences in national legislation.
- We advise the EU to move towards a simpler and more transparent FP9 bringing more opportunities for newcomers, serving less vested interests and allowing for more bottom-up collaboration. We suggest abandoning the WPs altogether and to allow researchers and their partners to upfront and jointly set the impact of research and innovation projects in response to broad and mission-oriented bottom-up calls. There are many advantages to such a system. Firstly, it is much faster from the perspective of the people doing the research and innovation. Secondly, it puts the definition of the desired impact and benefit in the hands of those who actually will use and apply it. Thirdly, it increases the transparency and efficiency of spending taxpayer's money at European level.

- The EU should merge all current (innovation) co-funding schemes into one integrated COFUND intervention scheme with one set of rules effectively leveraging public and private investments.
- The Programme Committees used today in developing the WPs can all be closed. This would save time and the resources of all involved parties and simplify FP9. The focus should move towards defining broad areas allowing mission driven research and innovation activities.
- We suggest nominating an ombudsman for the FP to mediate on issues and concerns regarding the ruling of Project Officers.

APPLY LESS INSTRUMENTS

Although we welcome the introduction of a single set of rules combined with a clear set of instruments applied in the FPs, we believe there is room for more simplification mainly by applying an ever more limited set of instruments.

- The EU should limit the number of instruments applied in FP9 to a) mono- or multi-beneficiary grants, b) one COFUND intervention scheme and c) a common exploitation booster. Moreover, we suggest introducing d) an ERA TOP-UP intervention scheme whereby the EU funds additional activities of excellent research and innovation projects selected and funded at national level.
- We plea for more mono-beneficiary grants with a more flexible approach to the definition of beneficiary (person instead of organisation) effectively placing the European benefit at the level of an action rather than a project.
- The EU should refrain from applying simplified forms of costs, promote real cost awareness and safeguard that EU funding does not drop below salaries paid at national level.
- We recommend to first pilot *lump sum* funding under Horizon 2020 for a limited number of calls and then to evaluate it carefully with our involvement. Importantly, such *lump sum* funding may not orientate at the outputs, but at activities exclusively. Moreover, it may not lead to a situation where beneficiaries get less money for doing more work. Finally, such lump sum funding must be transparent, assure awareness of costs and assure full coverage of real costs taking differences between countries into account.

APPLY MORE FLEXIBILITY AND TRUST IN EVALUATION, MONITORING AND AUDITING

Beyond doubt: it is important to create legal, financial and political certainty, to safeguard stakeholders' interests and to guarantee accountability for research and innovation funded by the EU. However, the current strict audit procedures for the FPs are hindering research and innovation and a value-based paradigm shift is needed for FP9.

- The EU should move towards more flexibility (prevent one size fits all), more trust-based auditing and a rebalance between compliance and performance. The current practice of *ex post* audits by the European Court of Auditors (ECA) is not fit for purpose and jeopardises the trust between the beneficiaries and the EU funding body. Instead, we plea for more *ex ante* controls and a move from compliance and control (distrust) towards accountability and performance (trust).

- We fully support more acceptance of usual accounting principles and institutional practices and underline the need to assess and approve the quality of normal institutional accounting systems based on usual principles enabling the EC to rely on control of the overall system.
- We advise to better select and train evaluators, to bring in more SSH evaluators and to re-introduce consensus meetings.

INCREASE FUNDING AND LEVERAGE MORE PUBLIC AND PRIVATE INVESTMENTS

With deep concern we note that national investments into education, research and innovation are not keeping pace with the increased need for knowledge and respective budgets at national and European level have repeatedly been cut so the Barcelona objective is largely not realised. Education, research and innovation in Europe suffer from a persistent lack of acknowledgement and public (at the regional, national and European levels) and private investment. The current funding of the MFF - primarily through MS contributions - creates much uncertainty for beneficiaries due to the difference between commitments and payments, thus preventing the EC from playing its full role.

- The EU should allocate at least €130 billion for civilian research and innovation for seven years and ensure that EU funding leverages more public and private funding under the EU rules for participation instead of covering R&D activities substituting investments. However, if Europe wants to assume highest leadership to realise the sustainable development goals, the EU needs to invest a more ambitious amount.
- Funding for knowledge should also be increased and improved at national level. The national governments must stop cutting budgets for education, research and innovation to finally meet the Barcelona objective and make binding agreements on how to raise investment levels.
- The EU should move towards collecting more own means through direct EU taxes and allocate more and ring-fenced funding to education, research and innovation in its funding programmes.
- We urge the EU to allocate full funding of grants and refrain from funding through loans. Grants are important for not-for-profit universities and should be issued via ESIF and EFSI as well.
- The competition and state aid rules should be adjusted and improved, not least with a view on funding R&D and innovation activities from the ESIF.
- We advise against cascade funding under the FPs.
- The EU should refrain from applying unit costs, promote real cost awareness, fund actual costs based on usual accounting principles and safeguard that EU funding does not drop below salaries paid at national level.
- We recommend to first pilot *lump sum* funding under Horizon 2020 for a limited number of calls and then to evaluate it carefully with our involvement. Importantly, such *lump sum* funding may not orientate at the outputs, but at activities exclusively. Moreover, it may not lead to a situation where beneficiaries get less for doing more. Finally, such *lump sum* funding must be transparent, assure awareness of costs and assure full coverage of real costs taking differences between countries into account.

3. EXCELLENCE

Simplification also means to cherish and preserve what has been successful. The actions under Part I: Excellent Science of Horizon 2020 have made European science more attractive to researchers worldwide and have led to ground-breaking research and innovation results, particularly due to the sustained ten-year efforts of the ERC.

- The EU should preserve the actions for Part I: Excellent science.
- We strongly advocate that the criterion of excellence is applied across all actions - from investigation-driven and applied research to innovation and close-to-the market activities and advise against any geographical distribution of budgets.
- We underline the difference between excellence and ground-breaking nature of research and innovation and call upon the EU to focus even more on the second.
- A bottom-up approach is preferred at project level with the needs defined by the different partners.

INVEST MORE IN ERC

The highly prestigious ERC is arguably the single most successful European research funding instrument ever, raising the reputation of our institutions and attracting talent to us due to its strong recognition of bottom-up excellent science.

- In light of its 10th anniversary, we urge the EU to provide sufficient funding to the ERC amounting to at least €4 billion annually, keeping it exclusive, but also attractive with a success rate around 15%.
- The synergy grants need greater support in future in order not to draw upon funding from the other ERC grants.
- We urge the EU to provide for sustainable legal and financial models safeguarding the workings of the ERC despite MFF negotiations.

KEEP FET ACTIONS ATTRACTIVE

Oversubscription is a huge problem in the Future Emerging Technologies (FET) Actions and the budget for the FET Actions should significantly increase in FP9 in order to keep them attractive. However, the difference between Synergy Grants and FET Open is very small.

- We advise to integrate the FET Open into the ERC Synergy and allocate the corresponding funding to more Synergy Grants as this has proven to be a good instrument.

SAFEGUARD LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES

We welcome the new methods of the European Strategy Forum for Research Infrastructures (ESFRI), but underline the need for accessibility. Importantly, universities - in particular universities of science & technology - and other Research Performing Organisations (RPO) host, (co-) operate and (co-) own significant Research Infrastructures (RIs) based at our institutions. We are active partners (operation and funding) to national and regional RIs and contracting partner to many pan-European, international and global RI and thus contribute to the international dimension of RIs. Our researchers and research groups are at the forefront of the scientific case of RIs: as frontier (lead) scientists and reviewers of RIs and we educate, train and deliver key scientific, managerial, operational and support staff for RIs. We are the employers of researchers as users, advisors and governors of RI and underline the importance of involving our staff and us in all phases of the RI lifecycle. Universities and other RPO are key and indispensable for ensuring scientific excellence of RIs, unlocking the innovation potential of RIs, delivering scientific, economic, social and societal impact of RIs and reaching out to society creating acceptance for RIs.

- The EU should undertake actions to ensure that the current concentration of few big RIs in few places is stopped and more small and medium RIs are cherished across the entire ERA.
- EU RI funding should encourage RIs to communicate better with potential users in the relevant research communities across Europe and beyond that it exists and which services it provides.
- Rather than maintaining the dedicated action for access to RIs, the costs related to access should be eligible in any FP9 grant. Access costs can include the RI's depreciation costs for investments.
- FP9 should provide flexible financial support to the ESFRI portfolio and the European Open Science Cloud (EOSC) allowing addressing specific challenges throughout their entire lifecycle thus safeguarding their Long-Term Sustainability (LTS).

KEEP MSCA LIGHT, BUT WIDE

The MSCA again are a great success, but suffer from heavy oversubscription.

- We advise to allow for the funding of doctoral schools, allow for more flexibility and allow for more co-funding.

FULLY INTEGRATE COST

The networking activities under the European Cooperation in Science & Technology (COST) have proven to be precious, particularly with a view on widening participation and spreading excellence.

- We advise to integrate COST fully in Part I: Excellent Science strictly applying one set of rules.

4. IMPACT

Although we welcome the linking of research and innovation within the FPs, the current experiences between the research and innovation actions under Horizon 2020 are fundamentally different: while the research parts are extremely successful, the innovation funding is less and resulted in numerous incidents around competition. University born start-ups and scale-ups face fragmented regulatory frameworks hindering their freedom to operate in the internal market and then slowing down their growth potential. Larger companies seem to use the FPs to regulate and [`manipulate`](#) the development of their markets rather than creating new ones. We are concerned with superficial business and industry development, which could be done more effectively by companies themselves outside the FPs. We recall, that the Barcelona objective also aimed at providing more private funding into Research and Development (R&D), including research and innovation activities performed by not-for-profit RPOs.

- Considering that the EU could opt for not funding any R&D activities performed by business and industries at all, the EU should focus its public funding on leveraging co-investment from companies in areas where they can derive real future competitive advantages instead of covering their R&D activities thus substituting own investments.
- The EU must provide the boundary conditions for innovation, i.e. a well-functioning internal market, provision of funding opportunities for disruptive innovation, simplification of funding for start-ups, obligation for MS and EU to treat their neighbours fairly and allowing start-ups from universities to challenge vested interests.

FUND MORE BOTTOM-UP COOPERATION AVOIDING HIGH TECHNOLOGY READINESS LEVELS

Funding for collaborative research & innovation plays a crucial role in tackling societal challenges across borders and fostering innovation leadership. The closer linking of research and innovation is useful for us universities of science & technology as we have the capacity to do fundamental research with a clear view on potential applications and on designing and engineering new technologies.

However, Horizon 2020 so far put too much focus on incremental innovation and projects with high TRLs and this overemphasis on incremental-innovation and close to the market activities prevents our scientific staff and innovators from participating optimally with breakthrough technologies and business ideas. This gap was especially evident in Part III: Societal Challenges under Horizon 2020 where there is no proper connection between the technologies to bring solutions to the market, and the ground-breaking research as a pre-requisite for anticipated solutions. The trend towards higher TRL is somewhat exacerbated by the increasing importance of public-private partnerships

- We advise to enlarge the impact definition covering scientific, social, economic and societal impact. The impact definition describes the desired outcomes of research and innovation while the TRLs stipulate the route to get there.
- We advise the EU to set ambitious aims so that companies effectively co-invest in collaborative projects under FP9. Fully funding R&D activities from private companies sets wrong incentives. Companies interested to participate in collaborative projects should substantially fund their involvement by own means. EU funds for collaborative projects thus should primarily go to public research organisations, higher education institutions and non-

profit organisations. Advantage being that the company commitment is a strong argument in favour of the project. It resolves as well the highly debated TRL discussion, which rightly can be seen as direct industry support using public means for high TRL projects.

- We advise to incentivise co-funding by governments and public services for Part II: Societal Challenges and by business and industry for Part III: Innovation Leadership in the evaluation of the impact criterion.

Implementing our advice would result in the following direct consequences and benefits:

- Removing the imbalance between what business and industries can deliver and what is necessary to achieve sustainable development.
- Erasing current issues with TRLs and competition law and promoting a true risk-taking culture in European research and innovation activities.
- Placing researchers from academia, governments, public services and companies into the drivers seat instead of relying on technocratic and lobbying structures.
- Incentives for private companies to participate in collaborative projects, are no longer of a financial nature but driven by their needs for cutting edge research and innovation. Hence, a high SME or industry participation is not an aim in itself. Instead company commitment is probably one of the best criteria in having impact down the road.
- Rather than having calls for proposals with deadlines, the EC could easily implement open calls with a couple of cut-off dates per year.

IMPLEMENT EIC TO BOOST DISRUPTIVE RESEARCH-BASED INNOVATION

We welcome the focus on open innovation strengthening the role of universities in feeding into disruptive innovation. The concept of the European Innovation Council (EIC) - as part of Part III: Innovation Leadership - offers opportunities if executed as a true reform agenda for the current EU innovation funding actions maintaining successful actions and abolishing ineffective ones.

- The EIC should strengthen the role of universities in disruptive innovation by funding innovators, by adopting novel approaches to supporting innovation eco-systems and by funding bottom-up science-driven innovation projects in a swiftly and agile manner. It should not be designed as a one-stop-shop covering the entire innovation chain.
- The EIC should provide two funding actions, i.e. 1) a true bottom-up instrument targeting innovators and their ideas (i.e. Innovator Grants uniting the Fast-Track-To-Innovation and SME Instrument) and 2) support for local incubators and regional and thematic innovation eco-system players catalysing European collaboration. A flexible approach to types of applicants is needed (person instead of organisation) and portability of grants should be allowed.
- The EIC can learn from the ERC, particularly with regard to lean and quick procedures and decision-making.
- The EIC should set clear criteria for evaluating excellent and ground-breaking innovation, as well as carefully monitoring the outcome of funded projects and highlighting successes. Direct interaction between the evaluators and the proposer before the completion of the evaluation report is essential, allowing for the clarification of questions and the verification of information.

- The EIC should aim to become a `seal of excellence` and leverage more private and public funds for innovation.
- A life cycle and support approach to move towards implementation will enable the EIC to develop a portfolio of market-creating innovation projects at various stages. The EIC should periodically monitor the progress of all projects in its portfolio and review how they have followed up on prior recommendations. Rather than a `tick-box` exercise, such monitoring should investigate whether the projects are agile enough to respond to developmental and market conditions.

INTRODUCE AMBITIOUS CROSS-CUTTING PART IV: PROOF OF CONCEPT SCHEME

The Proof of Concept (PoC) currently under the ERC proved to be very successful.

- The PoC scheme should be extended as a crosscutting Part IV under the entire FP9 and provided with generous funding.

R&I IN RIS3

Many European regions have modernised their approaches by exploiting their investments in the creation of dedicated education, research and innovation ecosystems in the form of Thematic Regional Clusters, Regional incubators, etc. The introduction of the Research & Innovation Smart Specialisation Strategies (RIS3) have also contributed to better identify the thematic priorities where many regions have an interest to invest.

- Better-structured cross-regional collaborations and alignment of the use of the ESIF with key EU initiatives are needed. The EIC provides for an opportunity for achieving this with the EC steering the efficient structuring of regional innovation ecosystems & networks.
- More flexibility is needed in the financial management and programming of ESIF giving the regions the possibility to re-adapt their RIS3 and related funding on the basis of the societal and market developments. Moreover, the future programming should enlarge its funding coverage possibility also to excellent research
- Regions must be enabled to exploit possible opportunities represented by a) investments in specific RIs of pan-European interest, b) funding projects having received the Seal of Excellence in mono-beneficiary grants under the ERC, MSCA and EIC and c) by effectively allowing and leveraging co-funding with regional funds.

5. OPENNESS

OPEN UP RESEARCH AND INNOVATION

We welcome the current focus on and attention for open science in general and for open access in particular. Evident issues include how to achieve the ambitious goal of 100% open access to scientific publications deriving from publicly funded research by 2020 e.g. through changing the publishing business models and new reputation and crediting system for science acknowledging different aspects of scientific work. How can we reward multidisciplinary, collaborative work, innovative ideas and reuse of data in the grant schemes? Another important aspect concerns the potential tension between private and public interests in relation to openness. The definition of rules of engagement containing new criteria to index and evaluate open access publications and FAIR and secure data - as e.g. suggested for the European Open Science Cloud (EOSC) - will play a crucial role in this respect.

- We reconfirm our commitment to open access. With regard to the open access to scientific data, we insist on Findable, Accessible, Interoperable, and Reusable (FAIR) and secure scientific data. Furthermore, information for researchers on research data management must be improved and the costs of data stewardship declared eligible.

WIDEN PARTICIPATION MORE AND SPREAD EXCELLENCE BETTER WITHIN ERA

While some progress has been made towards a more streamlined and homogenous ERA, the research and innovation divide within the ERA is persistent. There is an urgent need to widen the participation of lesser performing regions and to better spread excellence. We underline the necessity for more and better synergies and complementarities with the ESIF and other EU funding programmes. Too often, education, research and innovation are not included in the Operational Programmes and funding is not ring-fenced.

The eligibility criteria based on the 70% Composite Indicator of Research Excellence which has been developed in Horizon 2020 to distinguish those countries identified as `low R&I performing` or `widening` countries do not reflect the objective of the programme, i.e. `tapping Europe's unexploited potential in research and innovation. Research excellence will reach the 70% of EU threshold for a number of currently eligible countries in FP9. However, these countries still severely underperform in participation in Horizon 2020 (in absolute financial terms), in coordinating Research and Innovation Actions, in technology transfer and other innovation parameters.

- The complementarity between FP9 and the other EU funding programmes - notably the ESIF - should be strengthened by enabling financial support for proposals having been rated excellent (i.e. received seal of excellence), but due to a lack of budget can't be funded. Using ring-fenced funding from other EU funding programmes to support excellence research needs to be built into FP9 from the very beginning on in order to avoid cumbersome fixes like in Horizon 2020. By nature, mono-beneficiary grants are more suited for being funded out of ESIF.

- The ERC should promote the possibility - to countries which have passed the evaluation, but due to a lack of funds can't be supported by the ERC budget - of funding provision from national earmarked funds proposals hosted in this specific country. The advantage of such a model is that by paying into the ERC, the funds come back with ERC rules attached thus spreading excellence at the regional and national levels.
- The EU should redefine the better integration and alignment of procedures and criteria between the FP9 and the other EU funding programmes. Therefore, improvements of state aid rules are necessary to better allow for funding research and innovation activities under the other funding programmes.
- No separate Composite Indicator for FP9 is needed, better alignment with the definitions as applied under the ESIF is required.

INVOLVE CITIZENS MORE IN SCIENCE

We greatly welcome the extension of the triple helix (state, business and academia) towards a quadruple helix opening up towards civil society. Involving citizens more in science must strictly comply with scientific excellence and be embedded within an academic context.

- The enhanced dialogue between academia, business, industry, public services and citizens defining impact through abandoning the WPs will ease the exploitation of results. Information about project results thus should be more easily accessible for all.
- FP9 should allow for more and better involvement of citizens in research and innovation and allow for co-funding through crowdfunding in the COFUND intervention scheme.

OPEN UP FP9 TO ENTIRE WORLD

With great concern, we witnessed the decline of industrialised third country participation in Horizon 2020. Increased international scientific collaboration is driven by the pursuit of quality. International collaboration is essential to enhance competences at individual, institutional and societal level as well as to address the societal challenges across borders and continents.

The current political and legal framework of bilateral negotiations between the EU and other third countries concerning associations to the EU programmes is not fit for purpose: it led to much uncertainty and uneven level playing fields and jeopardised the long existing excellent links and cooperation between institutions.

- Science is a strong force in international diplomacy and the EU should seek to strengthen collaboration in science & technology further beyond Europe.
- The EU should establish a new and uniform ethical, legal and financial framework offering the association to FP9 to any industrialised country worldwide allowing for the direct participation of institutions from such associated countries in FP9. As an incentive to join FP9, the EU should cover the administrative costs (evaluation, managing projects etc.). In return, the EU rules for participation apply providing for a strategic long-term interest of the EU rather addressing the compliance with its rules at the level of the beneficiaries through the grant agreement than through bilateral science & technology agreements with third countries.

6. OUR PROPOSAL FOR FP9

NINTH FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION (article 173 and 182 TFEU)		
PART I: EXCELLENT SCIENCE 42%	PART II: SOCIETAL CHALLENGES 30%	PART III :INNOVATION LEADERSHIP 23%
European Research Council (ERC) 25% 1. Starting Grant (StG) 2. Consolidator Grant (CoG) 3. Advanced Grant (AdG) 4. Synergy Grants (SyG)	- SUSTAINABLE DEVELOPMENT GOALS - MISSION-ORIENTED RESEARCH & INNOVATION ACTIONS - INCENTIVES IN EVALUATION FOR COOPERATION BETWEEN ACADEMIA, PUBLIC SERVICES, BUSINESS, INDUSTRY AND CITIZENS - LEVERAGE PRIVATE AND PUBLIC FUNDS	Leadership in Enabling and Industrial Technologies (LEIT) 10% 1. ICT 2. nanotechnologies 3. advanced materials 4. biotechnology 5. advanced manufacturing and processing 6. space
Future Emerging Technologies (FET) 5% 1. FET Open 2. FET Proactive 3. FET Flagships		European Innovation Council (EIC) 13% 1. Innovator grants 2. support to local and thematic innovation eco-systems
Marie Skłodowska-Curie Actions (MSCA) 7% 1. Initial Training Networks (ITN) 2. Individual Fellowships 3. Research and Innovation Staff Exchange (RISE)		
Research Infrastructures (RI) 4%		
European Cooperation in Science & Technology (COST) 1%		
PART IV: PROOF OF CONCEPT (PoC) 5%		
INSTRUMENTS FROM FINANCIAL REGULATION IMPLEMENTING FP9		
GRANTS (TITLE VI FR):		
mono-beneficiary ERC, MSCA & EIC grants		
multi-beneficiary Coordination and Support Action (CSA)		
multi-beneficiary Research and Innovation Actions (RIA)		
PROCUREMENT (TITLE V FR):		
Pre-commercial Procurement		
Public Procurement of innovative solutions		
INTERVENTION SCHEMES:		
COFUND		
ERA TOP-UP		
SYNERGIES AND COMPLEMENTARITIES WITH OTHER EU FUNDING PROGRAMMES, NOTABLY ESIF		