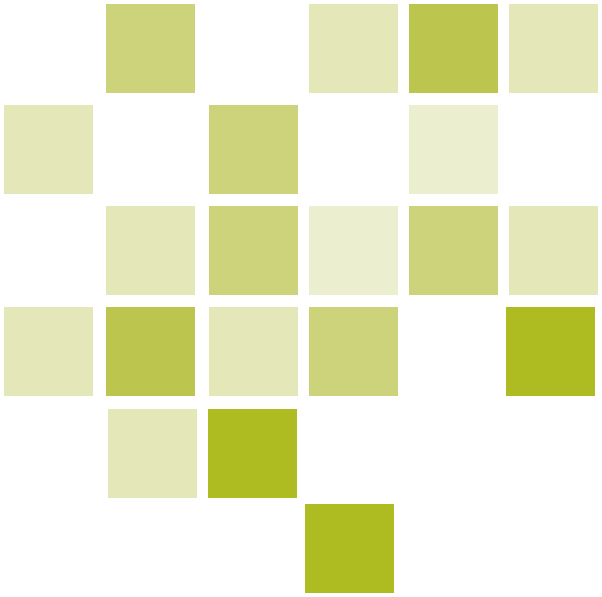
Position and vision of the Institute for Bioengineering of Catalonia
on the next European research & innovation framework programme (FP9)

November 2017



Technological Mission

We consider that a lowest common denominator among all Technological Missions should be a focus on global challenges that address societal needs. Once this directionality is defined, these missions will engage the citizenry while encompassing social sciences and humanities in a natural way. To achieve this mission-oriented goal, multidisciplinary approaches that pursue sustainability will be needed. A key aspect of missions is to look for smart growth. As well as looking towards improving or fixing existing mechanisms, they should also be risky, transformative and ground-breaking, opening new directions for change and offering added value to Europe's global encounters. For this reason, not all missions would have the same economical weight or see the same rate of growth.

CONTACT:

Institute for Bioengineering of Catalonia (IBEC)
Projects Office
Baldiri Reixac, 10-12 · 08028 Barcelona
Phone: +34 934 031 198
Fax: +34 934 039 702
Email: panorama@ibecbarcelona.eu
www.ibecbarcelona.eu

Position and vision of the Institute for Bioengineering of Catalonia on the next European research & innovation framework programme (FP9)

Global bioengineering scene

Research and development in the biomedical engineering sector and the medical and care services industry are among the fastest-growing industrial areas in terms of turnover, as well as in employment and education. Biomedical engineering is understood to be a multidisciplinary coupling of engineering and medicine and biology methods for diagnostic and therapeutic measures in healthcare. Its vigorous promotion and, ultimately, the establishment of a single market combining biomedical engineering with the medical and care services industry – in combination with ICT and telemedicine – would have tremendous advantages for European society, its citizens, and the EU's economic development[1].

IBEC's performance in EU and H2020

Founded in 2005 to support the rapid growth and success of biotechnology and bioengineering research, the Institute for Bioengineering of Catalonia (IBEC) currently consists of 250 researchers and support staff in 21 research groups. IBEC wishes to play a strong role in this and future discussions, illustrating the importance of bioengineering and medical technologies in the elaboration of the next framework programme, which will be a stepping stone for Europe's future innovation and economic growth. IBEC is also the coordinator of the Spanish Platform on Nanomedicine (NanoMed Spain), a member of ETPN, a member of the EIT Health Supervisory Board, and the Catalan government's representative in the EC's Smart Specialisation Platform (S3P) in the Medical Technology area. Moreover, in the first four years of H2020, IBEC has been the beneficiary of 16 grants, totalling almost 12,5 M€.

In this context, IBEC proposes the following nine points that could contribute to stimulating future debate about the future Framework Programme (FP9), the first of which outlines the thematic priorities to be included.

1. Thematic priorities

Global challenges should outline citizens' needs rather than responding to industrial or sectoral economic priorities. Health for all remains one of those challenges. The proposed topics should be more accurate and clear, suggesting transversal issues to be Technological Missions.

a) One of the most important issues to be addressed in FP9 is **antimicrobial resistance**, one of the major threats being faced by humanity today. It is projected that by 2050 it will account for 10 million deaths. It is very easy for pathogens to adapt biologically and become resistant to current antibiotics, and together with the slow-down in the discovery pipeline, this is compromising our current therapies against harmful microbes. Diagnostic devices to identify specific bacterial infections and provide the proper antibiotic should be developed. These should be affordable, fast, accurate, easy-to-use, scalable, safe, and connected. In addition, it is important to investigate new antibiotics or antimicrobial compounds that target bacteria to reduce the emergence of antibiotic resistance, as well as increasing patient compliance by shortening the duration of antibiotic therapies. FP9 could coordinate a strong response together with other Commission bodies that already work in this area, such as DG-SANTÉ, IMI or JPI-AMR.

b) As not all individuals respond equally, classifying target groups of patients and tailoring treatments is crucial. New diagnostics and informatics that provide an understanding of the molecular basis of disease must be established in order to develop **personalized medicine** solutions and approaches. These must be available to all citizens via public health services, avoiding social inequalities.

c) **Tissue regeneration** for the replacement of cells and tissues, with or without stem cell research, may be used to treat cardiovascular, brain and heart pathologies or diabetes.

d) Over the past 150 years, average life expectancy has increased by approximately 4-5 years per generation, resulting in an age-related functional decline of physical and cognitive capacities. Increased life expectancy has not translated into healthy life expectancy, however. Cognitive loss, dementia and associated neurodegenerative disorders are highly prevalent at an older age. For this reason, a multidisciplinary approach must be taken to address these challenges and enable elderly European citizens to improve their quality of life, promoting healthcare that improves **active ageing**. FP9 should be the seed funding for novel technologies further developed through EIT Health.

Bioengineering approaches for the priorities listed above should be systematically adopted into routine healthcare systems. To do this we could adopt an **Implementation research** approach that frames research findings within real world conditions.

2. Foster the proper instruments

Grants and co-funding instruments should be fostered and prioritized in FP9. Among grant funding instruments, individual grants (such as ERC grants), Research and Innovation Actions, as well as Innovation Actions, should be the leading edge of FP9. Of all the funding instruments for market-oriented innovation, we would give priority to the Fast Track to Innovation (FTI) pilot as an instrument that promotes close-to-the-market

[1] *Opinion of the EESC 2015/c 291/07*

innovation because of its inclusive characteristics: it invites bottom-up proposals, and is open to all types of beneficiaries. We believe that a budget increase for calls such as Future Emerging Technologies (FET) OPEN and PROACTIVE, both powerful added-value tools, should be considered. In terms of training, MSCA in synergy with other calls from the ERASMUS+ programme or even with EIT calls should be fostered. While on the subject of synergies, instruments to ensure coordination among pillars could be promoted.

Huge projects are difficult to manage, and the impact generated is sometimes not in accordance with the money invested. Big proposals hinder competition and lead to administrative burdens. Thus smaller, more manageable projects could be more efficient than big ones.

Instruments to tackle the existing gap among low technology readiness level (TRL) and high TRL projects that are able to diminish this 'death valley' are needed. Current tools (ERC-PoC or FET Launchpad) are not enough.

Bottom-up calls at low TRL levels could also be enhanced by the next work programme. These approaches allow us to improve, think big and go beyond the state of the art, and could be useful for current identified challenges at the mid- to long-term. We consider that one out of four calls should be bottom-up (25%), with the rest being top-down (75%) in FP9. On the other hand, top-down topics should avoid ambiguity and be well-defined and explicit, steering clear of predefining solutions and methodologies to address each particular challenge.

In fact, FP9 could be a good context in which to try to reorganize the current situation of the PPPs-JTIs, as some of them overlap in their strategic agendas. In addition, harmonizing the governance models and providing better access to those initiatives could also be improved. an alignment of accessibility.

3. European Research Council (ERC)

A serious approach to prioritizing excellence must be considered in FP9, as it is the genesis for all further applied technological markets. This can be translated to expanding ERC tasks or issues, and scaling-up the investment in low TRL technologies (TRL1-4).

Regarding the ERC, it is the only programme offering support for 'basic research', but only a small percentage of researchers are able to participate due to the specific proposal formats and evaluation criteria. New formats should be considered that are both more inclusive and collaborative while not compromising on excellence, such as something similar to the ERC-SyG grants, but with fewer restrictions. As the foundation of EU research, the ERC must be fortified with an increase in budget, and excellence rigorously pursued independently of political and ideological objectives. Moreover, the ERC schemes (including evaluation) need to be revised to better integrate interdisciplinary projects (such as bioengineering ones) and reduce gender bias.

New models of ERC funding should be explored; for multidisciplinary high-risk short or long research projects that build synergies towards FET, for instance. As research costs are closely related to the scientific discipline, we also envision an ERC scheme in which the maximum budget awarded per project is determined by the scientific area. To further promote new research ideas, an approach similar to the Seal of Excellence could be applied by ERC funds, according to which the first-ranked proposals not funded would be given a smaller personal grant to set the basis of a potential ERC project.

Maybe the ERC could expand its scope and empower its presence in Europe as a whole by being more involved in policy-making in terms of frontier research.

4. European Innovation Council (EIC)

Fostering entrepreneurs or innovators and improving their conditions is a relevant aim for FP9. However, currently there exists: (1) a complete pillar (Industrial Leadership), with 22% of the total budget; and (2) the European Institute of Technology (EIT), which is in charge of consolidating the Knowledge Triangle and Innovation through close and effective links between education, research, and innovation; so maybe another high-level strategic body is not a priority for the EU.

It appears sensible to place innovators at the centre of the future 'FP9 Pillar 2' calls (Innovation & Competitiveness), or in existing EIT ones. Rearranging (reshaping or re-empowering) existing structures could make these initiatives useful for new challenges within the Commission, leading to a more sustainable strategy rather than creating a new one and dispensing with existing ones. Innovation should be promoted across all pillars, with interdisciplinarity a consistent priority as a source of technological and other innovation (such as educational, business or social innovation).

It is difficult to imagine building a successful bureaucracy for innovation. The European Union must provide competitive funding that can address the lack of a venture capital culture in Europe to drive innovation and SMEs. This must be goal- and impact-oriented, with success the incentive; for instance, low threshold seed investments followed by larger investments based on success.

5. Transparency and flexibility

Regarding the last comment from the previous point, one of the characteristics that should define the next framework programme should be transparency at all levels, including in decision-making, access to the big public-private joint initiatives, and topic choices in all FP9-funded work programmes.

FP9 should promote flexibility to reach all relevant European stakeholders in the fields of science and

technology. Some measures could be an increase in the overall budget, or rearranging possibilities within call budgets regarding the applications submitted. To reduce oversubscription, give more calls a two-step evaluation procedure, and narrow the scope of the topics.

6. Simplification

By optimizing reporting and project monitoring procedures, the Commission could increase their productivity on other related issues (evaluation coordination; acceptance and implementation support).

A 'lump sums' approach, which entails keeping a record of all transactions for future audits, seems a simplification for the funding bodies, but it puts a much heavier burden on the users.

Moreover, output-based funding should be restricted to certain scenarios: maybe industrial pilot lines or projects close to the market (low-risk and high TRL). The intrinsic uncertainty of basic research makes it unsuitable for the proposed simplification measures; thus, we only envisage this funding model in a basic research context if extra support is delivered to the beneficiary only when the expected achievements are fully obtained making it a prize on top of a grant. Maybe an intermediate mixed model combining both systems (less reporting and more output) could be the answer, as could closer follow-up by the Project Officer (an expert on the topic) in the reports and meetings.

Some other measures that could help to simplify FP9 could be improving and reducing templates; more intuitive and simple online application forms; reducing and simplifying acceptance (all information included in the proposal – deliverables, milestones, risks, etc – could be made available in the Participant Portal for GA preparation) and amendment procedures; introducing a standardized code of conduct across EU research as part of the Consortium Agreement; strengthening the role of the coordinator and project management board; allowing the usual accounting practices of each institution; and including all FP9 funding calls (i.e. KICs, JTIs, ERANETs) on the participant portal, as well as simpler, fewer and common rules (reducing sub-programmes, JTIs, etc).

7. Evaluation

Research impact should be evaluated fairly in regard to the TRL scenario (from basic research to innovation close-to-market). This would avoid a mismatch of the evaluation parameters requested in each case and minimize misunderstanding the impact of the very principles of fundamental research. Moreover, for multidisciplinary proposals, review procedures must be standardized across all units and the consensus meeting reintroduced in all cases, building on proper and validated expertise. In case of project resubmissions, it would be good to align the evaluation feedback with previous evaluations received. Maybe increasing the number of experts/evaluators/officers by topic could optimize project management procedures and timings with the Commission. Furthermore, we encourage two-stage evaluations in FP9, with extensive and specific feedback at the first stage to be received well in advance to allow further improvements in the second stage.

8. Synergies

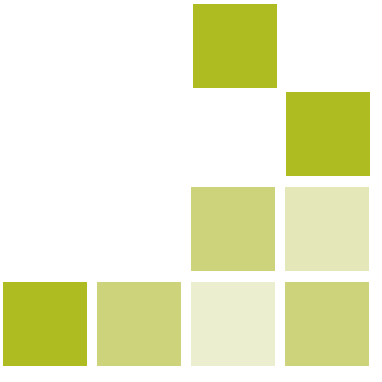
As mentioned in Lamy's report, a better alignment of EU and national and/or interregional R&I investment (ERANETs, JPIs, etc.), is required for added value and better oriented objectives and ambitions. As Structural Funds (ERDF and ESF) are 256 billion €, and H2020 70,2 billion €, at first glance it seems beneficial to join forces and try to enhance research and innovation within the EU with both budgets. In any case, as one of the focus areas of the European Structural and Investment Funds (ESIF) is to specialize the EU regions in research and innovation, there will be synergies already.

Nevertheless, two issues should be pointed out: (1) these synergies must not be used as an excuse to reduce FP9's budget in cases where no synergistic effect will result; and (2) synergies with Structural Funds (ESIF) must be addressed with a strong commitment to the Commission and the member states by removing current barriers (i.e. State Aid), as allocation of ESIF funds strongly depends on national politics and priorities, which are not always aligned with H2020-ESIF synergy.

Training for young researchers and entrepreneurs might also be addressed synergically with other EU programmes that pursue education, such as ERASMUS+ (14.7M€, DG-EAC) and/or EIT-KICs.

9. The Three Os – Open Innovation, Open Science, Open to the World

FP9 must continue to strive towards the three Os. International cooperation will undoubtedly increase and improve EU's knowledge and technology. FP9 should be aligned with research programmes from global markets (Japan, USA, China), identifying common global goals. FP9 could fund joint programmes promoting international cooperation with research, training and exchange activities, funding common schools, workshops, and conferences organized by the appropriate CSA ■



Institute for Bioengineering of Catalonia · Baldiri Reixac, 10-12 · 08028 Barcelona · +34 934 031 198 · panorama@ibecbarcelona.eu · www.ibecbarcelona.eu