

FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.

THE FUTURE EUROPEAN INNOVATION COUNCIL A FULLY INTEGRATED APPROACH

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Introduction

In a huge effort to collect all stakeholders' opinions in a comprehensive procedure, Commissioner Moedas set out to build the European Innovation Council (EIC) bottom-up. According to the draft paper "Preparatory phase of a European Innovation Council (EIC)", the first step is pulling existing instruments together under one roof and complementing them with prizes¹ for the solution of challenges that are deemed critical for Europe's innovation capability.

Fraunhofer would like to congratulate the European Commission on having integrated the full innovation cycle into their approach and would like to take this one step further into a fully integrated approach on innovation that should be reflected in the future EIC and that builds on European strengths. Therefore, Fraunhofer would like to emphasise that in our view Europe's continuing weakness in valorising its excellent research can be solved in a straightforward, technology-push approach under an assertive European Innovation Council in the future framework programme.

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Building on Europe's strengths

1.1 Strength in excellent research output

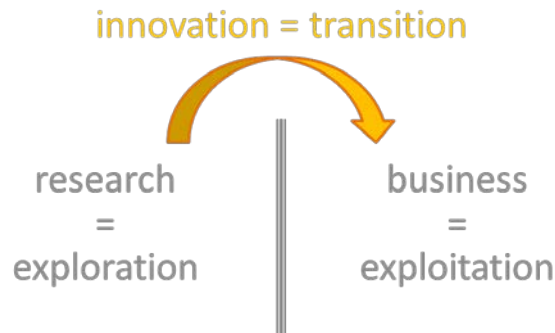
It has been said over and over and it is rarely disputed: Europe can be proud of the achievements of its research programmes that led to a top position in global rankings of scientific output. At the same time it is also widely acknowledged that Europe comes short in valorising our excellent research and that we cannot compete with the most innovative regions in the world. Nevertheless, Europe competitiveness is still high due to its firm and broad industrial base. To maintain that competitiveness we have to improve the innovation capabilities of European industry.

1.1.1 Turning research into products and solutions

Starting from Europe's struggle with turning its excellent research into successful products, the EIC should have as main objective the improvement of Europe's innovation output. The aim is to finally make use of that extensive knowledge base and valorise the knowledge for the sake of Europe's industry and for the welfare of Europe's citizens by maintaining Europe's industrial competitiveness and strength. In short, Europe should push more of its valuable technology to the market and the EIC is a unique opportunity to build a compelling innovation support structure and technology-push mechanism.

¹ Inducement prizes compensate the efforts of the winner while leaving all other contestants uncompensated; it is doubtful whether an inducement prize leads to investments in innovation that would not take place anyway.

Since innovation is defined as bringing a novelty successfully to the market, it spans from research (novelty, invention) to business (market, product/solution). The main challenge in innovation is the transition from one world to the other while both worlds function on contrary rationales.



1 Complexity of innovation

The innovation process is hugely complex with multiple stakeholders from different sectors and disciplines, interacting in different constellations at various moments. The innovation process is defined by the complexity of the technology and the realities of the market, both varying extremely over time as knowledge grows and the world changes continuously.

1.1.2 There is no easy way out

It is tempting to over-simplify innovation by adopting a traditional process view that looks at input on the one side and output on the other side and leaves aside everything that might happen in between. This would lead to the assumption that a maximum effect can be achieved by supporting innovative businesses only.



2 Over-simplified view on innovation

This clearly follows a market-pull approach and higher investments only have one effect: to influence the odds of winning a bit in favour for some European business to bring about innovation. But it remains a gamble and there is no intelligence about how much money would be needed to create the five, ten or fifteen unicorns that Europe wants so desperately. Besides, financial support for single beneficiaries is hard to defend against state aid law and does not solve the initial problem with the unexploited research knowledge that Europe creates.

Unfortunately, there is no easy way out if we want to help Europe in the transition from research to business. Fraunhofer strongly recommends taking on the challenge of dissecting the innovation process and is convinced that there are ways to deliberately make our knowledge and technologies exploitable for business.

Strength in networked innovation

European framework programmes have always enabled collaborative research in order to create synergies from the many excellent individual stakeholders. The obvious success and unanimous approval confirms the importance of co-creation of knowledge, technology and also innovation on a European level. Europe has a hugely diversified innovation landscape with players from education, research and businesses of all sizes that can be orchestrated to turn knowledge and technology into more products and solutions.

2.1.1 Innovation process

The draft for the EIC pilot 2018-2020 shows that the European Commission takes an integrated view on innovation by starting very early with the FET Open instrument designed for low technology readiness levels. Technology readiness levels (TRL) are a widely acknowledged reference system to define the maturity of a technology with respect to its market deployment. Coming from a technology push perspective, it is a good starting point to look at the innovation process.

Very generally speaking, basic research is done in TRLs 1–3 and ends with a proof-of-concept model. On the other end, TRL 8 and 9 focus on a pilot implementation of technology under real life conditions. Between TRL 4 and TRL 7, many steps have to be taken to advance theoretical principles to practical benefits and to demonstrate any technology's aptitude for a specific application. Depending on the kind of technology, the maturation process from TRL 4 to TRL 7 can take many years and consumes a lot of resources. One major challenge during this period is to find the best application for a promising technology, including iterative efforts on market assessment and technology adaptation. Especially with potentially game-changing technologies, there is not only one field of application, but a multitude of possible options –each worth testing.

Thus, the most critical phases in the innovation process are TRLs 4–7 and that is where Fraunhofer sees the biggest potential to make a difference by using the scope and scale of a European framework programme.

2.1.2 Innovation stakeholders

The main task in the maturation process of a technology is to break down the many possible application opportunities into the very limited amount of profitable ones. Since profitability depends on many external factors, it is crucial to find the "window of opportunity" and to time innovation accordingly.

Universities and other academic research organisations are best equipped and should continue to focus on basic research in TRLs 1–3. In these stages, the explorative nature of technology maturation is paramount and researchers are unhindered by any limiting factors and economic considerations. On the other side, the mainly exploitative focus prevails in TRL 8 and 9, where profit-oriented market players target a specific application. Technology maturation in TRLs 4–7, however, is stuck in between. Deep technological understanding must be combined with market expertise from various application fields in order to assess the potential of a technology. There is no type of organisation whose mission is to bring a technology into as many applications as economically favourable. But this is exactly what Europe should aim for: to maximise the exploitation of knowledge and technology that has been created with public money in the first place.

Although research and technology organisations (RTOs) doing applied research combine expert knowledge in cutting-edge technologies and in-depth knowledge of the markets suitable for technology adoption, they have no reason to maximise the exploitability of a technology. The business model of organisations like Fraunhofer is still demand driven and the transfer of technology takes place mainly via contract research with industry.

3 Recommendation for a fully integrated approach to the EIC in FP9

The first step is to acknowledge the need for a coherent technology push approach that has to be reflected in the setup of the future EIC. Building on the findings of Mazzucato¹, who made the case for the state's role in innovation, the future EIC should spur, facilitate and accelerate innovation by an active technology push.

Starting from technologies at TRL 3 / 4, there has to be a dedicated instrument for the maturation of technology that is not targeted at a specific field of application yet. This instrument will need to involve different stakeholders in a collaborative setting with the aim to assess the potential of a technology in different application fields. This new instrument should render our knowledge and technologies exploitable for business. The final transition from research to market is facilitated by a collaborative assessment of the technology in a specific field of application (Fast Track to Innovation) and the market entry on an – at least – European scale will be accelerated with the help of a (modified) SME instrument.

RTOs are already well suited to understand the complexity of the innovation process, to integrate the variety of stakeholders and to coordinate the technology adoption process with the right timing. Europe should take advantage of RTOs' capabilities and make use of their eventual willingness to move to a technology push approach and to actively aim at the valorisation of technology.

¹ Mazzucato, M., "The Entrepreneurial State – Debunking Public vs. Private Sector Myths", Anthem Press (2013)