REPORT

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# *EU Research & Innovation: Interim Evaluation of Horizon 2020*

**Interim Evaluation of Horizon 2020 Key Messages:**

1. **Innovation** is important for future EU industrial competitiveness. Horizon 2020 promotes Research and Innovation (R&I) over a wide spectrum of research themes. Cefic recommends allocation of funds to projects representing a carefully determined balance between Research and Innovation; projects that are significant in size, and are 'future defining' in nature.
2. **Societal Challenges** drive research and innovation programmes to reach the market across value chains. Calls under the current Societal Challenges pillar are broad and generic. Cefic recommends sharper definition and addition of *implementation plans* with a focus on Key Enabling Technologies.
3. **Intellectual Property** (IP) strategy and protection is critical in R&I projects. The current default co-ownership of jointly developed research results and *Open Science* approach require fine tuning to ensure that Horizon 2020 remains attractive for the private-sector.
4. **Industry Participation** is essential to turn ideas into value in the market. Top-100 beneficiaries include only two names from the private sector. Cefic believes Horizon 2020 low project success rate is discouraging participation by business research. Increased share of Framework Programme budget dedicated to successful Public Private Partnerships like SPIRE can address private sector participation in a network including both large companies and small and medium-sized enterprises (SMEs).

## Innovation Policy and Funding Programme Framework

A reliable growth strategy of the European economy is based on research, development and innovation. Cefic believes addressing societal challenges through **partnership driven innovation** is key to providing competitiveness and sustainability to the European chemical industry. Innovation fuels the chemical industry's ability to compete globally. Innovation is a cornerstone of EU policy with recognition of the **Innovation Principle**. Framework Programmes (FPs) are funding instruments created by Europe to foster and create research and innovation (R&I) aimed at improving Europe's competitiveness, drive economic growth, and create jobs. Framework Programmes target an increased investment in R&I, an improved overall speed to market, and - provided the right framework conditions and settings are created among value chain partners - easier and more fruitful cooperation in a pre-competitive environment.

Cefic welcomed the changes from FP7 to Horizon 2020; *Science for science, society and economy* with the objective: ***Challenge driven R&I for a competitive European industry and market***.

## Interim Evaluation of Horizon 2020

Horizon 2020 is the financial instrument implementing the Innovation Union. Horizon 2020 couples research and innovation to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in developing innovative solutions. Embracing a shared risk model, therefore reducing risk for individual partners, Horizon 2020 is designed to take great ideas from the lab and create breakthrough discoveries and world-firsts in the market.

Considering Effectiveness; Efficiency; Relevance; Coherence; and Added Value Cefic collected the following contributions relating to the interim evaluation of Horizon 2020:

1. **Objectives and Priorities.**
   The pillars of the Horizon 2020 programme are 1) Excellence in Science; 2) Industrial Leadership; and 3) Societal Challenges. Programme drivers for Industrial Leadership include:
   - Investments in Key Technologies to drive innovation across existing and emerging sectors
   - Attract more private investment in research and innovation
   - Allow innovative small and medium-sized enterprises (SMEs) to market test their ideas, create growth and jobs

The Innovation Demo programme in the final years of FP7 resulted in increased industry participation. Two recently completed project examples illustrate the impact of this programme[1]:

1. F3 Factory: Accelerate development and demonstrate advantages operating modular continuous plant processes, more economical and sustainable by digital process control and online analytics.
2. E4Water: Close university-industry partnership to fast-track development of water treatment technologies and demonstrate efficient approaches for sustainable water re-use & management.

**Public Private Partnerships** (PPP), like Bio-Based Industries JU (BBI) and SPIRE (representing the innovative process industries), have an effective position in Horizon 2020. Through dedicated calls a solid portfolio of R&I projects to deliver *A Resource Efficient Europe* has been established.
SusChem **European Technology Platforms** (ETP) addresses challenges specific to R&I in the European chemical and industrial biotechnology sectors. SusChem provides input to Commission consultations; creates a forum for stakeholder input and communication. Its close engagement in Horizon 2020 results in calls, and therefore projects, along the priority innovation themes of the sector and attracts higher levels of participation and (co)funding from the industry.

## 2. Relevance and Implementation

Priority innovation themes for the chemical industry include: Resource Efficiency, Utilisation of Alternative Feedstock; Energy Efficiency; ICT & Process Digitisation[2]; Catalyst & Process Development; and Materials Application Development (value chain partnerships).

The relevant shift in Horizon 2020 towards innovation and alignment in themes offers a basis for full engagement by the chemical industry. The current Societal Challenge drive however creates relative broad project calls resulting in low project success rates. Cefic recommends more accurate definition of the challenge and call texts to improve relevance towards the priority innovation themes of the chemical industry to deliver societal, environmental and economic value add for Europe.

Horizon 2020 set out to increase participation from industry; increase participation of SMEs and shorten the 'time to grant'. The annual monitoring reports reveal:

| | **H2020** 2014 | **H2020** 2015 | **SPIRE (PPP)** 2014 & 2015 | **FP7** All years |
|---|---|---|---|---|
| **Programme Funding** (€ Billion) | 8.5 | 7.4 | 0.2 | 55.8 |
| **Industry participation** | 31% * | 32.6% | 59% | 20 % |
| **Participation SMEs** (% of private sector) | 61% | 65% | 26% | n/a |
| **Time to Grant**[3] (days) | 224 | 193 | 178 | 324 |
| **EU contribution per grant** (€ Million) | 1.78 | 1.63 | 5.9 | 1.77 |
| **Project Success Rate**[4] | 13.6% | 10.7% | 16.6% | ~20% |

* 40% of H2020 industry participants are consultants, i.e. 1 out of 10 project participants has a consultancy background.

Cefic backs the two-stage call approach in Horizon 2020. By receiving reviews on the relevance of a proposal to a call the project proposal can be refined adding specific details not available during the first stage. Strengthening, balancing and completing a proposed project consortium is a quality effort that takes time which is now available between the first and second stage of a call.

Programme funding increased from FP7 to Horizon 2020; however available budget is not sufficient to fund all high quality proposals. The Horizon 2020 Monitoring Report 2015 reveals only **26.3%** of the *High Quality Proposals* for Horizon 2020 were funded in 2014 and 2015.

With the transition of FP7 to Horizon 2020 the overall Project Success Rate has dropped from ~20% to 11-14%. The complexity of building a project consortium along the value chain combined with the current project success rate and time to grant discourages relevant business oriented innovation

[1] Additional project examples can be found in the SUSCHEM Position Paper – Horizon 2020 Interim Consultation January 2017

[2] Includes Big Data and Artificial Plant Intelligence initiatives

[3] Represents the time between closure of a call to project granting

[4] Number of project granted versus total number of project submitted to a call

programmes from participating. Solutions for this dilemma are PPPs like SPIRE and a sharp definition of the societal challenge and action plans in terms of Key Enabling Technologies.

Horizon 2020 programme was heralded as aiming for simplification. The streamlined funding rate scheme[5] serves as a good example. The entire programme, however, is still considered as "complicated". Participating entities find it difficult to find their way. A single set of coherent participation rules can be a solution. Horizon 2020 templates are rigid with a *one size fits all* perspective. A more 'flexible' approach is recommended requesting minimum information and allowing the proposed consortium to tailor information on the issues, strength and impact the project will deliver.

3. **Costs, Benefits and Value**

Successful project proposals for Horizon 2020 calls require a precise and accurate match with the call. Excellence in developing text for proposals is required. Larger enterprises may have required expertise in house; SMEs require consultants to provide the required support. Time, and therefore cost, for building a consortium and preparing a proposal has increased compared to previous FPs.

Since projects cover more parts of the value chain, a higher number of actors are required for a successful project proposal. Brokerage events enable formation of strong and solid consortia and are often an opportunity to meet new partners.

Crossing the *technology valley of death,* i.e. taking the Technology Readiness Level (TRL) from 4/5 to 7/8, adds risk and financial hurdles to an innovation project. Horizon 2020, in particular the shared-risk principle, accelerates projects through this resource intensive pilot and demonstration phase of development and therefore adds value through increasing the speed to market.

Protection of Intellectual Property (IP) is an important issue for chemical companies. Regarding the automatic default clause for joint ownership of mutually developed research we recommend a change. Although at first glance it may be attractive, our experience is this will trigger difficult and lengthy negotiations, and if applied will be burdensome to administer. Furthermore, regarding *Open Science*: it is important that it is applied without affecting (i) the freedom to choose whether to publish or not, and (ii) the commercial exploitation of research results. Too hasty publication of results may destroy the possibility of IP protection, e.g. via a patent, therefore it is essential to maintain an opt-out provision.

Active Horizon 2020 projects require a narrowly defined set of accounting rules. Unfortunately these rules do not normally match with enterprise accounting platforms, e.g. SAP, used by companies and therefore generates an extra, often double, administrative burden.

Time for evaluation is long. Time-to-Grant has shortened, however Time-to-Market is a dominant factor in creating market value. SME feedback reveals time between presentation in the SME Instrument first phase (feasibility assessment) and the start of an approved project in the 2nd phase may take 15 months. Process efficiencies should be considered to further shorten timelines.

4. Horizon 2020 **Structure & Synergy** with other EU programmes

Excellence in Science; Industrial Leadership; and Societal Challenges make the three pillars of Horizon 2020. The second and third pillars are attractive and create momentum for the chemical industry to participate. Societal Challenges drive innovation projects to reach the market with project consortia built along a value chain. The connection between the pillars is not always clear. In combination with low project success rates business oriented innovators are discouraged from participating. Cefic recommends a range of changes to re-engage business driven innovation projects:

- Horizon 2020 call descriptions and project proposal reviews should include clear, explicit descriptions of the connection of the project to the Horizon 2020 pillars.
- Industry technologies are needed to solve Societal Challenges; therefore a merger between the second and third pillars, i.e. simplification of programmes, could be considered.

[5] Either 65% or 100% depending on the type of entity

- Increase the role, share and influence of successful Public Private Partnerships, like SPIRE and BBI, and also enlarge the number of *bottom-up* project calls.
- Maintain the balance between Research and Innovation; support more higher TRL-level projects: innovation projects, demonstration and flagship actions.

Continuity and synergy in innovation programmes enhances the ability of the EU chemical industry to compete globally. The continuity in partnership driven innovation projects is therefore important. R&I funding programmes across Europe are heterogeneous and competing, rather than complementary, in nature. Cefic recommends a common and coherent EU R&I policy built in a context of continuous support and complementary use. Alignment in themes and rules across EU, national and regional R&I funding instruments is essential to avoid discontinuities in progression of projects, while achieving a carefully selected **balance between Research orientated and Innovation orientated projects**.

## 5. Forward Looking

Looking beyond the Horizon 2020 programme, Europe should continue to aim to **improve** its **global competiveness and power to innovation**. Quality innovation platforms with a *value added* objective require coordination in funding between European and National programmes, a close and trusting cooperation between a balanced mix of public and private partners, including big and small enterprises. Collaboration between institutes and industry is a key success factor in the development of new markets and implementation of new emerging business models.

The societal challenges approach aims to bring research and innovation closer to the market, and to the general public. Establishing a common vision and pathway to identified solutions based on their value for Europe, creates a mission and constructive image of a future leading to clearer and **sharper definition** of innovation programmes and proposal reviews.

Europe should continue building on its strengths, i.e. the **Key Enabling Technologies,** and where possible encourage a bottom-up driven and transformation focused approach. This frame of reference should replace the current "scattered approach", creating a shift from funding individual R&I ideas into ***investing for future*** success.

Creating **continuity in R&I investment**, through a coherent EU R&I policy, will positively impact evaluation time and project funding success rate, as a result creating value in the market faster. Alongside key monitoring parameters should be transformed from Key Process Parameters to **Key Impact Parameters** based on sustainability assessment with appropriate integration of life cycle approaches.

*Horizon 2020: Excellence in Science; Excel in challenge driven Innovation.* Cefic recommends that the most important issues to address are **Sustainable** generation, supply and storage of **Energy** and a sustainable **development of Circular Economy**.

The chemical industry will continue to address challenges through partnership driven innovation and is ready to extend alliances to initiatives connected, but not directly related, to chemistry. With its broad spectrum of technologies and solutions the chemical industry can contribute to understanding and addressing challenges and opportunities to improve Europe's competitiveness.

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About Cefic

Cefic, the European Chemical Industry Council, founded in 1972, is the voice of 29,000 large, medium and small chemical companies in Europe, which provide 1.2 million jobs and account for 17% of world chemicals production.