

# EU Research & Innovation Framework Programme

## *The Chemical Industry's role in EU growth and competitiveness*

### The Next Framework Programme: FP9

Horizon 2020 marked a step improvement over previous Framework Funding Programmes but we still need strong commitment to ensure future Framework Programmes address market-implementation and realisation of innovation, translate into industrial competitiveness, further the development of Key Enabling Technologies, reinforce intellectual property strategy and attract industrial participation to deliver impact for Europe.

	EU-28	USA	Japan	China
R&D Intensity as % GDP from 2005 to 2015:	1.7 → 2.0 %	2.5 → 2.7 %	3.3 → 3.6 %	1.3 → 2.1 %
EU-28 Sources of R&D Funding in 2015:	Business Enterprise: 55%		Government: 33%	

*Source: Eurostat February 2017 data*

Europe is lagging behind in R&D investment. With close to 90% of the R&D funding coming from the Business and Government sectors there is an opportunity for these two sectors to work together in a symbiotic setting to close the gap. The next EU R&I Framework Programme should become the catalyst accelerating change; *Orchestrating an Impact Driven, Value Generating European Innovation Ecosystem*.

### EU Research & Innovation Framework Programme Key Messages: **The 3I's**

*A future-oriented EU R&I Ecosystem requires a well-balanced combination and perfect orchestration of **Innovation, Industry and Impact**. A European Framework Programme should propel funding, reduce risk, accelerate time to market and demonstrate commitment to the launch and acceptance of 'future defining' innovative solutions.*

#### **Innovation**

The Chemical Industry has a strong and enabling position in multiple value chains and holds a pivotal position in research, development and the market introduction of innovative solutions. Research and knowledge generation are necessary precursors; then Innovation is the transformation into new products, processes and/or business models, all aiming at technological advancement and societal benefit. R&I is and will remain the basis for competitiveness, progress and welfare. Therefore, we must substantially strengthen the ability to transform knowledge into technological developments and transfer these into market-ready innovations.

#### **Industry**

The Chemical Industry strongly supports the three pillars "excellent science", "industrial leadership" and "societal challenges". Industry Participation in EU Framework Programmes is essential to turn ideas into impact-driven and value-creating applications. Engagement of the whole Innovation Ecosystem coupled with Public Private Partnerships, like SPIRE and BBI, addresses private sector participation. By understanding the channels to market, the industry can bridge gaps and accelerate the generation of impact and results from R&I programmes.

#### **Impact**

Europe's competitiveness and welfare rely on the economic and innovative strengths of enterprises. Research drives knowledge and a solid future. Innovation Partnerships bring together and bridge both the development chain and value chain. Knowledge transfer along these chains drives innovation to secure future-proof jobs and sustainable development, i.e. results and impact achieved in the economy, environment and society.

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In the design of the next European R&I Framework Programme, FP9, Cefic recommends addressing:

### 1. A Competitive Innovation Ecosystem

Advancing innovations from discovery through to commercialisation involves numerous actors from academia; research and technology organisations; government; investor communities; start-ups, and small-medium and large industries. In the discovery and fundamental research space funding mostly originates from government investments and grants. Implementing innovations in the market is associated with funding from the business environment. In-between lies the so-called *Valley of Death*. Lack of funding in combination with an imbalance in risk management often causes promising inventions to die. Successfully crossing this valley requires alignment in objectives and collaboration throughout the whole Innovation Ecosystem with the aim of manufacturing and market introduction of innovations in Europe.

Competitive Innovation Ecosystems; *Parameters to pull, solutions to be considered:*

- i. Public Private Partnerships; committed to innovation in a specific area to address fundamental challenges. PPPs, like SPIRE and BBI, create a *bottom-up* approach for project ideas and develop a solid portfolio of R&I projects with momentum to deliver impact. Preferably a PPP should be cross-sectorial, aligned to common missions or challenges, with the objective to replicate innovative solutions quickly throughout multiple sectors, rather than focused on a single segment.
- ii. Common and Coherent R&I policy across Europe; homogeneous policy programmes with solid alignment and synergy between EU and member states. Complementary funding instruments - grants, loans, tax breaks, etc. - should be available across the R&I management process to address risk management, create momentum and continuity in R&I programmes. A European Innovation Council (EIC) should advise on major innovation platforms, R&I policies, streamline and simplify the spectrum of innovation funding instruments with the objective of engaging all actors in the innovation ecosystem, including start-ups, small-medium enterprises and large companies, in the realisation of innovation programmes.
- iii. Definition of common themes for 'future defining' Research Missions for creating and advancing the European competitive position (e.g. energy storage systems).
- iv. Innovation Programmes and Legislation development; close and direct interaction between major R&I programmes and regulatory development with the objective to identify barriers to innovation early, manage and eliminate these before market launching an innovation.

### 2. A Balanced R&I Portfolio

Portfolio management can best be defined as balanced planning and steering of initiatives, aiming to provide the greatest overall impact. Considerations in managing balance across an R&I Portfolio include:

- i. Low and High TRL<sup>1</sup> projects, i.e. Fundamental long-term research ideas with output focus on new knowledge and breakthrough combined with a seamless transfer and pick-up of knowledge and results by industry with focus on shorter-term Innovation and demonstration. All coupled with and driven by the desire to *shorten time to market*.
- ii. Involvement of the whole Innovation Ecosystem. Active participation of academia, public and private sector. Within the private sector involvement and support for start-ups, small-medium enterprises and large companies to achieve bridging partnerships along the value chain.
- iii. Risk and Reward. Foster an integrated approach managing both risks and benefits associated with new ideas, Research & Innovations, to attract investments in breakthrough technologies, where risk-taking is indispensable, and improve public acceptance.

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<sup>1</sup> Technology Readiness Level in Horizon 2020 range from 1 = Basic principles observed, to 9 = Proven in operational environment

### 3. A Competitive EU Manufacturing Base

*Made in Europe* requires a strong, coherent, integrated and competitive manufacturing base in Europe. The chemical industry - as an enabler for many industry clusters and multiple value chains - holds a pivotal position in the research, development, scale-up and realisation of innovative materials and processes. Changes or transformation within these value chains will entail partnership with the chemical industry.

Priority innovation themes for the chemical industry include: Resource Efficiency, Utilisation of Alternative Feedstock (including biomass); Climate Change & Energy Efficiency; Catalyst Development; Reactor & Process Development; ICT & Process Digitisation<sup>2</sup>; Materials Application Development; and Mobility & Transportation.

Europe's drive towards and transformation into a Circular Economy and Low Carbon Economy<sup>3</sup> calls for an *investing for the future* mind-set, a perfect alignment of all actors and innovation programmes to create the necessary momentum and breakthrough in technologies and business models. The chemical industry is willing to take a leading role. With Key Enabling Technologies (KETs) forming the back-bone.

#### i. Breakthrough **Process Technologies**

Chemical Industry production processes of the (near) future must be more intensive and efficient from a resource and energy perspective, and at the same time more flexible, robust and tolerant to changes and variations due to, for instance, feedstock materials. Batch processes will need to be replaced by newly developed continuous production processes. Biobased chemicals will require new and efficient processes to be developed. Utilisation of alternative carbon sources (biomass, waste, gaseous industrial effluents including CO<sub>2</sub>) will require development and transformation of new processes.

#### ii. Market Enabling **Materials**

Advanced material development targeting low carbon solutions include applications like energy performance in buildings, energy production & storage, and mobility. Bridging the gap between lab and the market is the critical step in materials innovation. Key factors for success are bridging Innovation Partnerships bringing together both the Innovation chain and the Value chain.

Europe's knowledge of and capabilities in **Material Science** are strong. This competitive advantage is best maintained by a combination of actions: 1) A clear, focussed and uninterrupted Materials R&I support programme with a focus on application development and discovery & design of new materials; 2) Enhanced engagement with the "Materials" focussed industries like steel, glass, chemistry, transportation, non-fossil energy generation, non-ferro etc.)

Made for Europe's future; The European Commission needs to consider reinforcing the role of industry-driven European Technology Platforms (ETPs) such as SusChem, by giving them an accountability for shaping and maintaining strategic research & innovation agendas (SIRAs) and a greater involvement in strategic planning in their relevant R&I areas.

### 4. Sustainable Development & Impact - Industry Role

Results must become the driver of the next Framework Programme. Outcomes in terms of **impact** should be considered along the three dimensions of Sustainable Development: Society, Environment, and the Economy. R&I programmes need to demonstrate real impact across all three dimensions, rather than sub-optimised results along one or two dimensions. The **replication** potential to similar or related cases and between sectors should become a consideration for innovation projects.

- Society in the next FP expects, amongst others, a growth in terms of number of jobs and solutions to 'megatrends' like *Health & Aging, Digitisation, Resources & Energy, Globalisation & Urbanisation*.

<sup>2</sup> Includes Big Data and Artificial Plant Intelligence initiatives

<sup>3</sup> An Economy based on low carbon energy sources that therefore has a minimal output of greenhouse gas carbon dioxide

- The Environment experiences, amongst others, sustainable generation, supply, storage and utilisation of Energy, advances towards a Circular Economy, and solutions to Green House Gas emissions and Climate Change. Significant advancement in terms of usage of biobased feedstocks, electrification of the chemical industry, and use of renewable fluctuating energies are anticipated.
- From the Economic point of view, the next FP has to address EU competitiveness, Economic Value-added, increasing GDPs, distinct technological differentiation from the rest of world and technological leadership in selected, and therefore targeted, fields.

An important enabler of value generation and impact creation is a solidly developed and stringently executed **Intellectual Property** (IP) strategy. Protection of innovation through IP is an essential building block for the chemical industry's competitiveness. The EU's drive to Open Innovation, Open Science and Open to the World should not imply open and free to everyone, but rather warrant sustainable IP strategies, especially when these strategies are in development.

Research and Innovation is a prerequisite for creation of impact. The Industry understands the channels to market. Industry participation in R&I programmes is therefore essential to accelerate generation of impact and results.

*Future European R&I Framework Programme: Excellence in Science; Excel in Impact driven Innovation.*

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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.