



INNOCHEM CONFERENCE



Skills for innovation in the Chemical industry

Nicole L Maréchal
Friday 7 April 2017



CEPIC



The European Chemical Industry Council



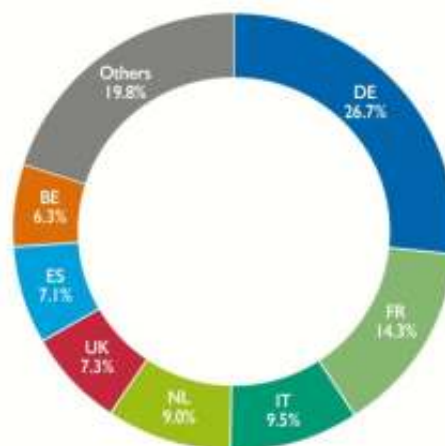
Cefic: the voice of the chemical industry in Europe



- 29 000 companies, 96% SMEs
- National federations in Europe
- 1.17 million jobs
- €551 billion of revenues in 2014
- 17% of world's chemical production

= key EU economic sector

Sales 2014 (€551 billion)



Source: Cefic Chemdata International - data for 2014

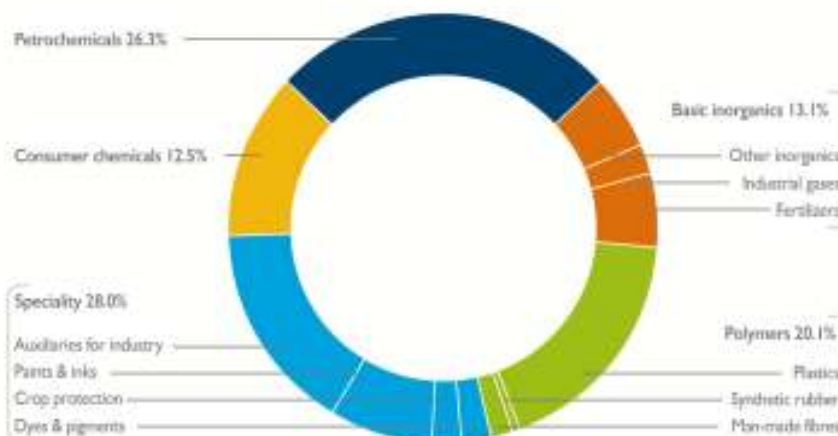
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Petrochemicals and specialty chemicals account for half of EU chemicals sales



EU chemical industry sales by sectoral breakdown

Sales 2015 (€519 billion)



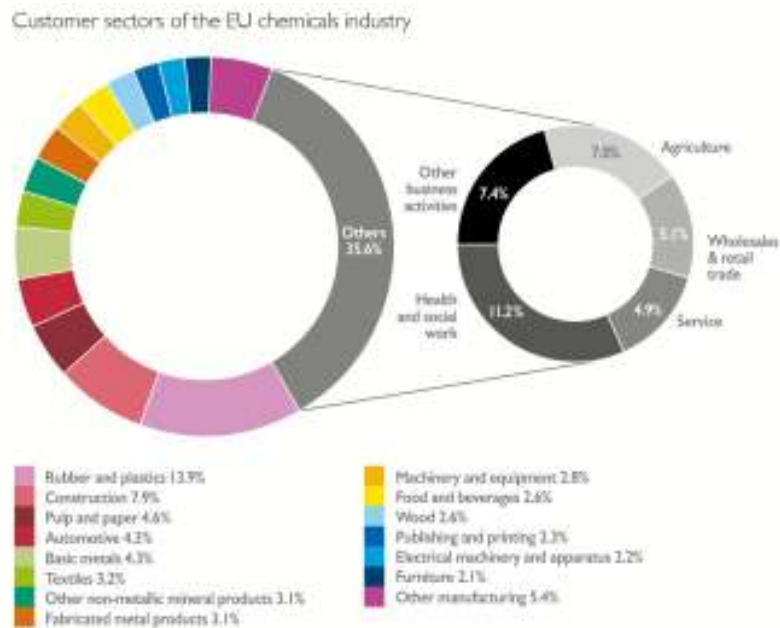
Source: Cefic Chemdata International 2016

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Nearly two-thirds of EU chemicals are supplied to the industrial sector



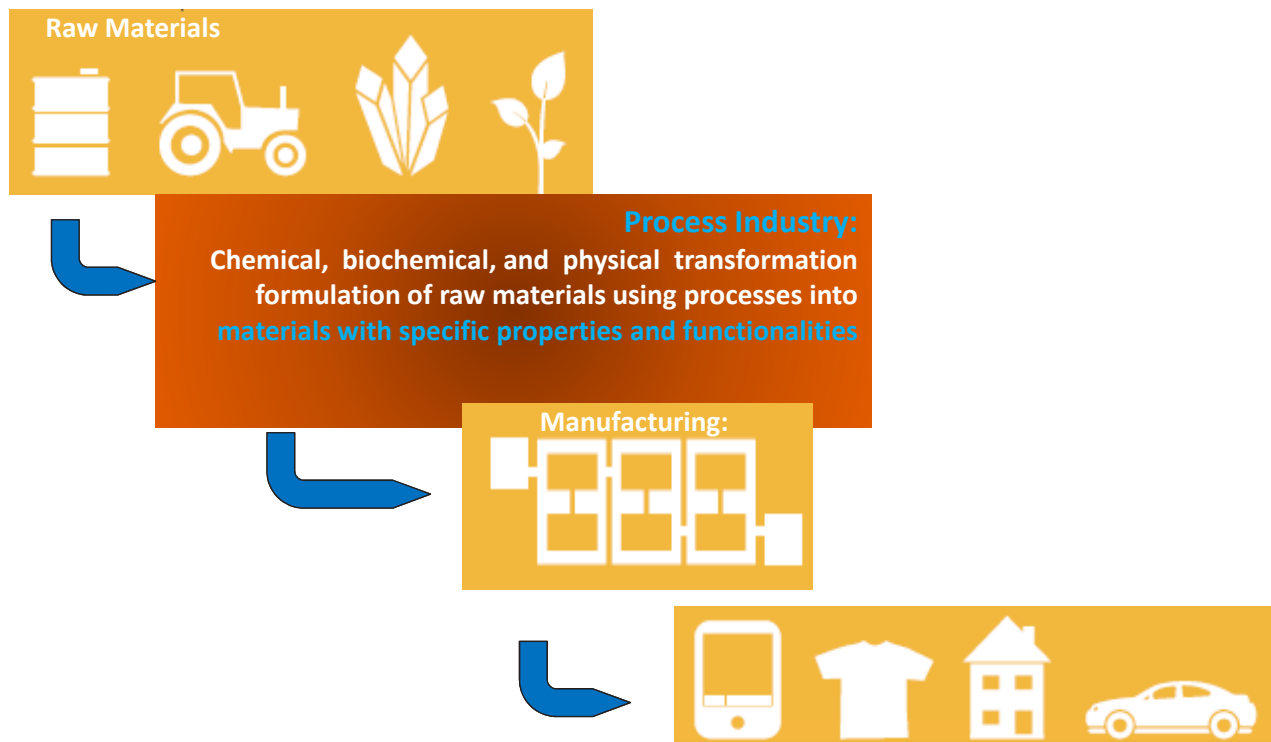
Contribution of the chemical industry to the EU economy



Source: Eurostat data (Input-Output 2000) and Cefic analysis

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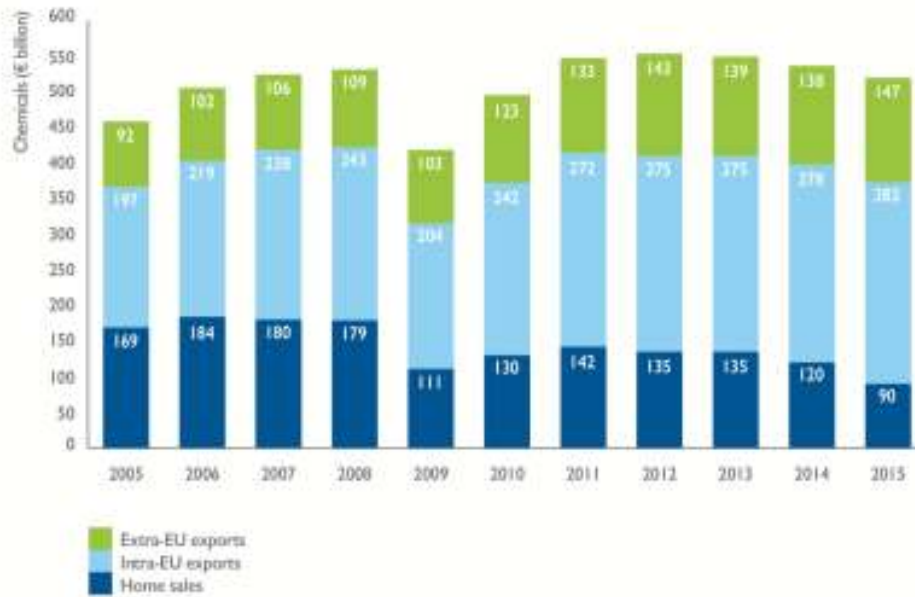
Positioning the Chemical industry



Internal market drives EU chemicals sales



EU chemical industry sales: structure by destination



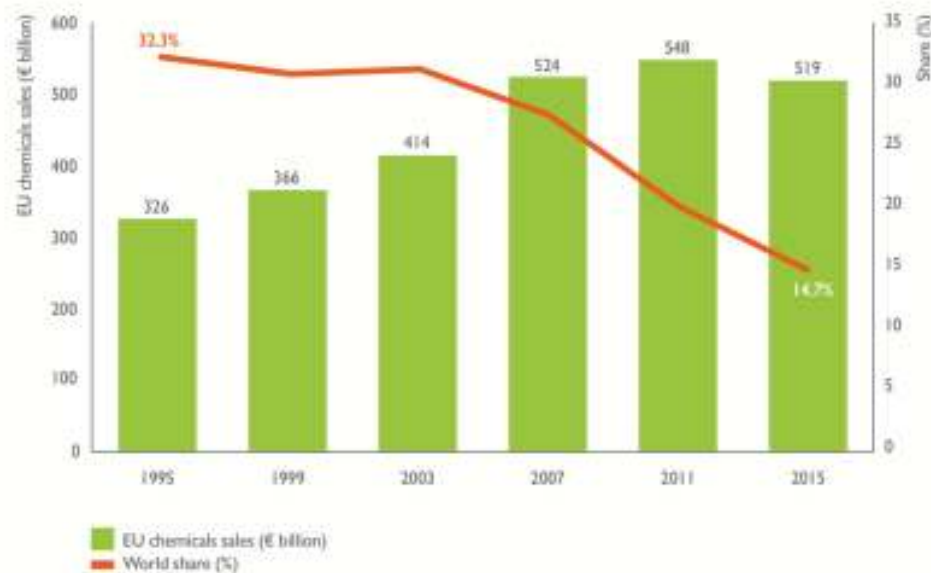
Source: Cefic Chemdata International 2016

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EU chemicals sales increase by nearly 60% in 20 years, while its world market share halves



EU share of global chemicals market



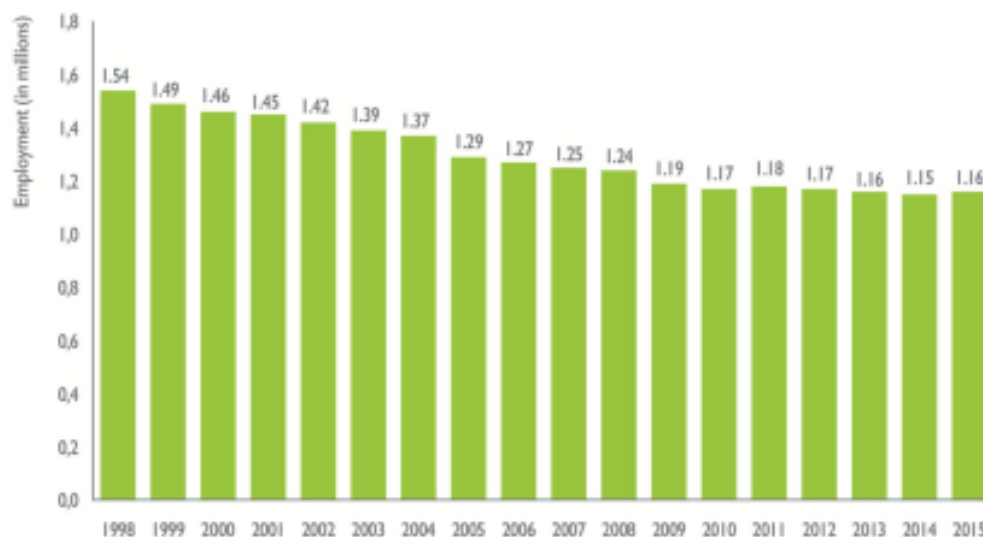
Source: Cefic Chemdata International 2016

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Employment level stabilised since 2010



Employment in the EU chemical industry



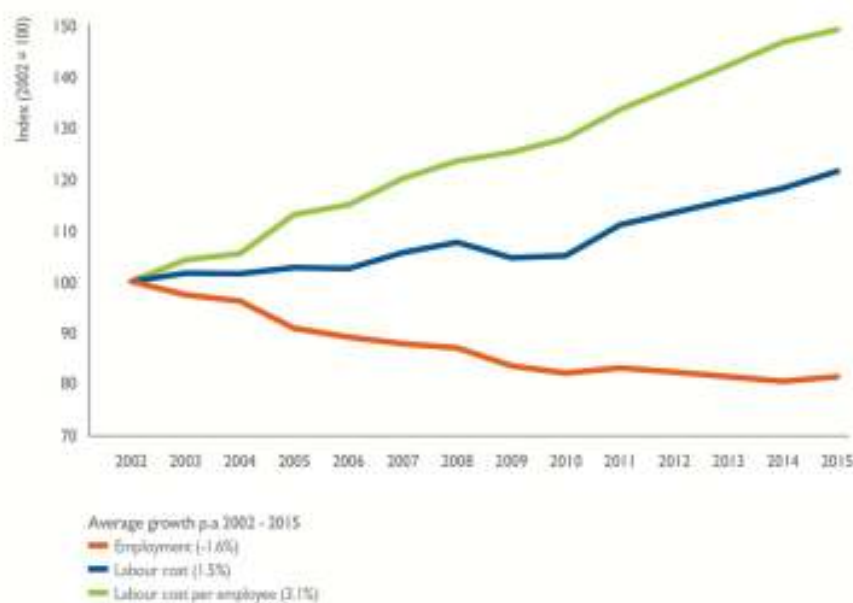
Source: Cefic Chemdata International 2016

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Labour cost per employee up by 49% since 2002



Labour cost per employee



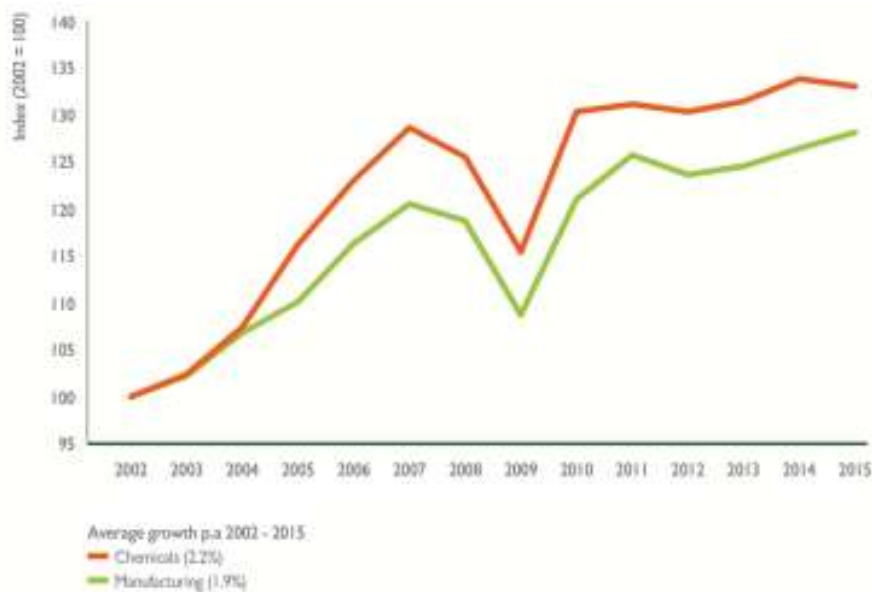
Source: Cefic Chemdata International 2016

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EU chemicals labour productivity growth slightly higher than overall manufacturing



Labour productivity: chemicals vs total manufacturing



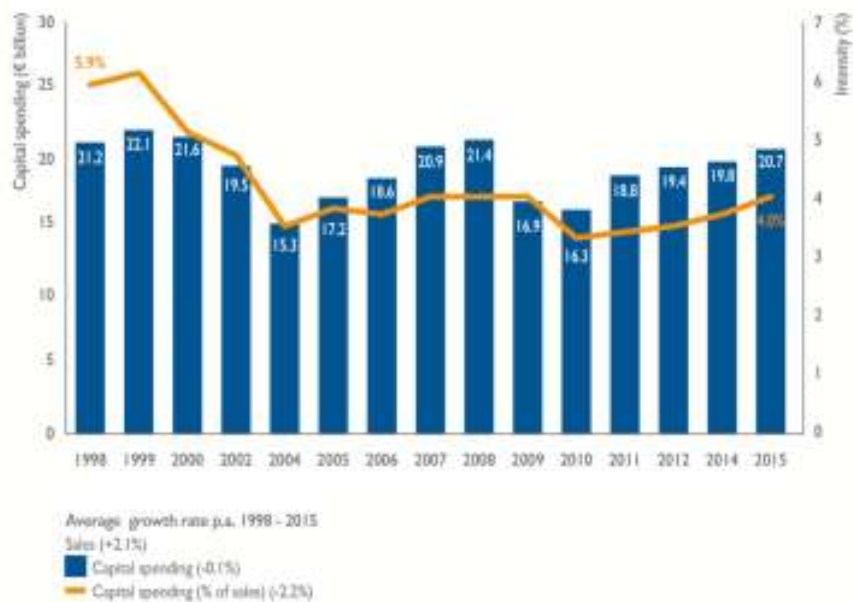
Source: Cefic Chemdata International 2016

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EU capital spending intensity still below its record level registered in 1999



Capital spending in the EU chemical industry



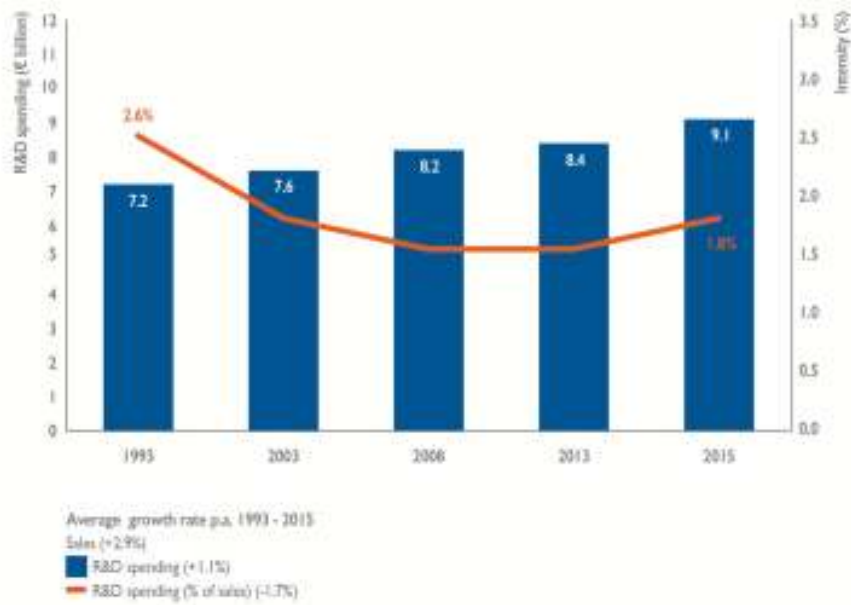
Source: Cefic Chemdata International 2016

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EU chemical industry boosts spending on R&D, but intensity still very low



R&D in the EU chemical industry



Source: Cefic Chemdata International 2016

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Only one choice!
 An ambitious one - for innovation

cefic

Responsible Care®
 OUR COMMITMENT TO SUSTAINABILITY

High Level Group on the Competitiveness of the European Chemicals Industry



Process launched in 2007

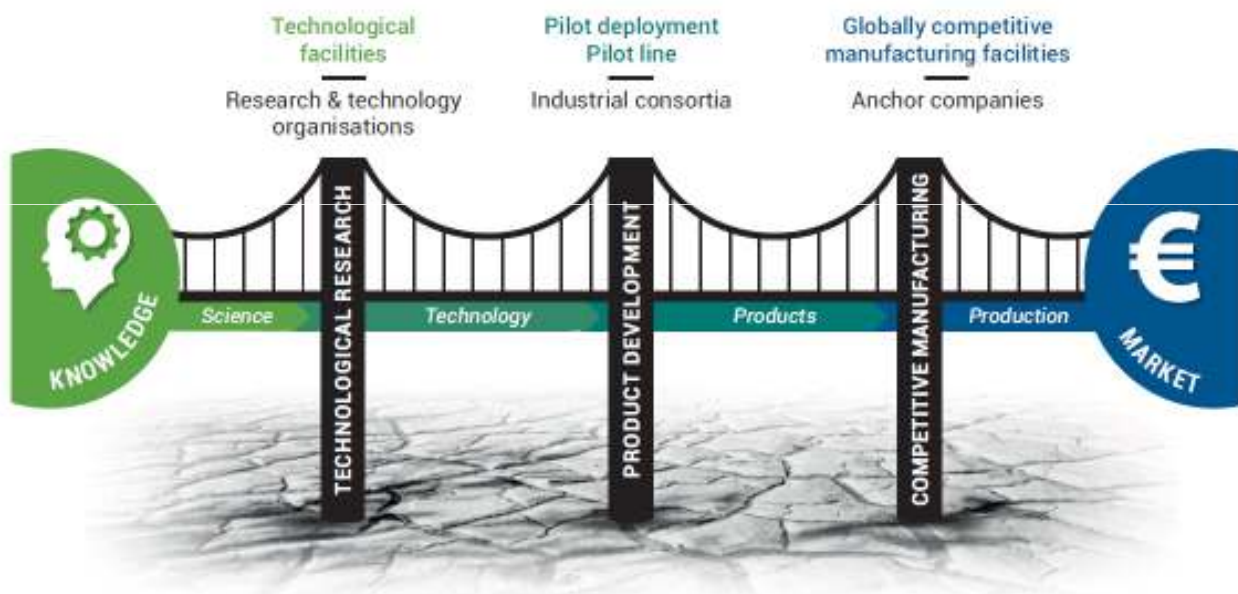
High Level Group chaired by Vice-president Verheugen and composed of representatives from the Commission, Member States, Regions, Trade Unions, Environmental NGOs, consumer Organisations and the Industry

Task of the Group: to conduct economic and statistical analysis of the factors determining the competitive position of the industry and formulate recommendations to the EU Institutions, national authorities, industry and civil organisations

Final Report: included Recommendations on Human Resources, concluding that the development of human resources needed more attention

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EU Innovation “deficit” *Crossing the Valley of ~~Death~~ Hope*





Skills for Innovation

in the European Chemical Industry

In order to speed up the delivery of solutions to societal challenges and to remain competitive, the European chemical industry needs the right workforce, prepared to push innovation forward.

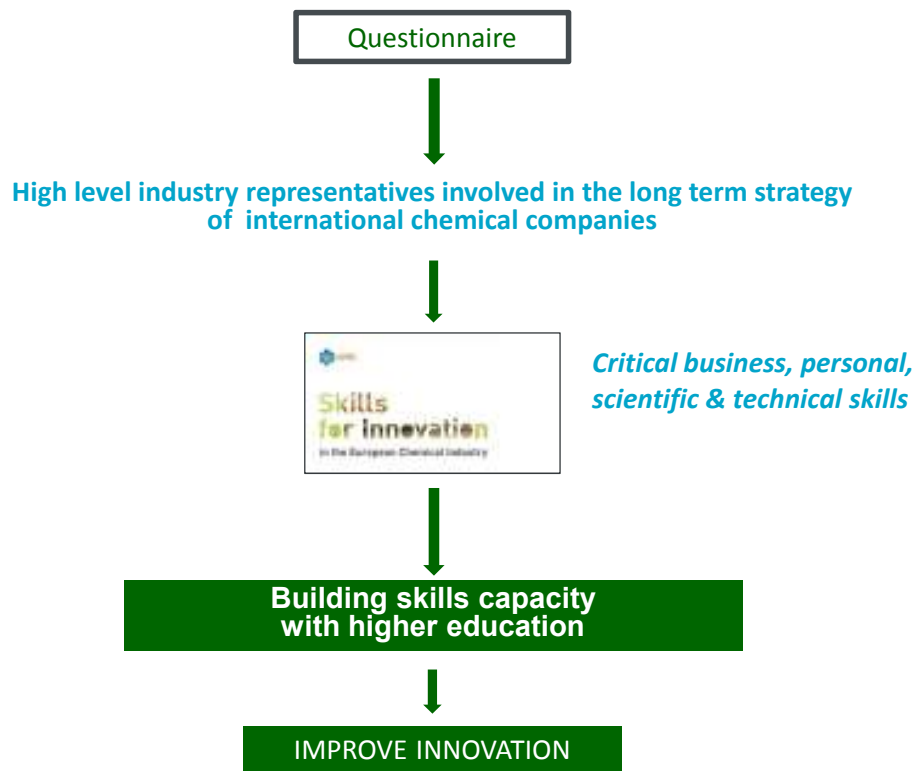


Only one choice!

An ambitious one - for education as well



Cefic “skills for innovation” project



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Research= Interview based - Study



European chemical sector, needs future **engineers** and **scientists** with:

- a broader scientific skill set that goes beyond traditional single discipline teaching
- a strategic awareness of business and innovation management issues

Opportunities for context- and problem-based learning need to be considered when developing courses

Interviews were conducted at European level in chemical companies, including SMEs by Cefic to define needed skills

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Skills for Innovation

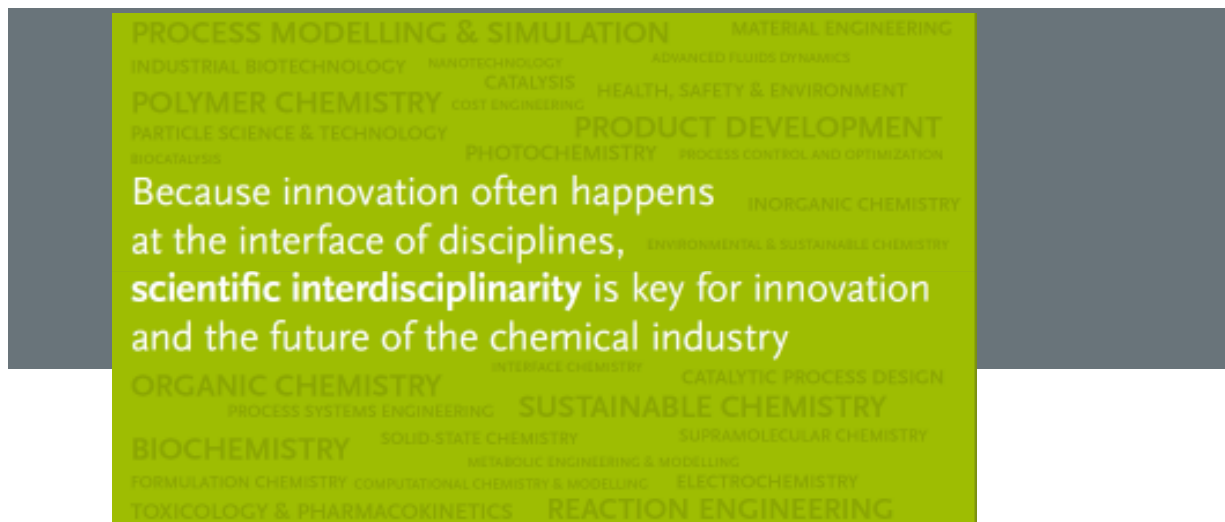
in the European Chemical Industry

In order to speed up the delivery of solutions to societal challenges and to remain competitive, the European chemical industry needs the right workforce, prepared to push innovation forward.

Skills needs for innovation : main findings

| Critical skills | For engineers | For scientists |
|---------------------------------|---|--|
| Business | <ol style="list-style-type: none"> 1. <i>Project management</i> 2. <i>Innovation management</i> 3. <i>Understanding customers & suppliers</i> | <ol style="list-style-type: none"> 1. <i>Intellectual property law</i> 2. <i>Innovation management</i> 3. <i>Strategic & visionary management</i> |
| Personal | <ol style="list-style-type: none"> 1. <i>Communication</i> 2. <i>Team work</i> 3. <i>Problem solving</i> | <ol style="list-style-type: none"> 1. <i>Creative thinking</i> 2. <i>Communication</i> 3. <i>Team work</i> |
| Scientific and technical | <p><i>Process Modelling & Simulation, Scale-up, Reaction engineering, Process Design, Biochemical engineering, Process Intensification, Safety engineering, Particle science, Nanotechnology, Sustainable chemistry, Materials chemistry.</i></p> | <p><i>Organic chemistry and polymer chemistry, Catalysis, nanotechnology, formulation, Sustainable chemistry, Interface chemistry, Industrial biotechnology, Biochemistry</i></p> |

Skills needs for innovation : main findings



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In a nutshell

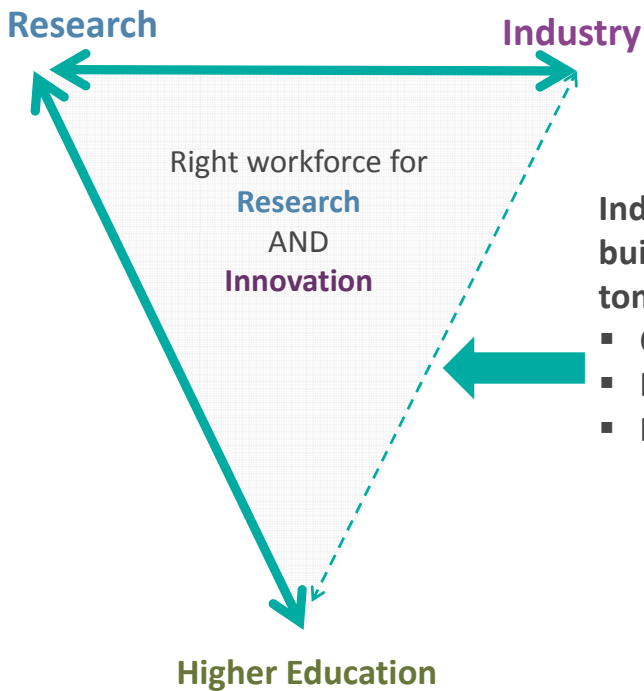


The chemical industry is continually evolving due to scientific and technological breakthroughs, emerging markets, changing legislation and sustainability requirements

Engineers and scientists will need to develop a wide range of skills in order to adapt to this fast changing world and to respond to these new challenges

These aspects should be reflected in education as well as in life long learning programmes, which should always be tailored to individual needs

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Industry and High Education Institutes to build together the skills capacity for tomorrow

- Create synergies
- Define concrete actions
- **But barriers and constraints exist:**
 - Professors assessed on research output
 - Existing curricula focus on research and not the whole innovation chain
 - Co-operation across disciplines is difficult in traditional HE structures

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IN CONCLUSION- We need



**The right workforce
for tomorrow's innovation
and markets**

*And I trust that the InnoChem project
will help to reach this objective*

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Thank you very much for your attention

Contact us



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