



# INNOCHEM CONFERENCE



Skills for innovation in the Chemical industry

*Nicole L Maréchal*  
Friday 7 April 2017



# CEPIC



The European Chemical Industry Council



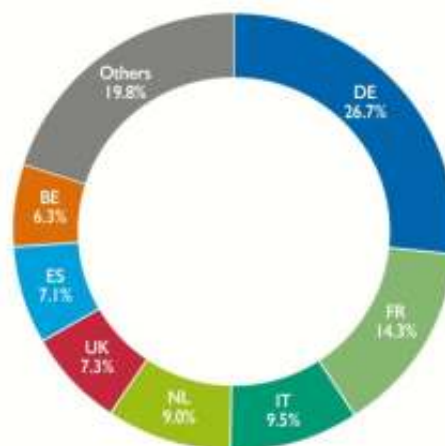
# Cefic: the voice of the chemical industry in Europe



- 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

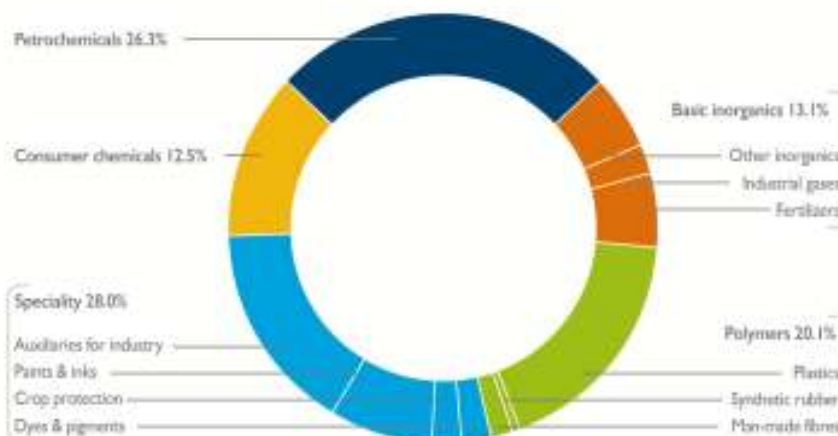
Page 3

# Petrochemicals and specialty chemicals account for half of EU chemicals sales



EU chemical industry sales by sectoral breakdown

Sales 2015 (€519 billion)



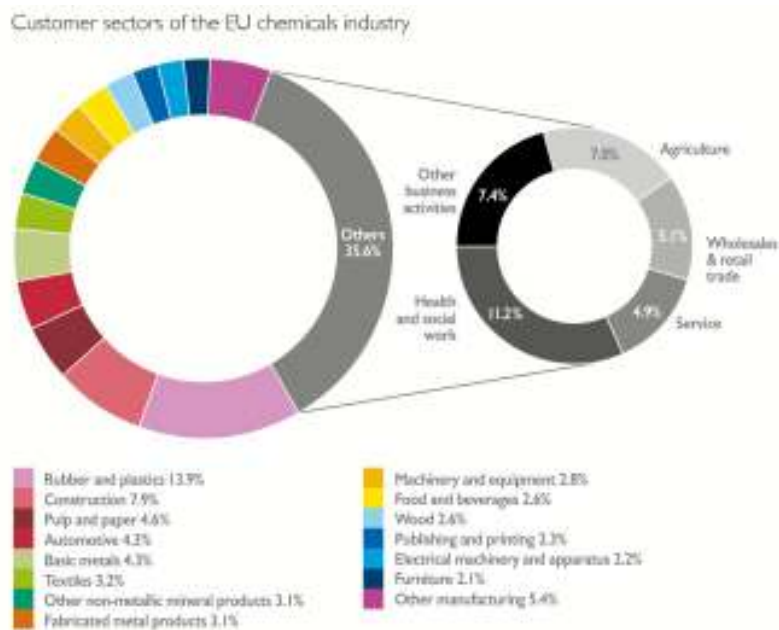
Source: Cefic Chemdata International 2016

Page 4

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



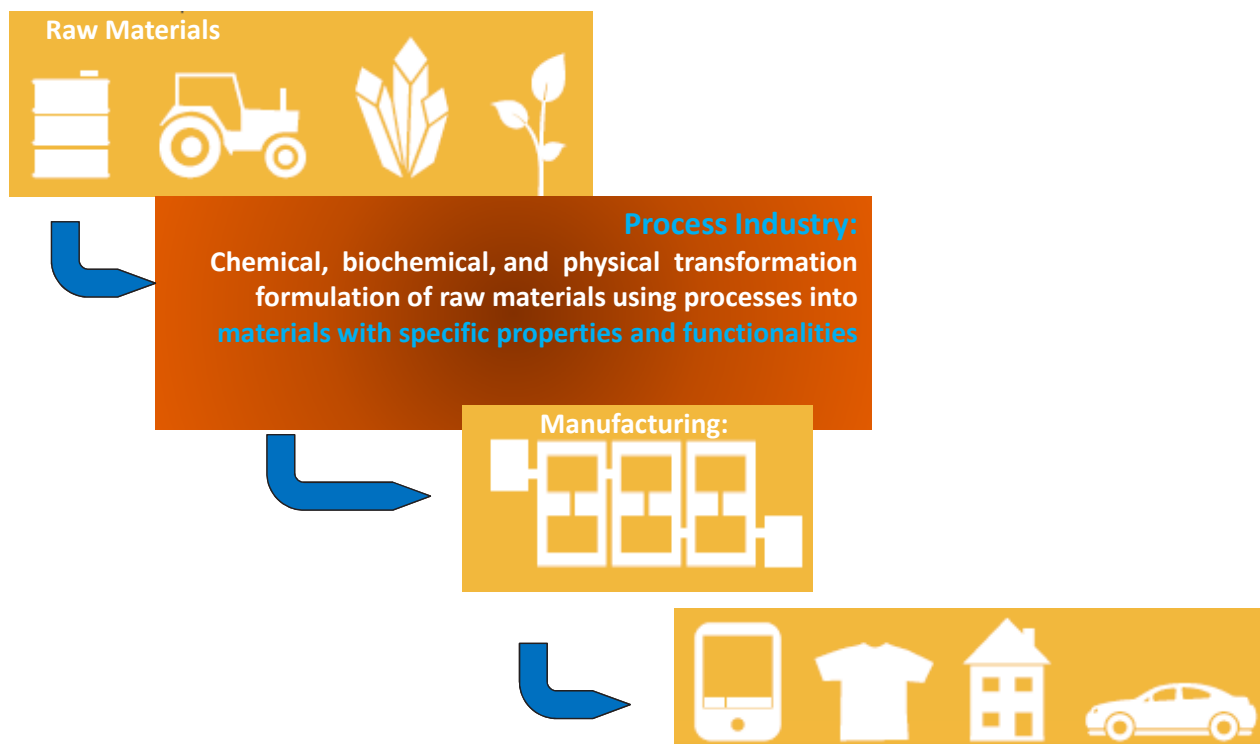
Contribution of the chemical industry to the EU economy



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

Page 5

## Positioning the Chemical industry

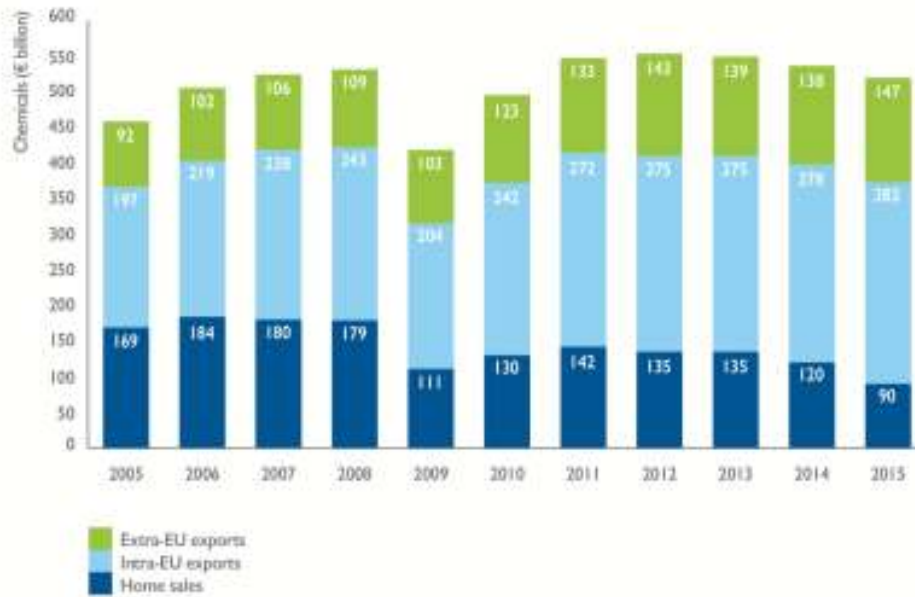


6

# Internal market drives EU chemicals sales



EU chemical industry sales: structure by destination



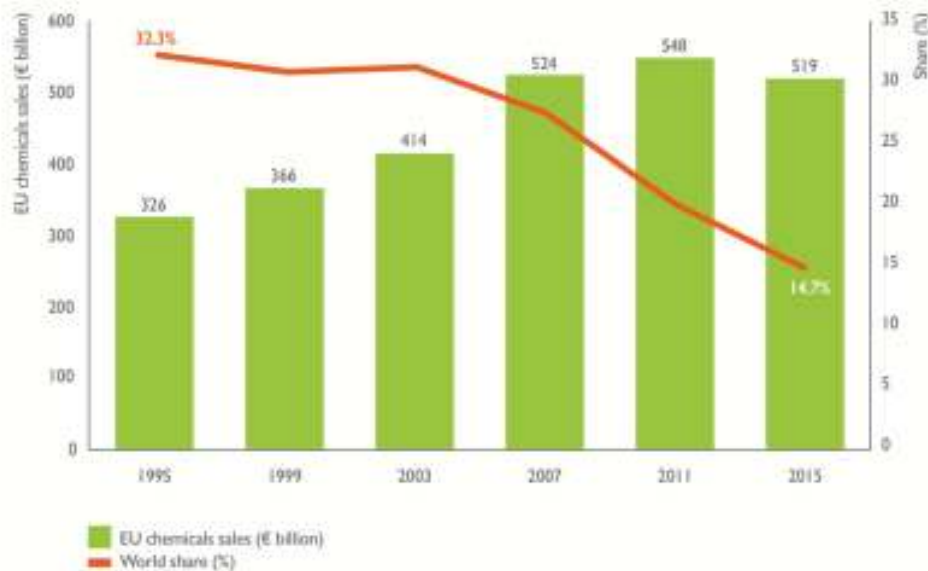
Source: Cefic Chemdata International 2016

Page 7

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



EU share of global chemicals market



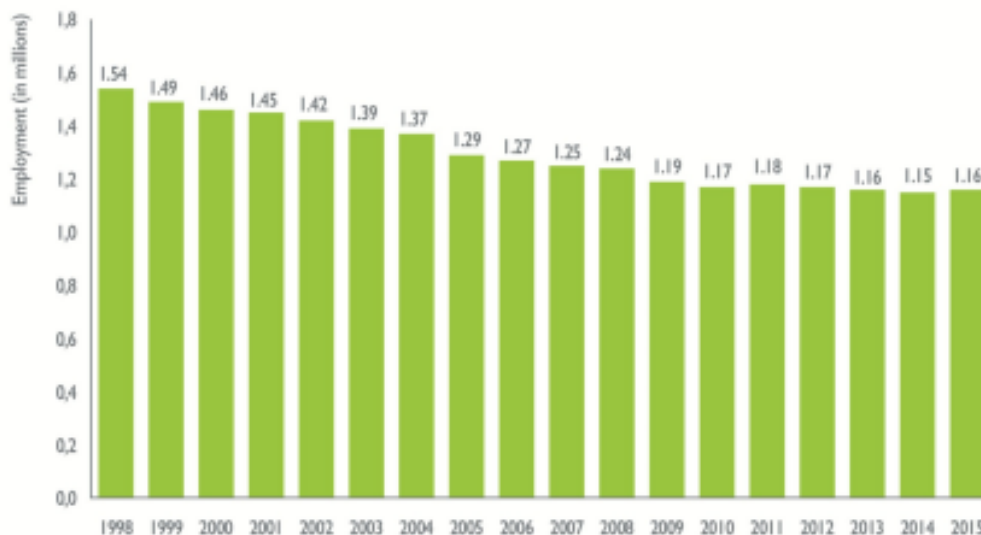
Source: Cefic Chemdata International 2016

Page 8

# Employment level stabilised since 2010



## Employment in the EU chemical industry



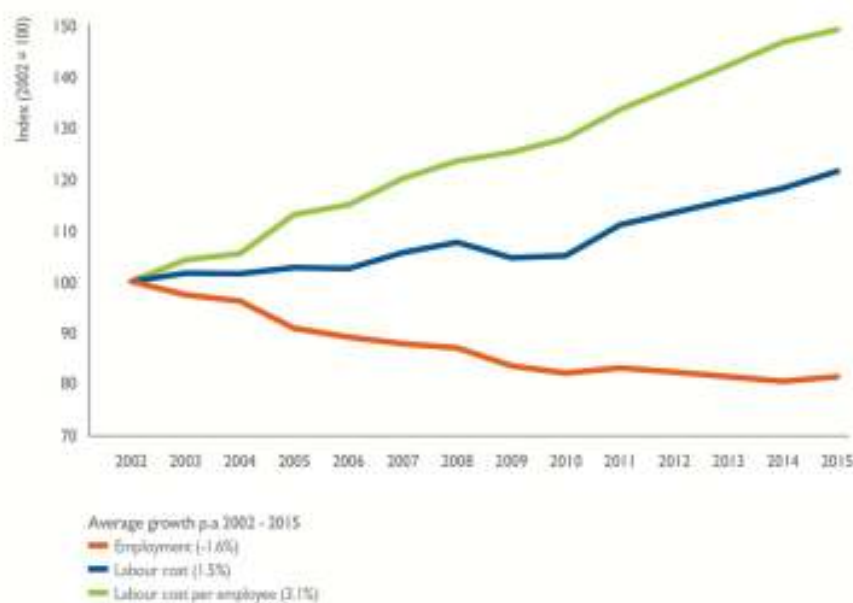
Source: Cefic Chemdata International 2016

Page 9

# Labour cost per employee up by 49% since 2002



## Labour cost per employee



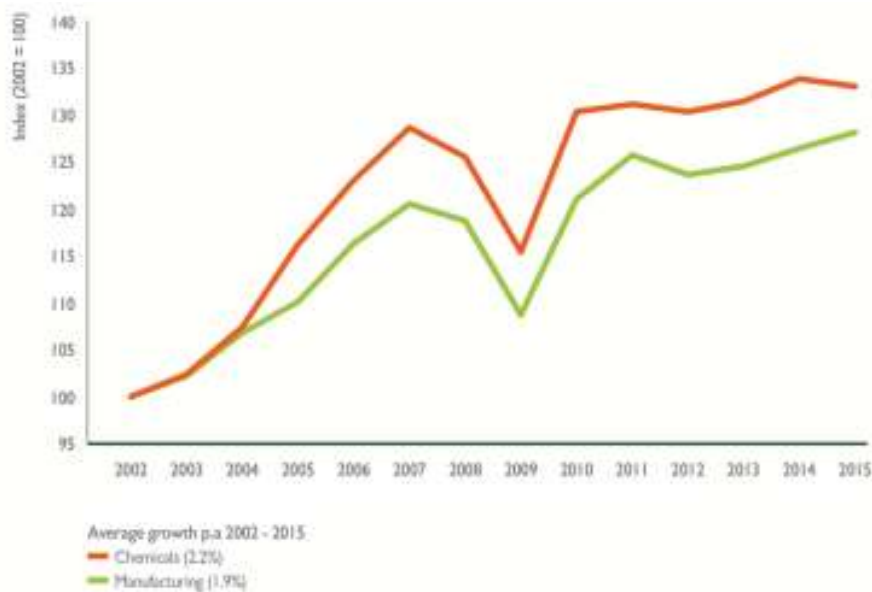
Source: Cefic Chemdata International 2016

Page 10

# EU chemicals labour productivity growth slightly higher than overall manufacturing



Labour productivity: chemicals vs total manufacturing



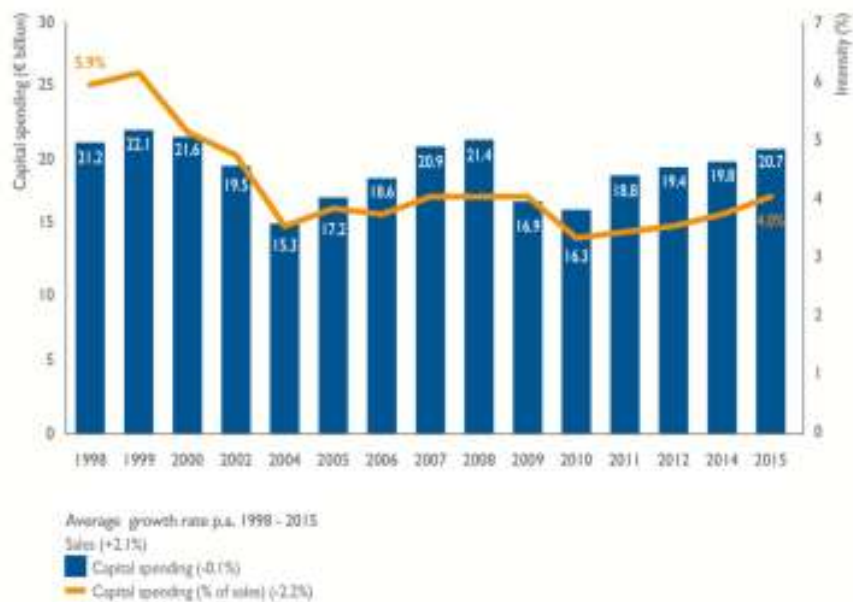
Source: Cefic Chemdata International 2016

Page 11

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



Capital spending in the EU chemical industry



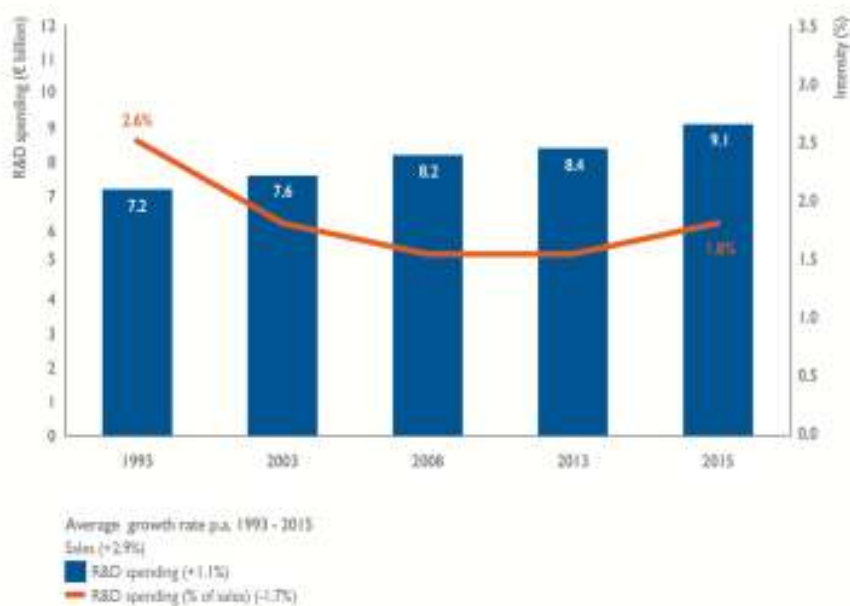
Source: Cefic Chemdata International 2016

Page 12

# 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

Page 13

**Only one choice!**  
 An ambitious one - for innovation

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# High Level Group on the Competitiveness of the European Chemicals Industry



Process launched in 2007

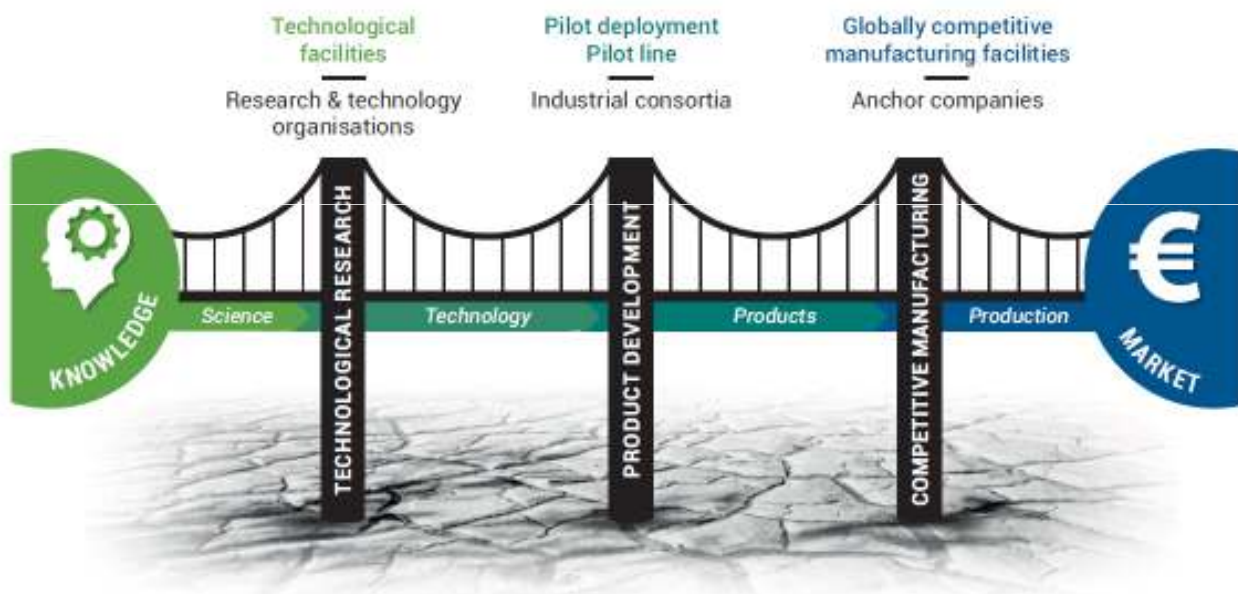
High Level Group chaired by Vice-president Verheugen and composed of representatives from the Commission, Member States, Regions, Trade Unions, Environmental NGOs, consumer Organisations and the Industry

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

15

## 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.

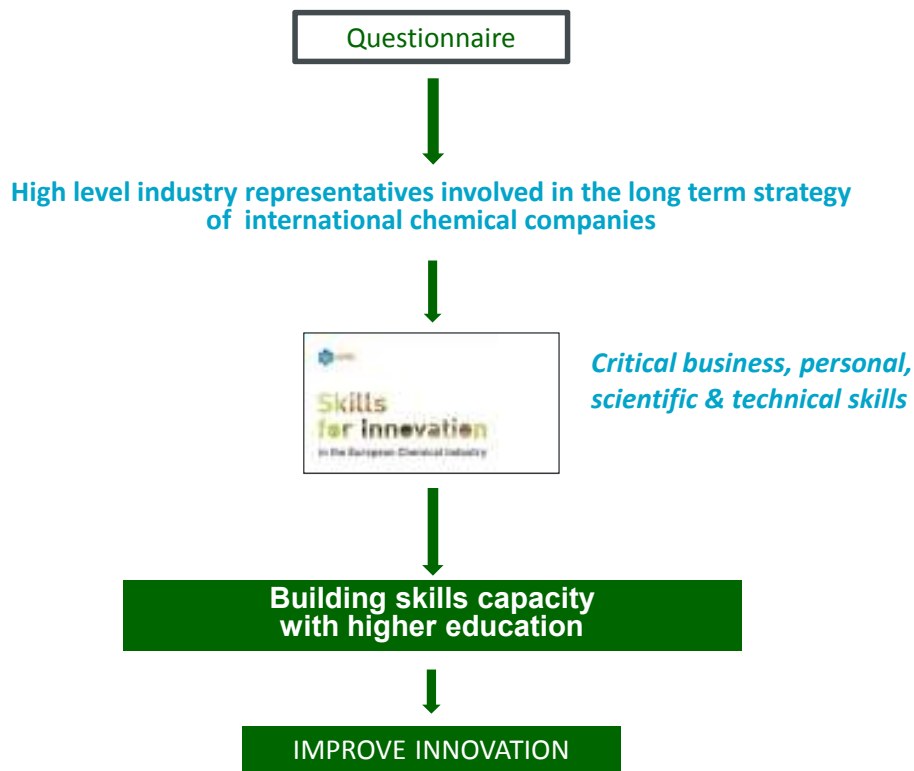


# Only one choice!

An ambitious one - for education as well



# Cefic “skills for innovation” project



19

## 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*

20





## Skills for Innovation

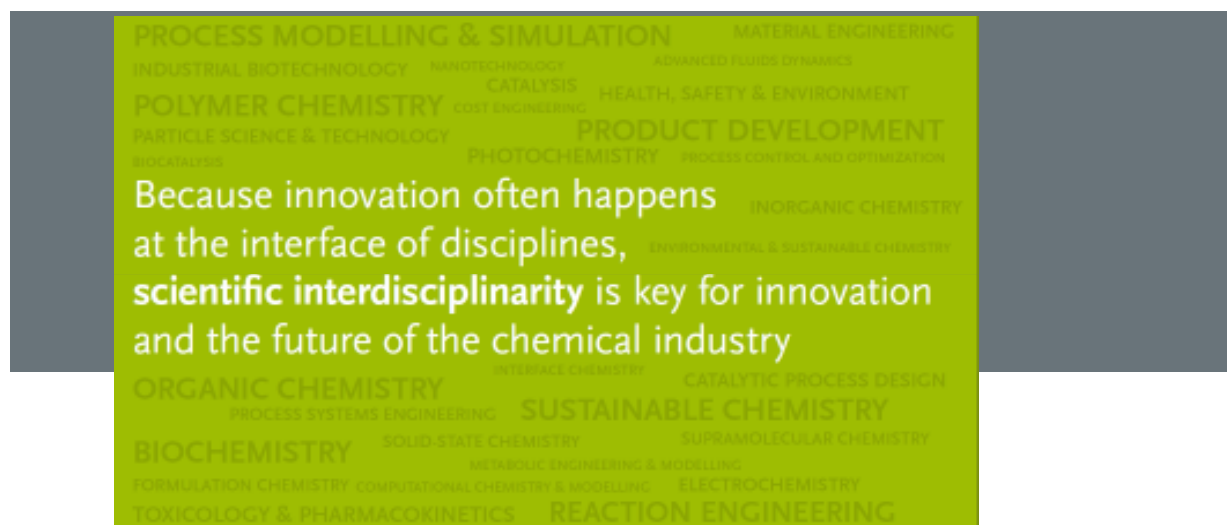
in the European Chemical Industry

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
<b>Business</b>	<ol style="list-style-type: none"> <li>1. <i>Project management</i></li> <li>2. <i>Innovation management</i></li> <li>3. <i>Understanding customers &amp; suppliers</i></li> </ol>	<ol style="list-style-type: none"> <li>1. <i>Intellectual property law</i></li> <li>2. <i>Innovation management</i></li> <li>3. <i>Strategic &amp; visionary management</i></li> </ol>
<b>Personal</b>	<ol style="list-style-type: none"> <li>1. <i>Communication</i></li> <li>2. <i>Team work</i></li> <li>3. <i>Problem solving</i></li> </ol>	<ol style="list-style-type: none"> <li>1. <i>Creative thinking</i></li> <li>2. <i>Communication</i></li> <li>3. <i>Team work</i></li> </ol>
<b>Scientific and technical</b>	<p><i>Process Modelling &amp; 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



23

## In a nutshell

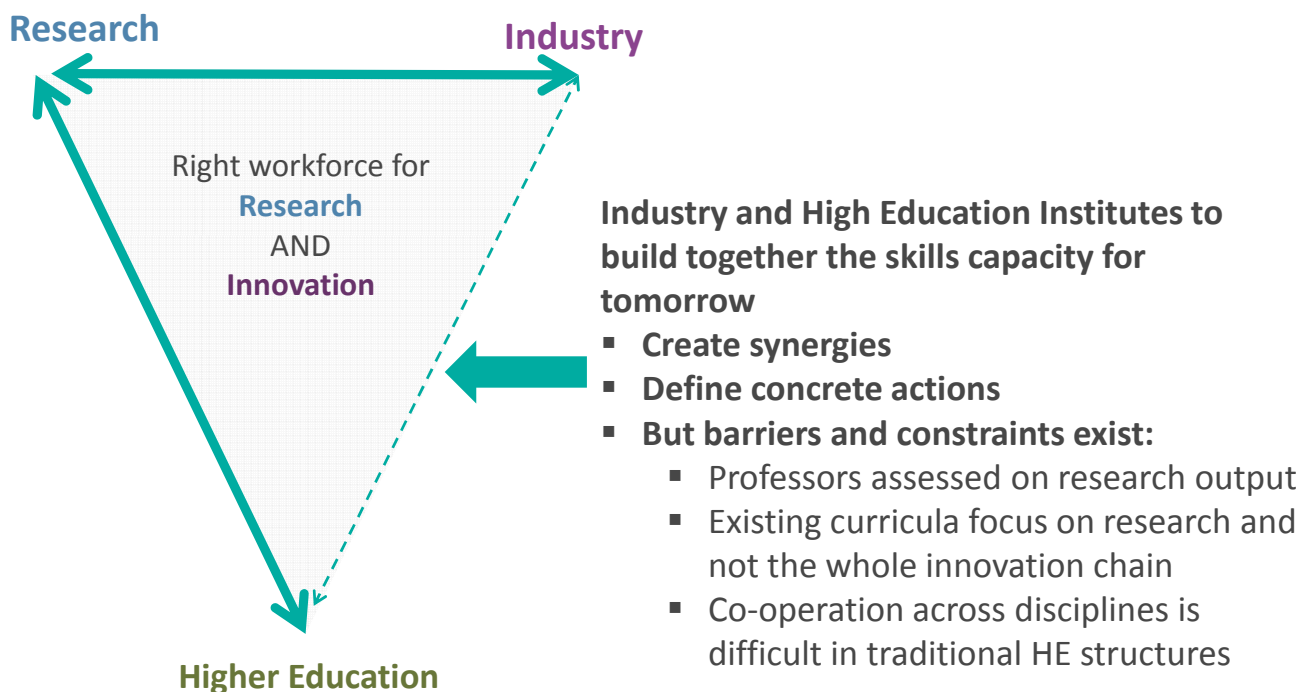


The chemical industry is continually evolving due to scientific and technological breakthroughs, emerging markets, changing legislation and sustainability requirements

***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

24



25

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*

26



**Thank you very much for your attention**

## Contact us



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