Landscape of the European Chemical Industry
March 2014
# Table of contents

- Foreword by Kurt Bock ........................................................... 5
- European Union ................................................................. 6
- Austria ................................................................. 16
- Belgium ................................................................. 19
- Bulgaria ................................................................. 23
- Croatia ................................................................. 25
- Czech Republic ............................................................ 29
- Denmark ................................................................. 33
- Estonia ................................................................. 35
- Finland ................................................................. 40
- France ................................................................. 43
- Germany ................................................................. 51
- Greece ................................................................. 56
- Hungary ................................................................. 59
- Ireland ................................................................. 62
- Italy ................................................................. 66
- Latvia ................................................................. 70
- Lithuania ................................................................. 78
- The Netherlands ........................................................ 80
- Norway ................................................................. 85
- Poland ................................................................. 89
- Portugal ................................................................. 93
- Romania ................................................................. 98
- Russia ................................................................. 103
- Slovak Republic ......................................................... 105
- Slovenia ................................................................. 109
- Spain ................................................................. 113
- Sweden ................................................................. 119
- Switzerland ............................................................. 123
- Turkey ................................................................. 127
- Ukraine ................................................................. 131
- United Kingdom ......................................................... 135
- About Cefic .............................................................. 140
- Contact ................................................................. 141
European institutions and Member States are currently discussing about the future design of a comprehensive European industry policy. The European Commission has emphasized the need to put Europe's industry back onto a path of growth by setting the target of increasing the industrial share of Europe's GDP from its current 15% to 20% by 2020.

This goal impinges on all policy areas, from energy and climate, environment, trade, research and innovation, infrastructure and finance, to employment or education. It should be the guidance for a reliable political framework that underpins global competitiveness and growth which is crucial for the chemical industry in Europe.

It is important for our industry to raise the perception of the chemical industry’s widespread contribution to a competitive Europe - externally as well as internally. The chemical industry in Europe consists of a wide field of processing and manufacturing activities and is strongly linked with virtually all other industrial sectors. With its large range of chemical products and innovative solutions the European chemical industry contributes significantly to the well-being of the EU economy as a whole.

With this brochure at hand we aim to provide our stakeholders with useful information ranging from economic data and situational analysis to an assessment of our strengths and current challenges. All information is categorized by countries and supplemented by the contact details of the national chemical associations. They are part of the European chemical network centred at Cefic in Brussels.

I am proud of the achievements of the chemical industry in Europe and I hope that policy-makers will put the right framework conditions in place that allow companies to be competitive on the global markets. The brochure provides a valuable insight into the manifold landscape of the European chemical industry and will hopefully lead to a better understanding of our industry’s impact on economic growth, jobs and welfare.

Kurt Bock
European Union

1. Place of the EU chemicals industry in the European economy

The chemical industry is one of the European Union’s most internationally competitive and successful industries, embracing a wide field of processing and manufacturing activities. Output from the EU chemical industry covers a wide range of chemical products, supplying virtually all sectors of the economy and providing a significant contribution to EU net exports. The chart below illustrates how the chemical industry underpins virtually all sectors of the economy, especially downstream chemicals users. Nearly two-thirds of EU chemicals are supplied to the EU industrial sector, including construction, rubber and plastics, pulp and paper, and the automotive industry. More than one-third of chemicals go to other branches of the EU economy such as agriculture, services, and other business activities.

The chemical industry’s contribution to EU gross domestic product (GDP) amounts to 1.1%. This may seem small at first, but should be reassessed taking into consideration the shrinking contribution by manufacturing in advanced economies coupled with a rise in service sector output.
2. Situational analysis of the EU chemical industry

2.1. Asian chemicals production dwarfs other regions

World chemicals turnover was valued at €3127 billion in 2012. This marks a significant recovery of the chemical industry compared with last year. Global sales went up in 2012 by 12.8% compared with 2011. This is considerably higher compared to the average growth of 7.0% during the last decade. World chemicals sales in 2012 grew by €356 billion compared with 2011. The recovery in the world chemical industry in 2012 can largely be attributed to China, where chemicals sales went up by 27.1% compared with 2011, accounting for 57% of additional global chemicals sales.

*Europe holds competitive position*

When including both EU and non-EU countries, total sales for the region were €673 billion in 2012 – 21.5% of world chemicals sales in value terms. However, as the worldwide competition is getting fiercer, the European Union has lost its top ranking in sales to China. The graph below shows chemicals sales in Asia are more than double those of the European Union.

World chemicals sales: geographic breakdown

World chemicals sales in 2012 are valued at €3.127 billion. The European Union accounts for 17.8% of the total.

Source: Cefic Chemdata International (2013)
* Rest of Europe includes Switzerland, Norway, Turkey, Russia and Ukraine
** North American Free Trade Agreement
*** Asia excluding China and Japan

Unless specified, chemical industry excludes pharmaceuticals
Unless specified, EU refers to EU 27
2.2. Despite EU sales growth, world market expands faster

During the years from 2002 to 2012, the European Union gradually lost its top spot in world chemicals sales to China and the rest of Asia (excluding Japan). The total value of sales in the European Union has actually been continuously growing, however, while overall world chemicals sales have been growing faster. World chemicals sales increased by 2.3 times in value terms in 2012 compared with 2002.

Developments during the last 20 years – from 1992 to 2012 – indicate that the European Union was in a much stronger position than today. In 1992, the EU posted sales of €290 billion, which made up 35.2% of the world chemicals sales in value terms. From then on, EU chemicals sales have been growing continuously, reaching an overall increase of 92% in value terms. World chemicals sales have increased at a much faster pace than in Europe. Global sales posted a four-fold increase as from €826 billion in 1992 to €3 127 billion in 2012. As a consequence, the EU chemicals market share has halved in 20 years, down from 35.2% in 1992 to 17.8% in 2012.

2.3. Seven member states make up 85% of EU chemicals sales

Germany is the largest chemicals producer in Europe, followed by France, Netherlands and Italy. Altogether these four countries generated 62.6% of EU chemicals sales in 2012, valued at €349 billion.
The share rises to nearly 87.7%, or €489 billion, when including the United Kingdom, Spain, Belgium and Poland. The other 19 EU countries generated 12.3% of EU chemicals sales in 2012, valued at €51.7 billion, nearly half of which was attributed to four EU countries – Austria, Sweden, Czech Republic and Finland.

2.4. Petrochemicals, speciality chemicals account for half of EU sales

Output from the EU chemical industry covers three wide ranges of products: base chemicals, speciality chemicals and consumer chemicals. Base chemicals cover petrochemicals and their derivatives, and basic inorganics. They are produced in large volumes and sold within the chemical industry itself or to other industries. In 2012, base chemicals represented 63.1% of total EU chemicals sales. Speciality chemicals cover the auxiliaries for industry, paints and inks, crop protection, dyes and pigments.

Speciality chemicals are produced in small volumes but they nevertheless made up 25.4% of total EU chemicals sales in 2012. Consumer chemicals are sold to final consumers, such as soaps and detergents as well as perfumes and cosmetics.

Altogether they represented 11.5% of total EU chemicals sales in 2012. All in all, petrochemicals and specialty chemicals accounted for 53.1% of EU chemicals sales in 2012.
2.5. EU reaches record trade surplus for chemicals in 2012

As a historically important player in the global chemicals market, the EU chemical industry continues to benefit from trade opportunities. Not only did the EU chemical industry recover in 2012 after the 2008 economic crisis, it also posted a record extra-EU net trade surplus of €49.2 billion. The European Union was the world’s top exporter and importer of chemicals in 2012.

The European Union has a trade surplus with each of the main trading regions – NAFTA, Asia, China, Japan, Latin America, Africa, and the rest of Europe and Africa. The rest of Europe played a major role in 2012 EU chemicals trade activity. The EU chemicals sector had a €15.1 billion net trade surplus with other European countries. The two major geographic blocs trading with the European Union in 2012 were the rest of Europe, which includes Russia and Turkey, and North America.
2.6. China dominates world chemicals investment

Chemical industry capital spending in the European Union reached €19 billion in 2012. It represents 9.4% of the €203.3 billion spent by the eight largest chemical-investing countries. China dominated world chemicals investment in 2006, spending €27.4 billion on its chemicals business. The situation in 2012 was even more spectacular when Chinese chemical industry capital spending reached €133.8 billion, representing close to two-thirds of the total amount invested by the eight largest countries in terms of chemical industry investment. China is the clear leader in terms of total capital spending. However, the United States and the European Union are in a better position compared with Japan, South Korea and also the other BRIC countries Brazil, Russia and India.

In absolute figures, investment in the European Union had been increasing from 2004 to 2008, registering a positive trend at a consistent pace. Investment during 2009, however, experienced a steep decline compared to 2008, down by 22.5%. It remained relatively stable in 2010. The chemicals sector registered a significant increase in investment in 2011, moving up from €16.7 billion in 2010 to €18.5 billion in 2011 and further up in 2012 to reach €19 billion. In relative terms, however, the ratio of capital spending to sales, or capital intensity, of the European Union chemical industry has been declining since 1999 and reached the value of 3.4% in 2012, down from 5.7% registered in 1996.
2.7. EU outspends industrial and emerging countries in chemicals R&D

In absolute figures, spending on research and development in the chemical industry was valued at an average annual level of €7.8 billion in the European Union during the period from 1991 to 2012. In relative terms, the ratio of R&D spending to sales, or R&D intensity, of the European chemical industry has been declining, down from 2.8% registered in 1991 to 1.6% in 2012.

In absolute figures, R&D spending in the European Union chemical industry was valued at an average annual level of €8.3 billion during the period from 2006 to 2012. In the United States, the average value of R&D spending per year was €6.6 billion during the same 7-year period and €6 billion for the Japanese chemical industry.
Wide variations in research and development (R&D) efforts are observed across the world chemical industry. Turning R&D into innovation is becoming increasingly important for a region’s competitiveness.

Analysing the ratio of R&D spending to sales of the chemical industry, the R&D intensity level in the European Union was far below that of Japan and slightly lower than in the United States during the 7-year time period from 2006 to 2012. Japan chemicals R&D intensity was more than double US and EU levels in 2012. The EU R&D intensity was 1.6% on average during the years 2006 to 2012, while the same ratio equalled 4.1% in Japan. China R&D intensity remains still far below US and EU levels. The high value-added products of the chemical industry continuously open up new fields of application, paving the way to progress and innovation in numerous other industries as well.
2.8. Energy intensity slashed in 20 years while output expanded 61%

For many years, the EU chemical industry, including pharmaceuticals, has made strenuous efforts to improve energy efficiency by reducing its fuel and power energy consumption per unit of production. By 2011, energy intensity – energy consumption per unit of production – in the chemical industry, including pharmaceuticals, was 48.7% lower than in 1990.

Energy efficiency is subject to decreasing returns as the higher the level of energy efficiency, the more difficult it becomes to make further improvements. During the 22 years from 1990 to 2011, however, the chemical industry succeeded in continuously increasing its output while at the same time keeping its energy input constant. As a result, the EU chemical industry has excelled in significantly lowering its energy intensity – on average by 3.1% per year.

Energy intensity in the EU chemical industry decreased by an average of 3.1% per annum from 1990 to 2011. As for the whole of the EU manufacturing sector, energy intensity went down by 2.4% per year during the same period. Energy intensity in the EU chemical industry was 48.7% lower in 2011 compared with 22 years ago.
2.9. Greenhouse gas intensity falls by two thirds

During the last two decades, the chemical industry has made an enormous effort to minimise the environmental impact of its production. Greenhouse gas (GHG) emissions per unit of energy consumption fell by 43% between 1990 and 2011. GHG intensity – the GHG emissions per unit of production – fell by more than two-thirds (71%) from 1990 to 2011.
Austria

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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry is the second largest industrial sector in Austria, representing about 12% of the industrial sector added value. The sector accounts for about 10% of total Austrian industrial employment, 13.5% of R&D expenditure and 17% of industrial spending on environmental protection.

In 2012, the value of chemicals production was €16.7 million, which means a stagnation at a high level after a 10.5% increase in 2011 over 2010, evidence of a recovery following the global financial crisis. In the past decade, the sector’s output has grown by 42% overall. More than two thirds of the chemicals produced in Austria are exported. The value of both imports and exports of chemicals has grown over the past seven years. In 2012, 85% of imports originated in European countries and almost 83% of exports were sold to countries in the same region. Many Austrian chemical companies have foreign subsidiaries or act as headquarters in Central and Eastern Europe for multinational chemical companies. Activities in the newer EU countries are an important factor in the recent growth of the Austrian chemical industry.

2. Situational analysis of the chemical industry

The chemical sector comprised 273 companies in 2012 (down from 349 in 2001) and employed nearly 44 000 people, about 400 more than 10 years before. It is made up of primarily mid-sized companies employing, on average, about 145 people. Only 17 companies have more than 500 employees. Chemical companies are distributed across Austria, with key clusters in Upper Austria near Linz and in the Vienna region.
Plastics (raw materials and products) made up more than 40% of the value of chemicals production in 2011, followed by pharmaceuticals (16.2%). Agrochemicals represented 4.4%. Over the last ten years, investment in the chemical industry has varied widely, with both positive and negative swings. It peaked in 2007, before the global economic crisis, but today is still 11% higher than it was ten years ago.

<table>
<thead>
<tr>
<th>Chemical Industry - key data 2012</th>
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<tbody>
<tr>
<td>Companies</td>
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<tr>
<td>Staff</td>
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<tr>
<td>Revenues</td>
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<tr>
<td>Imports</td>
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<tr>
<td>Exports</td>
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*Source: Annual Report 2012. Association of the Austrian Chemical Industry*

<table>
<thead>
<tr>
<th>Overview of the Chemical Industry Production – Breakdown by Sectors 2012</th>
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<tbody>
<tr>
<td>Plastic products</td>
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<td>Chemicals</td>
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<tr>
<td>Plastics for manufacture</td>
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<tr>
<td>Pharmaceuticals</td>
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<td>Man-made fibres</td>
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<tr>
<td>Rubber products</td>
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<tr>
<td>Detergents, cosmetics</td>
</tr>
<tr>
<td>Coating materials, printing ink and putty</td>
</tr>
<tr>
<td>Agricultural chemicals</td>
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<tr>
<td>Industrial gases</td>
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</tbody>
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*Source: Annual Report 2012. Association of the Austrian Chemical Industry*
Foreign trade figures for 2012 of the Austrian Chemical Industry in million €

<table>
<thead>
<tr>
<th>Trading partner</th>
<th>Import</th>
<th>Change from previous year</th>
<th>Export</th>
<th>Change from previous year</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>12 612</td>
<td>-2.4%</td>
<td>10 900</td>
<td>3.7%</td>
</tr>
<tr>
<td>EFTA</td>
<td>2 150</td>
<td>8.6%</td>
<td>1 778</td>
<td>4.2%</td>
</tr>
<tr>
<td>Remaining European countries</td>
<td>225</td>
<td>-1.3%</td>
<td>1 874</td>
<td>-1.2%</td>
</tr>
<tr>
<td>Africa</td>
<td>16</td>
<td>-10.7%</td>
<td>198</td>
<td>22.4%</td>
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<tr>
<td>Americas</td>
<td>1 633</td>
<td>16.7%</td>
<td>1 328</td>
<td>8.7%</td>
</tr>
<tr>
<td>Asia</td>
<td>1 036</td>
<td>-13.1%</td>
<td>1 397</td>
<td>5.6%</td>
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<tr>
<td>Australia-Oceania</td>
<td>13</td>
<td>13.9%</td>
<td>92</td>
<td>12.0%</td>
</tr>
<tr>
<td>Total</td>
<td>17 685</td>
<td>-0.3%</td>
<td>17 567</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

Source: Annual Report 2012. Association of the Austrian Chemical Industry

3. Strengths and weaknesses of the existing chemical industry base

Strengths

• High level of innovation
• High level of specialisation
• Social stability
• Well-educated and trained labour force
• Strategic location at the centre of Europe

Weaknesses

• Increases in labour costs in recent years
• Demographic development
• High energy costs
• High administrative and regulatory burden

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

No sector-specific but horizontal strategies in the fields of research, innovation, energy, and resources. However, centralised strategies sometimes tend to be of more political than practical relevance.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical, plastics and life sciences industry is the largest industry in Belgium, accounting for nearly 28% of total manufacturing value added. With 10 million inhabitants, Belgium represents only 2% of the European population, but with the chemical and life sciences industry accounting for 5% of the value added generated by the sector in Europe, it ranks amongst the eight biggest chemical-producing countries in Europe.

The sector includes many fields of production activities such as industrial gases, fertilizers, crop protection products, petrochemicals, polymers, plastics and rubber products, agrochemicals, pharmaceuticals and biotechnology (life sciences), cosmetics, soaps, detergents, glues, chemicals for the photographic industry.

The awareness and recognition of the chemical and life sciences industry as a strategic sector in Belgium has been recently supported by a High Level Group for a Sustainable Chemical Industry, initiated by the Belgian Prime Minister in 2012. This roundtable between industry-stakeholders-authorities focuses on key issues such as energy, innovation, transport & logistics, health and the labour market. It aims to consolidate the strong position of this industry in the future.

As an enabler of all other industrial sectors, the chemical and life sciences industry in Belgium is a central chemical hub in a globalised world. More than 75% of the total investment value in the chemical and life sciences industry in Belgium originates from foreign-based parent companies. It is therefore clearly an essential part of a wider industry in Western Europe.
2. Situational analysis of the chemical industry

In 2012, the chemical, plastics & life sciences industry in Belgium realised a turnover of €61 billion, a figure which included plastic and rubber processors. The sector employs directly 90,000 employees and generates about 150,000 jobs in other branches of the Belgian economy such as maintenance contractors, port activities, transport and logistics and information technology (IT). The sector is the country’s number one exporter and shows a structurally increasing positive trade balance. More than 75% of the production is exported. Although neighbouring countries, and particularly Germany, are the main trading partners – accounting for 40% of total exports – the share of emerging countries has increased rapidly during the past few years.

Belgium hosts a world-class petrochemical cluster in the port of Antwerp, where two-thirds of the world’s top chemical companies are present. Lying at the centre of the Western European pipeline network, Antwerp is directly connected with all the major sub-clusters in Belgium (for example The Feluy-Seneffe-Manage triangle, Jemeppe-sur-Sambre, companies along the Albert channel, Tessenderlo, Ghent) and by extension to the neighbouring countries (Ruhr in Germany, Delta region in the Netherlands).

The life sciences cluster is mainly concentrated in Walloon-Brabant province (east of Brussels) nearby universities, but also has a strong presence in the province of Antwerpen. Ghent is home to a biotech valley which brings together world-class expertise in the field of medical, industrial and agricultural biotechnology. Plastic and rubber processing companies are, by contrast, less concentrated and spread all across the country.

The sector spent €2.8 billion on R&D in 2012. About two-thirds of R&D expenditure, or €1.8 billion, is in-house. The balance, in the form of outsourced research, reflects the close collaboration between companies and technology centres for boosting innovation. It is the largest private investor in R&D, accounting for not less than 53% of the total in-house R&D-expenditure of all manufacturing companies. During the last ten years, R&D expenditure by the chemical and life sciences industry has nearly doubled. Life sciences account for more than 75% of the sector’s total R&D expenditure. However, industry spending on sustainable chemistry such as bio-based economy and green chemistry is increasing.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Attractive location at the heart of industrial Europe and in the middle of the Western European pipeline network
- First class availability of raw materials and direct gate to export thanks to three seaports (Antwerp, Gent and Zeebrugge)
Belgium

- A unique integrated cluster of chemical companies covering the whole value chain
- A competitive logistical platform according to international studies with tailor-made storage terminals and distribution platforms for the chemical industry
- Highly skilled labour force ensures world-class technical expertise for some key products
- Operational excellence which leads to high level of safety at work (low incidence rate)
- World-class performance in terms of energy efficiency according to benchmark
- Strong collaboration with universities
- Unique network between companies – authorities – downstream users to implement REACH & CLP
- Excellence in industrial and academic research and a unique academic and industrial collaborative network
- A broad offering of science parks with incubation and innovation centres

Weaknesses

- High energy costs, and in particular, increasing additional cost through inadequate eco-energy strategy of government
- High labour cost
- Ageing workforce and insufficient new talent, which can be observed as a threat

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Belgium has taken several steps to prepare for the future. In Flanders, the Northern part of Belgium, the Flemish government, together with its stakeholders, launched in 2009 the initiative “Flanders in Action”, which aims to place Flanders in the top five European regions by 2020 and identifies strategic breakthroughs. As a result, several innovation hubs have been defined. Following this initiative, the New Industrial Policy (NIP) was launched in 2011. This white paper formulates a vision of the future of the industry in Flanders. The main focus of the New Industrial Policy is the rejuvenation of the industrial sector, based on a transformation process. The New Industrial Policy entails a strategy for ‘focused’ cluster policy.

Within these frameworks, sustainable chemistry occupies a central position. Flanders’ Innovation Hub for Sustainable Chemistry (FISCH) is a competence pole focused on sustainable chemistry, resulting from a joint initiative of the chemical industry and the Flemish government. FISCH has been commissioned to accelerate this transition towards sustainability by creating a platform for open innovation. Its mission is to identify, stimulate and catalyse innovations for sustainable chemistry in Flanders, under themes like renewable chemicals, micro algae and sidestream valorisation. FISCH works on the basis of a strategic agenda, resulting from the interaction between chemical companies and knowledge
institutions in Flanders. This has given birth to seven strategic innovation programmes. Under these seven innovative programmes, FISCH supports small, medium and large enterprises and knowledge institutions in defining, setting up and implementing innovation projects.

In Wallonia, the southern part of Belgium, the socio-economic priorities have been translated in 2005 into an operational plan known as the Marshall Plan, followed later by an updated version Marshall.2.Green. Recently, the Walloon government has launched a draft strategy in order to meet the challenges in the longer term, called Horizon 2022. Industrial policy is at the centre of that strategy.

In this context, GreenWin has been recognised as one of the six strategic business clusters in the Walloon region. GreenWin brings together, in a collaborative venture, small and large enterprises, universities, research centres, training operators and communities involved in the development of a green economy. GreenWin is organised around three strategic axes focusing on the life cycle of materials, i.e. development of sustainable products and materials, sustainable integration and implementation of materials as well as treatment and valorisation of waste and wastewater. Alongside GreenWin, BioWin is the health competitiveness cluster in Wallonia, with more than 100 health companies specialised in health biotechnology and medical technologies.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The priority areas of the chemical sector in Bulgaria for the period 2020 are related to the development of new chemical products needed on the market and not currently produced in the region, as well as the development and implementation of new products using waste as a secondary raw material and energy resource.

2. Situational analysis of the chemical industry

- The chemical industry in Bulgaria is important for the country, contributing to better productivity, gross domestic product (GDP) and a better external trade balance. For selected products like soda ash, mineral fertilizers, petrochemicals and some others, the location is important for the chemical industry in the region.

- The sector in Bulgaria faces particular breakdowns related to employment and demography. The average age of workers is climbing, requiring better education of students to compete better with previous generations of workers.

- Long-term co-operation between the Bulgarian Chamber of Chemical Industry (BCCI) and leading companies, along with the Universities of Chemical Technologies and Research Technology Organisations, to establish R&D agendas in processes is a good precondition for better and more effective joint research pilot studies for the introduction of new chemical products. On the basis of experience up to now, developments and new production can be expected in the industrial chemical complex in the regions of Devnya, Bourgas, Dimitrovgrad and Svishtov. At the same time, active research and increased development are going on in the area of Yambol and Vratsa.
3. Strengths and weaknesses of the existing chemical industry base

**Strengths**
- The areas where the Bulgarian chemical industry is in an advantageous competitive position vis-à-vis the rest of Europe are soda products, fertilizers, petrochemicals among others

**Weaknesses**
- Shortage of domestically-produced oil and natural gas resources
- Low acceptance of chemical industry and products by the Bulgarian public and green NGO’s
- Increasing legal pressure – taxes and fees; burdensome and too long procedures in EU and Bulgaria
- Low level of recycling and utilization of plastics, paper and biodegradable wastes

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

The top objective of the National Public Strategies is utilisation of biomass from different sources – with the emphasis on wastes of different origin.

Expected new products as a result of co-operation at national and EU-level are:
- New chlorine production using membrane technology
- New sulphur – containing complex fertilizers
- New nano products on organic and inorganic base
- New soil conditioners from wastes
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

In Croatia, the chemical and pharmaceutical industry and plastics and rubber processing represent infrastructural branches of the economy. Chemical science and the chemical industry have a long tradition in Croatia. The country was the birthplace of two world-famous scientists, both Nobel Prize Laureates in Chemistry: Dr Lavoslav Ružička received the Nobel Prize in Chemistry in 1939 for his work in the area of cyclic organic compounds, and Dr Vladimir Prelog received the Nobel Prize in Chemistry in 1975 for his work in the area of fundamental operations in physical and organic chemistry. These facts point to the long tradition and existence of an experienced and well-educated work force, which is the main comparative advantage of the Croatian chemical industry.

The sector includes many fields of production activities such as the manufacture of:

- Basic pharmaceutical products and pharmaceutical preparations
- Perfumes and toilet-cosmetics preparations
- Soap and detergents, cleaning and polishing products
- Plastics in primary forms
- Plastic and rubber products
- Fertilizers
- Pesticides and other agrochemical products
- Paints, varnishes and similar coatings, printing ink and fillers
- Technical gases
- Glues
- Explosives
The main characteristics of the Croatian chemical industry are:

- Important role in the national economy
- Experienced and well-educated work force
- Dependence on import of raw materials
- Wide production range
- Good foundation and environment for acceptance, cooperation and investment in the area of new technologies and production in order to strengthen competitiveness

2. Situational analysis of the chemical industry

The manufacture of chemicals and chemical products is one of the main export-oriented industrial sectors in the country.

The chemical industry’s share of gross domestic product (GDP) in Croatia during 2012 was 2.1%, or €946 million. The 276 active companies employed 6,933 people in 2012, the equivalent of 3.0% of total manufacturing industry employment.

In 2012, the pharmaceutical industry, with 3,918 employees – 1.7% of those employed in the manufacturing industry – and turnover of €695 million, accounted for 1.6% of Croatian GDP.

The plastic and rubber industry accounted for 1.2% (€539 million) of the GDP of Croatia in 2012, with 628 active companies employing 7,119 people in 2012 – 3.1% of employees in the manufacturing industry.

The value of investments in the chemical industry in 2012 totalled approximately €289 million. Pharmaceutical industry had €580 million in investments and plastic and rubber industry investment reached €224 million.

Companies are concentrated around larger towns – mostly in the Zagreb area.
A majority of companies, especially small- and medium-sized enterprises, are focusing on the internal economy and organisational and marketing restructuring of production processes in line with European standards. Manufacturing processes are being modernised and operating costs reduced, while introducing international quality certification, as many of the companies, especially the larger ones, are export-oriented.

Exports of the chemical industry in 2012 accounted for 6.1% (€584 million) of total Croatian exports, while pharmaceutical industry exports were 4.6%, or €438 million. Exports from the plastics and rubber industry were valued at 1.7% of total Croatian exports, or €167 million.
3. Strengths and weaknesses of the existing chemical industry base

Strengths

• Tradition in production
• Highly skilled labour force ensures world-class technical expertise for some key products
• Advanced technological equipment
• High-quality and price-competitive products
• Excellent geostrategic location (Central European and Mediterranean country; three Pan-European corridors pass through Croatia)
• Ability to transport by sea (sea ports-direct gates)
• Most modern transport infrastructure in the region
• Demand in the domestic markets (Consumption of most chemical products per capita in Croatia has not yet reached the EU standard)

Weaknesses

• Heavy dependence on raw material imports
• Uncertainty over fuel supply
• High energy and logistic prices
• Lack of investment in new and innovative products
• Insufficient investment in marketing
• Insufficient interconnection links with companies and research institutions to develop new products and improving technology (joint projects)
• High cost of taxes, contributions and utility charges
• Pressure to increase taxes and fees, due to public sector financial deficit

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy
A national industrial strategy is being developed at the moment. Started in 2013, it focuses on competitiveness, innovation and keeping jobs.

Research policy and links with other industries and with research infrastructure
There are no strong and effective links between industry and research/universities, in spite of successful cooperation.
The Croatian chemical industry is represented by: the Chemical Industry Association, the Plastic and Rubber Processing Industry Association, the Affiliation of Health Service Products Manufacturers and the Affiliation of Manufacturers and Wholesalers of Detergents and Cosmetics. Through these organisations, we work to strengthen cooperation between science and industry to increase competitiveness.

Opportunities for Growth
There are many opportunities for growth of the chemical industry in Croatia. Consumption of most chemical products per capita in Croatia has not yet reached EU levels. The production structure of the chemical industry should be changed to boost the competitiveness of the Croatian chemical industry, and to move to the production of high value added products. Our assets are a highly skilled labour force supported by good scientists and an excellent geostrategic location.

Smart Specialization Agenda
The Croatian government is currently working on a Smart Specialization Strategy in Croatia. There is an ongoing project through which we will give our support for smart, inclusive and sustainable growth of chemical industry, based on a broader concept of innovation.
Czech Republic

1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry in the Czech Republic is the second largest manufacturing industry based on sales, following automotive.

The Czech chemical industry includes the following sectors: refining of petroleum (CZ-Nace 19.2), chemicals (CZ Nace 20), pharmaceuticals (CZ Nace 21) and rubber and plastics processing (CZ Nace 22). Sector production by companies includes the following products: motor fuels, heating oils, lubricants, paraffins and asphalts, inorganic and organic bulk chemicals, fertilizers, basic petrochemicals, primary form plastics, synthetic resins, synthetic rubber, paints, dyestuffs and pigments, agrochemicals, pharmaceuticals, rubber tyres, tubes, technical rubber products, rubber blends, and a wide range of plastic products for industrial consumption and for final use.

The chemical industry is represented in all regions of the Czech Republic. The biggest concentration of the Czech chemicals sector is situated in the North-West Bohemia, North Moravia and Central Bohemia regions.
2. Situational analysis of the chemical industry

In 2012, the Czech chemical industry had sales – in current prices – of about €22 billion and employed 113 000 people. Investments amounted to €0.8 billion. The external trade balance of the chemical industry in 2012 was deep in deficit at minus €4.2 billion, but the negative balance decreased year-on-year by €0.48 billion. In 2012, the number of enterprises with 20 or more employees in the chemical industry was 879.

The Czech chemical industry overcame the economic crisis in 2009 relatively quickly. Key indicators of the chemical industry decreased slightly in the period January-September 2013 in comparison with the same period of 2012 (except pharmaceutical industry).
The Czech region with the largest chemical industry is the North-West Bohemia region, followed by the North Moravia region and the Central Bohemia region. Czech companies finance approximately 50-70% of their R&D from own sources. Collaboration between industry and academia is functioning well.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

• Well-educated labour force
• Strategic location of the Czech Republic within Europe
• Unique network of pipelines in the Czech Republic
• Long history and tradition of the chemical industry in the Czech Republic
• Investments in the chemical industry
• Significant position for manufacture of rubber and plastic products in the Czech Republic. The country is a significant producer of tyres for industrial and agricultural use
• Social partnership, cooperation between companies and unions

Weaknesses

• High and increasing energy prices
• Strong dependence on raw materials imports
• Complex and burdensome EU legislation
• Low recycling rates for plastics
4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy
The Czech Republic does not follow any sectoral industrial policy strategy. The government sets overall horizontal framework conditions in many areas: energy, research, education and infrastructure.

Research policy and links with other industries and research/universities
Research policy and links with other industries and with research infrastructure are influenced and supported by three technological platforms, initiated and supported by the Association of Chemical Industry of the Czech Republic. They are:

- Czech Technology Platform for Sustainable Chemistry
- Czech Technology Platform PLASTICS
- Czech Biofuels Technology Platform

They focus mainly on new (nano)materials, effective and flexible processes, biotechnologies, renewable resources, bioplastics and recycling of plastics and other materials.

Opportunities for Growth
Opportunities for growth lie in the production of high value-added products, such as nanomaterials, bioplastics, polymers, epoxy resins.

Smart Specialization Agenda
National Smart Specialization strategy and fourteen regional Smart Specialization strategies are under preparation.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The Danish chemical industry has grown considerably in recent years, and is the seventh largest manufacturing industry in Denmark as well as the fifth biggest export industry.

Since the start of the millennium, the Danish chemical industry’s exports have seen overall growth of 60%. Although the financial crises had an immense impact on both the total exports and turnover in the chemical industry as well as on almost all other industries, the sector’s exports and turnover are now growing steadily and are now back at the pre-crisis level.

In 2012 the chemical industry’s share of Danish industrial exports was 6.6%, and the total value of exports was approximately €3.3 billion. The chemical industry’s share of Danish manufacturing industry was 5.2% in 2012, measured by turnover, and 6.3% measured by value added. However, its share of industrial employment in Denmark is 3.7%, which shows that the chemical industry has a higher productivity level than the average for the entire manufacturing sector.

The chemical industry in Denmark is diverse and produces many different products. Around 75% of its output is exported whereas the rest of the output is primarily used as input in the rest of the industrial sector.
2. Situational analysis of the chemical Industry

Direct employed in the Danish chemical industry in 2012 stood at 11,190, a decline of 2,278 from 2008. The industry produced a turnover of approximately €11 billion – a twofold increase since 2000. This increase was largely due to the manufacturing of products that include paints and soap.

The value of total investment in the chemical industry was approximately 20% of investment in the Danish manufacturing industry, amounting to nearly €241 million in 2009. The investment in machinery and equipment as well as buildings corresponds to almost 21% of the value of total investment in the chemical industry.

In 2012, gross value added in the chemical industry amounted to €1.43 billion.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- High level of innovation
- High level of worksite safety
- High environmental protection
- High overall educational level
- High product quality

Weaknesses

- Negative attitude towards the industry and a tendency to supplement EU legislation with national legislation
- High taxes on energy
- High level of bureaucracy; it is hard for the industry to get permission to start new or change existing chemical production sites in Denmark
- High labour cost
- Weak competitiveness compared with Asia and other countries

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

The Danish minister for business and growth has announced to the public a new strategy for industry in general in spring 2014 before the end of 2013. The focus will be on keeping jobs in Denmark and building a competitive framework for the industry.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The Estonian chemical industry is a small but export-oriented, well established and specialised sub-sector of Estonian industry. Overall industrial activities account for 21% of Estonian GDP. That share is higher than the European average, but at the same time well in line with the EU’s 20/20/20 strategy, which in addition to well-known energy, resource and climate goals, sets a target for raising industry’s contribution to EU GDP from 15.2% to 20% by 2020. In 2012, Estonian gross domestic product (GDP) was €17.42 billion in current prices.
The processing industry accounts for 73.2% of the whole industry sector. Chemicals and chemistry products account for 5.2% of the processing industry, contributing about 0.8% to GDP.

It must be noted that the Estonian Statistics Office considers the production of shale oil under the “fuel oils production” sector, so the shale oil contribution to GDP is viewed separately from chemicals. However, all shale oil producing companies in Estonia need to comply with the EU chemicals regulatory framework and are, therefore, members of the Federation of Estonian Chemical Industries (FECI).

The chemical industry has a high growth potential and is one of the most competitive industry sectors in Estonia. Traditionally, the export share of Estonian chemical companies’ sales has been high, accounting for 87% in 2012. Based on turnover, the productivity and output rate per worker are among the highest compared to other industry sectors.

2. Situational analysis of the chemical Industry

The Estonian chemical industry is characterised by strong territorial concentration, as more than half of the chemical industry is located in one county: East-Viru. This results from tradition and development possibilities of that region.

Two important chemical sub-sectors are characteristically specific to the Estonian chemical industry: oil shale chemistry and the producing of rare earth metals and their oxides. Industrial production of Estonian shale oil was started in 1924. Producing oil from oil shale is a long-term tradition in Estonia, but a unique process in Europe. It makes a remarkable contribution to the economy of the country.

The Estonian economy is characterised by a large share of small businesses, but the vast majority of sales are generated by the minority of big companies. This pattern is reflected by the chemical industry as well.

According to the Estonian Statistics Office, the total number of businesses in 2012 in Estonia was approximately 66 000. Among those, there were 80 companies in the chemical industry, only two of which had more than 250 employees. The number of employees in chemical industries was 2 487, accounting for 2.4% of the number of people employed in the processing industry. At the same time, sales account for 5.4%. The overall turnover of the chemical industry in 2012 was €549 million.

Again, it must be mentioned that the profile of FECI members is somewhat different than the national chemical industry defined by the statistics office. To that end, FECI has 50 member companies that employ approximately twice as many workers as the national chemical industry.
Export success comes mostly from East-Viru county, where the main export articles are shale oil and phenols, benzoic acid, sodium benzoate, and plasticizers, rare earth metals and their oxides; production of urea fertilizers has ceased.

Producers of construction chemicals, namely sealants and construction adhesives, play a big role in chemical product exports. Export volumes of applied chemistry are more modest, but Estonia has a long experience in producing cosmetics and applied chemistry such as home care products.

![Production of chemicals: structure of enterprises and their turnover](image)

### Table: Overview of exports and imports

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<tr>
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<th>Export, million €</th>
<th>Import, million €</th>
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<tbody>
<tr>
<td>Goods in total</td>
<td>8 743</td>
<td>12 013</td>
</tr>
<tr>
<td>Goods of chemical industry and related sectors (includes pharmaceuticals and explosives)</td>
<td>395</td>
<td>565</td>
</tr>
<tr>
<td>Share of chemicals exports/imports in total exports/imports</td>
<td>4.5%</td>
<td>4.7%</td>
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Source: Estonian Statistics Office; [www.stat.ee](http://www.stat.ee)
The Estonian chemical industry co-operates closely with research institutions, as the main universities in Estonia engaged in offering chemical and engineering education have appointed representative facilities that are direct members of the association (FECI).

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Success in niche markets
- Unique experience and knowledge as the only European manufacturer of rare earth metals and their oxides
- Leading producer of polyurethane foams globally
- Unique natural resource in the form of oil shale and concentrated, unmatched know-how in shale oil production – in addition to serving as an excellent export article, this industry branch significantly contributes to keeping Estonia’s place as one of the few energy independent countries in the EU and to enhancing R&D by creating needs and appliances
- Opportunity-offering location: port connections to Europe; borderline of Europe and wide Russian market
- Good quality-cost relationship of the workforce

Weaknesses

- High average age of chemical industry workforce and chemistry researchers in Estonian universities, making it necessary to find younger employees and scientists to allow for sustainability
- High and increasing energy prices
- Complex and burdensome EU legislation and a tendency to supplement EU legislation with national fees in the environmental taxation sector are placing additional financial burdens on the Estonian chemical industry
- High portion of indirect taxes and tendency to make unexpected changes in the tax system creates uncertainties and discourages long-term investments
- Lack and/or fragmented structure of support to SMEs to ensure that the growing regulatory burden does not hurt their competitiveness and that access to competence in R&D-intensive industry branches is available for SMEs
- Estonian model of creating added value places a relatively large burden on the environment in terms of CO₂ efficiency and material productivity
4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Estonia does not have a specific industrial policy. However, the government has an overall economic strategy in place, which should address industry aspects among other sectors of the economy.

Present and Future Prospects

Due to the depth of scientific research on oil shale and resources of good quality oil shale, this branch of industry should be the key sector for the development of the Estonian economy. In order to cope with increasingly stringent European Union environmental regulations and to ensure a competitive chemical industry for Estonia, a supportive economic environment is needed.

Additionally, there is a need for the preservation and development of the scientific potential of chemistry; preparing and educating needed chemists and specialists on chemical safety; and development activities of the chemical industry through new technologies and processes. These measures would ensure the preservation of production and export capability of chemicals and chemical products, and would improve the employment situation. It is necessary to acknowledge the key role of the chemical industry as a developer of “traditional” and “new economy” in Estonian society. It is impossible to develop the economy and a whole society without knowledge of chemistry and the chemical industry.

In Estonia the smart specialisation strategy is compiled by the Ministry of Education and Research as well as the Ministry of Economic Affairs and Communications. Monitoring and analysis of smart specialisation is carried out by the Development Fund. As a first step, eight economic sectors were selected based on the created added value. As a follow-up, the selection was narrowed down to three areas of growth. FECI played an important role in getting the chemical industry recognised as an area with high growth potential. Three areas of growth were selected as a result of the Development Fund’s analysis:

- Information and communications technology (ICT) horizontally via other sectors
- Health technologies and services
- Enhancement of resources

The sub-sectors under the last growth area include: chemical industry (more efficient use of oil shale) and industry involved in enhancement of materials.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry is Finland's biggest export industry and the second largest manufacturing industry. Its share of Finnish industrial output and industrial exports amounts to 25%.

Several factors explain this growth. Chemical companies themselves are among the main driving forces: these industrial companies have the know-how to create growth through the introduction of new, innovative products and services to the market. The growth in relative importance of the chemical sector also results partly from the decline in other industrial sectors such as electronics and the forest industry.

The Finnish chemical industry includes chemicals and chemicals products, oil refining, pharmaceuticals, plastics and rubber products, paints and coatings, cosmetics, detergents and other chemical products. Basic chemicals include for example water treatment chemicals, fertilizers, titanium dioxide and polyolefin. The majority of the total output of the Finnish chemical industry comes from chemicals and chemical products, as well as oil refining.

As an enabler of all other industrial sectors, the chemical industry has a role in the economy of all regions or clusters. In Finland, the other major industrial sectors are machinery and metal products, electronics and electricity products as well as pulp and paper. The change of industrial structure in Finland has increased the importance of the chemical sector.
2. Situational analysis of the chemical industry

In 2012, the value of exports of the Finnish chemical industry totalled approximately €13.3 billion and revenue (gross value) amounted to €22.1 billion. Its share of Finnish industrial output and industrial exports amounts to 25%. The chemical industry employs directly approximately 35 000 people in Finland.

In recent years, the R&D expenses of the chemical industry have been stable and approximately at the level of €330 million, or 11% of manufacturing industry total R&D expenses in 2012. The level of R&D expenses is on average 1.5% of revenues, but varies between the different companies, being highest in the pharmaceutical industry.

In 2012, the value of investments in the chemical industry totalled approximately €540 million, corresponding to approximately 15% of investments in the Finnish manufacturing industry. A large part of investments in the chemical industry comprises replacement investments.

Major chemical industry clusters are located in Southern and Western Finland, in Porvoo (oil refining and petrochemical), and the Turku area (pharmaceuticals, oil refining). A significant number of companies representing state-of-the-art chemical expertise are concentrated in Kokkola. Plastics and rubber product companies are less concentrated.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Well-educated and highly skilled labour force
- Collaboration with universities
- Very good research and university structure
- Good physical and social infrastructure
- Operational efficiency and safety
- Ability to satisfy sophisticated consumer demands
- Specialization
- Strong mining industry potential
- Location next to Russian markets, Russian knowledge
- Location next to Arctic sea routes, Artic knowledge
- Small and compact market size for testing
- Positive public attitude towards the industry
Weaknesses

- High energy and logistic prices
- Location on the Northern edge of Europe
- Lack of road connection to Central Europe/dependency on ship transfer
- Strong dependence on raw material imports
- Pressure to increase taxes and fees due to public sector financial deficit

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy

Finland does not follow an explicit sectoral industrial policy strategy. Closely related to the field of chemicals, the national bioeconomy strategy as well as the growth strategy for health sector research, development and innovation activities (RDI) was published at the end of 2013.

As an enabler of all other industrial sectors, the chemical industry is highly integrated into other sectors, and smart specialization is a natural way for a small country such as Finland to compete and succeed amid global competition.

Opportunities for growth

Low-emission and renewable fuels, water treatment, closed industrial processes and use of waste-based raw materials, health technology and medical research are examples of growth opportunities.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

In France, the chemical industry is a key component of the national economy and industry. Its added value was estimated to be €18.7 billion in 2012, close to 9% of the overall manufacturing added value and ranking third behind the food and beverages and automotive industries.

The chemical industry is one of the leading export sectors, maintaining its position for several years, accounting for 14% of total manufacturing exports, ahead of electric and electronic products, aeronautics and space and automotive. With a trade surplus of €4.4 billion, the chemical industry helps to improve the national trade balance, and is ranked fourth with respect to other industrial sectors behind aeronautics and space, food and beverages and medicines.

The chemical industry in France encompasses 3 350 companies, with nearly 6 000 production sites throughout the country – 94% of which are SMEs. These companies employ 156 000 people directly, – more than 5% of all staff employed by the French manufacturing sector. Regarding indirect employment, the chemical industry generated more than 620 000 jobs.

Regarding portfolios and activities, France offers a large range of activities, from base chemicals to specialty and fine chemicals. It also has a strong position in consumer chemicals, which includes soaps, cosmetics and perfumes. The chemical industry itself consumes nearly 20% of its own production.

The strategic role of the chemical industry in the development of a sustainable economy is clearly recognised by the French government and the Ministry of Industry. The presentation by the French president of the industrial policy priorities in France over the next 10 years shows the role and contribution of the chemical industry to the selected sectors.
2. Situational analysis of the chemical industry

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<tr>
<td>3,350</td>
<td>€88.9 billion</td>
<td>9%</td>
<td>€55 billion</td>
<td>62% of Total</td>
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<tr>
<td>Nearly 6,000 production sites</td>
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<tbody>
<tr>
<td>155,740</td>
<td>&gt; 600,000</td>
<td>5.4% of all industry</td>
<td>11,849</td>
<td>7% of total chemical investments</td>
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The chemical industry, including fine chemicals for pharmaceuticals, in France generated in 2012 a total turnover of nearly €90 billion, 62% of which are exports. The European Union is its first trading partner with more than 63% of its exports.

The sector spent nearly €4 billion in capital spending in 2012, representing more than 4% of sales. Investments were well balanced between maintenance-modernisation of sites and new capacities. The chemical industry dedicated 8.4% of its added value, or €1.54 billion, to research and development, which accounts for more than 5% of total research for industry.

In France, 31 competitiveness clusters are linked to chemicals and materials, six of which are totally dedicated to the sector. Those six clusters are:

- AXELERA in Rhône Alpes (Lyon)
- Normandie (Gonfreville)
- Nord Pas de Calais (Dunkerque)
- Moselle (Carling)
- PACA (Fos-Lavera Berre)
- Aquitaine (Lacq)

There also exist clusters in biorefineries, which are PIVERT in Picardie and BRI in Champagne-Ardenne.
a. The chemical industry in RHONE-ALPES
   - 1st for the production of chemicals in France
   - 2nd in terms of employment
   - More than 500 private companies
   - 31,500 people directly employed (excluding pharmaceuticals)
   - Leading sector for exports
   - 2nd industrial sector in terms of turnover
   - 15% of industrial investments

Rhône-Alpes is one of the leading French manufacturing regions with more than €12 billion of turnover, attracting 25% of national research resources and €500 billion of investments.
Rhône Alpes main assets

- Strategically located between Northern and Southern Europe
- Main olefin provider with refinery and steam-cracker plants
- Concentration of major French and international groups, as well as a large number of mid-cap and small-size companies
- Three top competitiveness boosters: Axelera, world-class cluster for chemistry and environment; Ideel, Institute for eco-technologies and non-carbon energy, whose aim is to build the factory of the future; and Axel’One, collaborative platform for innovative R&D projects
- Easy trade within the region by all means of transport, connected directly to the Swiss, Italian and German markets
- Famous universities, engineering schools and research centres in Lyon, Grenoble and St-Etienne
- And most of all, a strong mobilisation of all the regional actors (public or private) to build a consistent long-term vision to maintain upstream (basic chemistry) and develop downstream activities (specialty chemistry) and promote the emergence of a sustainable and innovative chemistry

b. The chemical Industry in NORMANDY

- 2.1% of the employment of the region with 1 621 companies employing more than 100 people
- 80% of the national production of oil and additives (40% of European), 25% for olefins and 50% for plastics and elastomers
- 1st European fertilizer producer
- €2 billion invested in the last seven years to improve production abilities and in anticipation of new environmental standards

Normandy benefits from a dynamic economic situation. The chemical industry, a key sector of the “Centre Seine”, is a sector of excellence providing necessary know-how amid the international competition.

Normandy main assets

- Highly specialised companies in petrochemicals, additives & lubricants and crop-protection products
- Le Havre harbour – the fifth in Europe, with the efficient platform HAROPA
- World-wide companies such as Total, Exxon Mobil and Arkema, and a wide range of small and medium-sized enterprises
- Sustained innovation through the Nov&atech, linen sector, CBS technopolis, Nov@log technical centres
- The completion of a recent study focused on transport facilities shows the good will of public and private stakeholders to foster industrialisation in the region
c. The chemical industry in PROVENCE-ALPES-COTE d’AZUR

- 3% of the French GDP and 5.2% of exports
- 3rd region in terms of employment
- 16,000 people employed directly
- About 450 private companies, 80% of which are SMEs
- Marseille harbour, gateway to the Mediterranean markets

The Marseille/Etang de Berre area remains one of the major places for liquid bulk (hydrocarbons and chemicals). The chemical industry benefits from growing industrial sectors, composed of aeronautics, energy (research and production) and micro-electronics.

The eastern part of the region (Grasse) has been historically devoted to fragrance production, still a rapidly growing activity linked to the luxury business and the development of bio-sourced raw materials.

**Provence Alpes Côte d’Azur main assets**

- 5% of the olefins produced in Europe
- Major chemical companies: Ineos, LyondellBasell, Kem’One, and Total Petrochemicals
- 40% of French capacity of chlorine and its derivatives
- Constant support of universities and research centres with a big focus on “green” chemistry as a guideline for the future and part of the policy implemented by the regional authority and stakeholders

Increasing consciousness of the regional public authorities that chemical industry should maintain a significant position in the future framework of industrial activities, as key actor for a non-carbon economy.

Regional policy encourages the development of SMEs, and supports clusters like NOVACHIM to develop the chemical industry and foster innovation.

d. Chemical industry in the PICARDIE CHAMPAGNE-ARDENNE

- 1st industrial employer over the two regions
- 200 enterprises
- 13% of industrial employment
- 14,600 people directly employed
- Several world-wide chemical leaders such as: ARKEMA, DOW, PROCTER & GAMBLE, BASF, L’OREAL, CLARIANT…and a number of diversified SMEs

The chemical industry in Picardie Champagne-Ardenne is a competitive and innovative industry. Focused on products with high added value, it contributes to the economic and industrial development of the region and plays an active role for sustainable growth.
Picardie Champagne-Ardenne main assets

- A strategic geographical situation
- Four competitiveness world-class clusters dedicated to the “materials and chemicals” field: the Industries & Agro-Resources (IAR) biorefining Cluster I-Trans (Transports), UP’TEX (Textiles), Materalia (Materials)
- A young population, having access to high-level education actors, partners of the chemical industry, which include universities, engineering schools, technical centres
- A consistent infrastructure network, namely logistics and multi-modal transport
- A large bio-mass potential of plant materials
- Innovation fostered by the development of a green chemical industry (sustainable chemicals) with notably PIVERT, the Oilseed Biorefinery of the Future (non-carbon energies excellence institute), and the BRI and IMPROVE platforms

e. Chemical Industry in ILE DE FRANCE

- 367 companies with more than 50 employees, mostly large and mid-sized companies
- 3% of the French GDP (2010)
- More than 52,000 employees
- About 50% are dedicated to commercial activities
- And 30% to specialty chemistry
- 40% are international companies

With Paris as its centre and attractive heart, the Ile-de-France benefits from the presence of many stakeholders: corporate offices, production sites, research centres. Arkema, Air Liquide, Solvay, PCAS, L’Oréal, BASF, Dow, Henkel, Bayer, and Total Petrochemicals are situated in the region.

Ile de France main assets

- New profitable segments are developing within the luxury sector, namely perfumes and cosmetics
- A strong synergy between world-class universities and school laboratories fosters innovation; they are premises for the profitable markets of green and environmental chemistry, such as CEA, CNRS, and the Institut Pierre et Marie Curie
- Education, with a concentration of world-class top schools, including Ecole Polytechnique, Chimie Paris Tech, and Centrale
3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Large downstream industrial sectors with worldwide leaders: energy, transport, aeronautics and space, perfumes and cosmetics, water treatment, among others
- Well-known environmental and process expertise
- High-capacity for innovation with a SusChem France roadmap
- One of the leading European countries in bio-based chemistry
- Dedicated fiscal incentives, notably the research tax credit
- Highly educated youth with a complete training system
- A privileged geographical situation. French infrastructures (road, rail, port and river) make the country a real gateway to the EU market
- Nuclear energy with lower GHG emissions
- High number of SMEs, relevant innovation players, endowed with a strong marketing and production strategy

Weaknesses

- High energy cost and dependence on raw materials imports
- High labour cost
- Low acceptance of chemical industry and products by the French public

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

The French chemical industry, under the stewardship of the Strategy Committee for Chemicals and Materials, has drawn up a project plan focusing on three main guidelines:

- **Competitiveness** based on:
  - the development of innovation
  - favourable economic, fiscal and regulatory conditions
  - long-term access to energy and raw materials at competitive prices
  - convenient business environment for investments in the chemical industry
  - strong regional clusters
  - integration of chemicals and materials into promising downstream industries, such as materials, composites, and healthcare
- **Sustainability**: developing a sustainable economy focusing on renewable energy and resources, as well as on recycling

- **Attractiveness**: offering more innovative products and technologies to downstream customers, maintaining and developing jobs and skills according to the prospective technical and economic needs of the chemical industry

The strategy committee has launched five working groups in order to set up an operational plan to achieve the strategic objectives and to develop a common roadmap. Two regions are also developing strategy committees: Alsace and Rhône-Alpes.

**Smart specialization**

As far as the Smart Specialization Agenda is concerned, UIC plays a key role in the national platform SusChem France as leader. That is the reason why UIC is responsible for giving information and overview on the issues of the two PPP (Public-Private Partnerships) named Biobased Industry (BRIDGE) and SPIRE about resource efficiency. Many of the members are strongly involved in both.

So it can be underlined that representation of French chemical industries is very high in HORIZON 2020. UIC is also working to help SMEs increase their involvement in their European dedicated projects.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical & pharmaceutical industry is the third largest industry in Germany. While the turnover of the automotive industry and machinery & equipment production is higher, it sells more than the food & drink, electrical equipment and metal industries.

The German chemical industry is a strong producer for all segments of the industry: basic inorganics, petrochemicals, polymers, agrochemicals, specialties, cosmetics and pharmaceuticals – just to name the broader segments.

While the chemical industry is present in all of the German Länder, the specialisation of German regions differs slightly. Some are somewhat more specialised in basic chemicals, while others have a stronger focus on specialties or pharmaceuticals.

As an enabler of all other industrial sectors, the chemical industry has its role in the economy of all regions or clusters. To highlight just a few specific segments, technologies or regions would not be a suitable way to maintain the strength of the German chemical industry.

2. Situational analysis of the chemical industry

In 2012, Germany’s chemical & pharmaceutical industry had a turnover of €186.8 billion and employed 434 000 people. More than 70% of German chemical companies have research activities, totalling R&D
expenditure of more than €9 billion per year. The industry had overcome the crises after 2008 relatively quickly – also thanks to its internationalization. However, its production has been stagnating at a high level in recent months.

To maintain its competitive edge, the German chemical industry will double its research effort by 2030, according to the VCI Prognos study “The German Chemical Industry in 2030”.

The German federal state with the largest chemical industry is North Rhine Westphalia, followed by Rhineland-Palatinate and Hesse with its strong pharmaceutical industry. All three are situated next to the river Rhine. Good access to transport infrastructure is one important locational factor for a successful chemical industry. In Eastern Germany, Saxony-Anhalt is the top chemical producer.
While German chemical companies finance 95% of their R&D from own revenues, collaboration between industry and academia is well established: one third of chemical companies collaborate with academia in research projects.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Highly integrated globally competitive clusters and chemical parks
- Highly innovative chemical sector
- Strongly globalized industry with activities in all centres of growth
- High resource efficiency
- Well-educated labour force (academic, non-academic, e.g. via dual education)
- Supplier and customer relations (see description under point 4)
- Strong research and university infrastructure (see description under point 4)
- Good physical infrastructure, positioned at the centre of Europe
- Social partnership, cooperation between companies and unions
- Experience in safety of production
- Ability to satisfy sophisticated consumer demands
Weaknesses

- Energy prices are high and rising
- Strongly depends on raw material imports
- Due to scarcity in many raw materials, there is a certain vulnerability to external shocks
- Demographic change will pose an increasing threat in the future, especially in rural areas
- A sceptical view of parts of society on change and new technologies

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy

Germany does not follow an explicit sectoral industrial policy strategy. It defines itself as a social market economy, in which the government sets overall horizontal framework conditions (research, energy, education, infrastructure), and in which the actors of the economy adapt to the requirements of customers.

Research policy

Research policy is an important area to develop the industrial strength of Germany further. In 2011 government R&D expenditure (including funding of industrial R&D) accounted for 0.94% of the GDP and business R&D expenditure for 1.97% of GDP, totalling 2.91% of GNP. Most important for Germany is the “High Tech-Strategy” of the Federal government. Its focus is on innovation in the areas climate and energy, health and nutrition, mobility, security, and communication, and on key enabling technologies, such as bio, nano, materials, production. There are also regional programmes of the Bundesländer focusing on the academic and industrial strengths of their regions.

There exist some sectoral initiatives on technology development in Germany, which encompass value chains and go beyond the chemical industry. To name two:

- The National Platform on Electric Mobility
- The support for renewable energies by the EEG

Whether these initiatives will prove to be ultimately successful remains to be seen. For example, costs for renewable energy production threaten to curb production of energy-intensive products, while new jobs in renewable energy technologies have been lost in recent years.

Closely related to the field of chemicals, the national “BioEconomy 2030” strategy has been developed by the German government and industry.
Also, several regional initiatives exist; in Hesse, for instance, an initiative on the health industry involves the pharmaceutical industry.

**Links with other industries and research/universities**
There are strong and effective links to both – industry (but also services) and research institutions. They form some of the central strategic advantages of the German chemical industry.

Germany has many top competitive industrial sectors, such as automotive, chemistry, electrical/electronic equipment, machining, which are collaborating in R&D. The importance of this collaboration has been underlined by a study of the IW (Institut der deutschen Wirtschaft) on behalf of the VCI and others.

As mentioned already above, collaboration between industry and academia is well established: one third of chemical companies collaborate with academia in research projects.

Chemical parks are efficient local platforms for collaboration between chemical producers and suppliers of infrastructure, services and other inputs.

**Opportunities for Growth**
Areas of growth for the chemical industry lie in the topics addressed in the “High Tech-Strategy” of the Federal government.

**Smart Specialization Agenda**
Funding in the context of “smart specialisation” via the EU structural funds is of lower importance as Germany is doing very well economically, and state R&D funding of German industry is mostly from national, not EU sources.
Greece

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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry represents approximately 7% of total Greek industrial activity. Compared with the other sectors, the chemical industry has an important role as exporter; it is the second biggest exporter, contributing 12-15% to total exports.

The chemical industry is located in two basic regions – Central-South Greece and North Greece. The Central and South Greece region, prefectures of Viotia and Attica, accounts for almost 45% of the activity.

2. Situational analysis of the chemical industry

Almost 400 chemical companies operate, 95% of them considered as SMEs. A few large-sized companies are producers of basic chemicals, fertilizers, petrochemicals and polymers. Many SMEs are active in areas that include building and construction materials, consumer products and agrochemicals. Six to seven micro-enterprises are active in nanomaterials. The chemical industry employs almost 18 000 people.

There are two main regions where manufacturing activities including chemicals manufacturing take place:

- The Central and South Greece regions, prefectures of Viotia and Attiki, accounts for almost 45% of the activity
- The North Greece region, Thessaloniki prefecture, accounts for almost 30% of the activities
- The rest are spread in various areas, particularly in Central and North Greece
In spite of the number of chemistry and chemical engineering schools, cooperation between industry and universities is still less than expected. Unfortunately, much more money is spent on basic research than on applied research. In 2011, government R&D expenditure, together with EU funds, accounted for 0.57% of the GDP, much less compared to the EU average. It is widely recognized that there is plenty room for improvement.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- An interesting location in southern Europe close to the Middle East and Balkan countries area
- Access to the market thanks to the fast growth of the main port in Piraeus with a parallel connection to train facilities. Numerous multinationals use Piraeus as their logistics hub
- Low labour cost
- Reforming of the Greek economy; reforming of public sector services
- Incentives to invest in Greece
- Hydrocarbons exploration ongoing in the area of Ionian sea
- Mineral resources availability
- Sufficient network between companies, authorities, and downstream users to implement REACH & CLP

Weaknesses

- High energy cost, both in electricity and natural gas
- Heavy dependence on raw material imports
- Higher taxation compared to other countries
- Difficulties in accessing capital due to the financial crisis
- During the last three years, measures taken to solve the financial crisis have caused a profound decrease in internal consumption and difficult access to financing, with current interest rates for lending higher than in other European countries

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

The restructuring of the Greek economy will put the region in an advantageous position. The priority for the coming decade is production of pharmaceuticals, advanced materials, isolation materials and agriculture.
Greece has one of the largest oil refining capacities in the Balkans, as well as one of the most strategic geopolitical locations in Europe, with an impeccable shipping industry that can actually provide Europe with natural gas.

Greece is one of the least explored countries in Europe as regards the search for fossil fuels. Estimates made by experts suggest a potential 22 billion barrels in the Ionian Sea off the coast of western Greece and more than 4 billion barrels in the Northern Aegean.

The role of Greece in the supply of gas is being continuously upgraded. The Trans Adriatic Pipeline (TAP) is a natural gas pipeline project that will start in Greece, cross Albania and the Adriatic Sea and come ashore in southern Italy, allowing gas to flow directly from the Caspian region to European markets.
Hungary

1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry in Hungary is an important branch of the national economy. Since 2007 it has been performing above the industrial and national economic average, contributing to the positive foreign trade balance of the country, producing 17% of all industrial exports.

2. Situational analysis of the chemical industry

The chemical industry has the largest output among processing industry sector, valued at €17 billion in 2012 and producing 27% of the added value of the whole industry of the country. Production of chemicals & chemical products (NACE 20), with an output of €4.5 billion in 2012, is the fifth largest branch of the processing industry sector following automotive, engineering, electronic and food processing industries.

Since the early 1990s the industry has undergone significant structural and technological changes. Its privatisation has been completed and its technological base has been renewed due to new investments. The leading petrochemical companies in the country have become regional players in the Central European chemicals market.

About half of the chemical products manufactured in Hungary are exported, 93% of which to European countries. Major destinations in 2012 were Germany, Romania, Russia, Poland, Italy and the Central European region.

The chemical and pharmaceutical industries have a long history in Hungary, as do research, development and innovation that are particularly essential now to the competitiveness and sustainable development
of chemical companies of the country. The sector has invested in this field, and operates laboratories and research centres. The Chemical Research Centre of the Hungarian National Academy and the technical universities of Budapest, Veszprém, Debrecen and Miskolc are also engaged in both basic and applied research projects in cooperation with companies and/or under EU programmes.

The industry is also important from a social point of view. Although belonging to the less labour-intensive sectors of the economy, employing 75 000 people – among them 12 000 in overall chemicals and 16.7 thousand in pharmaceuticals production– which amounts to nearly 10% of those employed in the processing industry. And with gross wages above the national average, the chemical sector is considered and valued as an indispensable factor in providing employment in several regions of the country.

Regions

Hungary is a medium-sized country in Central Europe with good infrastructure in terms of motorways, roads and railways, fixed and mobile telecommunications and energy supply.

Important chemical clusters are located in three regions: Northern Hungary, Central Hungary (Budapest and the surrounding area) and Central Transdanubia.

a. Northern Hungary: 15% of sales; focus on petrochemical and polymer production, two large companies with <€1 bn turnover. Large presence of SMEs. Active involvement with universities in Miskolc and Debrecen.

b. Central Hungary (Budapest and surrounding area): 50% of sales; focus on oil refining, petrochemicals and polymers; specialty and fine chemicals; pharmaceuticals. Large presence of SMEs. Active involvement with Budapest Technical University and Veszprém Pannon University.

c. Central Transdanubia: 8% of sales; focus on fertilizers, carbon fibres and agrochemicals. Significant number of SMEs. Active involvement with Veszprém Pannon University.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

The industry has a strong petrochemical base. Economies of scale, up-to-date technologies and environmentally conscious management practices are now characteristic of the industry. Stock exchange capitalization in Hungary is related to a large extent to chemical and pharmaceutical companies. Most of the Hungarian companies that have become multinational – at the regional level – belong to this sector.
Significant investments have been made to increase production capacities in view of demand from other sectors like the automotive and electronic industries, agriculture among others. The geographical location of the country makes it a natural choice for numerous chemical companies, including multinationals, to cover the immediate region and South-Eastern Europe.

Weaknesses

However, the industry is highly dependent on imported feedstock and energy sources, so the safe supply and the diversification of those resources is indispensable for its operation. High energy prices are weakening its competitiveness.

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

As for the European industry as a whole, a supportive industrial policy and “smart regulation” at both the European and national level are prerequisites for the sustainability of the chemical industry of the country.

Hungary has a solid educational system, from elementary school to universities. Special emphasis has been put in recent years on the teaching of science subjects at all levels of education, as well as on the importance of the technical professions in higher education. This trend should be strengthened. Chemical companies are making considerable efforts to maintain and develop close relations with vocational training schools, specialized high schools and technical universities to provide the succession to an ageing workforce through the influx of young, well-trained and highly educated young people. Those efforts also aim prevent the “brain drain” of professionals to industries in more developed economies.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical sector in Ireland, commonly referred to as the pharmachemical sector, plays a pivotal role in the Irish economy. It accounts for over 60% of goods exported from the country. It employs more than 24,000 people directly, resulting in a further 24,000 indirect employed. It is an important employer of graduates, with over 50% of the workforce holding a third level qualification.

It is dominated by pharmaceutical companies both in Active Pharmaceutical Ingredient (API) manufacture and also dosage form manufacture (hence the term pharmachemical). It is also a growing centre for the manufacture of biopharmaceuticals – second in importance only to the United States.

The sector is dominated by multinational companies – many of US origin. Nine out of the top 10 global pharmaceutical companies are located in Ireland, making it the largest net exporter of pharmaceuticals in the world.

Ireland is a small country and for this reason it can be viewed as a single region for the purposes of industrial policy. However, there is a cluster of API plants in the Cork region – mostly engaged in high-end chemical synthesis. The Dublin region contains a more diverse industry base including chemical synthesis, drug product formulation and biotechnology based manufacture – including fermentation, purification and formulation. Pfizer operate one of the largest biologics manufacturing plants in the world just outside Dublin.

There is a small amount of manufacture in the centre of the country and on the Western seaboard.
2. Situational analysis of the chemical industry

Chemical/Pharmaceutical exports

- Ireland’s chemical and pharmaceutical industry currently generates 60% of the country’s exports, which contributes to making Ireland the largest net exporter of medicines in the world
- The sector exported products to the value of €55.98 billion in 2011, representing 60% of the national total
- The sector contributed more than €1 billion in corporation tax annually

Direct employment

- Employment in the sector grew from 5,200 in 1988 to 24,500 in 2010
- Over 24,500 people are employed providing services to the sector
- Over 50% of the employees are third-level graduates

Value of chemical/pharmaceutical sector investment

- Eight of the top 10 companies in the world have substantial operations in Ireland
- Companies indicated planned expenditure of about €1.5 billion during 2011/12 on various capital projects creating more than 1,300 new positions
- The replacement value of the sector is estimated to be €40 billion

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Excellent levels of regulatory compliance (EHS/Quality), reducing risk of manufacture or possibility of inability to meet internal demand for product
- An inherent ability to comply with tough and demanding international regulations
- A good record of continual improvement allowing companies to bring product to market on time
- Strong reputation nationally
- Ranked third in Europe and seventh in the world by the World Bank in terms of ease of doing business
- A well-qualified workforce that has achieved critical mass
- A research skill base that has a core capability which will significantly assist the retention and attraction of high tech FDI, and a significant increase in indigenous innovation:
– 440 world class principal investor (PI)-led research teams
– 2,000 PhD graduates in total at an ongoing average rate of approximately 400
– 1,000 post-doctoral research training places

Weaknesses

• Cost base high – including labour and energy costs
• Dependent on inwards investment
• Responding to patent cliff issues
• Pressure on cost of healthcare

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

The key policy driver nationally is the development of the national research base in order to harness and anchor innovation in the country. This led to the establishment of Science Foundation Ireland (SFI), which funds basic and applied research. The Programme for Research in Third Level Research Institutes (PRTLI) has invested in state-of-the-art research infrastructure.

Specific industry initiatives

SSPC-2 – a centre specializing in reach into solid state chemistry and wet synthesis has been established. This €35 million research centre is part funded by Government (SFI), the industry and the university sector. It is an excellent example of industry-academic-Government collaboration. It will concentrate on near- to- industry research and innovation.

PMTC – The Pharmaceutical Manufacturing Technology Centre – funded by government through Enterprise Ireland will fund applied research conducted by the research community for industry.

NIBRT – The National Institute for Bioprocessing Research and Training – will support innovation in the biotech sector – part funded by industry and Government. A state-of-the-art facility.

CRANN – Research institute established by government specialising in nanotechnology.

Research Policy

The pharmachem sector as demonstrated above is not only “high value” in terms of its expenditure on the Irish economy in terms of salaries but is also a major participant in private sector research and development. Just over 80% of pharma and chemical firms engaged in R&D in 2011, behind only medical device firms. This is well ahead of other manufacturing sectors including electrical equipment.
and computers. In this sense the pharma sector is not only a major manufacturing industry but also a very high value manufacturing industry, as R&D jobs tend to be of a better quality than more basic manufacturing.

To see the benefits of this for the economy one need only look at expenditure on R&D by the sector. In 2011 the sector spent almost €600 million on R&D – nearly twice that of other high tech sectors such as IT and three times as much as medical devices. Given the importance of R&D in economic growth and the high level of value attached to R&D positions, this is a major contribution to the Irish economy.
Italy

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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry is the sixth largest manufacturing industry in Italy, accounting for 5.6% of manufacturing industry in terms of turnover.

The Italian chemical industry is active in all segments of the industry: basic chemicals (41% of total chemicals turnover), fine and specialties (41%) and consumer chemicals (18%).

Italy has a significant manufacturing base: among European countries, it is second in terms of share of world manufacturing production. Only Germany produces more.

The Italian industrial system is characterised by the presence of a high number of industrial districts (more than 150), i.e. agglomerates of small- and medium-sized firms, specialised in a single-product business, concentrated in a specific geographic area. Enterprises from Italian industrial districts are known around the world for their high-quality and innovative products.

It is in such a context that the Italian chemical industry plays its full role of “technology transfer”. What distinguishes chemicals from other manufacturing sectors is that it is a science-based industry. For example, chemical companies do research, create innovative products and solutions that – being intermediate goods – are used by almost all industry sectors and support their competitiveness.

Italian chemical companies are able to develop sophisticated intermediate products responding to any specific requirement and are among the elements upon which the success of Italian industrial districts relies.
2. Situational analysis of the chemical industry

The chemical industry in Italy accounts for 2,800 companies and about 110,000 employees. It has a turnover of €53 bn (2012).

The chemical industry in Italy sees the balanced presence of three types of actors: firms with foreign capital (36% of the value of production), medium-large Italian groups (26%) and SMEs (38%).

The chemical industry is heavily concentrated in the North of Italy, which accounts for 76% of total chemical employment and 81% of total chemical turnover.

Lombardy, in particular, represents a major part of the chemical industry in Italy, with 31% of total chemical firms, 41% of total chemical employment and 45% of total chemical turnover.

It also has an important position among European chemical regions, as it is among the top three in terms of employees, and first in terms of number of companies.

But the chemical industry in Lombardy shows quite different features from other European regions with a strong chemical presence:

- Production is not concentrated in a limited number of highly integrated chemical sites
- Large companies do not prevail, as there is an extensive network of small- and medium-sized enterprises

In Lombardy can be found a well-balanced mix of all the actors forming the Italian chemical industry:

- Foreign multinational companies
- Medium-large and large Italian companies
- Small- and medium-sized Italian companies

Even if the role of foreign MNEs and medium-large Italian companies is very important for the whole sector, it is undeniable that the chemical industry in Lombardy is above all made up of SMEs:

- Excluding companies with less than 10 employees, 94% of all chemical companies have less than 250 workers
- SMEs account for the majority of chemical employment (64%), playing a much greater role in comparison with Europe

In effect, Lombardy sees a strong presence of companies in chemical sectors where the average size of firms is lower: detergents and cosmetics, specialty chemicals and active pharmaceuticals ingredients.

The chemical industry in Lombardy also benefits from the presence on the territory of major universities and research centres, able to develop research projects oriented to industry and to offer qualified human profitable collaborations.
There are other regions which show an important presence of the chemical industry:

- Emilia-Romagna, which accounts for 12% of total chemical employment and 13% of total chemical turnover
- Veneto, with 10% of employment and 8% of turnover
- and Piemonte, having 9% of employment and 7% of turnover, and where there is a growing specialization in bio-based chemicals

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- The Italian chemical industry has a strong interaction with industrial districts. That means having as customers many SMEs belonging to the traditional sectors of the Made in Italy, which are world trend-setters, wide open to innovation and always ready to test and develop new products
- There are a lot of Italian chemical graduates very well prepared, with a strong theoretical background and also very motivated. They hold specific know-how, sometimes even considered unique, in different areas, including fluorine chemicals, woven and non-woven polyester, polyurethanes, special polymers, leather chemicals, adhesives, pharmaceuticals active ingredients and cleaning additives
- In Italy many chemical companies focus on innovation activity based on research. They are both Italian and foreign companies, large firms and SMEs. More than 800 chemical companies in Italy have innovation activity based on research and they employ about 4,800 R&D employees. Research activity is very widespread among chemical companies in Italy: excluding micro companies (with less than 10 employees), 48% of chemical companies have intra-muros R&D activity. This share is higher than other high-tech sectors, and it has grown by 10 percentage points in 10 years due to more and more SMEs having R&D activity
- The chemical sector in Italy benefits from low levels of conflict and industrial relations that, through a participatory and pragmatic approach, are able to identify the most useful tools to favour renovation, often anticipating changes in regulation. Having the improvement of productivity among its main strategic objectives, the national collective labour contract allows for maximum organizational flexibility, particularly in the management of working time. It enhances bargaining at company level and enables temporary agreements amending national rules. It also promotes training, youth employment and generational turnover through a pact of solidarity – recruitment of young people against the voluntary transformation of older employees’ contract from full to part-time when approaching retirement. Strong social responsibility has allowed important decisions in the field of welfare and, in the manufacturing landscape, the chemical industry, together with pharmaceuticals, was the first to create sectoral funds for supplementary pension and healthcare

These strengths are also at the basis of the decision of many foreign companies to be present in Italy, not only with commercial units, but also with production sites, often accompanied by research laboratories.
Weaknesses

- The cost of electricity is 30% higher than the European average and is even twice as much as France. This gap is due significantly to the tariff component, which is not dependent on the cost of raw material but on taxes and extra costs such as incentives for renewables. The chemical industry is particularly sensitive to the high cost of energy in Italy because it is a high energy-intensive sector, highly exposed to international competition, having an export turnover share exceeding 40%.
- The cost of logistics in Italy is higher than in other European countries, and its incidence on turnover is between 10 and 15%.

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy
Italy does not follow an explicit sectoral industrial policy. Horizontal industrial policies are preferred.

Research policy
The Ministry of Economic Development has created the “Fund for Sustainable Growth”, which could be used for projects relating to Sustainable Growth; Green Chemistry is one of these.

Besides clusters supported by the Ministry of Research, two specific clusters for bio-based chemicals and for biotechnologies have been developed both at national and at regional level to encourage and sustain innovation and new projects.

Links with other industries
Italy has a specialization in traditional sectors which are going through dynamic change in terms of innovation and qualitative upgrading. The chemical industry has an important role in supporting their competitiveness through its products.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The Latvian chemical industry has a long history and is a cornerstone in today’s economy. Latvia has historically had a strong research, development, and manufacturing base in sophisticated chemical and pharmaceutical products. The industry, comprising companies that produce industrial chemicals as well as pharmaceuticals, is central to the Latvian economy. Its importance was recently reaffirmed by the 2009 decision of the Latvian Cabinet of Ministers to include the chemical and pharmaceutical industry in the list of priority sectors essential for the economic development of the country.

One of the most promising sectors in Latvia, the chemical and pharmaceutical industry includes chemicals and chemical products, manufacturing of basic pharmaceutical products and pharmaceutical preparations, as well as rubber and plastic products. The industry is an important part of the Latvian economy, accounting for 8.1% of turnover for all manufacturing industries in 2012. The pharmaceuticals sector is the industry’s largest sub-sector, creating 33% of industry production or industrial output volume.

Latvia’s long experience and traditions, availability of highly qualified specialists, cost efficiency, high degree of competence in R&D, and strong manufacturing base provide an excellent foundation for business and innovative activities in the country’s burgeoning chemical, pharmaceutical and biotechnological sector.
2. Situational analysis of the chemical industry

Due to historical traditions, Latvia has a strong manufacturing base in fine chemicals and pharmaceuticals, making a wide range of products, ranging from petrochemicals and man-made fibres to paints and household chemicals. Latvia was the principal location for these sectors in the former Soviet Union, with 25% of all new Soviet drug technology designed here. One out of every four medical products manufactured in the former USSR and intended for the USSR market was actually made in Latvia.

The chemical sector is always among the largest manufacturing industries in Latvia. The chemical and pharmaceutical sector occupies 4th place according to turnover among manufacturing industries (8.1% in 2012), 6th place among other industries by number of employed (6.8% in 2012), and fifth place by share of export in sector sales (75.8% in 2012).

The main chemical manufacturing branches today include:

- Pharmaceuticals, medicine, phytopharmaceuticals
- Paints and varnishes
- Chemical compounds and synthetic fibres. Household chemicals, cosmetics and perfumes
- Plastic and rubber products
In 2012, turnover of the chemical industry increased by 15.2% in comparison to 2011. Turnover by sector, million €.

According to data from the Central Statistical Bureau, the sector included 388 companies in 2011, 99% of them SMEs. The number of employees in the pharmaceuticals subsector has remained rather stable during the last seven years. The sector employs approximately 2 000 employees. The number of people employed in the plastic and rubber subsector during the last three years is also stable, but a considerable decrease was observed in 2008. Currently, the number of employees in this sector now stands at just under 3 000. The number of employees directly and indirectly employed by sector is put at 9 000.
Foreign Trade

According to the Central Statistical Bureau of Latvia, in 2011 chemicals and pharmaceutical products took the lion’s share of the industry’s exports, 41% and 37%, respectively, followed by plastics at 22%. Currently the country produces and exports a diverse array of pharmaceuticals and chemical goods, from unique anti-influenza medicine to petrochemicals, household chemicals, and paints.

Companies in the chemical, rubber, and plastic industries are well-supplied with raw materials and reagents by well-known European and worldwide companies via representative offices and powerful logistics centres, ensuring optimum proximity to customers.

The core export markets are the Baltic neighbours – Lithuania and Estonia – as well as CIS (mainly Russia), Denmark, Germany, Sweden, and the Netherlands.
Education, R&D potential

The educational system supports the sector at both the vocational and higher education levels. In 2010/2011, 2,550 students were involved in programmes related to chemistry, pharmacy, and biotechnology.

There are seven main institutions at the higher and vocational education level:

- Riga Technical University
- University of Latvia
- Riga Stradins University
- Latvia University of Agriculture
- Daugavpils University
- Riga 1st Medicine College
- Olaine Mechanics and Technology College

Latvia offers 48 programmes at the college, professional, bachelor’s, master’s, and doctoral levels. Pharmacy, chemistry, and biology are the most popular programmes. Other programmes include biotechnology, material technology and design, chemical technology, materials sciences, biomedicine, veterinary medicine, provision and nutrition science, natural science and pharmacy.

Latvia possesses an extensive R&D base with good co-operation between the industry and scientific and academic sectors, covering a diverse range of research spheres: microbiological synthesis, virology, the synthesis of physiologically-active substances, bioorganic chemistry, molecular biology, genetics, biotechnology, biomechanics, bioengineering, among others. Another traditional sub-sector within the industry now seeing resurgence is R&D, in areas such as life sciences, wood chemistry, and the development of new materials for the aerospace, automotive, and construction industries.
In order to increase investments in R&D, the Latvian government and the Ministry of Education and Science will support nine National Level Research Centres (NLRC) covering inter alia pharmacy and bio-medicine, food processing technologies, nano-structured and multifunctional materials, structures, constructions and technologies, as well as public health and clinical medicine.

Manufacturing and design of biotechnological equipment is also prevalent. Furthermore, Latvia is becoming recognized internationally for its CRO (Contract Research Organization) activities.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Skilled, flexible and relatively cheap labour
- Businesses use modern production facilities
- Flexible production capability to manufacture small production lots of different designs, materials used and to meet specific consumer preferences
- High export capability
- Connection to and availability of local research professionals
- High added value products
- Location next to Russian markets, high Russian knowledge
- High level of scientific research in the existing infrastructure
- High production quality, relevant EU standards
- Broad international cooperation between exporting enterprises
- Recognized educational institutions which implement accredited industry-related educational programmes in the sector
- A high level of investment in the recent past
- Positive attitude towards the industry, identified by the state as a priority sector for economic development

Weaknesses

- Strong dependence on raw material imports
- Pressure to increase taxes and fees due to public sector financial deficit
- Underdeveloped infrastructure for industrial research
- Limited financial resources of the industry to invest in business development
- Lack of new technologies into production (except pharmaceuticals)
- Brain drain, able scientists leaving for foreign countries
- Low interest of research institutions in carrying out applicable, industry oriented research
- Ageing of the workforce: 50% of workers in the sector median age between 51 and 60 years
- Skills gaps: for some professions schools do not offer the relevant curriculum

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Business potential

The favourable geographic location of Latvia, the established business ties within the eastern as well as western markets, and a legal basis suitable for the sector contribute towards establishing a sustainable competitive advantage in the modern marketplace. Foreign investors in Latvia have the same rights and obligations as local investors. Intellectual property laws in Latvia are fully harmonized with EU legislation.

Prospects of the sector include:
- R&D of new medicines
- Generic production of pharmaceuticals
- Custom synthesis of new molecules
- Sub-contracted production of chemical intermediates
- Custom synthesis of organic compounds
- Outsourcing of analytical services to Latvian R&D institutions and laboratories
- New products developed by Latvian research institutes, e.g., nanosize powders, and preparations from local medical herbs, among others. Chemical processing of Latvia’s extensive timber resources
- Latvia’s natural gas deposits and storage capabilities provide other raw material sources
- Production of polyethylene pipes, industrial and food packaging

The Latvian chemical industry is represented by the Latvian Chemical and Pharmaceutical Industry Association (LAKIFA), one of the most influential industry trade groups in the country, representing around 60 companies and related institutions. Participation in the leading European chemical and pharmaceutical industry networks and groups provides the association with the information framework necessary to successfully operate in the European marketplace. The level of LAKIFA’s international activity represents a sizeable increase over the past fifteen years and gives an opportunity to effectively formulate opinions and defend the interests of Latvian companies at the national and at the European level.
Cluster activities
Two new sector-related clusters were recently established: the Life Sciences Cluster and the Clean Technology Cluster. Both of them have the long-term goal to build a platform to promote the sector on the global market.

The goal of the Life Sciences Cluster of Latvia is to strengthen the pharmaceutical industry as a leading innovative industry in Latvia, which produces and exports high value-added products and replaces traditional jobs within the manufacturing sector with knowledge-based, high-tech jobs.

About 30 pharmaceutical, chemical, and biotechnology companies, as well as educational and research institutions, form the core of the cluster. The main areas of competence in life science research are organic chemistry and biopolymer research, microbiology and virology, genomics, immunology, biotechnology, and wood chemistry.

Twenty-one enterprises and research/educational institutions from the following sectors are involved in the Clean Technology Cluster’s activities: renewable energy resources, waste and pollution, water management, clean technology products, equipment and solutions, energy production, accumulation and storage.

The aim of the cluster is to represent enterprises interested in cooperation in order to enter new international markets, improve their competence and competitiveness, as well as to create new and innovative products.

Political documents
National industrial policy (NIP) guidelines for 2014 to 2020 were adopted by Cabinet of Ministers on May 28, 2013. As one of the aspects to consider for encouraging employers to produce higher value-added products production is the fact that the Latvian-industrial companies cannot compete in mass production. The Latvian economy is characterized by small scale companies. It focuses on niche products.

The Smart Specialization Strategy remains in progress, but during the evaluation of sectors’ capacity, the chemical and pharmaceutical industry and its potential were taken into account.
Lithuania

1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry is one of the most significant industries in Lithuania. Total sales in 2012 amounted to €2.08 billion, up from €1.95 billion the previous year. The share of the chemical industry in gross domestic product (GDP), at 2.3%, was one of the highest in the European Union in 2011 as compared to the EU average of 1.1%. This can be explained by still lower input of other industry sectors as well as relatively low GDP per capita, which constitutes about 47% of the EU average. Since the other sectors of industry are growing, the share of the chemical industry might be expected to approach the EU average.

2. Situational analysis of the chemical industry

The chemical industry including plastics accounted for 20% of exports in 2011 and has increased more than the remaining industries in recent years. It ranks third among all industrial sectors, after oil refining and the food industry.

The main commodities are phosphoric and nitrogen fertilizers as well as plastics (PET), which share approximately equal parts of production.

The life sciences and biotech sector is growing rapidly. However, the sales estimates are in the range of €100 million and still do not exceed bulk commodities. Geographically, the chemical industry is situated all over the country – including the sea coast area. Employment in 2011 was 4,900 in the chemical industry.
3. Strengths and weaknesses of the existing chemical industry base

Strengths
- Well-educated labour force
- Research and university structure, newly created R&D centres
- Location next to the Russian markets, Russian knowledge
- Convenient logistics for road and sea transport
- Implementation of quality standards (mainly ISO) is a common practice
- Constructive dialogue with the authorities

Weaknesses
- High energy and natural gas prices
- Strong dependence on raw material imports
- Pressure to increase taxes and fees, due to public sector financial deficit

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Two out of six proposed priorities of the smart specialisation are related to chemistry, including:
- Medical and pharmaceutical engineering
- New functional materials

Three out of 10 Integrated Science, Studies and Business Centres (“Valleys”) are acting in the chemical area:
- Sunrise Valley, Vilnius
- Center for Physical Sciences and Technology, Vilnius
- SANTAKA, Kaunas (pharma, life sciences)
The Netherlands

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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

For several decades now, the chemical industry and the Netherlands have been a profitable combination. Due in part to Rotterdam harbour, infrastructure, top universities and the availability of qualified personnel, the chemical industry has found a good home base in the Netherlands. Many of the world’s largest chemical industries have opened production facilities in the Netherlands – to the benefit of both the companies and the Dutch economy.

2. Situational analysis of the chemical industry

Sector turnover in 2012 was a respectable €60 billion, including €7 billion of turnover from the pharmaceutical industry, making the Netherlands the third largest chemical producer in Europe after Germany and France. It provides work for 64 000 people (including 14 000 in the pharmaceutical industry), distributed among more than 400 companies, excluding pharmacies and sole proprietorships. With the exception of the food, beverages and tobacco industry, the chemical industry is the largest business sector in the Netherlands.

The Dutch chemical industry is a player at the global scale as well. In areas such as basic chemistry, biotechnology, food ingredients, coatings and high performance materials, the Netherlands is among the world’s top players. This can also be seen in its share of exports. The chemical industry accounts for nearly 20% of all Dutch exports. The Netherlands exports more chemical products than countries such as Japan.
The chemical industry is also important from an intellectual and social point of view. In the areas of research, knowledge development and innovation, the Netherlands is among the best countries in the world. The chemical industry accounts for one fourth of the country’s efforts in the area of industrial R&D.

Innovation is essential to the Dutch chemical industry. This is evident from the sector’s investments in research and development, among other things. Each year, the chemical industry in the Netherlands spends more than €1 billion on research and development. Together with the Dutch culture and mindset, this ensures a powerful chemical industry that forms an engine for the economy and acts as a leader in sustainable development and entrepreneurship.

The Netherlands has an attractive business climate for the chemical industry because the proper preconditions are present. For example, important raw materials are available or can be supplied via Rotterdam harbour or via pipelines. In addition, there are direct lines among the most important chemical centres in the Netherlands, Belgium, Germany and northern France. Together, they form a strong cluster in Northwest Europe.

Regions

The Netherlands is a relatively small and manageable country with an outstanding infrastructure, both in terms of roads, rail and waterways, and of telecommunications, energy supply and networks of underground pipelines. These join the regions in which the chemical industry is primarily established via direct lines.

From a geographical point of view, the chemical industry in the Netherlands is distributed across five regions that strengthen and complement each other, each with its own specific qualities and specialities.

Important chemical clusters can be found in the following regions:

- The area around the port of Rotterdam
- South Limburg
- Southwest Brabant and Zeeland
- The north-eastern Netherlands (Delfzijl and Eemshaven) and the eastern Netherlands/Twente

a. Rotterdam/Botlek/Pernis/Moerdijk

In the Rotterdam region, the focus is on basic chemicals and petrochemicals. Nearly 90% of the activities fall into this category or are related to it. Furthermore, the region has ambitious plans. Rotterdam harbour wants to integrate its petrochemical complex in the coming decades with the industries in Antwerp, Moerdijk, Terneuzen and Vlissingen. This would, in fact, create a single large petrochemical complex, a global leader connected closely with the complexes around the harbours of Antwerp and those in Germany, from Gelsenkirchen to Ludwigshafen.
b. South Limburg/Chemelot
South Limburg is the birthplace of Koninklijke DSM, known for its innovative products and services in the areas of life sciences and materials. In 2013, 6,000 people worked at this innovative company. About one in every four “DSM-ers” in the Netherlands is working on research, development and innovation. So the Netherlands is an important incubator for DSM in terms of innovation that takes shape in many places around the globe. Significant innovative activity has arisen around DSM and the University of Maastricht in the so-called life sciences area.

c. Southwest Brabant and Zeeland
The Southwest Brabant region can be mentioned in the same breath with the region of Rotterdam/Botlek/Pernis/Moerdijk. Not only are there direct connections to Antwerp by means of underground pipelines running through the Moerdijk area, there is also a lively cluster of chemical companies in the strip running from Bergen op Zoom/Roosendaal to Terneuzen (Dow Chemical) and other parts of Zeeuws-Vlaanderen (Yara and Zeeland Refinery).

d. Delfzijl/Eemshaven and the eastern Netherlands/Twente
Delfzijl and Eemshaven are in the far northeast of the Netherlands, not far from the Waddenzee. Active in the area are 160 companies, mainly in the sectors of energy, recycling, chemicals, metals, logistics, offshore and wind energy.

3. Strengths and weaknesses of the existing chemical industry base

Strengths
• The chemical industry in The Netherlands is embedded in a Northwest European cluster that comprises three countries
• Well-educated labour force
• Stable political and social climate
• From a physical point of view, Rotterdam harbour – one of the largest in the world - is an important advantage
• The Netherlands used to have a reputation as a high-wage country. However, in recent years, labour productivity has increased in the Netherlands, while developments in wage increases were moderate. As a result of this, labour costs per unit of product decreased

Weaknesses
• Industry in the Netherlands is faced with relatively high energy costs. However, in the summer of 2013, the government, stakeholders in the area of energy and social organisations, including the environmental movement, agreed to a comprehensive energy agreement containing commitments concerning energy savings, clean technologies and climate policy. Execution of the commitments must result in an affordable and clean energy supply, employment and opportunity for the Netherlands in the clean-technology markets.
The loss of technical personnel due to an ageing workforce must be compensated by the inflow of young employees. Well aware of this, government, education and the business community cooperate closely to prevent any possible shortage so that companies' development will not be hindered.

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy
The chemical industry in the Netherlands includes several larger chemical companies. In the context of the top sectors policy, extra attention is paid to the development of small and medium enterprises.

Research policy
The Netherlands has a good educational system, from elementary school to high-value (technical) universities. Increasingly, education, science, knowledge institutes and chemistry look to each other for educational solutions that better align with the business community. Cross-pollination is taking place in research, allowing innovation to occur more rapidly.

Opportunities for growth
In January 2012, VNCI and business consultancy Deloitte published a study of future opportunities for the chemical industry in the Netherlands and Northwest Europe. The results of that study were positive. By 2030/2050, the sector should experience substantial growth regardless of global, social, political and economic developments. This all depends on the sector’s continued building on its strengths. The existing collaboration with the cross-border chemical industry played an important role in this growth prognosis. The VNCI has since ordered an update of this study.

Researchers believe that the chemical industry will undergo large transformations. Raw materials will be used more efficiently, and a shift will take place from fossil resources to biomass, (bio)waste and other resources that are less burdensome to the environment or which even result in a positive CO2 balance. The chemical sector will be seen increasingly as innovative, clean and safe and as an essential industry producing clever products that limit the negative impacts of economic activities on health and the environment.

To achieve this vision of the future, the investment climate in the Netherlands must remain attractive. The encouragement of free trade remains important. Producing more energy efficiently and achieving diversification in raw materials, focused R&D, sustainable innovation and facilitating legislation are important.
The government endorses the Dutch chemical industry’s important role. The first cabinet under Rutte (October 2010 to April 2012) developed the top sector policy aimed at strengthening business sectors in which the Netherlands excels globally. To achieve this, the government, business community, universities and research centres work together in the area of knowledge and innovation, among others. This collaboration comprises the entire chain of innovation – from fundamental research to application – and is expressed in such forms as public-private collaboration, innovation labs and centres for open chemical innovation. The second Rutte cabinet (October 2012 to date) continued the top sector policy. The chemical industry is one of those top sectors.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The largest industrial sector in Norway in terms of production value is by far the petroleum sector. Next come mechanical/engineering industries supplying equipment and installations for the petroleum sector. In Norway, the chemical sector is considered a part of the process industries, which have a strong identity in Norway, mostly because they transform Norway’s ample renewable hydroelectricity into industrial products and materials. The process industries are the third largest industrial sector in terms of production value and exports.

With a limited domestic market of only five million people, the chemical industry is export-oriented, dependent on economic development in the European Union and globally. It derives only marginal benefit from the strong domestic economy, which is driven by high investments in the offshore petroleum sector. Conversely, the high activity in the petroleum sector drives the wage level, the general cost level as well as the exchange rate of the Norwegian krone (NOK).

Regions do not play a significant role in industrial policy and industrial policy instruments relevant for the chemical and other process industries.

Beyond the fact that process industries are located along the entire coastline and not in inland Norway, there are some local concentrations of chemical and other process industries - sometimes in industrial parks or in clusters operating across regional borders.
2. Situational analysis of the chemical industry

Statistically, the chemical sector and oil refining are combined. Consequently, “chemical sector only figures” are not available. Chemical industry, including oil refining, is identified as part of the process industries in Norway, together with metals and paper and pulp.

In 2012, Norway’s chemical, oil refining & pharmaceutical industry had a turnover of NOK144.8 bn (€18 billion), of which NOK113.7 billion from export income (78.5%), and the sector employed 14 000 full-time equivalents (FTEs). The turnover has risen since the financial crises, and in 2012 was NOK10 billion higher than in 2008. Value added was NOK25 billion (€8 billion) in 2012.

The Norwegian chemical sector is concentrated on basic inorganics, fertilizers, petrochemicals, polymers, some specialties, also from biorefineries. The pharmaceutical industry, however, is relatively small in Norway compared to neighbouring Scandinavian countries.

The chemical industry is located along the coastline, mainly due to the vicinity to hydroelectric power plants and deep, ice-free harbours. Biotech start-ups are located around the universities in Oslo and Tromsø, although these cities cannot be considered industrial centres.

Norway is organised in 19 political and administrative regions, but without a strong mandate on regional industrial policy. Industrial policy lies primarily at national level. Chemical and other process industries are mostly located in 10 of these regions. Only one region, the Agder region, has developed a strategy for industrial development. The process industries are key sectors in the region. Universities are located in only four of the 10 process industry regions. However, most chemical and other process industry companies have strong ties to the University of Technology and Science in Mid-Norway.

The chemical and other process industry companies in Norway are, with a few exemptions, subsidiaries of international companies.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Unique set of energy resources: hydropower, petroleum and new renewable energy sources such as wind power and biomass – if made available at competitive prices
- 100% renewable electricity – future strengthening of the power balance expected
- High energy and resource efficiency – demonstrated ability to reduce GHG-emissions
- Low environmental pressure, robust recipients
- Well-educated labour force (academic, non-academic, e.g. via dual education)
- Social partnership, cooperation between companies and unions – lean organisation
- Political stability
- NGO and politicians supportive to process industries transforming hydroelectricity into materials and products
- Global integration

Weaknesses

- Labour cost and cost of living
- Energy prices are high compared to non-European competitors
- Lack of access to feedstock at competitive prices
- Demographic change will pose an increasing threat in the future
- Position on the outskirts of Europe
- “Brain power” in education, engineers, universities attracted to petroleum sector

4. Top national strategies (public or private) that are putting the region or country in a European/globally advantaged position

Policy strategy

Norway does not follow an explicit sectoral industrial policy strategy. Government sets overall horizontal framework conditions (research, energy, education, infrastructure, environment). We have observed, recently, however, a change in favour of process industries that are transforming hydroelectricity into materials and other products for the global market. A parliament report in 2012 on climate change policy based on consensus across party borders, agreed that further development of the process industries in Norway, based on renewable electricity, is sound global climate change policy. Carbon leakage is accepted as a threat and policy developed accordingly to counter it. While a couple of years ago the climate change policy indicated ETS plus additional national taxes and sector targets, there is now broad political support for the EU-ETS only, compensation for indirect CO₂-cost in electricity prices and a new innovation fund reserved for climate and energy efficiency technologies in ETS-industries. Support is to be granted to pilot and demonstration installations and the deployment of new technology. The company response is very positive. In addition, support schemes for environmental technology development and deployment have also been set up to support large pilot and demo projects in large companies. Normally support schemes are geared at small projects in SMEs only.
Research Policy
Research policy, however, is not particularly industry-oriented. The following programmes are industry relevant: biotechnology, climate and energy, nano and material technology. Support to industry initiated projects has stagnated in recent years. The new government as from October 2013 has signalled, however, an increase in industry-initiated research projects.

Two of the 12 National Centres of Excellence financed by Innovation Norway are relevant, but not restricted to the chemical industry: Micro and Nanotech and Energy and Climate Change. One of the local process industry clusters mentioned is nominated under Innovation Norway’s national programme for long-term development of regional business clusters.

Opportunities for Growth
Norwegian renewable electricity production is increasing and the supply/consumption ratio is expected to grow well beyond one, leaving room for expansion of electricity using industries. We expect electricity prices to be competitive in the longer run.

Links with other industries and research infrastructures
Process industry parks and local clusters are efficient local platforms for collaboration between chemical producers, other process industry producers and suppliers of infrastructure, services and other input. Two of these are appointed as National Centre of Excellence. Process industry companies have close ties with the University of Technology and Science in mid-Norway and the related research foundation SINTEF.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry, which includes pharmaceuticals and rubber and plastics, is the second largest industry in Poland, right after manufacturing of food products and ranked ahead of manufacturing of motor vehicles, trailers and semi-trailers. The chemical industry accounts for almost 14% of turnover of the manufacturing industry in Poland.

The structure of Polish chemical production covers all segments of the industry: basic organics, petrochemicals, polymers, agrochemicals, specialties, cosmetics and pharmaceuticals. What is characteristic of the Polish chemical industry is that basic chemicals account for 60% of total chemical production in Poland.

Poland has faced for years a trade deficit in chemicals. In 2012 it was – €6.979 billion. The highest deficit is observed in pharmaceuticals, plastics in primary forms, various chemical products and organic chemicals.

2. Situational analysis of the chemical industry

In 2012 the sold production of the Polish chemical industry was €31.397 billion including pharma, plastics and rubber.

The sector employs 247 000 employees: 71 000 in chemicals, 21 000 in pharmaceuticals and 155 000 in production of rubber products and plastics goods.
The chemical industry location is concentrated in the southern part of Poland: Grupa Azoty S.A. (fertilizers, caprolactam, PA), Grupa Azoty Zakłady Azotowe Kędzierzyn S.A. (fertilizers, OXO, plasticizers), Synthos S.A. (rubber, PS, specialties, adhesives), PCC Rokita S.A. (polyols, chloride products), Zakłady Chemiczne Organika - Sarzyna S.A. (crop protection, epoxy and polyester resins), Zakłady Chemiczne Siarkopol sp. z o.o. (fertilizers, sulphur), Rafineria: Petrochemia-Blachownia S.A., Rafineria Nafty Jedlicze S.A., Rafineria Jasło S.A. There are also large chemical sites in north-west Poland near the border with Germany: Grupa Azoty Police (fertilizers, titanium dioxide), Fosfan S.A. (fertilizers) and in the north: LOTOS S.A. (refinery), GZNF Fosfory Sp. z o.o. (fertilizers). Another strategic site is in central and the eastern part of Poland: PKN ORLEN S.A. (refinery and petrochemicals), ANWIL S.A. (fertilizers and PVC) and Grupa Azoty Zakłady Azotowe Puławy S.A. (fertilizers, caprolactam, melamine).

Grupa Azoty (Azoty Group) is the leading chemical producer in Poland. The group leads the Polish market in:

- Fertilizers: multicomponent fertilizers (AP, NPK, PK), mineral fertilizers, fertilizers including S, N fertilizers
- Polyamides, OXO alcohols, plasticizers, titanium dioxide, melamine

In the EU market, Grupa Azoty (GA) is in second position in mineral fertilizers and melamine. GA is in third position in multicomponent fertilizers and in the top 10 manufacturers of plasticizers, OXO and polyamides (among integrated producers).

Investments in R&D in 2012 in the chemical industry in Poland were €2.287 billion.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- High resource efficiency, especially in fertilizers and petrochemicals manufacturing
- Well-educated and efficient labour force
- Supplier and customer relations
- Good R&D centres, university and technical university infrastructure
- Experience in safety of production

Weaknesses

- Energy prices are high and rising
- In comparison to other EU countries, power production is based on coal, and the ETS system will have a huge impact on Polish producers (920 kg of CO₂ for 1 MWh and in France only 30 kg)
- Strongly depends on raw material imports
• Lack of efficient gas pipeline infrastructure to import gas from west and south and that is why Poland, with total consumption about 15 billion cubic metres (m$^3$), is obliged to buy about 7 billion m$^3$ of natural gas from Russia, paying more than Germany
• Weak railway infrastructure and high cost for railway transport of chemical goods

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy
The new industrial policy in Poland that takes into account the requirements of industrialisation of economy has not yet been elaborated. The energy policy elaborated a few years ago should also be changed, because the development of the industry has not been taken into account; nor have shale gas opportunities.

Research policy
Research policy is deemed to be important for the Polish government, but unfortunately much more money is spent on basic research than on applied research. In 2011 government R&D expenditure, together with EU funds, accounted for 0.74 % of the GDP – four times less than in Germany – with the total amount more than €1 billion. There exist some sectoral initiatives on technology like the Polish Technology Platform SusChem, coordinated by the Polish Chamber of Chemical Industry, and one project is foreseen together with member companies.

Links with other industries and research/universities
There are no strong and effective links between industry and research/universities – in spite of successful cooperation in the past, when many technologies were developed together to be licensed to many countries, like caprolactam or cyclohexanone and polyoxymethylene. The Polish industry should be much more innovative now.

Almost all chemical companies have established technological parks. But without raw materials available, it is not easy to develop them.

One successful technological park is, however, Plock Industrial and Technological Park, located at the site of the refinery and petrochemicals of PKN Orlen S.A.

Many investments have been made, for example the surface active agents production unit of 30 000t/y realised by PCC Rokita S.A.
Opportunities for Growth
There are many growth opportunities of the chemical industry in Poland. Taking into account chemicals consumption per capita, it has increased but remains lower than in many EU countries. The production structure of the chemical industry should be also changed to move to the production of high value added products. Today basic chemicals account for 60% of total production.

Smart Specialization Agenda
There are some regions in Poland with some smart specialization like Podkarpackie for advanced materials, industrial biotechnology and nanotechnology.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry, including the activities classified as NACE 20, represents about 1% of the GDP of total Portuguese industry.

Compared with the others sectors, the chemical industry has an important role as exporter. In 2012, the sector was the second biggest exporter, with 12.5% of export sales, and fourth in terms of the contribution to export growth, keeping this position in 2013.

Portugal is not organised by regions, excluding the Atlantic archipelagos, where there are no chemical industries. Statistics presented in this document refer to the country.

2. Situational analysis of the chemical industry

In 2010 there were about 800 companies included in CAE 20. There were only 65 companies with sales above €10 million – considered large and medium sized – although they represented 66% of the total sales of the sector – €2.7 billion out of a total of €4.1 billion. So most companies classified as chemical industries were small and micro companies, mostly operating in the area of consumption products. Larger operators are involved in activities such as basic chemicals, fertilizers, petrochemicals, polymers and, of less importance, fibres and specialties. There is also a small but dynamic group of companies in the fine chemicals area, with their own know-how and a significant contribution to exports.
Geographically, the chemical industry in Portugal is mostly located in two defined chemical industry hubs in Estarreja and Sines and in the industrialised areas of Lisbon and Oporto.

a. **Hub of Estarreja/Aveiro**

This hub has a significant supply chain integration, accounting for 11% of the total Portuguese chemical industry according to 2010. Methylene diphenyl diisocyanate, or MDI, is the most important output, and is produced mainly for export.

Nitric acid, nitrobenzene, aniline, hydrogen, carbon monoxide and chlor/alkalis, are also produced in this hub by different companies. Large quantities of these products are used in the production chain of MDI, but external sales are also significant. The output of this hub includes other less important products associated with the above main products.

Also located in the same area are other chemicals plants such as PVC and urea-formaldehyde resins.

One of the main raw materials, benzene, comes from a refinery located in Matosinhos (Oporto), about 45 kilometres (km) away. Another raw material, ammonia, is brought by rail from the Lisbon area (300 km), while VMC (vinyl chloride monomer) comes by pipeline (25 km) from the port of Aveiro.

This hub is considered an efficient site, mainly export-oriented, with good links to universities mainly in Aveiro (about 20 km away), Porto (40 km) and Coimbra (80 km).

Concerning logistics, the hub uses the port of Aveiro (25 km), railways and a motorway junction (enabling connections to the whole of Portugal, Spain and Europe). There are some points which can be improved, such as the transport of benzene and the railway connection with the harbour of Aveiro.

The strong dependence on one output (MDI) is the weak point of this hub, limiting the development strategy.

b. **Pole of Sines**

Sines is a petrochemical complex, planned in the early 70s, on the coast and 150 km south of Lisbon.

Construction started in the middle of that decade, with a 10 million tonnes refinery and an ethylene plant. The ambitious initial plan was affected by the two oil crises, and the growth of the complex was slower than planned. At present, in addition to the refinery and the ethylene plant, there are plants for the production of polyethylene, butadiene, and ETBE. (ethyl tert-butyl ether). In the same complex there are also plants for the production of carbon black, PTA (terephthalic acid) and urea formaldehyde resins. Local utilities include a large coal power plant.

In 2010 sales from Sines represented about 20% of the Portuguese chemical industry. This figure should now be some points higher, due the start-up of the 600 Kilotonnes –per-year PTA plant.
The main logistical strength of the complex is a deep water harbour (28 meter) capable of receiving ships up to 350 kilotonnes (kt). This harbour, planned together with the refinery, now receives different kinds of bulk cargoes, including liquefied gases, liquids and solids. A container terminal was added some years ago. Near the harbour there is a large LNG storage facility, linked to an LNG maritime terminal. The complex also has a railway connection.

The refinery recently underwent a deep revamping, and its competitiveness has been improved.

The future development of the petrochemical complex is strongly dependent on the competitiveness of the ethylene plant.

c. Lisbon Area
In the past there were two important hubs for chemicals in the Lisbon area. Since 1985, for competitiveness and environmental reasons, plants producing basic chemicals, which were the basis of these hubs, have been disabled.

The Lisbon area still has sizeable chemical units in the field of middle-sized plants such as fertilizers, chlor-alkali products, fibres, specialties and pharmaceuticals. These industries are not interconnected, and the plants are in different locations, so they do not constitute a chemical complex. Their competitive edge comes from the importance of Lisbon as a consumption centre, not only for final consumers but also for downstream users, together with the good logistical conditions, such as the port of Lisbon, railways, motorways, and from the central location in terms of the country.

Lisbon has two universities, both featuring high-quality schools of technology.

Sales of the chemical industry in the Lisbon area are roughly estimated to represent about 35% of the national total.

d. Oporto area
In the Oporto area and close to a large harbour, a refinery is located. This refinery includes an aromatics plant with a capacity of 400 kt/year, where raw materials for the chemical industry, such as benzene, toluene and ortho xylene, are produced. Benzene is used as a raw material at Estarreja, the other products being exported. Several small industries, supplying chemicals for other industries, can be found in the Oporto area.
3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Logistics
Portugal, being a peripheral country in Europe, is well placed in relation to other continents - North America, South America and Western and Northern coast of Africa.

The expansion of the Panama Canal will soon allow much larger ships to pass through it, and most of the traffic between Asia and Europe is expected to use it. Sines will then be the closest European harbour. The railway connections between Sines and Europe are already being improved, and the general logistical conditions of this hub will improve considerably.

- Know-How
The chemical industry in Portugal is supported by the availability of competences at the different levels, at reasonable cost. There are good chemical engineering schools, and the research in the universities has been improving considerably during the last 15 years.

Weaknesses

- The value chain in the Portuguese chemical industry has significant gaps, mainly in the field of intermediate products, making the production processes often not completely integrated
- Electricity costs are higher compared with the average in Europe, especially as regards to big consumers. The electric power connections between Iberia and the rest of Europe are poor, making it difficult to develop a real competitive market in Portugal and Spain
- Portugal does not have natural gas reserves. There are good facilities to import LNG, but pipeline connections are limited to just one supplier (Algeria). This means that the price of natural gas cannot be better than in other European countries, which means high figures compared with other world regions
- During the last two years, the measures required to solve the financial crisis have caused a big decrease in internal consumption and difficult access to financing, with current lending rates being higher than in other European countries, including 3.2% points more than in Germany, according to data from June 2013

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

The segment of chemical specialties for the manufacturing of pharmaceuticals has been quite dynamic in Portugal in recent years. The number of companies in this segment is limited, but their growth, both
in terms of number of patents, production and employment, has been quite substantial. The cost of energy and financing difficulties are not relevant for this segment, which supports its ability to grow in the development of know-how and in the availability of qualified human resources at reasonable cost.

Production of nanomaterials is being developed in Portugal, with one company already able to produce several tons per year through its own proprietary and unique technology. Additionally, the Iberian Nanotechnology Lab, located in the north of Portugal, with its state-of-the-art facilities and top researchers from all over the world, is expected to drive the dissemination of nanotechnology throughout the industrial landscape. This can be an area with opportunities to grow in the near future.

The segments related to forest products should also be watched. Portugal has an extensive area covered by pine and eucalyptus woods which support developed industries of cellulose, paper and wood-based panel production. These industries induce the development of several segments of chemicals. For instance, they justify the existence of plants of urea formaldehyde resins, and they are important consumers of chlor-alkali products. Related to the pine woods, there are some chemical companies producing derivatives of the resins, which are quite competitive in the external market.
Romania

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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

According to the most recent financial statements published by the Romanian Finance Ministry end 2011, the chemical industry sector comprises 4,598 companies, generating a total turnover of €10.53 billion and employing 89,696 people.

The chemical industry represents an economic sector on which Romania can rely for further development in the coming years.

Attracting local and foreign investments can transform this sector into a growing one, taking into account the global growing trend, estimated at 12%.

The chemical sector is confronted with several aspects which can change its relative stability in terms of the number of companies and employed people and the economic trend, noted by 24% growth in turnover for full-year 2011.

Analysis shows:
- 22% fewer companies are operating in April 2013, compared with 2011. Of the 4,598 that remain
- They are bigger in number and size than the newly established ones created in between 2008-2011
- Increased solvency problems for companies in general, compared with 2010. The chemical industry sector is exposed to risk, as about 45% of active companies in the field have a high degree of insolvency risk
2. Situational analysis of the chemical industry

- Before 1990 – one of the largest in Eastern Europe.
- After 1990 – one of the most affected – large state-owned production facilities had to be restructured and privatised due to:
  - Obsolete technology
  - High production costs
  - Low productivity
- Economic contraction after 1990 – led to decrease in demand for chemical products and loss of external markets, leading to a decrease in output and employment in chemicals.
- Fragmentation of the industry – number of companies rose from 97 in 1990 to 3,500 by end of 2006.
- End of 2007 – 93% of the companies were privately owned.
- Chemical and petrochemical industry remained one of the fastest growing sectors of the Romanian economy. For example, the sector in 2006 had 17% of total industrial output and 13.3% of total exports, mainly pharmaceuticals, pesticides, dyes and intermediates.
- The most important events which influenced the local chemical industry – Romania’s EU accession on January 1, 2007, and the adoption of REACH.
- Romania’s legislative framework – modelled on European framework.
- Impact on industry:
  - Costs associated with restructuring, increasing competition and costs related to testing and registering substances for REACH.
  - Complying with EU environmental standards – significant investments needed by 2020
- The chemical industry in Romania is highly heterogeneous, focused on petrochemicals, organic and inorganic chemicals, bulk drugs, agrochemicals, paints and dyes.
- Romania will remain an importer of chemicals.

High investments to meet environmental regulations, besides upgrading technology, are tough challenges to Romania’s chemical industry. Upgrading technology and passively adhering to existing business models might not be enough in a world of scarce resources – innovative business models are needed and research is a must.

Basic manufacturing, mostly based on relatively substantial hydrocarbon resources (compared to Europe), provided in 2011 a temporary impetus to the overall chemical industry. But it adds dubious gains in terms of value added.

The sector’s competitiveness remains low overall, mainly driven by cheap natural gas and labour cost – thus remaining unsustainable. Basic chemical manufacturing, but also more value added segments
like paints and plastic products manufacturing were in the red in 2011, while the sectors making profits were fertilizers, rubber (tyre mostly) production and wholesale trade with chemicals (mostly importers).

The toughest problems at the level of industry segments are in basic chemicals manufacturing.

The paints segment also features low profitability and this may explain the pressure for mergers and acquisitions.

Profitability in plastics manufacturing is also negative, but the market size is expanding much more steeply than the paints or basic chemicals segments.

The distribution of active companies in the Romanian chemical industry is a mature one, with 60% of companies being active on the market for more than seven years. These companies also have an important social and economic role in the chemical industry business and economic environment, generating:

- 82% of the total jobs in the sector
- 91% of total sector turnover
- 87% of the total value of debts and claims
- 89% of total actives
- More than 97% of the own capital

**Key-data chemical industry Romania in 2012**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies</td>
<td>4,598</td>
</tr>
<tr>
<td>Staff</td>
<td>89,696</td>
</tr>
<tr>
<td>Revenues</td>
<td>€10.53 billion</td>
</tr>
<tr>
<td>Imports</td>
<td>€9.85 billion</td>
</tr>
<tr>
<td>Exports</td>
<td>€4.95 billion</td>
</tr>
</tbody>
</table>

*Source: Deutsch-Rumanische Industrie-und Handelskammer AHK Jahresbericht 2012*

**Overview of chemical industry production – out of total revenues in 2012**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic chemicals</td>
<td>15%</td>
</tr>
<tr>
<td>Paints, coatings, adhesive</td>
<td>4%</td>
</tr>
<tr>
<td>Fertilizers, agri-chemicals</td>
<td>8%</td>
</tr>
<tr>
<td>Plastics</td>
<td>28%</td>
</tr>
<tr>
<td>Rubber products</td>
<td>24%</td>
</tr>
<tr>
<td>Wholesale chemicals</td>
<td>21%</td>
</tr>
</tbody>
</table>

*Source: Major Companies in Romania 2012*
Chemical industry competitiveness will increase by:

- Industrial clusters appropriate with the regionalisation process
- Research & development & innovation (R&D&I): Romania committed to target 2% of GDP (1% public +1% private funds) vs.3% in European Union
- Cohesion policy contributes not only to reducing regional disparities but also to reaching the goal of competitiveness

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Strong petrochemical base
- Substantial natural reserves, namely salt, sulphur, potassium, methane gas
- Good level of regulatory compliance (EHS/Quality)
- Strategic location at the centre of Europe
- Business/FDI potential
- Mature market – growth is export-driven
- EU member state
- Hub for Central and Eastern Europe
- History and tradition of the chemical industry

Weaknesses

- Poor level of innovation and specialisation
- Demographic development, namely an ageing population, decrease in numbers
- Poorly educated and trained labour force
- Increases in labour costs during the last years and in energy costs
- High administrative and regulatory burden
- Raw materials dependence – import, stock depletion, plus external shocks dependency
- Poorly developed infrastructure
- Lack of know-how
- Insufficient interconnection links with companies and research institutions to develop new products and improving technology, such as joint projects
- Pressure to increase taxes and fees, due to public sector financial deficit
4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy
Romania does not follow an explicit sectoral industrial policy strategy. All horizontal strategies refer to the 2014-2020 timeframe and follow the EU 2020 strategy. They will be finalised and submitted to the European Commission by the end of 2013.

Horizontal strategies in the fields of National Industrial Policy (SRR), Export (SNE), Energy/Resources (SER), Competitiveness and Innovation (SNCI) are being developed at the moment.

The chemical sector is one of the areas highlighted in the applicable documents, such as SRR.

The government sets overall horizontal framework conditions in many areas: energy, research, education, and infrastructure. However, centralised strategies sometimes tend to be of more political than practical relevance.

Opportunities for Growth
Areas of growth for the chemical industry lie in the topics addressed in the National Industrial Policy (SRR).

Smart specialisation
Romania Vest and Romania Nord-Vest regions registered in the Smart Specialisation Platform.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry is a key component of the national economy and industry in Russia. In 2012, the volume chemical and petrochemical products amounted to about €73 billion, representing 2.6% of gross domestic product (GDP) and about 9% of the total value added in manufacturing.

In the chemical industry, there are approximately 3 500 large enterprises and SMEs, 100 scientific and design organisations and experimental plants employing approximately 680 000 production workers.

Russia develops and implements a wide range of activities directed towards the processing of associated petroleum gas, the creation of ethylene-producing complexes as well as the expansion of the production of finished products.

Recently, the Russian Government, the Ministry of Industry and Trade as well as the Ministry of Energy have focused their attention on the strategic role of the chemical industry for a sustainable economy.

2. Situational analysis of the chemical industry

Geographically, the chemical industry is significantly represented in 44 out of 83 regions within the country. The main developing clusters of complexes for the chemical and petrochemical industries are:

- Sibur holding company:
  - “Tobolsk-Neftechim” is an anchor enterprise of the Tobolsk cluster formation that includes an R&D centre and a local university.
  - Ust-Luga is a port-city with a complex for transhipment of chemical products where a complex for product processing is planned to be built.
Kstovo is a large complex for PVC production.

- “Nizhnekamskneftekhim” is an anchor enterprise whose business activities embrace support of R&D centres and cooperation with universities involved in the processing of petrochemical products in Nizhnekamsk, Krasniye Polyany, Kazan and other clusters.
- “PhosAgro”: Cherepovets city, Apatity city.
- “EuroChem”: Belorechensk city, Novomoskovsk city etc.
- “Gazprom Neftekhim Salavat”: Salavat city, Republic of Bashkortostan.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Availability of raw material base
- Investment in processing and infrastructure
- Active development of the chemical clusters

Weaknesses

- Harmonisation of international legislation (OECD, WTO, the Customs Union)
- Low labour productivity
- The process of active modernisation

4. Top national strategies (public or private) that are putting the region or country in a European/globally advantaged position

- Increased public attention to industry’s development (state “Development Strategy of Chemical and Petrochemical Industries until 2030”)
- Implementation of projects on creation and operation of research infrastructures of RUSNANO, large Russian companies and research universities

Opportunities for Growth

- Labour productivity
- Development of the internal market (production localisation of major automakers, the construction industry boom, agriculture development)
- Regional development (the Customs Union, EurAsES, etc)
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

Basic macro-data on Slovakia

- Population: 5.4 million
- Area: 49 thousand km²
- GDP: €9 400 per capita in 2012
- Currency: euro (€) as of January 1, 2009

In the 1990s the Slovak chemical industry was marked by three significant factors: partition of Czechoslovakia, orientation from eastern markets to western ones and privatisation. Some chemical companies successfully transformed and survived this period, some were bought by foreign investors, and others did not take roots in the new market environment and exited the market. The first decade of new millennium represented stabilization, integration to EU market and new investments.

Data for 2012 show the chemical sector with the sales of €10 734 million, translating to a 16% share of total Slovak industry sales. The Slovak chemical sector has 14.1% and 11.8% shares of total exports and added value respectively. The chemical sector is ranked second in terms of Slovak industrial production, followed only be the automotive sector.
Chemical sector and its share of total industrial manufacture of Slovakia

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Chemical sector</th>
<th>Industrial manufacturing in total</th>
<th>Share of chemical sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>€ million</td>
<td>10 734</td>
<td>66 943</td>
<td>16.0%</td>
</tr>
<tr>
<td>Employees</td>
<td>Persons</td>
<td>37 232</td>
<td>375 547</td>
<td>9.9%</td>
</tr>
<tr>
<td>Exports</td>
<td>€ million</td>
<td>8 189</td>
<td>58 448</td>
<td>14.0%</td>
</tr>
<tr>
<td>Imports</td>
<td>€ million</td>
<td>8 352</td>
<td>48 791</td>
<td>17.1%</td>
</tr>
<tr>
<td>Added value</td>
<td>€ million</td>
<td>1 485</td>
<td>12 607</td>
<td>11.8%</td>
</tr>
</tbody>
</table>

Chemical sector according to SK NACE Rev. 2, which means: 192 – Manufacture of refined oil products, 20 – Manufacture of chemicals and chemical products, 21 – Manufacture of pharmaceutical products and preparations, 22 – Manufacture of rubber and plastic products.

Sales of chemical products in million € in 2012

Foreign Trade

Commodity structure of Slovak exports and imports of chemical products by sub-sectors in 2012

<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>Unit</th>
<th>Exports</th>
<th>Imports</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refined petroleum products</td>
<td>€ million</td>
<td>3 002</td>
<td>1 306</td>
<td>1 696</td>
</tr>
<tr>
<td>Chemicals and chemical products</td>
<td>€ million</td>
<td>2 180</td>
<td>3 303</td>
<td>-1 123</td>
</tr>
<tr>
<td>Pharmaceutical products and prep.</td>
<td>€ million</td>
<td>309</td>
<td>1 418</td>
<td>-1 109</td>
</tr>
<tr>
<td>Rubber and plastic products</td>
<td>€ million</td>
<td>2 698</td>
<td>2 325</td>
<td>373</td>
</tr>
<tr>
<td>Chemical industry in total</td>
<td>€ million</td>
<td>8 189</td>
<td>8 352</td>
<td>-163</td>
</tr>
</tbody>
</table>
There are in 2012 around 1 710 manufacturing companies in Slovakia’s chemical sector; 3% of them are large with 250 or more staff, 8% of medium size, 24% small, and 65% are micro-sized, having up to nine employees.

As to the international comparison, total sales of the Slovak chemical industry represent up to 2.0% of the EU27’s sales and some 0.3 – 0.4% of total world sales (2011).

2. Situational analysis of the chemical industry

Industrial production is located mainly in the west part of Slovakia which is formed by Bratislava, Trnava, Trenčín and Nitra Self-governing Regions. These western regions have a 60% share of Slovakia’s total GDP (2010). Central Slovakia is formed by Žilina and Banská Bystrica Self-governing Regions, with a share of 20.3%, and the Eastern part, formed by Prešov and Košice Self-governing Regions, with a 19.7% share of total GDP. The highway connection between the west and the east of Slovakia is still not finished, which is a big handicap – mainly for Prešov and Košice regions. It is to be finished by about 2018.

The chemical industry is also concentrated mainly in the western part of Slovakia where oil refinery, production of primary plastics, rubber products (tyres), fertilizers, coatings, pharmaceuticals, plastic products are located. Production mainly focuses on of man-made fibres, plastic foils and other chemical products in central and eastern Slovakia. Many small- and medium-sized companies are geared to the production of rubber, plastic and other products for the automotive industry. There are three big car factories: Volkswagen, Peugeot-Citroen and KIA, located in the western part of Slovakia. A total number of 926 555 cars manufactured in 2012, the equivalent of 118 units per 1 000 inhabitants, the most of any country in the world.

As far as the accessibility of universities and research technology organisations is concerned, there are three universities important for the industry: Comenius University and Slovak University of Technology, both located in Bratislava, and the University of Technology in Košice in eastern Slovakia. There are four private R&D Institutes geared mainly to the chemical sector: R&D of chemical technology,
petrochemicals, plastics, and man-made fibres. There is good co-operation between specialised faculties of the universities, R&D institutes and the Slovak Academy of Science, a state institution. Lack of state support for applied R&D is a significant issue for the Slovak chemical industry. In 2011 there were €468 million of financial means for the whole R&D in Slovakia, of which €284 million from public funds, €184 million from the private sector, which in total represented 0.68% of the Slovak GDP. At the beginning of 2013 the government prepared the material Strategy of Research, Development and Innovations in the Slovak Republic till the Year 2020. ZCHFP SR and its members very actively participated in the preparation of the material.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Central location, possibility to act as a connecting territory between the north and the south, the west and the east of Europe (Ukraine, Russia)
- Availability of oil (Druzhba pipeline) and gas (Bratstvo pipeline) from Russia
- Relatively low labour costs
- Euro-zone membership
- Sound and stabilised banking sector
- Well-educated and skilled people
- Tradition of chemical production in all regions
- Research and development capacities ready to join new projects

Weaknesses

- Slovakia is short of most raw materials that are important for chemical production.
- Uncompleted highway infrastructure
- Relatively high prices of electricity
- High dependence on Russia (and Ukraine) for gas deliveries

The combination of the above-mentioned strengths gives Slovakia a good advantaged position in general.

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

In particular, the Slovak chemical sector can build its future progress on good cooperation between universities, the Slovak Academy of Science, the private R&D institutes and R&D departments of advanced manufacturing companies. Their cooperation on the Project NANOFORCE is one of the best examples.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry in Slovenia comprises manufacturers of chemicals and chemical products, pharmaceutical raw materials and preparations, rubber products and manufacturers of plastic products.

The chemical industry is one of the most important manufacturing activities in Slovenia, with a long tradition. The following picture shows its share within manufacturing activities in Slovenia:

(source: KAPOS GZS 2012)
2. Situational analysis of the chemical industry

The next basic indicators identify the chemical industry of Slovenia:

- 668 companies, 95% of which are SMEs, predominantly of small size and almost 70% of them are plastic processing companies
- 24 564 employees
- €4.8 billion of turnover

Chemical industry breakdown by its main product segments:

- The pharmaceutical industry is an important and development-generating industry with large companies of major importance
- The “strongest” product segments within the “classic” chemical industry (i.e. production of chemicals and chemical products”) are pigments, coatings and paints, adhesives, artificial fibres, some inorganic basic chemicals and some types of consumer chemicals
- plastic processing segment: large presence of companies, predominantly SMEs, suppliers of products for automotive industry, advanced packaging products for industrial and consumer use etc
- rubber processing industry: predominant products are tyres, rubber belts, environmental protection and rescue products

The chemical industry is largely export-oriented, with export sales at 76% of total sales.

1 size defined according to the Slovenian Companies Act.
The system of universities and R&D institutions in Slovenia is relatively solid and well structured; some institutions are internationally well-recognised and successful. The system is one of the key chemical industry’s stakeholders, offering it significant support. But there is still large potential for cooperation with the industry.

Research and Innovation

*Strategy of Slovenia 2011-2020* explicitly calls for more efforts to promote and facilitate more applied R&D above basic R&D – based on industry’s proposal/request – aiming to bring more innovative products to the market.

Some chemical industry companies are traditionally in constant and productive cooperation with R&D institutions, but more companies need to be included in similar relations.

Also, there is need for a further push to re-direct the flow of public financial resources for R&D institutions to promote applied R&D above basic R&D activities.

This rather fresh strategy offers plenty of space for activities enabling the aims to be met.

Recent (2013) Slovenian Industrial Policy 2014-2020 names segments of the chemical industry among key industrial sectors within technological fields addressing the key societal challenges, such as environmental and energy challenge and the efficient use of natural resources based on sustainable production and consumption; food, human health and ageing; and key enabling technologies.
Smart Specialisation Strategy

Document (in public consultation till end August 2013): Initially the chemical industry requested its importance and potential to be specifically mentioned in the document, but it turned out the document structure could not include this directly. At the moment the document (based also on the analysis of the current importance and development potential) contains some “anchorages” relevant for chemical industry (e.g. within Priority Area “Materials” chapter).

3. Strengths and weaknesses of the existing chemical industry base

- Well-educated, qualified, skilled and internationally savvy workforce
- Extensive transport network, deep-sea port in the country
- Country’s geostrategic position: in Central Europe, between the Alps and the Mediterranean
- “Bridge” to the countries of South-Eastern Europe, especially Balkan countries, for historical reasons good knowledge of these countries’ culture and markets - strong commercial contacts across Eastern and South-eastern Europe

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

See description under point 2.
Spain

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Director General
Federación Empresarial de la Industria Química Española (FEIQUE)
jal@feique.org

1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry in Spain encompasses the chemical (NACE 20) and pharmaceutical (NACE 21) industries, and excludes plastics and rubber products (NACE 22).

Since 2011, it has been the third largest industry in Spain, accounting for 12% of total manufacturing gross product (after food, beverages & tobacco industry at 20%, and metal industry, at 16%), generating an added value about €15 billion and a turnover of €55 billion. Including NACE 22, the percentage of the contribution to manufacturing gross product would rise to 15%, with added value about €20 billion, and the turnover to €74 billion.

Since the beginning of the crisis in 2007, Spanish industrial production fell by about 20%. Only the chemical industry and food & beverages have increased their added value – 17% and 14% respectively – and their turnover – 6% and 5%.

In terms of EU chemical industry sales (NACE 20&21) by geographic breakdown, the Spanish chemical industry represents about 10% of the €539 billion in EU sales registered in 2011 based on latest available data, ranking among the seven biggest chemical countries in Europe.

The chemical industry is also the second largest exporter of the Spanish economy, and the first investor in R&D and environmental protection. Due to the essential contribution of the chemical industry to the Spanish economy, it was declared in 2009 a strategic sector by the government.
2. Situational analysis of the chemical industry

Main figures of the Spanish chemical industry

<table>
<thead>
<tr>
<th>Category</th>
<th>Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of companies (2012)</td>
<td>3 109</td>
</tr>
<tr>
<td>Sales (2012)</td>
<td>€55.117 million</td>
</tr>
<tr>
<td>Manufacturing Gross Product Contribution (2011)</td>
<td>12%</td>
</tr>
<tr>
<td>Exports (2012)</td>
<td>€28.525 billion</td>
</tr>
<tr>
<td>International Sales (2012)</td>
<td>51.3% of total</td>
</tr>
<tr>
<td>Direct Employees (2012)</td>
<td>155 900</td>
</tr>
<tr>
<td>Employment Indirect generation (2012)</td>
<td>&gt; 500 000</td>
</tr>
<tr>
<td>Indefinite duration contracts (2012)</td>
<td>91% of the total contracts</td>
</tr>
<tr>
<td>Sales by Employee (2012)</td>
<td>€356 000</td>
</tr>
<tr>
<td>Consumption per habitant (2012)</td>
<td>€1 003 Yearly</td>
</tr>
<tr>
<td>R&amp;D Expenses (2011)</td>
<td>24.2% of industry</td>
</tr>
<tr>
<td>R&amp;D Personnel (2011)</td>
<td>21% of industry</td>
</tr>
<tr>
<td>Innovative Companies (2011)</td>
<td>65.8% of total</td>
</tr>
<tr>
<td>Environment Investments (2010)</td>
<td>20% of industry</td>
</tr>
<tr>
<td>Taxes Contribution (2011)</td>
<td>€6.5 billion</td>
</tr>
</tbody>
</table>

Geographic breakdown and main chemicals production locations

Forty-six per cent of chemicals production in Spain is located in the region of Catalonia, and 25% in the petrochemical cluster of Tarragona – one of the biggest of southern Europe. The production in this site is about 21 million metric tonnes (MMT) per year and directly employs 6 000 people, generating more than 30 000 jobs in other dependent sectors. Backward integration with refining and forward integration with some specialties. It has great involvement with local universities and research bodies.
The second largest production region is Madrid, accounting for 14%, mainly dedicated to pharmaceuticals and detergents.

The region of Andalusia generates 8% of production, including the second largest chemical site of Spain, located at Huelva, where main outputs are organic and inorganic chemicals. Backward integration with refining and energy companies. This site employs directly and indirectly 8,000 people and generates sales of about €11 billion, a figure which includes not only chemical activity.

The last important chemical region is Valencia, accounting for 7% of Spanish production. These four regions together represent 75% of Spanish chemicals activity.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Access to high growth regions in Northern and Western Africa
- More flexible labour market, due to new regulation from 2012
- Salaries growth in the chemical industry linked to economy growth, not prices
- Highly skilled labour force
- Strong collaboration with trade unions
- New national transport Infrastructures plan (railway and ports)
• Ongoing investments to introduce the UIC standard gauge railway: development of three corridors (Mediterranean, Central and North) to connect with the European Market
• Exclusive logistics national strategy plan for the chemical industry (infrastructures and services)
• Strong collaboration with authorities in the development of national R&D&I strategies and programmes
• Strong collaboration with universities and business schools, research centres, chemical engineers and chemist professional associations
• New energy regulation focused on reducing electricity costs (will finish in 2014)
• New international energy connection infrastructures to France, Portugal and Morocco
• Great potential of shale gas, which could reach the level of 2 TCM
• National Competitiveness Plan for the Chemical Industry (€200 million from 2010); focused on financing new investments and competitiveness improvements
• The Spanish chemical industry records the best favourability rating among the general public and opinion leaders (Cefic 2012 Pan European Survey)
• Strong alliance with other industries: Alliance for the Competitiveness of Industry (chemical, automotive, steel, refine, paper and concrete industries); Energy Industrial Platform (15 sectors)

Weaknesses

• High energy costs persist
• Iberian gauge railway remains in place all over the country, instead of the UIC standard
• 40 tonne weight limit for road transport
• Low raw materials production in the country

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy

Energy Reform

• Started in 2013 and will end in 2014
• Objective: Reduce electricity costs

Logistics national strategy for the chemical industry

• Started in 2013 and will end in 2017
• Objective: development of infrastructures and services according to the chemical industry’s needs
National Competitiveness Plan for the Chemical Industry (€200 Million from 2010)

- Started in 2013 and no end foreseen
- Objective: finance new investments and competitiveness improvements

Industrial Policy National Strategy

- Will start in 2014
- Objective: increase industry contribution to GDP (20%)

Marca España

- Started in 2013
- Objective: Marca España (Spain Trademark) is a state policy whose objective is to improve the image of our country, both domestically and beyond its borders, for the common good. In a globalised world, a good country image is an asset that helps to support the international position of a political, economic, cultural, social, scientific and technological state (Ángela López, from MA3 Communications)

Others

- National strategy R&D+I plan
- Supporting programme for innovative clusters
- Innovation support programme for SMEs

Links to Research Infrastructure

- Strong links created with university research infrastructures via partnership between Feique and the Association of Chemical Engineering and Chemistry Faculties, to public research infrastructures, namely through partnership between Feique and the National Council of Scientific Research
- Strong cooperation with public and private research infrastructures through SusChem España

Links to other industries

- Alliance for the Competitiveness of Industry, formed by chemical, automotive, steel, refine, paper and concrete industries representing a third of manufacturing gross product
- Energy Industrial Platform, formed by 15 electricity consumer sectors

Smart Specialization

The chemical industry is considered a strategic sector for Spanish national research and innovation programmes. Regarding the RIS3 Programme for Smart Specialization, FEIQUE has entered into contact with the 17 Spanish Regions for RIS3 and has developed through SUSCHEM Spain a roadmap with proposals for specialisation areas in advanced materials, industrial biotechnology, advanced manufacturing and nanotechnology.
<table>
<thead>
<tr>
<th>Region</th>
<th>Regional Agency in the Smart Specialization Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andalucía</td>
<td>Agencia IDEA</td>
</tr>
<tr>
<td>Aragón</td>
<td>Instituto Tecnológico de Aragón</td>
</tr>
<tr>
<td>Canarias</td>
<td>Gobierno de Canarias</td>
</tr>
<tr>
<td>Cantabria</td>
<td>iCan</td>
</tr>
<tr>
<td>Castilla y León</td>
<td>Junta Castilla y Leon</td>
</tr>
<tr>
<td>Castilla-La Mancha</td>
<td>Junta Castilla - La Mancha</td>
</tr>
<tr>
<td>Cataluña</td>
<td>Acció</td>
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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry accounted for approximately 16% of total Swedish exports in 2010, approximately €12 billion. This can be compared, for example, to the automotive industry and the pulp and paper industry – excluding wood and wood products – which in the same year accounted for 11% and 8% respectively. The chemical industry is an important export industry in Sweden, and as one of the basic industries, it provides an important foundation for other industries and industrial development.

The Swedish chemical industry includes chemicals and chemical products, oil refining, pharmaceuticals, plastics and rubber products, paints and coatings, hygiene products, detergents, agrochemical and other chemical products. Basic chemicals include for example plastics in primary forms and organic and inorganic basic chemicals.

Sweden can be divided into five regions, which differ in that the northern region mostly has bio refineries, the central pharmaceutical companies and the southern parts refineries and basic chemicals.

2. Situational analysis of the chemical industry

The chemical industry in Sweden in 2010 accounted for about 34 000 full-time jobs in 1 000 companies. The ten largest companies and corporate groups account for more than 50% of employees.
Sweden can be divided into five regions: North, Central, West, East and South. In Region North, a large proportion of employees work in chemical industry companies that are bio refineries or use biogenic feedstock. Region Central is dominated by companies which develop and manufacture pharmaceutical products and chemical products for medical purposes, and many of the companies have significant R&D activities. Region East has by far the smallest share of chemical industry activity. Most companies produce different chemical products, and the companies are to a greater extent Swedish-owned compared to the other regions. In Region South there is an even distribution between companies producing basic chemicals, different chemical products, and pharmaceutical products.

In the western part of Sweden, the basic chemical industry and the refinery industry are the main employers within the chemical sector. Cluster initiatives have been formed in the region, and the large chemical companies in Stenungsund – Borealis, INEOS, Akzo Nobel, Perstorp and AGA – work together with a joint vision on sustainable chemistry by 2030 and together with other regional actors through a regional initiative “Kemiindustriklustret”. Furthermore, within the region, green chemistry and bio-based products have been nominated as one of five strategic areas and are identified as a regional strength.

Accessibility of universities and research technology organisations to establish R&D agendas in processes, materials and pilot lines exists to a moderate degree but could be better. Agendas and plans are under development to secure a better integration.
3. Strengths and weaknesses of the existing chemical industry base

Strengths

• Well-educated and highly skilled labour force
• Very good research and university structure
• Good physical and social infrastructure
• Well known environmental expertise
• Strong safety and responsibility culture (Responsible Care) in production and distribution
• Very good R&D centres, university and technical university infrastructure
• Highly integrated globally competitive clusters and chemical parks
• Highly innovative chemical sector
• High resource efficiency
• Strong collaboration with trade unions
• Excellent labour relations

Weaknesses

• High energy and logistics prices
• Strong dependency on raw material imports
• High labour cost
• Low acceptance of chemical industry and products by the Swedish public

4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy

Sweden does not follow an explicit sectoral industrial policy strategy. The Swedish government has decided to have a national strategy for the development of a bio-based economy. The strategy should cover the following areas: research and development, need for innovation efforts, coordination requirements between research funders, researchers and the business community and domestic potential.

Research policy

Sweden is among the countries in proportion to their population investing public resources in research. Publicly funded research amounted in 2012 to more than €4.2 billion, or about 1.04% of GDP. The bulk of government research funds are supplied to universities. Sweden has chosen a model where public resources for research are to be linked primarily to universities.
The Swedish business sector R&D investments in 2010 amounted to €8.8 billion, or about 2.42% of GDP. Swedish R&D investments are proportionately among the largest in the world. Only Israel and Finland devote more to R&D.

**Links with other industries and research/universities**

The chemical industry and the forest industry in Sweden are collaborating. This will hopefully be a closer collaboration in the future when cars, wind generators, medical supplies, cables, colours and materials could be made with Swedish timber as a raw material. Both the chemical and the forest industries are needed for that to happen.

The Confederation of Swedish Enterprise confirms that the interaction and mutual exchange that exists between academic research and the R&D within companies will continue to be the foundation of Swedish growth and prosperity. However, they emphasise that the research must be relevant to the business community and the surrounding community in order to be useful.

**Opportunities for Growth**

Growth in the Swedish chemical sector is low, despite high R&D activity. A better capacity to create innovation and collaboration between industry and R&D organizations are important to find and seize growth opportunities. The industry has identified innovation as the top common agenda for joint efforts. Policymakers and government are being addressed to find new growth opportunities and secure a good collaboration between government and industry.

An opportunity for Sweden is to build a bio-based economy. Sweden has a unique position to attract investment for this transition, since Swedish timber can be used as raw material.

**Smart specialisation**

As an enabler of all other industrial sectors, the chemical industry is highly integrated to other sectors, and smart specialization is a natural way for a small country like Sweden to compete and succeed amid global competition.

1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The business association scienceindustries assembles nearly all important chemical, pharmaceutical and biotech companies operating in Switzerland. Its approximately 250 member companies contribute 40% of all Swiss exports and constitute the country’s number one export industry. With exports of CHF 79 billion and imports of CHF 39.4 billion in 2012, science industries companies earned a trade surplus of CHF 39.6 billion during that year – the largest export surplus of all Swiss industrial sectors. With a share of about 5% of world exports of chemical and pharmaceutical products, Switzerland ranked seventh in 2012 among the important export nations.

2. Situational analysis of the chemical industry

With a GDP-share of more than 4%, scienceindustries companies constitute one of the most important and dynamic Swiss industries. They rank first, ahead of the machinery industry. Between 1995 and 2011, production increased at an average annual rate of 12.4%; the entire Swiss industry achieved a figure of 2.8% in the same period of time.

With 65 000 employees in Switzerland (2012), science industries companies are one of the largest Swiss industrial employer. However only around 14% (2012) of the world-wide employees of the top ten science industries companies are employed in Switzerland. About 275 000 persons are employed in branch offices and subsidiaries abroad. 62% of all employees in scienceindustries member companies are assigned to a higher qualification category by official statistics, compared to an average 42% in all Swiss industries.
Research policy

Switzerland is an important location for research and manufacturing for globally active science industries companies. A third of the worldwide research investments of scienceindustries companies are spent in Switzerland. In 2012 around CHF 6.6 billion was spent on research and development in Switzerland, whereas the respective turnover in Switzerland amounted to only around CHF 2.4 billion.

The member companies of scienceindustries operate nearly exclusively in the field of specialties, mainly in life science products. The product focus is on pharmaceuticals and diagnostics, vitamins, crop protection agents, flavours and fragrances and fine chemicals. Specialty chemicals for industry purposes, pigments and dyestuffs constitute the rest. The global annual demand for some of these specialties is often below a few metric tons or even less. All member companies are strongly export-oriented. The Swiss market counts for less than 2% of the production.

The regional locations of the science industries:

**Pharmaceuticals:**
North-western (Region Basel) and Central Switzerland (Regions Zug, Lucerne). Prescription and over-the-counter drugs (patented or generic) as well as their ingredients to be used in formulations. Companies: Novartis, Roche, Lonza.

**Diagnostics:**
Central Switzerland (Regions Zug and Lucerne). Health care products which support the physician to get additional information for curing a disease. Company: Roche.

**Vitamins:**
North-western Switzerland (Region Basel). Bulk product to be used in the manufacturing or pharmaceuticals, foodstuffs and animal feed. Company: DSM.

**Flavours and fragrances:**
Western Switzerland (Region Lake Geneva). Products not ready for consumption, but rather ingredients in the form of ‘bulk products’ to be used in the manufacturing of foodstuffs as well as cosmetics and perfumes. Companies: Givaudan, Firmenich.

**Crop protection agents:**
North-western Switzerland (Region Basel) and Wallis. Herbicides, fungicides and insecticides including their active ingredients. Primarily used in agriculture. Company: Syngenta.
Switzerland

Specialty and fine chemicals:
Throughout Switzerland. Numerous highly specialised products providing specific effects, often manufactured in relatively small quantities and in response to specific needs of individual customers. Professional advice to customers is usually of considerable importance with these products. Companies: Lonza, Clariant, EMS-Chemie.

3. Strengths and weaknesses of the existing chemical industry base

Strengths
The strategy of concentration on high end specialties is the key to success. With their high-grade specialized products, Swiss companies have established a world-wide presence, and often a world market leadership. The strategy of specialties requires important and continuous efforts in R&D. Research and development for new products and processes are the lifeblood of science industries companies. Using scientific findings and methodologies, science industries companies continuously develop new products and processes which satisfy existing and future requirements of customers. The necessary significant investment into research can only be made if the companies can rely on future returns. Research expenditures are funded by the profits made from the sale of today's products. The most important ingredients for this innovation process are the scientific and technological know-how and the skills of the workforce.

Given the dimension of investments necessary for research and development of a new drug or plant protection substance, the innovative activity of small- and medium-sized enterprises in the industry has to be concentrated on areas within well-defined borderlines. The concentration of several companies involved in world leading-edge research in Switzerland – called a “cluster” in innovation theory – creates favourable conditions for the success of SMEs too. The increasing orientation of the large companies towards highly innovative fields is accompanied by a corresponding outsourcing of research and manufacturing activities. The niches that open up allow a fair number of smaller- and medium-sized enterprises to operate innovatively as specialized sub-contractors and service providers. Their innovative activity relates to this specialized, limited role within the entire industrial network in a research cluster.

Because the cost of research and development is, at the end of the day, financed by each company, the regulatory environment – including issues concerning patents and prices – is a very important factor.

Weaknesses
The lack of skilled professionals and a quota system applying to workers outside Europe represents an hurdle for Swiss industry. The necessary, significant investment in research can only be made if companies can rely on future returns; research expenditures are funded by the profits made from the sales of today's products. Without a repatriation of the industry’s sales profits, Switzerland would be inconceivable as a research location.
4. Top national strategies (public or private) that are putting the region or country in a European/globally advantaged position

Scientific innovation is the basis for the economic success of the science industries. It is based on well-equipped regional centres, consisting of universities, private research institutes and companies. For some years the research activities of the Swiss science industries companies abroad have shown a particularly dynamic development. Swiss companies have had an extensive international network of research centres for decades. For example, Novartis and Roche operate no less than seven large research centres outside Switzerland, namely in the US, Singapore, Japan, United Kingdom and Germany. Moreover, co-operation with other third companies and universities has become noticeably more important in recent years. The major investments in biotechnology and genetic engineering companies, as well as the tight network of research alliances and licence agreements, illustrate the international nature of Swiss research efforts. Biotech companies are particularly important in identifying and developing new ideas, new technologies and innovative products. Companies in the north-western part of Switzerland currently allocate around 20% of their R&D budgets to co-operative projects with external research groups.
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry in Turkey greatly benefitted from the export-oriented economic policy changes in 1980, and has shown an impressive increase both in production and exports during the last five years, contributing significantly to the growth of the national economy. Currently, the Turkish chemical sector – with its modern technology and diversified products – is the key component of the manufacturing industry and integrated into the supply chain of national industries, especially the textiles and automotive sectors.

The Turkish chemical sector covers a wide range of products in 14 distinct product chapters in foreign trade statistics. The production of the sector is generally aimed at the products required by the manufacturing industry and the directly consumable products; namely, petrochemicals, thermoplastics, fertilizers, organic and inorganic chemicals, pharmaceuticals, synthetic fibres and yarns, soap and detergents, paints, etc. A total of 126 million tons of chemicals were produced in 2010. About 84% of production originates from the private sector.

2. Situational analysis of the chemical industry

Most of the companies in the chemical industry, especially private sector companies, are located in Istanbul, Izmir, Kocaeli, Sakarya, Adana, Gaziantep and Ankara. The Turkish chemical industry has developed significantly in terms of quality, productivity and protection of the environment, and has been successful in adopting the EU’s technical standards. In addition, Responsible Care, the chemical industry’s trademarked voluntary initiative on environmental, health and safety issues, has been successfully implemented since 1992.
The Turkish CLP (Classification, Labelling and Packaging) by-Law was issued in December 2013. Implementation for substances will be obligatory after January 1, 2015. For mixtures, the deadline is June 1, 2016.

The Turkish petrochemicals industry has shown considerable growth since 1970. The dominant organisation in the Turkish petrochemical sector is Petkim PetroKimya Holding A.Ş., which was privatised recently. There are two petrochemical complexes – one being the Petkim Aliaga complex in Izmir and the other Tupras (Turkish Petroleum Refineries Corporation) Korfez Petrochemical and Refinery in Kocaeli. In these two complexes, a wide range of petrochemicals, all common plastics (HDPE, LDPE, PS, PVC, and PP), aromatics, ethylene glycol, phthalic anhydride, terephthalic acid, carbon black, synthetic rubber, acrylonitrile and caustic soda are produced. The total production of these petrochemicals reaches about 2.9 million tonnes/year, and meets about 25% of domestic demand.

Since the textile sector is well-developed in Turkey, polymer production related to textiles and the production of textile chemicals have also developed simultaneously. Large plants for the production of polyamide, polyester and acrylic fibres have been built, and production has been directed to both foreign markets as well as the domestic. Almost all synthetic fibres are produced by the private sector, and synthetic fibre production is around 850 000 tonnes/year.

The fertilizer industry is also one of the key industries for Turkey, which has been supporting vast agricultural potential of the country. Currently, there are seven private sector companies producing fertilizers with total production capacity of 5.8 million tonnes/year. Turkey’s fertilizer production meets domestic demand and the surplus is exported.

Pharmaceuticals, soap and detergents, soda, chromium chemicals, boron chemicals, paints, sodium sulphate, fatty acids and rose oil are the other main areas of production of the chemical industry. The pharmaceuticals industry has become one of the leading sectors of the chemical industry, accounting for approximately 10% of the chemical industry’s production. Production trends of pharmaceuticals are closely related to domestic demand. Turkish pharmaceutical companies manufacture a wide range of pharmaceutical products, mostly generic formulas. The number of pharmaceuticals on the market is 3100 and this number reaches 7200 when alternative posologies are included. It is worth mentioning that the Afyon Alkaloids Factory produces 20% of the morphine consumed by pharmaceuticals industries all over the world.

The Turkish soap and detergent industry has shown very good performance in terms of quality, capacity and exports. There are many companies in the soap and detergent industry, about 15 of them being the major ones; among these there are multinational groups which have worldwide reputations. Since 1990 domestic and foreign investments in the Turkish cleaning products industry have increased considerably. As a consequence, detergent production capacity has reached 1.3 billion tonnes and soap production capacity has reached 550 000 tonnes; both have great export potential. The consumption
and production of cosmetics and personal care products are growing rapidly. The number of cosmetics and personal care products is increasing every year. Hair care has the largest share of the cosmetics and personal care products market in Turkey. Natural cosmetic production is on the rise, due to growing demand for these products.

Parallel to the developments in Turkey’s construction, automotive and marine industries, the paints and coatings industry has also developed to become one of the most dynamic sectors of the Turkish chemical industry. Today the industry produces about 800,000 tons/year of paints and coatings and is comprised of about 600 manufacturers, 20 of them being large-scale companies. In addition to meeting domestic demand, the Turkish paint sector has recently tended to export more.

Turkey has the largest soda factory in the Middle East, with a total capacity of 750,000 tonnes per year. In addition to light and dense soda ash, refined sodium bicarbonate and sodium silicate are produced at the Mersin plant. An extremely rich trona (natural soda ash) deposit was found near Ankara, at Beypazari and at present Turkey has substantial export potential for soda ash. Eti Soda A.Ş. started operation in 2009, with 1 million tonnes/year soda ash planned to be produced.

Being among the top five countries supplying chrome ore to world markets, Turkey produces and exports some of the most important chrome chemicals and derivatives such as sodium bichromate, basic chrome sulphate, chromic acid and chrome oxide.

Turkey also enjoys a comparative advantage in boron chemicals – borax decahydrate, borax pentahydrate, boric acid and sodium perborate – due to the size of its reserves, the quality of minerals and proximity to consumer markets. Eti Maden Isletmeleri Genel Mudurlugu is the dominant producer of boron minerals and boron chemicals and the sole exclusive exporter of boron chemicals.

Turkey has developed a substantial capacity and production of sodium sulphate. In sodium sulphate production, Turkey is second largest in Europe and sixth in the world.

Owing to Turkey’s climatic and ecological conditions, many medicinal and aromatic plants are cultivated or gathered from nature. Turkey is one of the most important rose oil exporters in the world market. The majority of these exports originate from the Isparta region. Laurel oil, thymus oil, lavender oil and origanum oil are also produced in Turkey.

In conjunction with recent industrial growth in Turkey, the consumption and production of many other chemicals are growing rapidly, and the number of chemicals produced is increasing every year. The recent developments in textile and leather chemicals are also worth mentioning, and many small- and medium- size companies have recently started to operate in these two sectors. In the Turkish chemical industry, there are about 314 companies with foreign investment. The Turkish chemical industry has a 13% share of total foreign capital in Turkey.
3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Unique geographical location for the world markets and oil & gas pipeline routes
- Presence of high younger population ratio as near-future employment potential
- Good adoption of international industry standards and EU harmonisations with EU market rules
- Presence of entrepreneurial capacity/potential of SMEs and Organized Industry Zones
- Presence of well-developed industry sectoral diversity and infrastructure

Weaknesses

- Relatively low allocations for R&D spending in chemical industry sectors
- Dependency on high-cost imported energy and raw materials supplies
- Limited production capabilities in high-added-value chemical products
- Inefficiencies in clustering between chemical sectors

4. Top national strategies (public or private) that are putting the region or country in a European/globally advantaged position

- Incentives by the state government were recently declared for new chemical industry investments, with the goal of reaching a US$50 billion in chemicals exports by 2023
- Incentives in the form of land allocation and investment credit support for establishment of clusters of integrated chemical industry zones were also developed, both at national and at regional level, to encourage and sustain innovation and new domestic and international production facility investments
1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The chemical industry sector is an important part of the Ukrainian economy. It occupies fourth place after metallurgy, machinery and food industries in terms of commercial production. Its share in overall sales of industrial products during the last two years remains 6% to 7%, giving the chemical industry priority status vis-à-vis other industries.

The Ukrainian chemical industry is export-oriented. The proportion of chemicals in total exports of goods in 2012 was 8.4%.

The chemical industry comprises about 6 000 large, medium and small companies with a diversified range of organic and inorganic products. It produces more than 7 000 kinds of products in large and small volumes used across 47 segments of the economy.
Chemical enterprises are located in all major regions of Ukraine, but the highest concentration of chemical production facilities is in South-Eastern and Central Ukraine. The regional structure of the industry is due to its proximity to sources of mineral and organic materials and the availability of transport infrastructure.

2. Situational analysis of the chemical industry

The Ukrainian chemical industry is gradually recovering from the 2008 crisis. Volumes of industrial production in 2012 compared to 2011 increased by 7.1%; sales of chemical products in 2012 rose to US$10.3 billion, but the aftermath of the crisis is still evident in the production of basic chemistry products, varnishes, paints and rubber products.

The causes of production stagnation in recent months are low demand on the domestic commodity market, surplus supply and adverse economic conditions on major export markets, especially on the ammonia and mineral fertilizers market.

The volume of the domestic commodity market for chemical products was about US$6.6 billion for the period from January to September 2013. Domestic consumption of chemical products in Ukraine has decreased by 4% compared to the same period last year.
The Ukrainian chemicals market is highly dependent on imports. The share of imported chemicals in the domestic commodity market is nearly 65-67%.

The chemical industry has several segments that have focused on daily consumer needs, and thus demonstrate positive dynamics of production during last two years. However, the share of these segments in the structure of chemical production is low (9%).

The chemical industry employs nearly 135,000 people.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Highly qualified labour force and professional management
- Favourable geographical position and developed transport infrastructure
- Diversified research base for applied research and advanced academic research, as well as educational infrastructure
- Developed mineral raw materials base with growth potential
- Advanced distribution network and considerable market potential
- Established social partnership, cooperation between companies and unions

Weaknesses

- Energy prices are very high*
- Substantial dependence on some raw material imports, primarily of hydrocarbons, phosphates, potash
- Technical and technological obsolescence of part of chemical production lines
- Excessive “sensitivity” to external situational factors such as prices fluctuations on the world markets, changes in demand and seasonal variations
- Prevalence of raw materials and semi-raw materials in chemical production
- Insufficient level of innovation in production

* At the end of 2013 the price of Russian natural gas for Ukraine at the border was US $478.4 per 1,000 m³. In accordance with the recent intergovernmental agreement between Russia and Ukraine in January 2014 the price is US $268.5 per 1,000 m³, but for consumers in Ukraine it will be calculated from the purchase prices of 2013 and 2014. It will decline quarterly during 2014 and expected price of natural gas for industrial users in the 1st Quarter 2014 will be US $375.4 per 1,000 m³.
4. Top national strategies (public or private) that are putting the region or country in a European/globally advantaged position

The chemical industry of Ukraine has great potential for development, based primarily on growth opportunities on domestic consumer and industrial commodity markets.

The government of Ukraine, in collaboration with industry, is currently crafting a long-term strategy for the development of the chemical industry.

Sectoral development of the chemical industry is reflected in current state programmes. For instance, the “State programme of development for domestic production” contains several investment projects:

- Development of phosphorus fertilizer production technologies based on domestic deposits of natural apatites and phosphorites;
- Processing of domestic raw materials to produce carbonaceous fillers and polymeric coatings and dry construction mixtures;
- Processing of man-made deposits of industrial waste such as titanium dioxide, argil and magnesium-bearing dump, galvanic sludge and sewage sludge; and
- Development of state programme of phosphoric raw materials extraction from domestic fields and creation of enrichment facilities.
United Kingdom

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1. Description of the priority status of the chemical sector in relation to the overall industry sector ranking of the regions

The UK chemical & pharmaceutical industry is the second largest industry in terms of both turnover and value added (in 2011, £57.5 billion and £18.8 billion respectively.) Only the food processing industry ranks higher, with comparative figures being £73.3 billion and £19.4 billion. The automotive industry comes third in the list at £54.3 billion, £11.2 billion.

The UK chemical industry is represented in all subsegments of the industry: basic inorganics, petrochemicals, polymers, agrochemicals, paints, detergents and personal care products, and specialities such as adhesives, flavours and fragrances, and a host of industrial specialities like lubricants, fuel additives, catalysts– as well as being a global leader in pharmaceuticals.

There are chemical manufacturing sites in all UK regions, although the type of activity varies, with primary commodity chemicals being produced mainly – but not exclusively – in Scotland and Northern England, while speciality chemicals and pharmaceuticals are more widely distributed.

The chemical and pharmaceutical industry is a closely integrated sector. Primary products use a variety of feedstocks such as hydrocarbons – mainly gas and refined petroleum fractions – minerals and vegetable or animal derived oils and fats. Sequential processing is a characteristic: intermediate products are taken from one part of the industry, with outputs going to another. Co-located processing clusters are therefore another common feature. The industry’s economic importance stretches far beyond its own sector, since all other industrial sectors use the chemical industry’s products as intermediate components or process enablers.
2. Situational analysis of the chemical industry

In 2011, the UK chemical & pharmaceutical industry had a turnover of £57.5 billion (€66 billion) and 160 000 employees – around 500 000 people if you include those whose jobs depend on the industry. R&D expenditure amounted to £5.5 billion (€6.4 billion) of which £4.8 billion was by pharmaceuticals. Chemicals and pharmaceutical production is stabilising now after steep falls in output in recent years, for different reasons. Uncompetitive energy costs and ambitious climate policies have seen UK chemical manufacturers struggle to compete at a time of widespread spare chemical production capacity in cheaper locations. Pharmaceuticals, for decades the fastest growing sector, has seen a fall in output as companies have faced reduced new product pipelines and patent expiries, forcing them to look to make economies in all areas of their business. This has led to much outsourcing of active ingredient production, although local R&D spending has continued to rise. There has also been recent major investment in new production capacity.

The UK region with the largest chemical industry turnover is North West England. Other major centres of activity, particularly for commodity chemicals, are in Scotland, North East England and the Yorkshire/Humber areas, while the South East and East of England regions also rank highly. In many cases location is linked to the presence of locally available feedstocks such as North Sea hydrocarbons, or salt and limestone, and energy (originally coal). The UK is some distance from the centre of the European market, but all chemical producing regions have access to good port facilities.
Links with UK academic centres are well established, and indeed AstraZeneca has recently announced the relocation of its headquarters to Cambridge in order to be close to the research being carried out there. Respondents to a recent survey of members of the Chemical Industries Association all rated university collaboration opportunities as “good” or “average”, with none saying “poor”.

3. Strengths and weaknesses of the existing chemical industry base

Strengths

- Several closely integrated clusters
- Strongly innovative
- High proportion of output from all sectors exported to geographically wide range of markets
- High resource efficiency
- Strong pool of highly skilled researchers and professional staff
- Very good research and university infrastructure
- Excellent labour relations
- Strong safety and responsibility culture (Responsible Care) in production and distribution
- Able to satisfy sophisticated consumer demands
- Government more supportive to chemical industry and to new technologies
- Improving public perception of industry

Weaknesses

- Fragmented ownership of individual plants within clusters can lead to non-optimal long-term strategies
- Energy prices are globally uncompetitive. EU and UK climate policies are driving prices ever higher, while other regions enjoy cheap energy such as shale gas in US and conventional hydrocarbon sources in the Middle East and Russia
- Mature local regional market – growth is elsewhere (Asia, US)
- Scarcity of skilled craft workers due to demographic issues, competition from other sectors like North Sea oil and gas, and past lack of skilled craft tradition in UK
- Relatively weak domestic manufacturing base, although automotive is strengthening and aerospace remains strong
4. Top national strategies (public or private) that are putting the member state in a European/globally advantaged position

Policy strategy

The UK government, in the wake of the financial crash, has said it recognises the need to “rebalance” the economy – increasing manufacturing share of UK GDP from its current 10.3%. The Business Department (BIS) is seeking to develop a guiding framework for industrial policy and has targeted a number of key sectors such as automotive, aerospace, life sciences and oil and gas for specific growth initiatives. BIS also increasingly recognises the chemical industry as a key enabler for growth in many other sectors, and the end of 2014 will see the establishment of a formal growth partnership between government and the UK chemical industry, centred around energy; innovation and rebuilding supply chains.

Despite the reduction in public spending, the nation’s science budget has been protected, in cash terms if not in real terms. The focus is on boosting the country’s innovation performance with a concentration of public spending – around £1billion – through the Technology Strategy Board and the development of Catapult Centres. These are a network of world-leading technology and innovation centres, helping businesses transform ideas into new products and services. Many of the seven centres are directly relevant to chemistry and the UK chemical industry – for example High Value Manufacturing; Offshore Renewable Energy and Cell Therapy – and it is anticipated that the industry's growth partnership with government will focus on how best to boost UK chemistry’s share of the opportunities presented by the Catapults.

Links with other industries and research/universities

As mentioned above, the UK chemical industry sees good opportunities for research and educational collaboration with academic institutions. The industry is also well aware of the importance of supply chains and good communications with both suppliers and customers. Although the UK manufacturing sector has shrunk in recent decades, the remaining part is competitive and resilient. A recent past survey of CIA members found that a third undertake collaborative research with individual (UK) customers, and a further third take broader local UK market needs into account in their innovation activity.

Local organisations have been established in major chemical producing regions. These now help to forge links with local academic establishments, offering advice to members and an opportunity for all those connected with the industry, not least those providing outsourced specialist services, to meet and learn about each other’s needs.
Opportunities for Growth

The successful exploitation of UK reserves of “unconventional gas” – both shale gas and coal-bed methane – would offer new opportunities for growth in primary petrochemicals, fertilisers and related sectors. Such developments would hopefully be accompanied by a more supportive energy policy which did not handicap both the chemical industry and the wider local manufacturing base. Continuing investment in R&D will independently continue to offer opportunities in speciality chemicals and pharmaceuticals. The new “Patent Box” legislation – a reduced corporate tax rate to encourage more local application and domestic exploitation of intellectual property – represents a very positive move to boost confidence in the UK by knowledge-based industries. This is further complemented by increasing evidence of “onshoring” of supply to the pharmaceutical and agrochemical customer base, helping to strengthen UK supply chains.

Finally, the UK government’s commitment to an industrial strategy is enabling the chemical industry to better understand the technology requirements and ambitions of key customer industries, looking out to 2030 and beyond. Whether it is new battery technology for motor vehicles or light-weighting of materials for the aircraft of the future, chemistry will be at the heart of the solutions.
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 21% of world chemicals production. Cefic interacts daily on behalf of its members with international and EU institutions, non-governmental organisations, the international media and other stakeholders.

The three distinct groups of members – corporate members, national federation members and business members – form one of the most active networks of the business community, complemented by partnerships with industry associations representing various sectors in the value chain.

Representing the entire range of chemicals production, Cefic is organised around horizontal programmes:

- Energy, Health & Safety and Logistics;
- Industrial policy;
- Legislation and international affairs;
- Product Stewardship;
- Research and Innovation, and
- Communications.

and around industry sectors, which look after specific issues related to individual substances or groups of substances.

Cefic is an active member of the International Council of Chemical Associations (ICCA), which represents chemical manufacturers and producers all over the world and seeks to strengthen existing cooperation with global organisations such as UNEP and the OECD to improve chemicals management worldwide. Cefic members are represented through three member assemblies – the Assembly of Corporate Members (ACOM), the Assembly of Federation Members (AFEM) and the Assembly of Business Members (ABM) – which meet during the course of the year. AFEM, grouping national federation members, comprises both European national federations and associated federations across Europe.

The national industry associations interact with Cefic on many different levels.

Cefic national federation members across 28 countries, plus Norway, Switzerland, Turkey, Ukraine and Russia, are represented on the National Association Board, which, together with ACOM and ABM, ensures the operational management of Cefic.

The national industry associations play a very active role in Cefic’s strategy, making the case for chemicals both at home and in the EU institutions.
The National Association Board is an integral part of Cefic’s operational management, coordinating the implementation of advocacy and communication for European issues in each of the member countries. Cefic and its members continuously strive to better understand environmental and human health effects and ensure the safety of products and processes through the chemical industry’s voluntary initiative, Responsible Care. Cefic’s role is to advance Responsible Care in Europe promoting and ensuring consistency of implementation by national member federations. Each Cefic member federation is responsible for developing and running its own national Responsible Care programme with its member companies, and for overseeing implementation by those companies.

The national associations and Cefic are also active in promoting research and innovation, notably through the Long-range Research Initiative and SusChem, the European Technology Platform for Sustainable Chemistry.

While in the industrial policy area, Cefic and the national associations are actively engaged in promoting jobs and growth.

Through their close cooperation, Cefic and its federation members have achieved some notable successes. Working together with their member companies, they were able to ensure, for instance, that the chemical industry successfully completed the first two registration phases of REACH (Regulation on Registration, Evaluation and Authorisation of Chemicals).

Cefic and its members support the efforts of the EU institutions to rebuild Europe’s industrial base. With its innovative products and sustainable solutions, the chemicals sector can play a big part in helping bring about a true European industrial renaissance.

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