

Chemicals in Europe: the way forward

Balancing the equation with
customized innovation and
strategy

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Executive summary

The competitive advantage of the European chemicals industry appears to decline, as the US and Asia develop low-cost production for chemicals. Furthermore, with demand growth shifting to the emerging markets of Asia and Latin America, manufacturing facilities have been moving to these regions and the chemicals producers are following suit. In addition, stringent regulations in the European chemicals industry, heavy green taxes and slow take up of alternate feedstock technology (shale etc.) contribute to the slow growth of the industry.

However, Europe continues to be a major contributor to global chemicals with a favorable environment for innovation, expertise in specialized chemicals and a strong infrastructure to support business. Moreover, the recent decline in oil prices may help Europe retain cost competitiveness in chemicals production. Nonetheless, the reduction of its share in the global chemicals is a cause for concern for the chemicals companies in the region.

We tracked the initiatives by major chemicals players in Europe and arrived at the crucial strategic considerations that can help

them on their evolutionary path.

As the global environment becomes all the more volatile, chemical players in Europe can consider developing a strategy that enables constant evolution to optimize market share and margin growth. In an environment where uncertainty regarding feedstock prices, demand growth, currency fluctuations and regulations pose varied challenges every day, companies need to be ready to adapt to the changing environment to improve their competitive position.

Chemicals companies need to differentiate their strategies according to their business segments and targeted market position. For instance, for a commodity chemicals business, which is highly feedstock intensive, optimized feedstock strategy and innovation in developing low-cost processes should be the imperative. While, for a specialty chemicals business, alignment with the customer's business and collaborative innovation would be the crucial differentiator.

Five-point strategy: key imperatives for companies in Europe

	Commodity	Specialty
How should business be structured to compete in the marketplace?	A business model with a value chain integrated with the raw materials or feedstock	A business model with dedicated sales team, which has a high level of collaboration with end-clients
Which is the optimum feedstock blend for the given product portfolio?	Strategic partnerships to identify and acquire alternate or low-cost feedstock	Partnering with peers for acquiring chemicals raw materials; developing a supply chain model with high frequency and low order sizes
What combination of product portfolio will be ideal to meet anticipated future state?	Increasing the share of products used in industries with high-growth potential	Focusing on products with a stable renewal demand
Where should the R&D expenditure and innovation be directed to?	Innovation in alternate technology or feedstock (e.g., coal-to-olefins (CTO), bio-based etc.) to reduce cost and facilitate sustainability	Customer-oriented innovation; new applications for their products
How to procure the suitable skill set and talent mix?	Hiring a higher share of technology and feedstock experts to reduce costs	Recruiting product and research experts to develop new products and applications

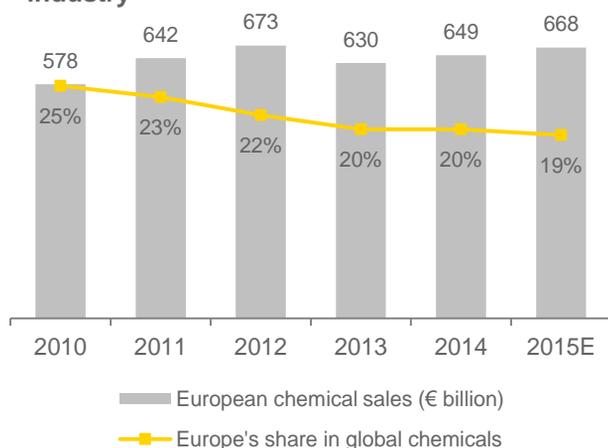
European chemicals industry today — losing share not sheen

European chemicals has witnessed reduced cost competitiveness and demand, however, it still offers a favourable business environment

Europe, which contributed to almost 25% of the global chemicals sales in 2008, has been losing share in the global industry, since most of the chemical plants are being set up in the regions of Asia that offer low-cost labor. While the global chemicals industry grew at a computed annual growth rate (CAGR) of 7.4% between 2010 and 2015, the European industry registered a CAGR of only 3%. The low feedstock and energy costs in the US and the Middle East prove Europe to be a disadvantageous manufacturing location. In addition, the shift of manufacturing to these regions is triggered by the decelerating overall demand in Europe — between 2004 and 2014, the European Gross Domestic Product (GDP) grew at a CAGR of 4.7%, against the global average of 6% during that period.

European chemicals' revenue has witnessed slow growth for the last three years with a stagnant share in the global market

Chemicals revenue and share in global industry



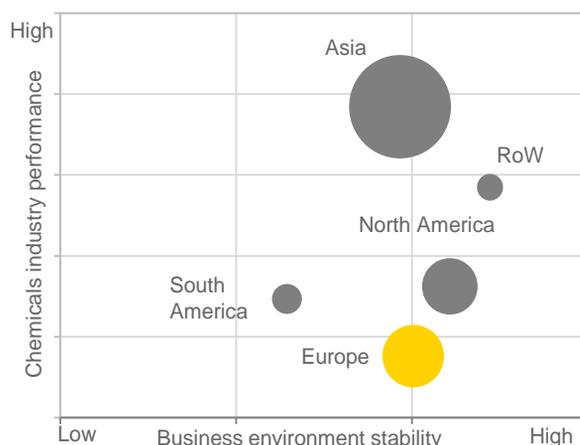
Source: CEFIC Facts & Figures 2015

European chemicals have been facing low sales growth in the past ten years and high relative cost of production leading to a shift of manufacturing base to emerging countries and decelerating capacity addition in chemicals. A number of chemicals players in Europe have been shutting down operations as manufacturing has become increasingly expensive owing to relatively higher feedstock and labor costs. In the past few years, around 144 chemicals plants in Europe have either been closed or are currently non-operational accounting for 12% of the total chemicals capacity in Europe.

While the demand growth is low, Europe displays a competent business environment

On the other hand, Europe offers a strong and stable business environment. The region provides strong infrastructure and highly efficient public institutions which facilitate a legally stable environment for business operation. The relatively high political stability in the region implies a large percentage of stable population which confirms continuity of renewal demand. Furthermore, it offers a more favorable investment environment owing to high technological readiness, policies encouraging innovative knowledge, and high-business sophistication across industries.

Chemicals attractiveness map



Source: EYK analysis

Bubble size represents the chemicals sales for 2013
RoW includes Middle East and Africa (majority)

Performance parameters:	Business environment stability parameters:
Sales growth, cost of production, change in exports and imports share, capital expenditure growth, chemicals industry outlook	End-user industry outlook, chemicals sales growth outlook, technological readiness, institution index, innovation index, GDP growth outlook

Methodology

We evaluated major chemicals producing regions on the basis of parameters that reflect the current performance in the chemicals industry and the favorability of the business investment.

The current performance axis rates the regions on parameters including sales growth from 2004–14, cost of production, change in share of chemicals exports and imports, and chemicals' capital expenditure growth.

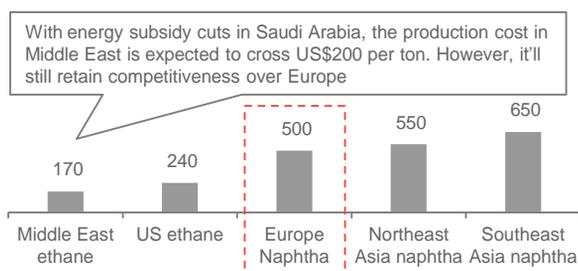
The business environment stability axis rates according to the end-user industry outlook, technological readiness, institutional quality index, infrastructure index, innovation index and GDP growth outlook.

What is slowing the growth of European chemicals?

High-cost disadvantage (particularly in base petrochemicals)

Europe predominantly uses naphtha for production of petrochemicals, which contributed to more than 45% of the European chemicals sales in 2014. In spite of declining oil prices since July 2014, the cost of producing a ton of ethylene (a widely used building block for petrochemicals) in Europe is more than 2.5 times the cost in the Middle East and double the cost in the US. This poses a major disadvantage for chemicals production in Europe. In addition, low labor costs and investment in the coal-to-olefin technology in Asia further toughens the competition for Europe.

Ethylene cash cost (US\$ per ton) — 2015*



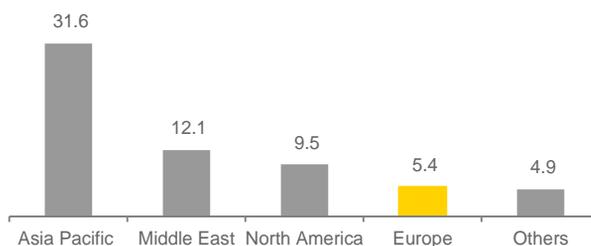
Source: Credit Suisse report via ThomsonOne, ICIS report 2015
*The graph shows indicative prices

Low capacity addition for key petrochemicals

Driven by their low-cost advantage, North America, Middle East and Asia are making new capacity additions for ethylene. Europe, however, does not have significant ethylene capacity in the pipeline. Currently the region contributes 17% of the global ethylene capacity while Asia and Middle East together contribute half of it. Further, Europe accounts for only 8% of the global planned ethylene capacity up to 2020 compared to Asia which accounts for 50%.

Expected ethylene capacity additions (2016-2020)

(total – 63.5 million tons per annum (TPA))



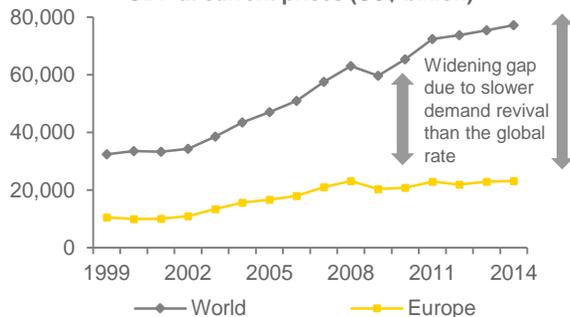
Source: ICIS news

In spite of declining oil prices, since July 2014, the cost of producing a ton of ethylene in Europe is more than 2.5 times the cost in the Middle East and double the cost in the US.

Slowing overall demand growth

In the last 15 years, the GDP of emerging countries has increased at a CAGR of 12% as compared with the global average of 6%. The recent economic down-cycles have affected Europe the most, indicating a slow down in GDP growth. This slowdown is also because of saturation of the economy in the Western European countries (GDP CAGR of 1.6% between 2009 and 2014) and slower than expected growth in the Central and Eastern European (CEE) countries; GDP CAGR of 2.1% during the period as compared with the global average of 5.3%.

GDP at current prices (US\$ billion)

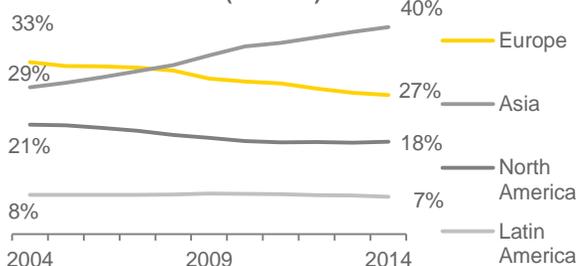


Source: World Economic Outlook database — 2015

Shifting manufacturing base

With an increasing cost advantage coupled with demand shift to the emerging markets of Asia, the global manufacturing base has also shifted. This has reduced Europe's share in the global manufacturing revenues from 33% in 2004 to 27% in 2014.

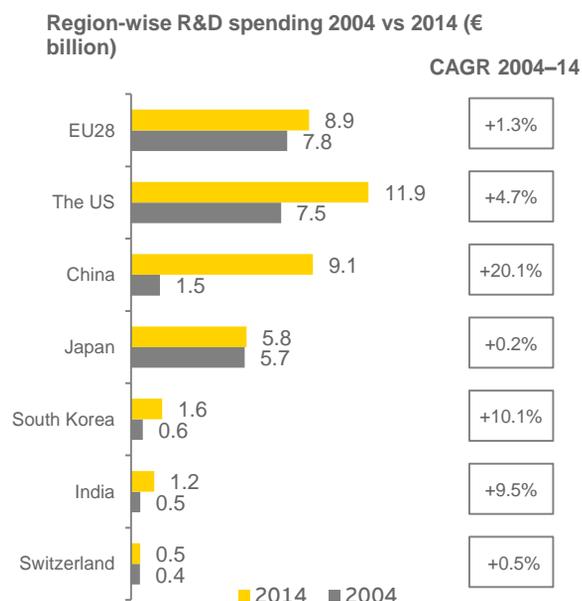
Share of global manufacturing revenue (2004-14)



Source: World Bank Global Economic Monitor 2015

Slow growth in R&D investment

Innovation can prove to be a differentiator for a chemicals company, with the growing competition in customer acquisition and cost. However, the growth of R&D investment in Europe between 2004 and 2014 has been much lower when compared to Asia. The growth is even lower than the US, which, like Europe, is a developed market.



Source: CEFIC Facts & Figures 2015

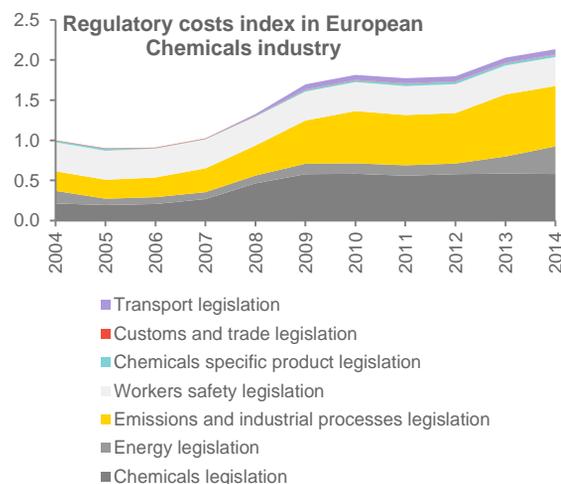
Ageing pool of blue-collar employees in chemicals

Europe currently witnesses an aging blue-collar workforce in chemicals manufacturing as the number of workers joining the industry has been declining over the years. The share of workers aged between 50 and 64 has increased from 25.7% to 29.6% in the last seven years while it has decreased for workers aged between 15–24 years.

The industry needs to identify ways to attract new talent. According to the first European employment survey for chemists and chemical engineers (conducted by Rainer Salzer, European Chemistry Thematic Network and TU Dresden, Germany), only 18% of the total chemistry graduates joined the chemicals sector. The remainder have joined competing sectors such as health care, bio-tech, food, mining and metals, etc. Only 7% of respondents chose production as their current job as compared to 43%, who selected R&D as their current job function.

Regulatory costs or burdens

The regulatory cost in Europe has doubled during 2004–14, while labor cost per employee has increased by 44% during 2002–14. Furthermore, the emission and industrial process legislation costs index quadrupled between 2004 and 2014. However, REACH cost is expected to decline by 2018.



Source: CEFIC Facts & Figures 2015

Additionally, rigid labor laws in the European manufacturing industry make layoffs difficult for companies experiencing an economic down cycle, forcing them to absorb the cost burden. Major European producers such as Germany, the Netherlands and Italy have a high cost of laying off tenured employees. Plant shutdowns in Europe, amid slow demand, further aggravates the issue with employee dismissal.

Share of labor-force in chemical manufacturing by age		
Age-group	3Q08	3Q15
15–24 years	7.4%	5.4%
25–49 years	66.9%	65%
50–64 years	25.7%	29.6%

Stringent regulations; paving way for a better working world?

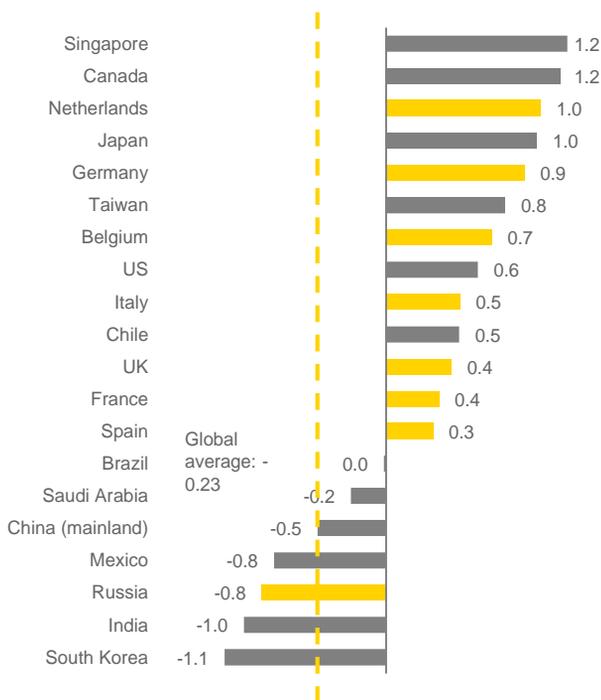
The strict regulations in Europe might weigh it down as an investment option, however, the sustainable view of the industry paves way for future chemicals which facilitate safety of employees and consumers. The region has already reduced greenhouse gas emissions by approximately 60% in the past two and half decades. Sustainable chemicals and processes is the way for chemicals tomorrow, and European chemicals have taken the rightful initiative in that direction.

What gives Europe a favourable business environment?

High level of political stability

Seven out of eight (except Russia) major European chemicals producers enjoy strong governance and political stability, higher than major manufacturing hubs such as China and India. The European countries above the global average score (-0.23) of political stability index together constitute approximately 14% of global chemicals sales.

Political stability index in 25 top chemicals markets (-2.5: weak governance to 2.5: strong governance)



Source: CEFIC Facts & Figures 2014, World Bank World Government Indices survey 2014

Well-established infrastructure

The major European chemicals-producing countries enjoy better chemical-related infrastructure (than Asia and Latin America) including transportation, supply chain, logistics, energy supply to support business activities. The Global Competitive Index rates major European producers (including Germany, the Netherlands, France etc.) between 4.8 and 6.2 (out of 7) in terms of infrastructure while Asian producers such as India and China are rated 3.6 and 4.7, respectively.

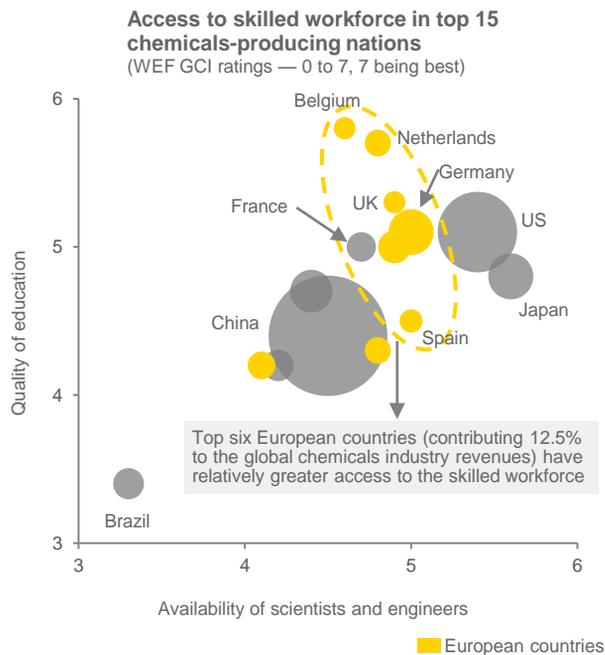
^ - Source: CEFIC Facts & Figures 2016

Favorable environment for innovation

European countries enjoy a high innovation index reflecting high-quality research institutes, increased share of company spending on R&D, Patent Co-operation Treaties (PCT) and availability of highly skilled research professionals as compared to other regions. The EU spent around 1.6% of its chemicals investment on R&D, while China spent only 0.8%[^] in 2014. A strong R&D base in Europe provides the region with a favorable environment and prospects for innovation, thereby, facilitating products with a higher value-add for the customers.

Access to suitable skills

European chemicals industry is increasingly focusing on producing high-value specialty products. The success of specialty chemicals industry depends on the extent and frequency of innovation in products. For an innovation-driven industry, criteria such as access to suitable talent is often more important than any other. We compared the availability of scientists and engineers and quality of education as the two parameters to measure the access to skilled labor for top-15 chemicals-producing countries — European countries such as Belgium and the Netherlands score high on quality of education while Germany and Spain have a large pool of scientists and engineers available.



Source: CEFIC Facts & Figures 2014, World Economic Forum – GCI dataset 2005-15

Source: CEFIC Facts & Figures 2014, World Economic Forum – GCI dataset 2005-15

Growing demand in the emerging and low-to-medium-income countries of Europe

The average GDP growth of emerging Europe*, in the next five years, is expected to be 5.9%, according to World Economic Outlook, above the global average of 5.4%. The demand for chemicals and their end-user industries in these regions are expected to witness strong growth reflecting an overall growth in the GDP.

According to the American Chemistry Council report for 2015, the chemicals output for CEE, (includes the emerging Europe countries and Germany) is expected to grow at a CAGR of 4% by 2025 as compared with 3.6% for the global chemicals output and 2% for Western Europe chemicals. More than 50% of the planned chemicals capacity in Europe* in the next four to seven years will be in low and medium income countries of Central and Eastern Europe (Poland, Hungary, Croatia Romania, Belarus, etc.)

- ▶ **Poland** — growth in pharmaceuticals, plastic products and organic chemicals
- ▶ **Croatia** — chemicals, rubbers and plastic form more than 7% of the country's exports

TTIP expected to increase EU's attractiveness

The Transatlantic Trade and Investment Partnership (TTIP) is expected to enhance demand in European industries particularly in the manufacturing sector with reduced tariffs and lesser bureaucracy.

Industries that would benefit the most include chemicals, metals and metal products, food processing and automotive. The resultant higher trade activity, besides increasing demand, will also imply uniform global standards, thereby enhancing innovation.

Further, tariff elimination under TTIP is expected to save €168 million in duties for the chemicals sector, according to *IHS Chemical Week*. The European chemicals sector could benefit from US export supplies of shale gas (in the wake of recent natural gas boom) to help their crackers become more competitive in the global market. This will particularly boost the trade of specialty chemicals and agrochemicals from Europe as the global population continues to grow.

Integrated cost-efficient chemicals clusters

Europe has strong competitive clusters which are the backbone of the European chemicals industry. □ According to European Chemical Site Promotion Platform (ECSP), Europe has 95 active chemicals clusters or parks with an aim to position Europe as an attractive region for new chemicals investment. European chemicals parks provide stable production conditions and reliable infrastructure owing to their long production history and highly professional site operators. The main advantage of European chemicals parks and industrial parks is the availability of well-qualified personnel at all levels.

Overall, investment cost levels are higher than at Asian sites because of higher material, construction and engineering costs. However, these costs are lower than those in the Middle East. Continuous improvement of parks' competitiveness and attractiveness enable European chemicals industry to be prepared for increased competition from China, Southeast Asia and the Middle East.

Europe can be expected to retain its position as a significant chemicals player given the favorable business environment, coupled with opportunities from TTIP. Furthermore, market dynamics such as the low-oil prices and depreciating Euro will also affect the competitiveness of Europe. Assuming that the low-oil price scenario continues, Europe will begin to regain its market share. Moreover, strategic options to acquire low-cost feedstock — by exploring shale-based options (particularly for large integrated players) in Europe or importing from the US — can also offer further growth opportunities.

However, the global and European demand outlook scenario continues to be a concern for Europe. We analyze the steps taken by several chemicals majors to improve their market competency in Europe and other regions and list the crucial strategic steps which can be considered by these players.

Countries in Emerging Europe – Albania, Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kosovo, Latvia,

Lithuania, Moldova, Montenegro, Poland, Republic of Macedonia, Romania, Serbia, Slovakia, Slovenia – Emerging Europe

*Excluding Russia

What are the global chemicals leaders doing in Europe?

Amidst the cost and demand challenges, companies operating in Europe are finding ways to tackle the situation. The corrective measures include a range of solutions from portfolio optimization to maintaining operational excellence through shutting down plants for high-cost, low-margin products. Most of the solutions include using one or more of these five levers: identifying the right feedstock, restructuring business operations, portfolio optimization, moving to high-growth regions and markets, and growing innovation capacity.

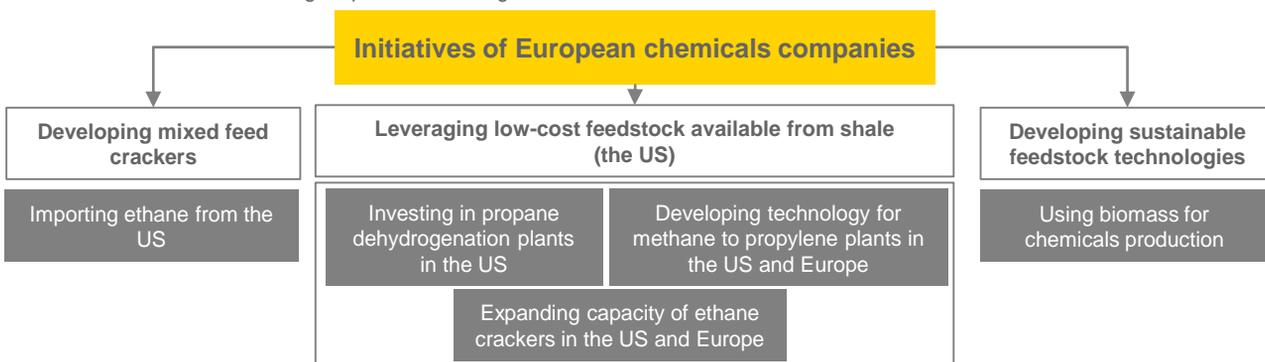
Strategizing around feedstock or raw material costs



Since feedstock forms the major chunk (~40%) of the chemicals production costs, chemicals companies continuously work on optimizing their feedstock strategy. Furthermore, with increasing environmental concerns and regulations, sustainable feedstock is the need of the hour. Overall, key success factors for an optimal feedstock strategy are proximity to the low-cost feedstock region, access to the latest technology and a sustainable feedstock for long term. Therefore, chemicals players are moving closer to the low-cost regions and deploying alternate feedstock technology (such as coal-to-olefins, methane-to-propylene).

European companies are increasingly investing in these regions to diversify their feedstock mix. If the oil prices rebound in the medium term, importing ethane from the US to feed plants in Europe will continue to be an attractive option for the chemicals players in the region. As of 2014, ethylene cost saving set by naphtha-ethane price spread and cost of investment (around €175 million) was approximately €328.8 (US\$ 375) per ton ethylene. However, the decision to invest in conversion will also depend on location, current cracker products, ease of ethane conversion, major business portfolio and capital expenditure.

However, in case of sustained low-oil price scenario, using the existing naphtha-based crackers in Europe will be a better option. As a result, the need for flexible feedstock or supply chain arises; companies need to develop technologies to be able to shift to a different feedstock without losing output or increasing costs.



Some other notable measures by chemical players in Europe include:

- ▶ LyondellBasell is expanding multi-plant ethylene capacity, which benefits from shale gas production.
 - ▶ Annual ethylene capacity expansion by 839,000 tons (1.85 billion pounds)
 - ▶ Investment of €1.17 billion (US\$1.3 billion)
- ▶ In April 2015, SABIC has announced plans to import ethane to its Teesside plant in UK to secure the future of its cracker at Wilton and to keep it competitive.
- ▶ INEOS Europe AG has entered into ethane purchase agreements with CONSOL Energy (2014), Royal Dutch Shell and ExxonMobil (2015) for long-term sourcing of low-price US ethane for its European crackers.
- ▶ In 2014, BASF announced to invest €1.2 billion (US\$1.4 billion) in US shale gas. BASF aims to produce on-purpose propylene by leveraging low cost US shale gas to meet internal demand for propylene in North America.

Further, European companies are developing technologies to use sustainable feedstock or processes for chemicals production:

- ▶ In 2014, BASF and Corbion Purac JV — Succinity, started its first commercial production facility (capacity ~10,000 TPA for bio-based succinic acid at Corbion Purac's Montmeló, Spain, site.
- ▶ Novozymes and Cargill are jointly developing a bio-based process for producing 3-hydroxypropionic (3-HP) acid and acrylic acid from renewable raw material.
- ▶ Evonik and AkzoNobel have started constructing membrane electrolysis plant in Germany. The plant will produce 130,000 TPA of potassium hydroxide solution and 82,000 TPA of chlorine. The plant, to be operational in 2017, is expected to improve its ecological footprint by 25% to 30% for each ton of chlorine.

In a bid to survive the cut-throat competition, European companies are streamlining their operations and divesting non-core businesses to cut costs and improve efficiency

Remodeling operations



In an environment of rising costs and declining pricing power, it is imperative for European chemicals companies to focus on cost and efficiency management to increase their profitability. One of the most used strategic initiatives to improve business efficiency is to target operational excellence for accomplishing cost leadership. Automation of manufacturing processes, integration of business operations (vertically and horizontally), enhancing supply chain efficiency and deploying cost saving programs are being used by chemicals players to achieve this.

- ▶ In November 2015, BASF opened a new 300,000 TPA toluene di-isocyanate (TDI) plant at its Ludwigshafen site (Germany) with an investment of over €1 billion. It is an integrated plant having all the most competitive facilities in the world. BASF also implemented a cost excellence program STEP between 2012-15 with a targeted cost-saving of €1.3 billion. The company is now initiating its new commercial excellence program –'Drive Efficiency' (DrivE) – with a target savings of €1 billion between 2016 and 2018.
- ▶ During 2010–14, Clariant's excellence initiative resulted in positive effects of €380 million owing to cost reduction and additional sales. Furthermore, Clariant has also popularized a culture of continuous performance improvements at business unit level (six sigma).

Solvay raised the expected excellence impact of €800 million on 2016 REBITDA vs 2013



Source: Company website

BASF — targeted savings from commercial excellence programs (€ billion)



Source: Company website

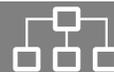
Chemicals companies are increasingly implementing process automation. One of the more popular ways of automation is industrial internet of things (IIoT). IIoT refers to an information system made up of sensors linking physical objects together using Internet technology. It is crucial for automation of processes in a chemicals manufacturing facility. IDC predicts that there will be €146 billion (US\$ 167 billion) of IIoT revenues opportunities for process manufacturing industries (including chemicals) by 2018. While IIoT is most commonly implemented in developing a more agile and efficient supply chain, other implementations are also being explored

- ▶ **Facilitating worker safety:** Facilitating worker safety through wearable sensors. Tata Sons is developing safety wearables for its workers in Tata Chemicals, Tata Power and Tata Motors.
- ▶ **Mitigating supply chain risks:** Detecting possible malfunctions through predictive maintenance thereby eliminating the supply chain risks. Tracking of logistics for location and authenticity, RFID tags (or using global positioning system (GPS) technology) can send alerts for change in temperature and moisture. e.g., Dow has used IIoT to build supply chain risk management programs to improve the supply chain.
- ▶ **Developing precision agriculture as a service:** Sensors capturing and transmitting data related to local weather, GPS, soil type, fertilizer requirement levels to be used in precision farming.

In addition, companies are investing in digitization, big data and analytics, which address the complete chemicals manufacturing lifecycle from R&D to market, cutting the cost and time needed to bring a new product to market.

* Recurring EBITDA; operating result before depreciation and amortization, non-recurring items, financial charges and income taxes.

Strengthening core business



There has been a fierce competition in the chemicals markets from the emerging countries. To survive in these rough times and to retain their market share, particularly in their core business, companies are streamlining their portfolios to confirm focus on core. This is leading the companies to divest non-core businesses and increase investment in business that aligns with their strategy.

- ▶ In February 2016, BASF announced the sale of its industrial coatings segment to AkzoNobel for €475 million (£368 million). Both the companies will benefit from this:
 - ▶ BASF's coatings division will now focus on automotive coatings and decorative paints.
 - ▶ AkzoNobel is expected to benefit since industrial coatings is one of its four focus end-user segments.
- ▶ In February 2016, Lanxess started its second production line for high-performance plastics at its facility in North Carolina, the US, doubling the production capacity from 20,000 to 40,000 TPA. It entailed an investment of around €13.3 million (US\$15 million) and it will cater to the growing US automotive industry. This investment is aligned to the company's strategy to focus on high-performance compounds and to move toward high-growth markets.
- ▶ In December 2015, Solvay acquired automotive composites business (Cytec). This acquisition adds value because Cytec complements Solvay's specialty formulations in mining and oil and gas chemicals and has a similar service-oriented business model.
- ▶ In September 2015, the Bayer group separated its material science business and formed a new entity "Covestro". Covestro may consider bolt-on acquisitions to grow its business.
- ▶ In July 2015, DuPont spun-off its struggling performance chemicals business into a separate public company, Chemours.
- ▶ Dow Chemical targeted to raise €7.6 billion (US\$8.5 billion), from the sale of non-core assets by mid-2016.
- ▶ INEOS's purchase of BASF's stake in Styrolution and its formation of a PVC partnership with Solvay in November 2014, will grow INEOS's core basic plastics businesses and help BASF and Solvay home in on specialties.

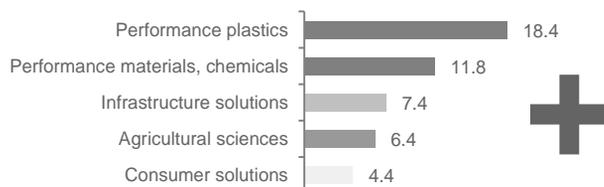
Dow-DuPont merger

The recently announced Dow-DuPont mega-merger is expected to create a combined entity with a market cap of €117 billion (US\$130 billion). It will be further split into three entities with each focussing on advanced materials, specialty chemicals and agrochemicals, respectively, another instance of retaining focus on the core competencies.

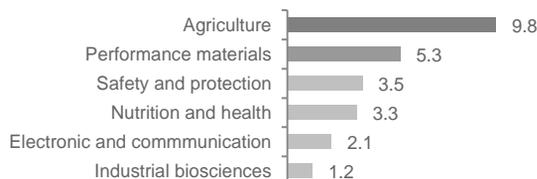
Mega-deal may trigger consolidation in European Agrochemicals

Amidst declining crop sales and thereby prices globally, the merger is expected to create increased competition for their European agrochemicals rivals (BASF, Syngenta, etc.) in Americas as the combined companies would sell around 16% of the world's pesticides and become the third-largest crop chemicals player. Besides, the merger may have boosted consolidation in global agrochemicals industry with ChemChina planning to acquire Syngenta and Bayer bidding to buy Monsanto. However, European companies (such as BASF, Clariant and Bayer) would have opportunities to buy more assets that may be on sale arising from anti-trust issues related to the deal.

Dow Chemicals: Sales by segment — 2015 (US\$ billion)



DuPont: Sales by segment — 2015 (US\$ billion)



DowDupont
Pro forma: US\$74 billion

Agriculture (US\$16 billion)

DuPont: Agriculture
Dow: Agriculture sciences

Materials (US\$46 billion)

DuPont: Performance materials
Dow: Performance plastics, Performance materials and Chemicals, Infrastructure solutions, Consumer solutions (excluding Electronic materials)

Specialty products (US\$12 billion)

DuPont: Nutrition and health, Industrial biosciences, Safety and protection and Electronics and communications
Dow: Electronic materials business (Consumer solutions)

Further, European companies are increasingly directing their investments towards high-growth end markets and emerging markets

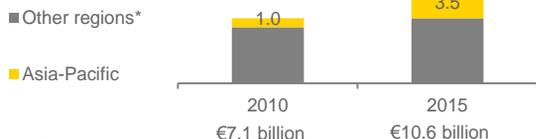
Targeting high growth markets



The emerging markets contributed more than 40% in the global chemicals sales in 2014 and the share is only expected to go up with the high GDP growth outlook. Hence, European companies are strategizing to expand their share in emerging regions to capitalize on the growth opportunities. This is evident from the increasing revenue share and capital spending in these regions.

- ▶ BASF increased its planned capital expenditure in Asia Pacific from 14% over 2010–14 to 18% in 2015–19. It is also investing €3.68 billion (US\$4 billion) in a petrochemicals plant in Iran, seeking to more than double its capacity in the next decade after the lifting of sanctions.
- ▶ Leading soda ash producer Solvay witnessed trebling of its revenues from Asia-Pacific during 2010–14 with the region's share increasing from 14% to 33% in 2015.

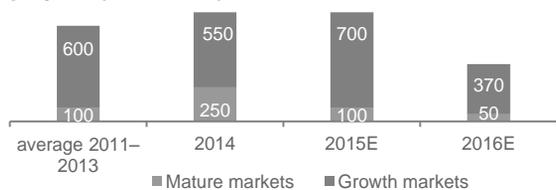
Solvay – revenue by region



Source: Solvay annual reports

Industrial gases major Linde is extensively investing in their growth markets (Eastern Europe, Africa, South & East Asia and Greater China) and North America to achieve its target of long-term profitable growth.

Linde's total capex of major committed projects (in € million)



Source: The Linde Group, 1H15 Presentation

In addition, many companies have made organic and inorganic investments in the emerging markets during the last few years:

- ▶ Clariant is investing €9.22 million (CHF10 million) in a healthcare packaging manufacturing plant in Tamil Nadu, India. The company is also constructing a masterbatch plant in Saudi Arabia to serve the growing Middle East and African markets.
 - ▶ Clariant invested about 62% of its total investments in North America and emerging markets in 2014.
- ▶ In 2015, LyondellBasell acquired polypropylene compounding assets of Zylog Plastalloys Pvt. Ltd with plans to further expand its India operations.

Driving growth through innovation



While innovation spearheads the growth for every manufacturing industry, it has become increasingly pivotal for the chemicals market amid increasing cost competition and increasing commoditization of chemicals. Global leaders in chemicals are not only investing in developing innovative products, but are also taking a more customer-centric approach to R&D.

Interestingly, European chemicals and plastics makers are also reducing in-house research and collaborating with industrial customers to develop customized solutions while saving on R&D budgets. This often implies partnering with exclusive supplier contracts.

- ▶ BASF has started working with sportswear maker Adidas to make running shoe soles more bouncy.
- ▶ Solvay is collaborating with an oil-producing company to develop polymer linings for corroded pipelines
- ▶ Lanxess is partnering with VW unit Skoda for innovation related to car parts by developing light-weight materials.

Further, innovation for sustainability, i.e. new and greener feedstock, sustainable production processes and expanding portfolios to include greener products are major initiatives by several chemicals players.

Moreover, stringent regulations in Europe are pushing the companies to develop eco-friendly products.

- ▶ As in September 2014, more than 20% of BASF's products analyzed (by sales) are contributing significantly to sustainability

As the emerging economies are taking over production of commodity chemicals business, chemicals players in Europe are investing in R&D to retain their competitive edge by supplying products which offer a higher value-add.

*Other regions include Europe, North America and Latin America

What strategies can the chemicals players in Europe consider in future?

- ▶ While restructuring business operations is the need of the hour for European chemicals industry, the industry also needs to have a focused approach to reorganize their business and operating model. An integrated business model which features a proximity to the raw material supplier and development of new differentiated products to meet the needs of the end-consumer is an imperative for the industry.
- ▶ Unlike earlier, identifying a high-growth product or industry is not enough for a chemicals player. It requires a consistent evaluation of the product (and services) portfolio and its validity amidst the current industry scenario. A company needs to manage the complete chemicals life-cycle of its products. Further, chemicals companies can no longer be oblivious to the needs and preferences of the end-customer. The chemicals players need to develop specialized products and services for the domain end-user industry of their customers.
- ▶ While doing this, companies also have to be responsible toward society and its stakeholders. They need to produce products that will improve health, environmental performance and security.
- ▶ To facilitate this, the companies need to develop a customized business model considering the value chain hierarchy of its businesses. After analyzing the top performers of the industry, we present a five-point strategy model that can be considered chemicals companies.



Refashioning business model and operations

To facilitate smooth operations, chemicals companies need to consistently evaluate and question their operating model. A close scrutiny of the operational parameters, technology and processes in use, the products in the market etc. is crucial for a company's success in Europe. Further, vertical and horizontal integration across the value chain and functions respectively needs to be an integral part of the business model. However, a high rate of restructuring may also hinder a company's growth in the market. Hence, it needs to optimize the frequency of reorganization activities to maintain leadership's focus on the core business.

How should business be structured to compete in the marketplace?		
Commodity chemicals	Diversified	Specialty chemicals
<ul style="list-style-type: none"> ▶ Reducing investment in siloed assets and investing more in assets at integrated sites or clusters ▶ Modifying operations strategy to focus on preserving cash, managing excess capacity, and securing access to capital ▶ Developing integrated (vertically and horizontally) and sustainable supply chains (greener modes of transport, product swaps etc.) 	<ul style="list-style-type: none"> ▶ Utilizing the large asset base by undertaking shared manufacturing with peers or affiliates to leverage economies of scale ▶ Expanding capacity in integrated chemicals production sites or industrial parks to optimize costs and margins ▶ Integrating continuous monitoring and evaluation of operations in the strategy ▶ Optimizing frequency of restructuring activities that may shift management's focus to internal activities instead of growing market share 	<ul style="list-style-type: none"> ▶ Developing dedicated teams comprising of sector and marketing experts to collaborate with each customer ▶ Teaming with your clients closely through digital portals ▶ Developing direct sales models for low-margin products (to reduce costs) ▶ Integrating smaller (but similar) plants or operations to facilitate cost efficiency

With the emergence of shale and other low-cost alternates to chemicals production, many companies felt the need to revisit their business models to achieve sustainable margins. However, with the volatility in oil prices and the dependent feedstock, particularly since July 2014, the need for an agile business model and operations, which are easily adaptable to the changing business environment has augmented more than ever.

Moreover, digitization is considered a disruptive trend which can help chemical companies to take that big leap to improve

Identifying the optimum feedstock blend

Chemicals companies need to evaluate the right mix of feedstock and production technology for chemicals production in Europe. They need to identify the optimum strategy for partnering around the acquisition of the feedstock. While a base petrochemicals player may focus on acquiring low-cost feedstock from the US (or other low-cost region), a specialty chemicals player will need to evaluate its cost structure and identify the right collaboration strategy to acquire raw materials from commodity and diversified chemicals companies. A diversified company, on the other hand, can invest in an integrated facility to achieve cost savings with a sustainable supply of raw material.

Enhancing supply chain flexibility

Being faced by volatility perennially, chemicals companies in Europe need to identify the best way to develop an agile and adaptable supply chain. Simultaneously, the chemicals supply chain needs to fulfill the safety requirements. A supply chain challenge such as the bull-whip effect is magnified in case of the chemicals industry as the excess inventory not only increases shelf space, but also deteriorates in value.



operational and supply chain efficiency. While several players actively implement digitization, it needs to go beyond the basic function of predictive maintenance and enter all the phases of the chemicals value chain from procurement to sale to customer feedback.

Further, digitization can be leveraged to develop a new business model for the chemicals industry. Several agrochemicals companies such as DuPont, Monsanto offer precision farming service as a part of their portfolio.

How should energy and feedstock costs volatility be managed?		
Commodity chemicals	Diversified	Specialty chemicals
<ul style="list-style-type: none"> ▶ Strategic partnerships to identify and acquire alternate low-cost feedstock 	<ul style="list-style-type: none"> ▶ Developing flexible feedstock technology (particularly for petrochemicals companies) 	<ul style="list-style-type: none"> ▶ Partnering with peers for producing or acquiring base chemicals used as raw materials to leverage economies of scale

How should supply-demand imbalances be managed?		
Commodity chemicals	Diversified	Specialty chemicals
<ul style="list-style-type: none"> ▶ Facilitating multiple sourcing options to improve bargaining power 	<ul style="list-style-type: none"> ▶ Sourcing from low-cost (owned or peers') facilities in regions (such as China) 	<ul style="list-style-type: none"> ▶ Developing a supply chain model with high frequency and low order sizes to achieve efficiency
<ul style="list-style-type: none"> ▶ Developing horizontal and vertical integration along the supply chain to improve efficiency and productivity and facilitating better asset deployment 	<ul style="list-style-type: none"> ▶ Formulating a market strategy to form contracts with the global parent instead of separate contracts with subsidiaries 	

Ascertaining the suitable business portfolio

Chemicals players in Europe can consider restructuring their portfolio according to the changing end-user markets. They need to identify the emerging mega trends in the regions served by them and how they will drive the demand for their products. Growth will come from technology breakthroughs in medical (miniaturization, nanotechnology, silicone usages, etc.), IT, electronics, automotive and energy (production, storage, increasing efficiency etc.) sectors primarily. An eye for the mega trends will help differentiate the high-margin high-growth potential products from the low-medium margin products offering unimpressive growth.

For example, specialty chemicals companies serving the automotive sector need to restructure their product portfolio to meet trends such as light-weight and low-emission products. Similarly, within Europe, the companies need to revisit their strategies according to the varied growth trends in the emerging and developed Europe.

What combination of product portfolio will be ideal to meet anticipated future state?

Commodity chemicals	Diversified	Specialty chemicals
<ul style="list-style-type: none"> Increasing the share of products used in specialty chemicals or consumer chemicals particularly in the high-growth segments 	<ul style="list-style-type: none"> Focusing on the non-cyclical end-markets of food, personal care and health industry 	<ul style="list-style-type: none"> Focusing on products with a stable renewal demand and high pricing power (ingredients for consumer chemicals)
<ul style="list-style-type: none"> Petrochemicals companies can focus on producing C4 and C6 derivatives which have a relatively stable demand in Europe 		<ul style="list-style-type: none"> Offering the most profitable products and services at increasing levels of sophistication

Emerging megatrends in chemicals' end-user markets

Industry	Trend	Products for which the demand will increase
 Automotive	Fuel efficiency, autonomous cars	Lightweight plastics components, electronic chemicals
 Healthcare	Monitoring health through mobile devices, use of big data and analytics	Electronic materials or chemicals, Lithium-ion chemistry, polymers replacing metal and glass in health care
 Energy	Energy storage, smart grids, smart meters, growing market for renewables	
 Construction	Smart buildings — energy efficiency, high illumination and thermal comfort	Materials for smart grids, automated electrical systems, insulation; smart materials such as nano-materials, self-healing coatings, etc., and other construction chemicals
 Agriculture	Precision agriculture, sustainable agriculture	Additional services such as precision agriculture, bio-pesticides or bio-herbicides
 Textiles	Smart fabric — built in health monitoring sensors	Advanced materials
 E-commerce	New designs in packaging, eco-friendly packaging	Innovative material in packaging — inks, sealants; eco-friendly packaging materials

Reshaping innovation strategy around the margin driver

Chemicals players in Europe need to differentiate their innovation investment strategy according to their customers. For instance, a commodity chemicals company which is highly energy- and feedstock-intensive should invest in innovation in raw material which reduces the overall costs and facilitates sustainable products. Further, the chemicals players in Europe need to develop innovation roadmaps with specific R&D targets for the company in each — feedstock, processes and products and solutions — thereby facilitating a premeditated apportionment of limited resources.

Where should the R&D expenditure and innovation be directed to?		
Commodity chemicals	Diversified	Specialty chemicals
Feedstock and process oriented innovation <ul style="list-style-type: none"> ▶ Investing in innovation in alternate technology or feedstock (e.g., CTO, bio-based) to reduce cost and facilitate sustainability ▶ Developing R&D clouds for leveraging the expertise available across the industry (knowledge sharing) 	Product-oriented innovation <ul style="list-style-type: none"> ▶ Adopt the 'innovate to differentiate' strategy facilitating value addition to its customers ▶ Developing local R&D and technical capability in the emerging markets 	Solution-oriented innovation <ul style="list-style-type: none"> ▶ Investing in customer-oriented innovation and new applications for their products ▶ Directing innovation to the high-growth high-margin products, such as raw materials for sustainable products (light-weight vehicles, novel solar photovoltaic technologies)

Attracting the right skill set

To achieve growth in market share along with margins, a chemicals company requires three integrated elements in its talent pool — scientists who develop innovative products, industry experts which identify the emerging need of the dynamic end-user industry and technology experts which facilitate consistent upgrading of the company's technology to optimize costs. Companies need to modify their compensation, HR and employee safety policies to facilitate a better working environment so as to position their companies a lucrative option for chemical graduates.

How to procure the suitable skill set and talent mix?		
Commodity chemicals	Diversified	Specialty chemicals
<ul style="list-style-type: none"> ▶ Hiring high share of technology or resources experts to reduce costs ▶ Developing safe and secure working environment for the employees 	<ul style="list-style-type: none"> ▶ Hiring major share of chemicals value chain experts to facilitate optimum integration of manufacturing, supply chain, logistics etc. ▶ Providing advanced skill training to the existing employees 	<ul style="list-style-type: none"> ▶ Investment in recruiting industry and research experts to develop new products and applications

Why EY?

EY is known for its chemicals sector knowledge, relationships with the industry's key stakeholders, and strong global capabilities

In an industry synonymous with innovation, the bar is set pretty high. Embrace new technology, develop new logistics networks, comply with new regulations at home and abroad and satisfy the ever-changing demands of end consumers. At the same time, manage costs, meet or exceed stakeholder expectations, "do more with less." EY global chemicals sector can help. We'll continue to provide high-quality assurance, tax, transaction and advisory services relevant to your industry and enterprise..

In summary, we strive to provide our people with deep and leading practice sector knowledge and experience, market leading business insights and services to assist our clients. Our goal is to confirm EY is branded as the organization of choice to work with the most valued and respected multinational companies in the world.

How our clients benefit from the experienced global chemicals professionals

Network

- ▶ We connect approximately 2,500 experienced global professionals who share information on current and emerging trends in the sector to help you manage risk, optimize performance, and increase operational effectiveness.
- ▶ We have multi-disciplinary teams working with global chemicals leaders.
- ▶ We bring you closer to your suppliers and customers to network and discuss business needs and issues.

Execution

- ▶ We bring together a pool of chemicals professionals with technical experience and industry knowledge.
- ▶ Industry risks are identified, analyzed, and communicated to service teams.
- ▶ We offer industry specific point-of-view and thought leadership.
- ▶ We develop educational platforms and training sessions for our people and clients.

Quality

- ▶ Expectations of Service Quality (ESQ) and Assessment of Service Quality (ASQ) process is routinely administered to a broad array of key stakeholders.
- ▶ Industry feedback is tracked and monitored for continual improvement.
- ▶ Senior partner on each engagement is focused on quality and staffing.

Insight

- ▶ We share relevant and practical thought leadership proactively.
- ▶ We organize issue-based forums addressing industry, technical and regulatory issues.
- ▶ We develop knowledge and learning initiatives that are vital to the strategic direction of our clients.
- ▶ We facilitate sessions and roundtables to help clients understand, prioritize and address matters critical to their success.

"EY is teaming with many of the world's leading chemicals companies today, helping them realize sustainable business improvements and removing unrewarded complexity."

References

1. "Facts and Figures reports and brochures," CEFCIC website, <http://www.cefic.org/Facts-and-Figures/>, accessed 10 January 2016.
2. "European Chemical Industry Facts and Figures Report 2016," CEFCIC website, <http://www.cefic.org/Facts-and-Figures/>, accessed 7 May 2016.
3. "World Economic and Financial Surveys," IMF website, <https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/download.aspx>, accessed 12 May 2016.
4. "The European Chemicals Industry – Facts and Figures 2016" CEFCIC website, <http://www.cefic.org/Facts-and-Figures/>, accessed 12 May 2016.
5. "Global Economic Databank," Oxford Economics website, <https://www.oxfordeconomics.com/forecasts-and-models/countries/data-and-forecasts/global-economic-databank/overview>, accessed 19 May 2016.
6. "Global Automotive Sales Forecast Q3 2015," LMC Automotive Limited.
7. "Global Construction Outlook: Executive Outlook Fourth Quarter 2013," IHS Economics, https://www.ihs.com/pdf/IHS_Global_Construction_ExecSummary_Feb2014_140852110913052132.pdf, accessed 1 December 2015.
8. "Dataset: OECD-FAO Agricultural Outlook 2014-2023" OECD Agri-Outlook website, <http://www.agri-outlook.org/>, accessed 15 November 2015.
9. "The Global Competitiveness Report 2015-2016 - Competitiveness Dataset," World Economic Forum website, <http://reports.weforum.org/global-competitiveness-report-2015-2016/>, accessed 2 December 2015.
10. "Asia Refining & Chemicals 2015 Outlook," Credit Suisse, 27 January 2015, via ThomsonOne.
11. "Plants" ICIS website, <https://www.icis.com/subscriber/plants-and-projects/>, accessed 12 February 2016.
12. "World Economic and Financial Surveys," IMF website, <https://www.imf.org/external/pubs/ft/weo/2015/01/weodata/download.aspx>, accessed 12 May 2016.
13. "Global Economic Monitor – Data Extract," World Bank website, <http://data.worldbank.org/data-catalog/global-economic-monitor>, accessed 29 November 2015.
14. "European Chemical Industry Facts and Figures Report 2016," CEFCIC website, <http://www.cefic.org/Facts-and-Figures/>, accessed 7 May 2016.
15. "Europe's Global REACH : Costly for the World; Suicidal for Europe," <https://cei.org/sites/default/files/Angela%20Logomasini%20-%20Europe%E2%80%99s%20Global%20REACH%20Costly%20for%20the%20World%20Suicidal%20for%20Europe.pdf>, accessed 10 January 2015. A CEFCIC publication notes: «Already today, bringing a new chemicals to the EU market takes three times longer and costs 10 times as much as in the US.
17. "New projects may raise US ethylene capacity by 52%, PE by 47%," ICIS News website, <http://www.icis.com/resources/news/2014/01/16/9744545/new-projects-may-raise-us-ethylene-capacity-by-52-pe-by-47-/>, 16 January 2014.
18. "Eurostat database- Employment by sex, age and detailed economic activity," EuroStat website, <http://ec.europa.eu/eurostat/data/database>, accessed 28 March 2016.
19. "Guest Editorial: The Professional Status of European Chemists and Chemical Engineers," Wiley Online library, <http://onlinelibrary.wiley.com/doi/10.1002/chem.201501364/full>, accessed 27 March 2016.
20. "Europe Seeks Chemists," Chemical & Engineering news website, <http://cen.acs.org/articles/93/124/Europe-Seeks-Chemists.html>, 15 June 2015.
21. "LABOR MARKET REGULATION DATA," Doing Business Database, <http://www.doingbusiness.org/data/exploretopics/labor-market-regulation>, accessed 17 November 2015.
22. "Worldwide Governance Indicators - Political Stability and Absence of Violence," World Bank website, <http://info.worldbank.org/governance/wgi/index.aspx#home>, accessed 25 September 2015.
23. "Landscape of European chemical industry," CEFCIC website, <http://www.cefic.org/Documents/Landscape-European-chemical-industry/Croatia%20-%20Landscape-of-the-European-Chemical-Industry-March-2014.pdf>, accessed 2 February 2016.
24. "Chemical Parks in Europe," ECSPP, <https://chemicalparks.eu/parks>, accessed 29 January 2016.
25. "European Chemical Industry Parks, Chem Manager online, <http://www.chemanager-online.com/en/topics/industrial-sites/european-chemical-industry-parks>, accessed 30 January 2016.
26. "Clariant sets its course," Specialty Chemicals magazine, http://www.specchemonline.com/articles/view/clarient-sets-its-course#.VpTzo_197IV, 11 October 2015.
27. "Saudi's Largest Petrochemicals Company is Investing in U.S. Shale Gas," Oil & Gas 360, <http://www.oilandgas360.com/saudis-largest-petrochemical-company-is-investing-in-u-s-shale-gas>, 27 July 2015.
28. "CEO Perspective: The Internet of Things for Chemicals," <http://www.iotsworldcongress.com/documents/4643185/e5b74e77-cd4e-43ee-a776-3ea0bd60003b>, accessed 10 January 2015.
29. "BASF US methane-to-propylene plant targets '19 start-up," ICIS, <http://www.icis.com/resources/news/2014/05/02/9777829/basf-us-methane-to-propylene-plant-targets-19-start-up/>, 2 May 2014.
30. "BASF Chemical Evaluates Investment in World-Scale Methane-to-Propylene Complex on U.S. Gulf Coast," IHS Chemical, https://www.ihs.com/pdf/Research-Note-BASF-Propylene_186332110913049832.pdf, 5 May 2014.
31. "Novozymes, Cargill continue bio-acrylic acid partnership as BASF exits," Novozymes website, <http://www.novozymes.com/en/news/news-archive/Pages/Novozymes-Cargill-continue-bio-acrylic-acid-partnership-BASF-exits.aspx>, 27 January 2015.
32. "BASF-Purac JV Starts Bio-Succinic Acid Plant in Spain, Chem Manager, <http://www.chemanager-online.com/en/news-opinions/headlines/basf-purac-jv-starts-bio-succinic-acid-plant-spain>, 5 May 2014.
33. "Biomass for chemicals manufacture in India," Chemicals weekly, 16th Annual business outlook conference, 14 April 2014.
34. "TTIP has significant benefits for US, EU Chemical Industries," HIS Chemical Week website, http://www.chemweek.com/chem_ideas/Guest-Author/TTIP-has-significant-benefits-for-US-EU-Chemical-Industries_73833.html, accessed 27 January 2016.
35. "Reliance Industries to save \$450 million/year by importing ethane from US," Economic Times website, http://articles.economictimes.indiatimes.com/2014-08-27/news/53285000_1_reliance-industries-clsa-feedstock, 27 April 2014.
36. "US Ethane Export 'Activity, Challenges and Outlook," Platts website, http://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/2014/pc434/presentations/Peter_Manning.pdf, September 2014.
37. "INEOS signs agreement with ExxonMobil Chemical Limited and Shell Chemicals Europe BV to supply ethane from US shale gas from Grangemouth to the Fife Ethylene Plant in Scotland," INEOS press release, <http://www.ineos.com/news/ineos-group/ineos-signs-agreement-with-exxonmobil-chemical-limited-and-shell-chemicals-europe-bv>, 9 November 2015.
38. "INEOS Signs Second Deal To Ship More Ethane To Europe – And Orders More Ships," INEOS magazine, <http://www.ineos.com/inch-magazine/articles/issue-6/ineos-signs-second-deal-to-ship-more-ethane-to-europe>, accessed 9 June 2016.
39. "CEO Perspective: The Internet of Things for Chemicals," <http://www.iotsworldcongress.com/documents/4643185/e5b74e77-cd4e-43ee-a776-3ea0bd60003b>, accessed 10 January 2015.
40. "Clariant sets its course," Specialty Chemicals magazine, http://www.specchemonline.com/articles/view/clarient-sets-its-course#.VpTzo_197IV, 11 October 2015.
41. "Saudi's Largest Petrochemical Company is Investing in U.S. Shale Gas," Oil & Gas 360, <http://www.oilandgas360.com/saudis-largest-petrochemical-company-is-investing-in-u-s-shale-gas>, 27 July 2015.
42. "CEO Perspective: The Internet of Things for Chemicals," <http://www.iotsworldcongress.com/documents/4643185/e5b74e77-cd4e-43ee-a776-3ea0bd60003b>, accessed 10 January 2015.
43. "Clariant Excellence," Clariant Annual report 2011, http://annual-report.clariant.com/uploads/tx_szmediacenter/Clariant_Excellence.pdf.
44. "Clariant Excellence Initiative Produces Corporate-wide Shake-up," Process worldwide, <http://www.process-worldwide.com/clarient-excellence-initiative-produces-corporate-wide-shake-up-a-354470/>, 19 March 2012.
45. "The Internet Of Things: 5 Real-World Examples Of What It Means For The Chemicals Industry (Part 1)," Digitalist magazine website, <http://www.digitalistmag.com/industries/chemicals/2014/12/09/the-internet-of-things-what-it-means-for-the-chemicals-industry-01862495>, 9 December 2014.
46. "Tata Sons CTO sets the agenda for tech innovation," Business Standard website, http://www.business-standard.com/article/companies/tata-sons-cto-sets-the-agenda-for-tech-innovation-115052001194_1.html, 21 May 2015.
47. "UPDATE 1-BASF prepares for new cutbacks, slows investment spend," Reuters website, <http://www.reuters.com/article/basf-se-outlook-idUSL5N11Y1A720150928>, 28 September 2015.
48. "INEOS to acquire BASF's share in Styrolution," INEOS press release, <http://www.ineos.com/news/ineos-group/ineos-to-acquire-basf-share-in-styrolution>, accessed 16 June 2016.
49. "MERGER UPDATE & FORM S-4 HIGHLIGHTS," DuPont company website, http://s2.q4cdn.com/752917794/files/doc_presentations/2016/presentation/S-4-Presentation-FINAL.pdf, 1 March 2016.
50. "Future: Focused," *The Dow Chemical Company 2015 Annual Report*, The Dow Chemical Company.

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