

# REACTION

Chemical Magazine / Eleventh Edition

## Strategic

realignment in the  
global chemical industry

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*cutting through complexity*

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realignment  
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# Introduction

Welcome to the latest edition of Reaction Magazine and without wishing to tempt fate, it would seem the overall outlook within the industry is a lot more positive than it was when we released our last edition in March. Certainly, the US economic recovery appears to be taking hold and despite continued weakness in the Eurozone, the debt and currency crises of the last few years seem to be a thing of the past, although structural issues still need to be worked out.

In this edition, we focus on strategic challenges facing the global chemical industry and recommend five key actions executives need to focus on to make their companies successful in tomorrow's world. We also take an in-depth look at sustainability and how the green agenda is continuing to shape and drive the chemical industry and the products it produces.

As ever, we continue to be active in the industry, with members of our Chemicals and Performance Technologies leadership team present recently at the CBA Lunch in London and the SCI Palladium Award Dinner in New York.

We will be back with our next edition in September, which will focus on China, to coincide with our next visit to the Asia Pacific region and our annual Chemical Executive Dinner in Shanghai – I look forward to seeing many of you there for what is always a great event. If there are any other topics you would like us to cover in future editions of Reaction, please don't hesitate to contact us.



**Mike Shannon**

Global Chair  
Chemicals and Performance  
Technologies



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# The Business Case for Sustainability

**Going green:** a sustainable advantage for  
chemical companies

by

**Yvo de Boer**

Special Global Advisor,

KPMG Climate Change & Sustainability



Today's chemical companies are taking major steps to create a more sustainable chemical sector. Previously, pursuing a sustainable agenda was viewed as more of a cost than a benefit, with companies narrowly focused on reducing their environmental impacts and achieving regulatory compliance through incremental changes to feedstocks, operations, and end products. Now, sustainability has become a top business initiative for many forward-looking chemical companies. These companies realize that sustainability is not only a way to reduce environmental impacts and carbon footprint, but it also provides opportunities to significantly lower costs, meet both customer and consumer requirements, and develop new products and services that address the needs of a growing world population. In short, leading chemical companies are driving innovation and transforming the industry by embracing sustainability.



**S**ustainability in the chemical industry used to be primarily focused on reducing environmental impacts of operations and products. While this is undoubtedly important, times have changed and so has the wider business context. For example, the global chemical industry's shift to the East, along with the sector's key end-customers such as textiles, automotive and construction companies. Overall, the chemical industry in Asia is bigger than Western Europe and North America put together.

This move to the East is one of several emerging global megaforces affecting chemical companies. Megaforces can present business risks, but perhaps more importantly, they can fuel innovation for forward-looking companies. Global megaforces are prompting industry leaders to develop comprehensive sustainability strategies that incorporate the upstream and downstream social, environmental, and economic impacts of industry operations.

According to KPMG's own analysis<sup>1</sup>, there are a number of global megaforces having an impact on the chemical sector. While many of these are driving demand for chemical products, they also provide operational risks and challenges as set out below:

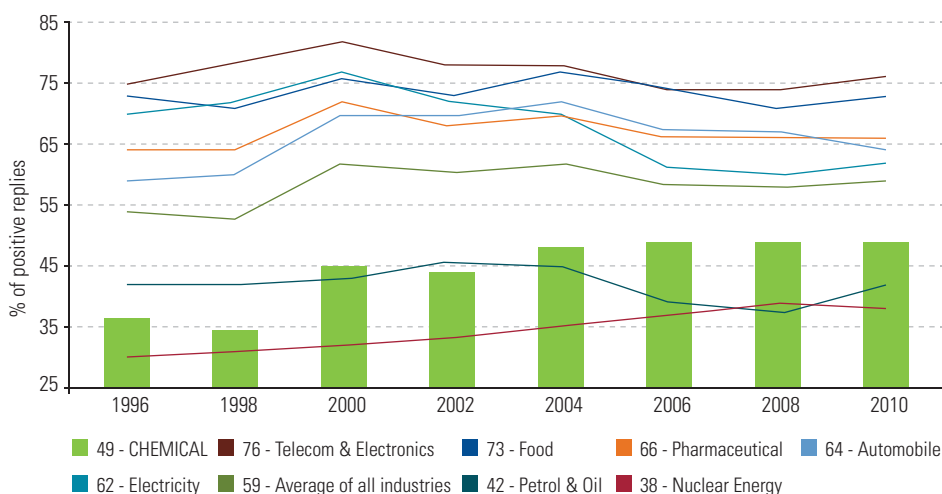
- **Water scarcity and rising water costs.** Regions expected to see the most demand growth for chemicals – South Asia, East Asia, and the Middle East – are also likely to face severe physical and economic water scarcity. Companies competing with local communities for scarce water resources are at risk of losing their license to operate.

- **Energy and fuel volatility.** Fossil fuels are used both as feedstock and to supply energy for the chemical production process. The sector remains a high energy user, with oil and gas the dominant feedstocks, along with coal which is being used more widely, particularly in China.
- **Climate change legislation.** The sector remains one of the most energy intensive industries and is vulnerable to emissions regulations, which could erode profits. Even modest taxes on greenhouse gas (GHG) emissions could reduce profitability.
- **Population growth and urbanization.** Communities are increasingly sensitive to the potential environmental impact of chemical plants.

- **Reputation.** Chemical companies are traditionally considered to have a negative impact on the environment. Despite attempts to improve public reputation of the sector, perceptions remain below average compared with other sectors.

Considering cost alone, companies cannot afford to ignore these global megaforces. According to KPMG research, the external environmental costs of 11 key industry sectors rose from US\$566 to US\$846 billion during an eight-year period (2002 to 2010).<sup>2</sup> In the case of the chemical sector, data suggests that the environmental impact in 2010 amounted to US\$43 billion and would account for 43 percent of sector earnings.<sup>3</sup> This is a significant share of chemical company profits which is potentially at stake if the sector does not adapt to environmental and social forces.

### European chemical industry public image



Source: European Chemical Industry Council (CEPIC). (2010). Cefic Pan European Survey on the image of the chemical industry 2010.

<sup>1</sup> Expect the Unexpected, KPMG International, 2012  
<http://www.kpmg.com/global/en/issuesandinsights/articlespublications/pages/building-business-value.aspx>

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.



“ Business must take a leadership role in the **development** of solutions that will help to create a more **sustainable future**. By leveraging its ability to enhance processes, create **efficiencies**, manage risk, and drive **innovation**, business will contribute to society and long-term economic growth. ”

– Michael Andrew  
Chairman of KPMG International

# Reducing operational impacts through sustainability

**S**ustainability strategies in today's chemical industry have at their heart the objective of minimizing negative social and environmental impacts associated with chemical manufacturing, while continuing to meet customer and consumer needs, by developing innovative and eco-friendly products and services.

Meeting this objective requires careful management of environmental impacts including air and GHG emissions, energy intensity, and water use. Companies have discovered that sustainability initiatives can facilitate significant cost savings by reducing overheads for energy, water and feedstocks.

The same initiatives can enhance a company's reputation as a good environmental steward. Although reputational risk will continue to be a challenge to chemical companies worldwide, affecting operations, strategic planning, resource recruitment and other areas, companies that adapt will be better positioned for changing markets and fluctuations in resource availability around the world.

The chemical industry is currently responsible for approximately 5 percent of global man-made GHG emissions.<sup>4</sup> Assuming sustained growth under a "business as usual" scenario, the chemical sector's emissions are forecast to more than double by 2030.<sup>5</sup> However, many chemical companies have already grasped emissions reduction as an opportunity to gain greater efficiencies and reduce costs, potentially diverting the sector's emission from this growth forecast. In the US and Europe, the chemical sector has significantly reduced its energy and greenhouse gas intensity. In Europe, energy consumption remained about level from 1990 to 2008, and GHG emissions fell by 42 percent even while production rose by 69 percent.<sup>6</sup>

In Europe, improved manufacturing sustainability is supported by dedicated policies to stimulate the development of "clusters" of interdependent firms, academic and support institutions, and customers, all linked to each other in a value-adding production chain. Cluster members leverage industry

experience and knowledge to increase manufacturing sustainability up and down the supply chain. Chemical industry clusters can play a fundamental role in improving competitiveness of all members while lowering energy intensity, streamlining access to raw materials, containing the risks of environmental pollution, and reducing health hazards.

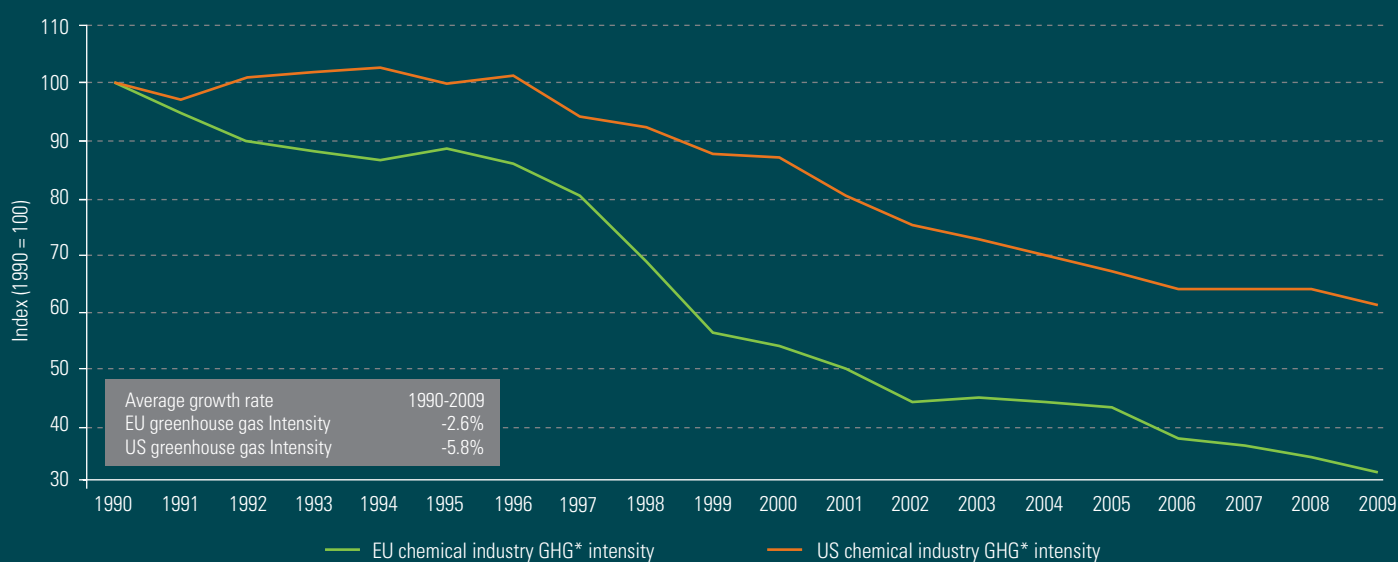
“Many **chemical companies** have already grasped emissions reduction as an **opportunity** to gain greater **efficiencies** and reduce costs, potentially diverting the sector's **emission** from this growth forecast.”

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

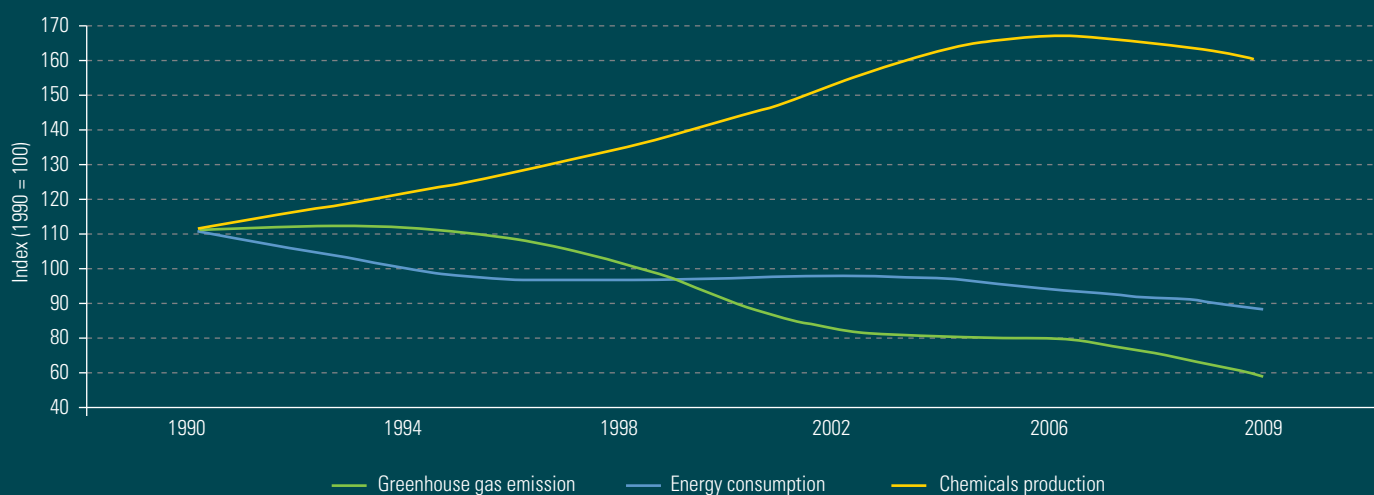
## Chemical industry GHG intensity reduction: 1990-2009



\* Including pharmaceuticals

Source: European Chemical Industry Council (CEFIC). (2011). Facts and Figures 2011: The European chemical industry in a worldwide perspective.

## European chemical production decoupled from energy use



Source: European Chemical Industry Council (CEFIC). (2011). Facts and Figures 2011: The European chemical industry in a worldwide perspective.

# Transforming the chemicals sector through innovation

The sustainability strategies of leading chemical companies have broadened as they aim to meet customer and consumer needs – and the needs of a rapidly expanding global population – through innovative and eco-friendly products and services. This is an exciting area, where leading chemical companies are investing in research and development (R&D) and finding new markets based on social and environmental responsibility.

Progressive companies are grasping the opportunity to develop products and technologies that offer positive social and environmental benefits beyond their own operations in other, downstream industries.

Examples include insulation materials, advanced lighting, plastics, and agricultural products that can reduce carbon emissions, reduce water use, improve nutrition and increase safety. It is no surprise that the International Council of Chemical Associations has calculated that for every unit of GHG emitted through chemical industry production, the resulting products enable savings of 2-3 units.<sup>7</sup>

Chemical companies such as BASF are examining the impact of their products downstream for customers. For example, in 2012, the use of BASF's climate protection products enabled its

customers to avoid 320 million tons of equivalent carbon dioxide (CO<sub>2</sub>e). The majority of savings came from BASF's products in the construction sector such as cement additives and insulation, along with transport sector products, such as lightweight plastics for cars, and in agriculture through nitrification inhibitors.

Companies are also discovering that a sustainability strategy can uncover new business opportunities and create a quantifiable competitive advantage. For example, BASF generated US\$9 billion from sales of climate protection products in 2012, the equivalent of 9 percent of total sales. As early as 2006, DuPont set a target for 2015 to increase their annual revenue by at least US\$2 billion from products that create energy efficiency and/or significantly reduce greenhouse gas emissions. The company already reached US\$1.9 billion in 2011. Sales of sustainable products across the sector seem likely to continue on a growth trajectory.

Further examples of chemical industry products with sustainability benefits on the market today include:

- Housing and construction materials such as insulation that reduce GHG emissions
- Plant biotechnology that improves agricultural yields

- Biofuels and fuel cell technologies for low carbon transport
- Bio-based chemicals that replace the use of petrochemicals in plastics and other products
- Chemical coatings that improve the resilience of products
- Longer-lasting, safer batteries
- Safety glass

The chemical sector can also play a significant role in developing solutions for a cradle-to-cradle, zero-waste economy. For instance, chemical companies can support the production of tires that can be recycled into new tires as well as other products such as shipping pallets, asphalt roads and waterproofing.<sup>8</sup>

**“ For every unit of GHG emitted, the resulting products enable savings of 2-3 units. ”**

<sup>7</sup> Ibid

<sup>8</sup> [http://www.greenbiz.com/blog/2013/01/11/why-small-companies-lead-second-chemical-revolution?page=0%2C0&utm\\_source=E-News%20from%20GreenBiz&utm\\_campaign=1a55de08e7-GreenBuzz-2013-01-11&utm\\_medium=email](http://www.greenbiz.com/blog/2013/01/11/why-small-companies-lead-second-chemical-revolution?page=0%2C0&utm_source=E-News%20from%20GreenBiz&utm_campaign=1a55de08e7-GreenBuzz-2013-01-11&utm_medium=email)



# R&D investment key to sustainability success

**M**any chemical companies are using a sustainability agenda to drive innovation and R&D. Sustainability not only provides the impetus to reduce carbon emissions and minimize water and energy use, but also to develop products that will meet the needs of a growing world population.

Companies with a strong commitment to R&D continue to increase their revenues and market share by providing high-performance, innovative and sustainable products to support markets in a growing range of industries. Sustainability strategies of many leading companies are underpinned by specific R&D and innovation goals.

For example, Solvay aims to have 100 percent of their R&D projects aligned to sustainable development by 2020, while reducing both GHG emissions and water usage by 10 percent.

Dow Chemical's innovation goal is to increase the percentage of sales to 10 percent for products that are highly advantaged by sustainable chemistry, while achieving at least three R&D breakthroughs that will significantly help solve world challenges. Likewise, PPG Industries aims to achieve 30 percent of sales from sustainable products by 2020.

By focusing on specific sectors and product areas, companies that commit to significant R&D investment in sustainability initiatives are increasing their technological capabilities while addressing global social and environmental megaforces such as

energy supply, human health, food security, housing, mobility, and access to freshwater. For example in 2012, DuPont announced plans to invest US\$10 billion in the food innovation sector by the end of 2020 and introduce 4,000 new products centred on introducing more food, enhancing nutrition, improving food and agriculture sustainability, boosting food availability and shelf life, and reducing waste.





# Conclusion

Chemical companies are recognizing that what is good for people and the planet can also be good for the bottom line and shareholder value. In a recent KPMG survey, 42 percent of respondents from chemical companies (and 60 percent of respondents from the large companies) said that their organizations derive financial value from their sustainability initiatives.<sup>9</sup>

With sufficient foresight and planning, chemical companies can turn potential risks into new opportunities while driving the sustainability of the industry.

To achieve this, business leaders need to fully understand the risks and analyze opportunities for efficiency, substitution, adaptation and adjustment in their operations. In effect, they need to acknowledge and address the global megaforces impacting the chemical industry, and make sustainability central to their corporate strategy. This includes ambitious plans, targets and actions relative to improving energy and resource efficiency, allocating resources for research and development related to sustainable products and services,

using safe, renewable and bio-based materials, increasing supply chain sustainability, and developing initiatives that will address global needs, thereby identifying new markets for innovative and sustainable products, services and technologies.

Forward-thinking companies know that sustainability presents opportunity for the chemical industry – and innovation is the key to success.

<sup>9</sup> Research conducted for the KPMG International Survey of Corporate Responsibility Reporting 2011







# Strategic realignment in the global chemical industry

Global opportunities for  
companies that act today



by

**Paul Harnick and  
Andrew Monro**

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Andrew Monro is a Partner with KPMG LLP in the UK and is the UK Chemicals and Performance Technologies segment leader. He specializes in advising large global clients on all aspects of business model transformation and optimization, including strategy development and risk mitigation.



**T**he global chemical industry is undergoing dynamic change, with a range of external factors presenting industry executives with vastly divergent challenges in different regions of the world. As such, running a global chemical company has never presented so many opportunities and challenges.

Fundamentally, the industry continues to be driven by two main factors:

- Global GDP dependence, which necessitates vastly different behaviors in emerging markets which continue to expand (albeit at volatile rates); Europe, where embedded structural issues point to long-term stagnation; and the US where a sustained economic recovery seems to be taking hold; and
- Global issues including population growth and middle class expansion; food and water shortage; energy and climate change, all of which drive demand for chemical products under the mantra of making life better and our planet healthier – continuing to drive the march downstream and the search for higher value, science-based chemical products.

Overlay the shale gas dynamics in the US which are moving the supply base of the industry west; while the demand side of the industry continues to move east and south, and executives have another significant issue to grapple with as they set their global business strategies.

It is somewhat surprising then, that a state of inertia currently exists within the global chemical industry. Rewind to 2009-10 and the dynamism displayed by the industry in the face of the worst economic conditions in generations was astounding. Costs were cut, cash was tightly managed, balance sheets were de-leveraged and under-performing assets were closed or sold as global chemical businesses were re-aligned for long-term success such that the industry that emerged from the downturn was leaner and more efficient than it had ever been.

Perhaps it should not be surprising that the industry paused for breath as growth returned in 2010-11. Perhaps the slow-down in emerging markets, never-ending fiscal crises in Europe and uncertainties related to the US fiscal cliff in 2012 knocked confidence which had only just begun to recover. Perhaps also, a state of

comfort has crept in – particularly at the commodity end of the industry in the US, where cheap gas feedstock is delivering once in a lifetime returns of profitability and cash. In 2012, and the first half of 2013, the world's leading chemical companies have returned billions of dollars of cash to shareholders through special dividends and share buy-backs. While these actions may offer a short-term boost to EPS, they do nothing to develop the long-term strategic direction of the company.

We believe it is time for the global chemical industry to stop deferring the important decisions and re-focus on the next wave of strategic re-alignment. The world is changing rapidly and there are huge rewards available for the chemical companies who can develop their businesses in advance of the coming trends. We offer five strategic platforms for development:

1. Capture growth from emerging markets – increase the pace of developing emerging market footprints to capture long-term growth and the emerging customer base. There is a need to be creative



and look beyond China. A portfolio approach to capture the benefits and offset the risks inherent in different markets comes from balancing geographic expansion.

2. Optimize the portfolio – take a more disciplined approach to identifying business units and segments which will not be competitive in the long-term; or which do not fit with the wider business strategy. In particular, remove the history and sentiment attached to legacy businesses, which often results in chemical companies holding onto areas which are no longer optimal in terms of maximizing shareholder value or no longer fit the strategy.
3. Build financial strength – many of the good things the industry was doing in 2008 onwards have stopped.

Supply chains have become bloated, buffers have been built in inventory and discipline around receivables collection has weakened. Moving third and fourth quartile working capital performance back to median performance (among the world's 50 largest chemical companies) could

unlock \$24.9 billion of cash – cash that would be better utilized funding the activities above to drive growth.

4. Reduce business model complexity – build leaner, more efficient business models which are more readily able to adapt to change. The chemical industry has become proficient at building structure and process and heavily integrating these structures resulting in reduced flexibility – adding layers of costs and functions which confuse the picture of underlying business performance, making it difficult for management to make optimal decisions and subsequently, make it difficult to deliver change.
5. Focus innovation to drive price and margin – among the wider manufacturing industry, the chemical industry is a clear leader when it comes to customer centric innovation and new product development. For established market companies, we don't pertain to offer anything new here – just a reminder to continue to focus on this as a core competency for long-term success. For emerging

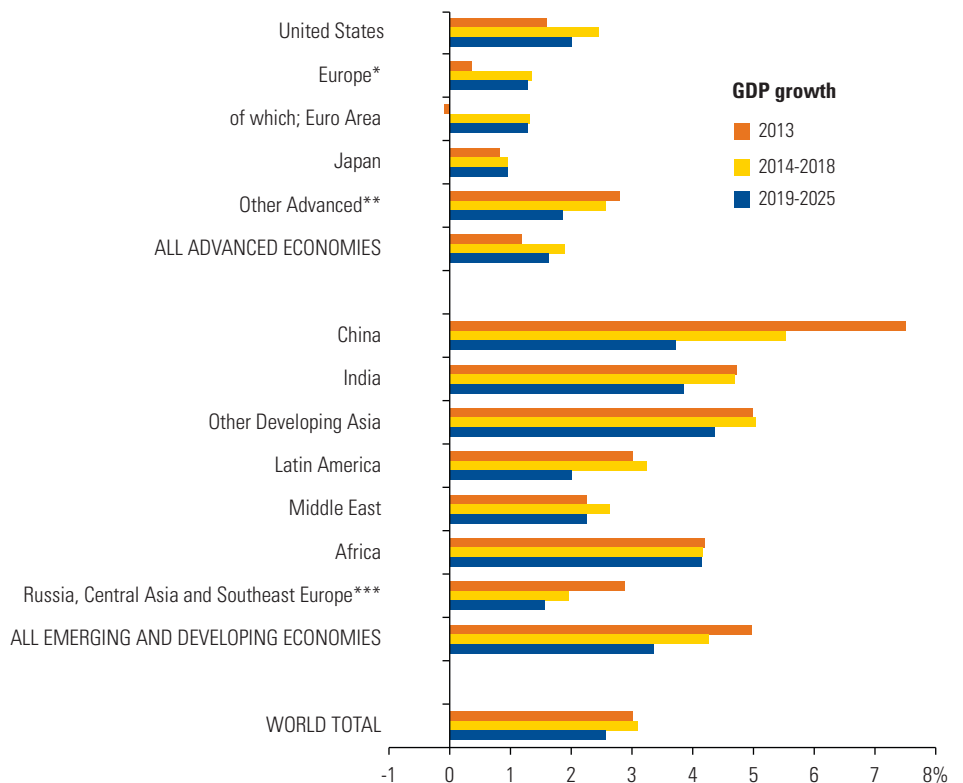
market companies, the pace of development of specialty chemical business units has been slow, such that many are now no closer to the heralded move downstream than they were five years ago, while opportunities continue to pass them by. Basic chemistry is much maligned but as part of a fundamental GDP building block it offers a platform to foster development.

Each of these is based around an existing chemical industry core competency, but there is a clear need for renewed focus and increased pace of change. It is not enough to do one or two of these well. A successful strategy in today's world requires all aspects to be performed equally well, at the same time, often at different paces in different regions of the world.

The time for change is now. In our view, those who wait and react will fall behind those who embrace the changing dynamics.

In 2009, the chemical industry hit the brakes hard. The global downturn caused major de-stocking, which in turn forced chemical companies to rationalize their portfolios and restructure operations to cut costs, eliminate overcapacity, reduce complexity and improve cash management. To its credit, the chemical industry in general has greatly benefited from these actions. In 2013, however, many chemical companies appear reluctant to continue down this road of transformation, even as global industry dynamics make the world a complex and challenging place. We believe that now is the time to act – not just react. Only those companies that take bold, strategic actions today to rationalize, optimize, streamline, innovate and expand will be positioned to become the global industry leaders of tomorrow.

### Global outlook for growth of gross domestic product, 2013-2025



\* Europe includes all 27 current members of the European Union, as well as Iceland, Norway, and Switzerland.

\*\* Other advanced includes Canada, Israel, Korea, Australia, Taiwan, Hong Kong, Singapore, and New Zealand.

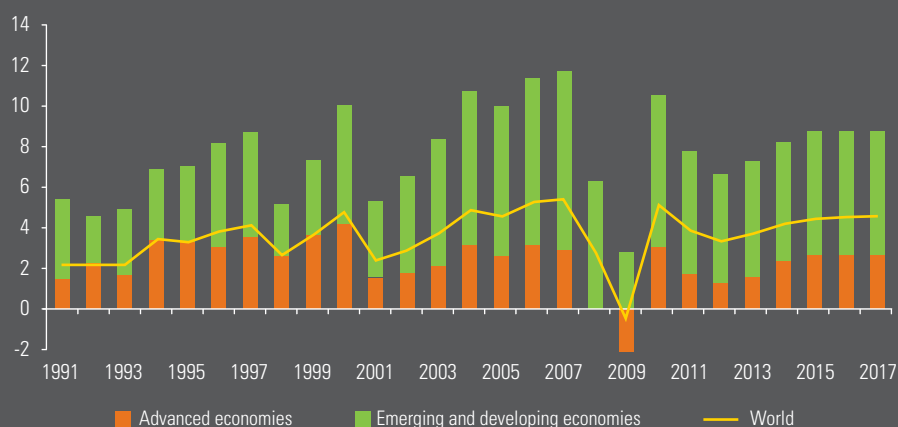
\*\*\* Southeast Europe includes Albania, Bosnia & Herzegovina, Croatia, Macedonia, Serbia & Montenegro, and Turkey.

Source: The Conference Board Global Economic Outlook 2013, January 2013 update

“A **portfolio approach** to capture the benefits and offset the risks inherent in different markets comes from **balancing geographic expansion**.”

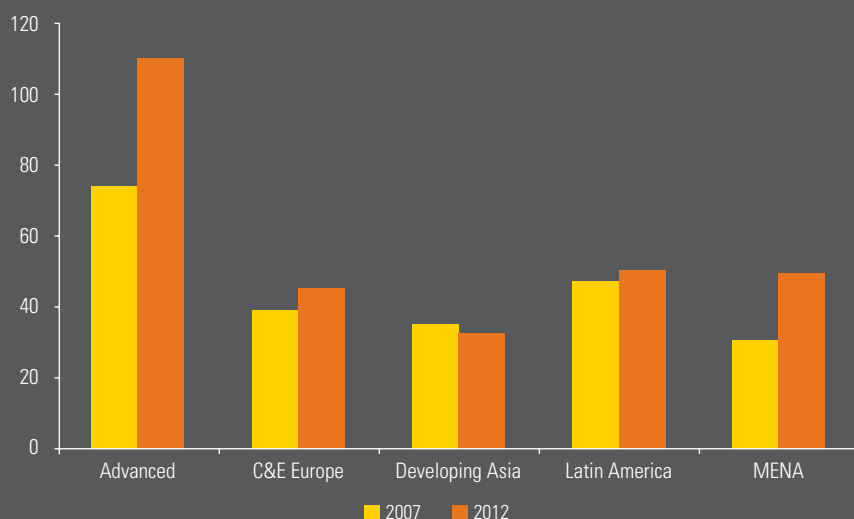


## Contributions to world GDP growth



Source: IMF, World Economic Database, 2012

## Gross government debt levels as percentage of GDP



Source: IMF, World Economic Database, 2012

“ Only those companies that take **bold**, strategic **actions** today to rationalize, optimize, streamline, innovate and expand will be positioned to become the **global industry leaders** of tomorrow. ”

## The macroeconomic landscape

If a number of chemical companies are risk averse, the reasons are clear to see. Economic recovery has been unexpectedly slow and remains uncertain. Many companies felt that 2012 would be a turnaround year, but global GDP growth hovered around 3 percent.<sup>10</sup> In addition, emerging market growth stagnated in 2012 and 2013 is unlikely to see a return to the high GDP growth rates experienced in the recent past.

According to the International Monetary Fund (IMF), global GNP will grow 3.8 percent in 2013.<sup>11</sup> US growth will average almost 3 percent and almost 6 percent in emerging markets. Activity in the euro area is expected to decline by 0.2 percent. The Conference Board forecasts an extended slow-down in emerging economies, with growth decreasing from 5.5 percent in 2012 to 5.0 percent in 2013<sup>12</sup>. This includes a decrease in China from 7.8 to 7.5 percent and in India from 5.5 to 4.7 percent.<sup>13</sup>

Although recovery appears to be established in the US, advanced economies are still suffering from balance sheet recessions, and that process will take several more years to repair. Emerging economies are

favored by longer-term drivers of growth such as demographics and proximity to strong markets, but they are not immune to problems faced by advanced economies or their own economic cycles. This volatility adds complexity – three years ago, not many people would have foreseen the GDP growth rate in Brazil dropping from 6% to 2%; nor the Middle East losing its feedstock advantage to the US.

In short, risks to global recovery remain firmly in place and clearly large parts of the chemical industry remain highly dependent on GDP. However, as we discuss in the next section, global chemical industry trends provide opportunities to remove an element of the global GDP link and establish successful business units (BUs) with a focus on growth and expansion. Indeed, many companies are already following this path. For example, BASF has identified 7 key segments (agriculture, construction, energy, nutrition, transportation, consumer goods and electronics) where chemical demand will outgrow the expansion in underlying customer industries<sup>14</sup>.

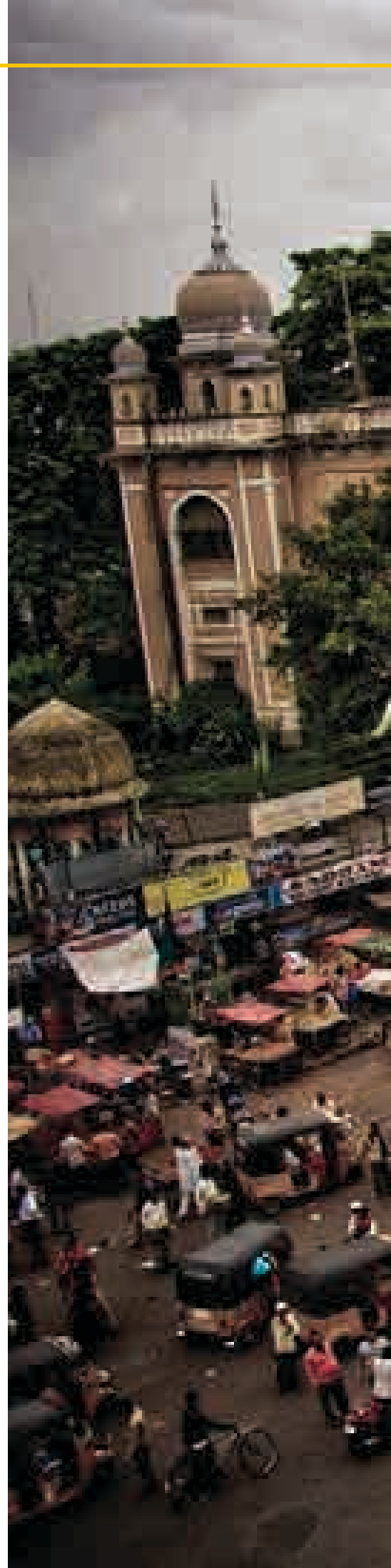
<sup>10</sup> *Global Economic Outlook, Outlook 2013, Update January 2013*, The Conference Board

<sup>11</sup> *Gradual Upturn in Global Growth During 2013*, IMF, January 2013

<sup>12</sup> Op. cit. *Global Economic Outlook, Outlook 2013, Update January 2013*

<sup>13</sup> Ibid.

<sup>14</sup> BASF strategy, November 2011





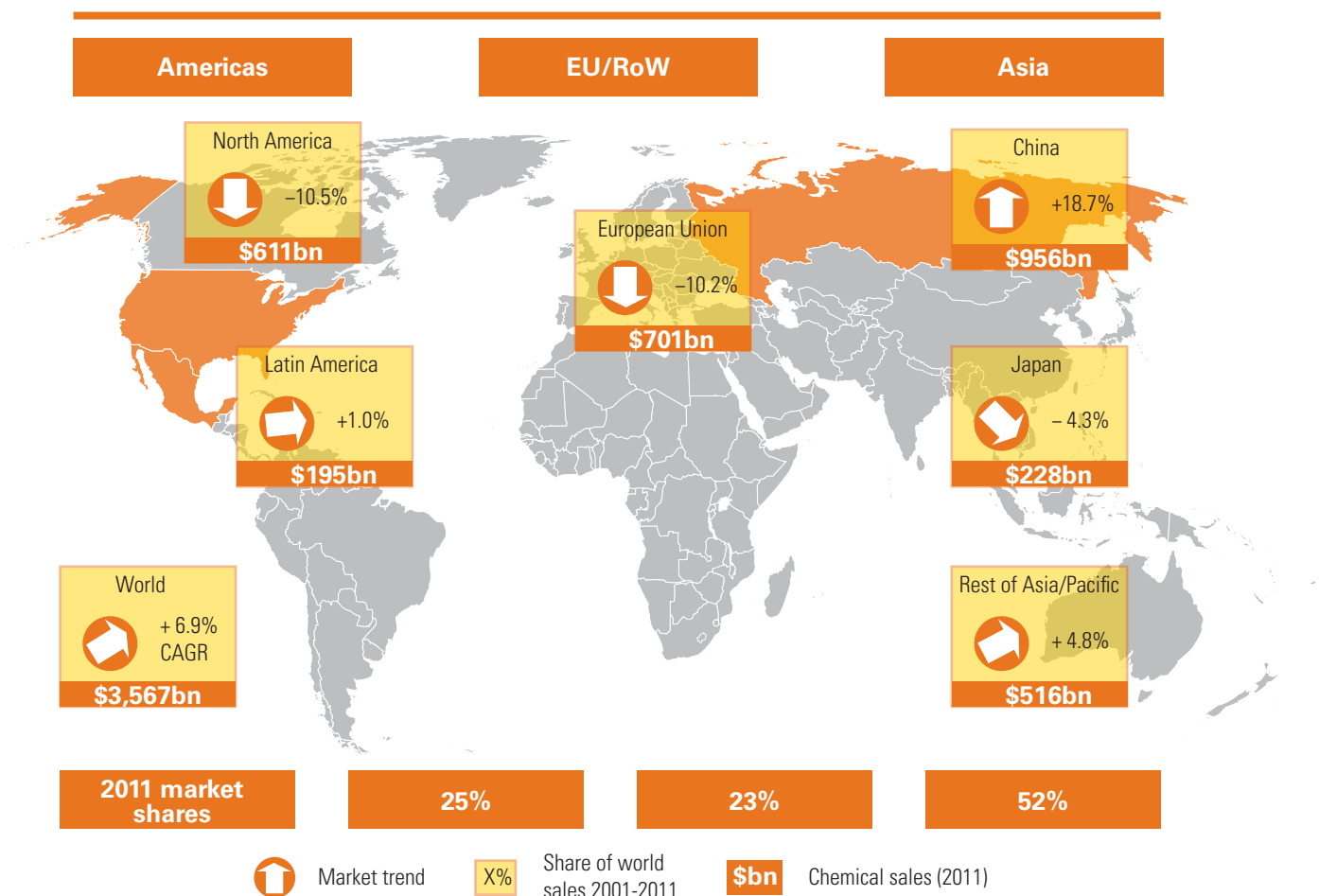




# **Strategic issues in the global chemical industry**

## Demand continues to move to emerging markets

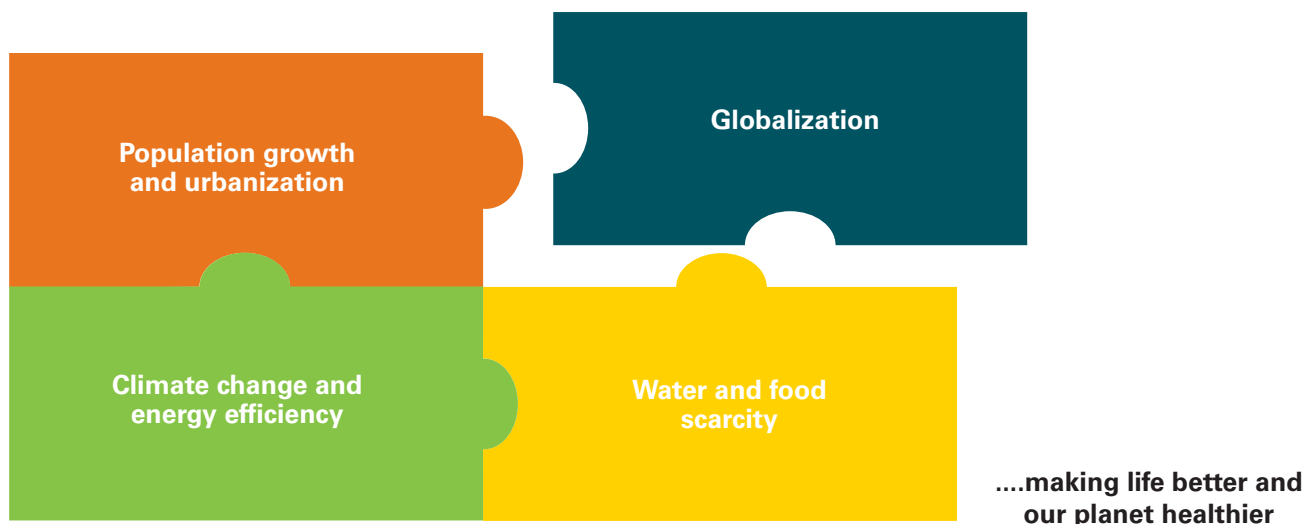
World chemicals sales by region



Source: CEFIC

## Global mega trends provide the focus for industry innovation

The chemical industry as enabler.....



Source: KPMG International, 2013

# Global mega trends continue to provide opportunity

**C**hemistry is widely recognized as a vital component of life. Water, food, plastic, fertilizer, sanitizers, the list is long and well regarded. However, when the words change to “the chemical industry,” the mindset changes yet the industry has a brighter future than it has ever had.

Indeed, the global industry is huge and growing. Global chemical output was valued at US\$171 billion in 1970; by 2011, it had grown to US\$3.6 trillion.<sup>15</sup> The Organisation for Economic Cooperation and Development (OECD) predicts that global chemical sales will grow about 3 percent per year to 2050, with growth rates for the BRIC countries more than double those of the OECD countries.<sup>16</sup> Forecasts developed by the American Chemistry Council (ACC) also predict significant growth in chemical production in developing countries in the period to 2021, and more modest growth in developed countries.<sup>17</sup> Consistent with previous trends, China is expected to have the highest annual growth rates in chemical production, exceeding 10 percent per year until 2015.<sup>18</sup>

This will only serve to drive the continued shift of the global chemical industry's demand base to the emerging markets as producers seek to follow their customer base and capitalize on population growth and a rising middle class. Indeed, the key markets for textiles have already moved to the East, with markets for plastics, agrochemicals, pharmaceuticals, construction materials and automotive components moving to China, India and other parts of Asia, in particular.

At the same time, those trends of a growing population and an industrializing world provide significant challenges, particularly with respect to food and water scarcity, climate change and the need for energy efficiency. The chemical industry has already made huge technological advances in these areas. Advances in seed technology and agrochemicals for crop protection have helped drive huge increases in crop yield per hectare of arable land. With respect to climate change, for every kilogram (kg) of CO<sub>2</sub> emitted by the chemical industry, the products it develops save in the region of 3 kg of CO<sub>2</sub> further down

the value chain. In the automotive sector specifically, the average car now contains in the region of 100kg of lightweight thermoplastics, which replace between 200 – 300 kg of traditional materials – cutting fuel consumption and minimizing environmental impact<sup>19</sup>.

These trends are not going away. Over the coming years, the need to deliver vital products and solutions will continue to provide new opportunities and new market segments for the chemical companies who can develop the products that make life better and our planet healthier. Indeed, today's chemical industry value chain is being re-shaped and re-defined by these trends as many companies re-invent themselves as science and technology or advanced materials manufacturers – focusing on high value specialty products and relentless downstream expansion. Even the emerging market chemical companies who initially established themselves as commodity chemical majors now have a thirst for IP and technology as they seek to capture the additional growth and margin that exists downstream.

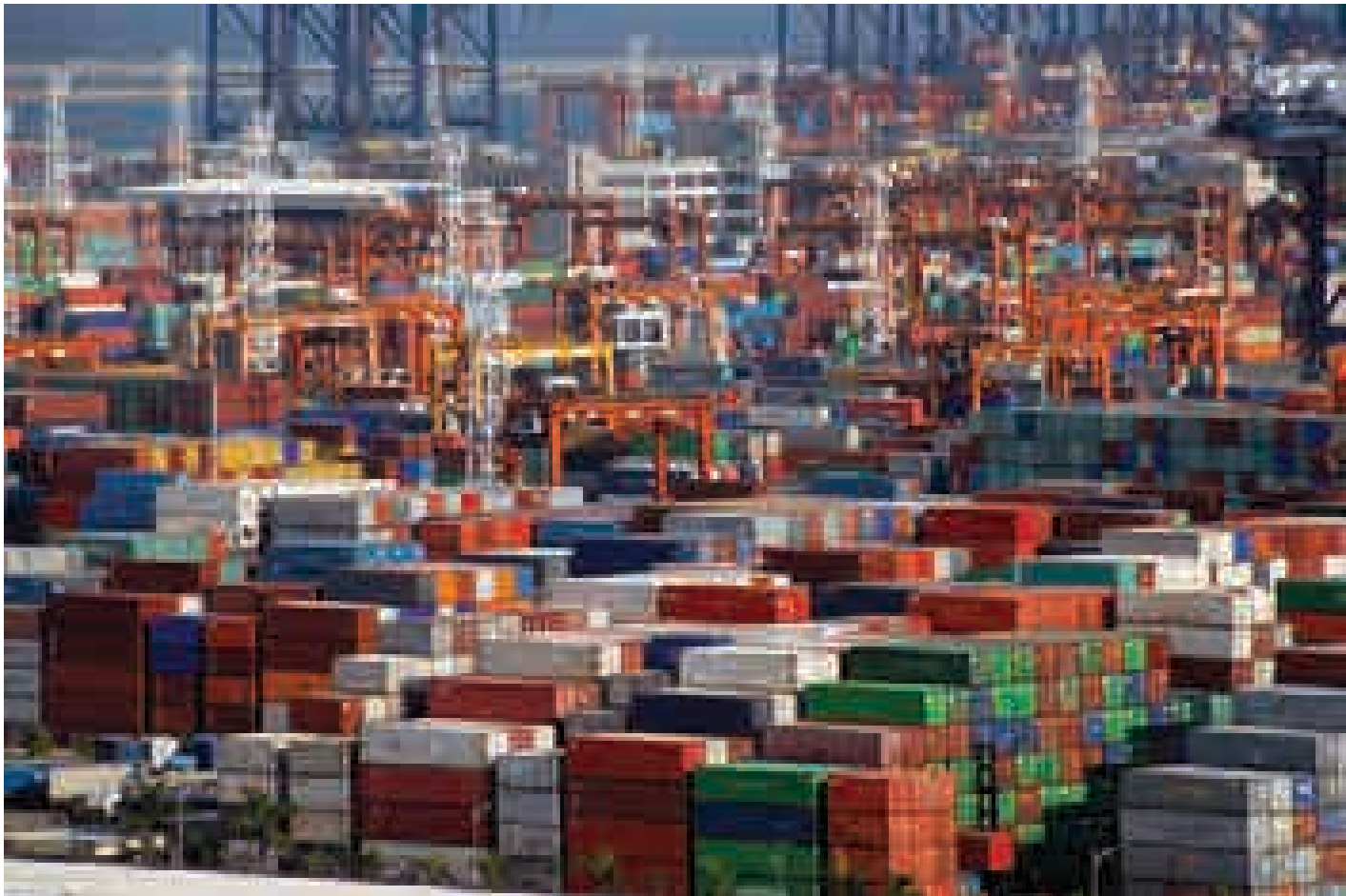
<sup>15</sup> *Facts and Figures Report*, CEFIC, 2012

<sup>16</sup> *OECD Environmental Outlook for the Chemicals Industry*, OECD, 2013

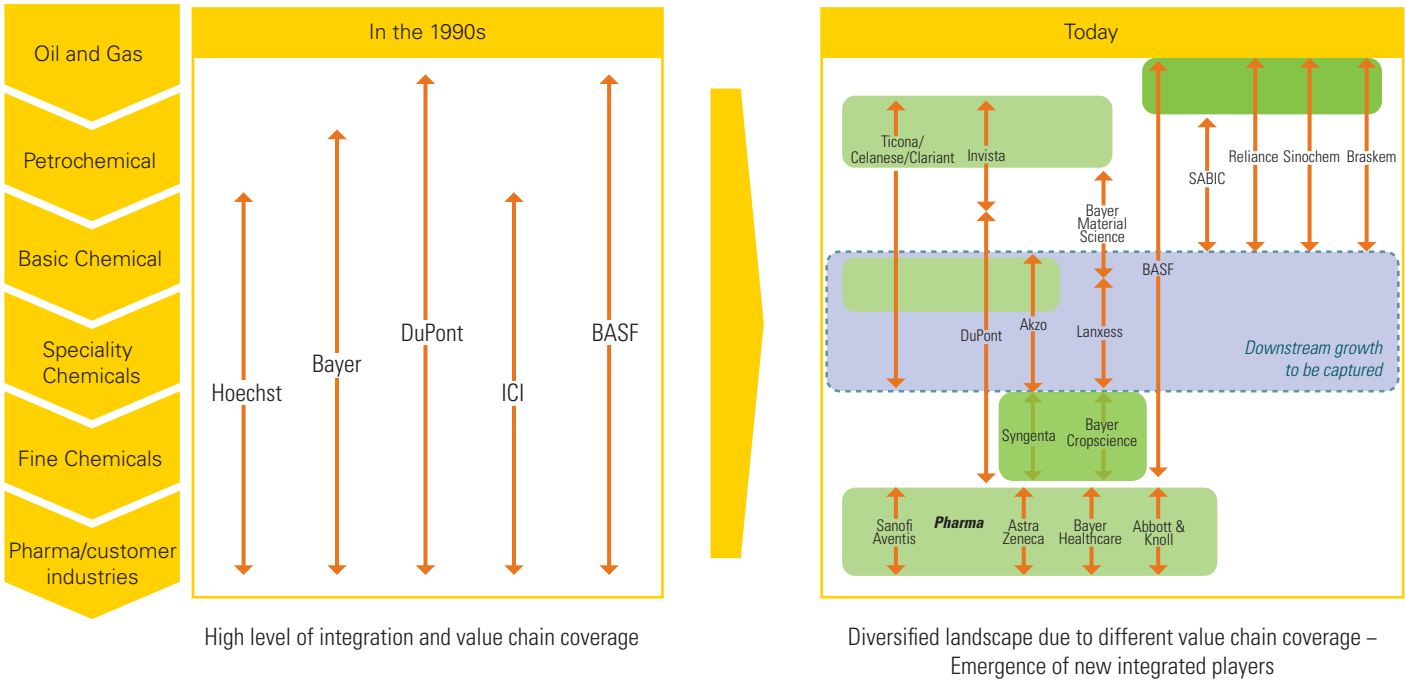
<sup>17</sup> *Mid-Year 2011 Situation & Outlook*, American Chemistry Council

<sup>18</sup> Op. cit. *OECD Environmental Outlook for the Chemicals Industry*

<sup>19</sup> *Transport: saving energy and improving safety*, APPE, 2013



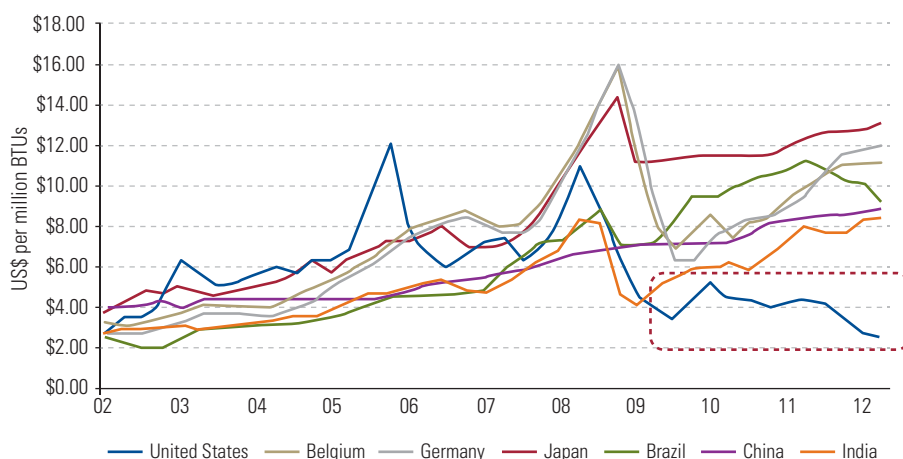
The changing shape of the industry value chain



Source: KPMG International, 2013

# Reinvigoration of the US: Supply moves West as demand moves East

## Impact of shale on US natural gas prices



Source: EIA, Petrobras, IMF, World Bank, various national statistical agencies

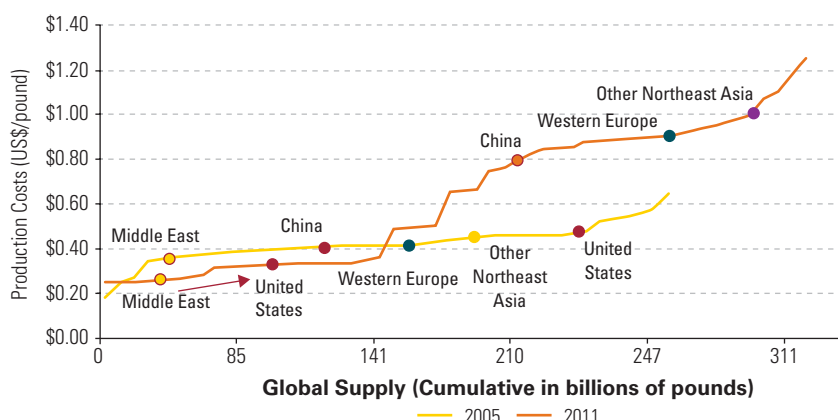
The single most important development for the US industry has been the development and commercialization of shale gas, enabled by the widespread use of hydraulic fracturing (fracking) and horizontal drilling. These extraction methods combined with the sheer abundance of proven shale reserves (200 years based

on current US demand outlook) have theoretically made the US industry the second most feedstock-advantaged region after the Middle East. However, as Middle Eastern countries continue to use more gas for domestic energy and fuel for water de-salination plants, gas allocations to the petrochemical industry have become extremely

“The single most important development for the US industry has been the development and commercialization of shale gas, enabled by the widespread use of hydraulic fracturing (fracking) and horizontal drilling.”

limited, such that we would argue the US is now the most advantaged location for petrochemical production worldwide and until the development of European and Asian shale (not likely before 2017), the US will continue to enjoy an enormous advantage.

## Shifting the global ethylene cost curve



Source: American Chemistry Council, 2012

The impact of US shale gas on the chemical industry is evident from the shift in the global ethylene cost curve (discussed in KPMG's paper entitled *The miracle of shale and the future of US chemicals*). Recent announcements from Dow, Shell, Sasol, ChevronPhillips and others suggest that we will likely see over 10 million tons of new ethylene capacity come on stream by 2017. The question is where that product is going to go.

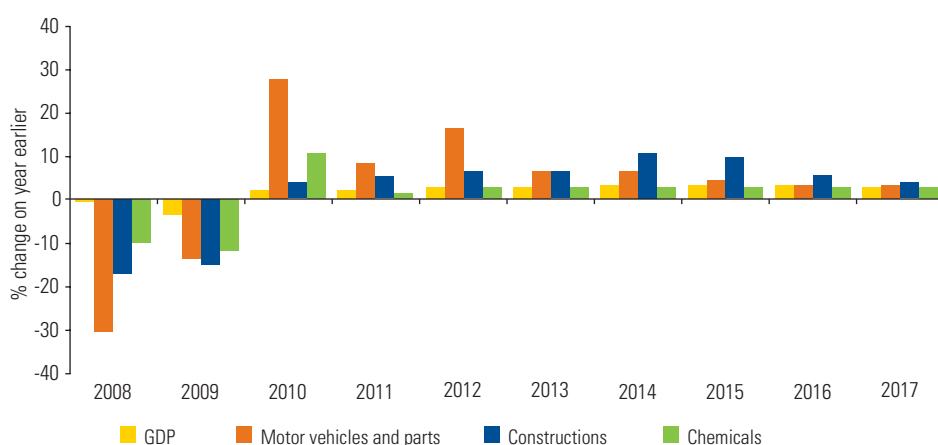
Undoubtedly, the US economy appears to be in a sustained phase of recovery,

with renewed strength in key industries such as automotive and construction. Cheap shale gas is also providing a boost to the wider US manufacturing base – providing competitively priced energy such that “Made in America” is becoming a cost competitive option once again, leading some multinationals to re-base their production activities in the US. Despite that, the US remains a mature economy which will not be able to absorb all of the planned chemical capacity. While companies have made

“Recent announcements from **Dow, Shell, Sasol, ChevronPhillips** and others suggest that we will likely see over **10 million tons of new ethylene capacity** come on stream by 2017.”

bold strategic announcements about the initial capacity expansions, we do not believe that in all cases there has been clear development of the business case with respect to where the ultimate markets for those products are going to be; nor how companies are going to get products to those markets while retaining the underlying production cost advantage. Significant investment in supply chains is required along with a focus on establishing a broader growth market presence.

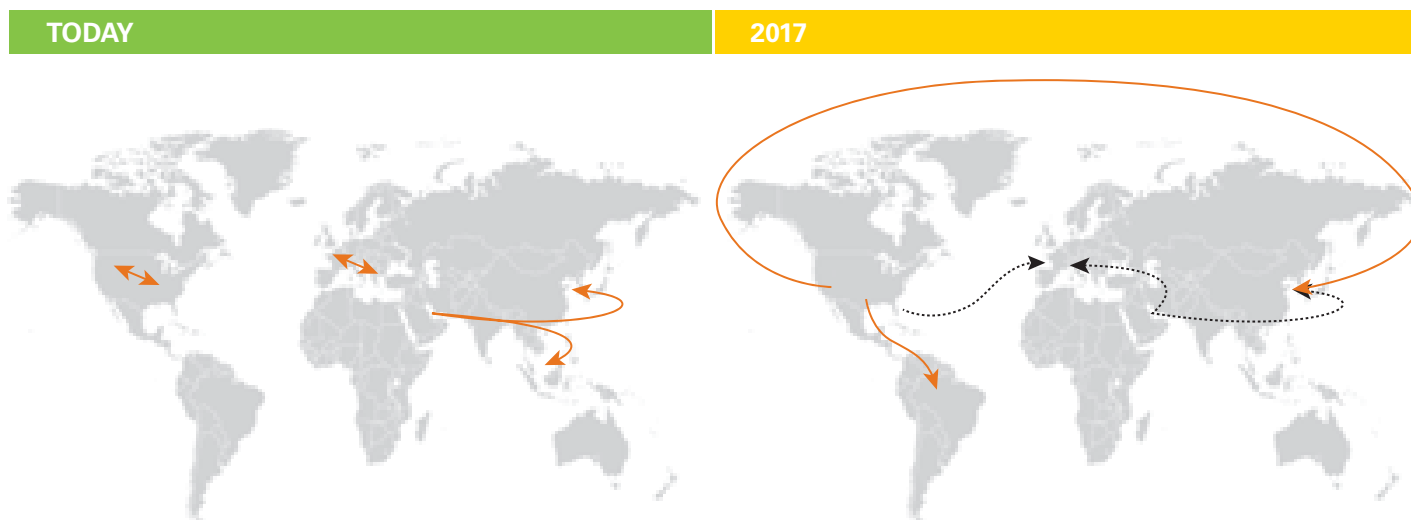
## Mature US economy unable to absorb planned capacity



Source: US Federal Reserve Board, American Chemistry Council



## Changing petrochemical trade flows because of shale gas



Source: KPMG International, 2012

As these dynamics play out over the next few years, the shale phenomenon is likely to fundamentally alter the established pattern of global petrochemical trade flows. We see three potential scenarios, which are not necessarily mutually exclusive:

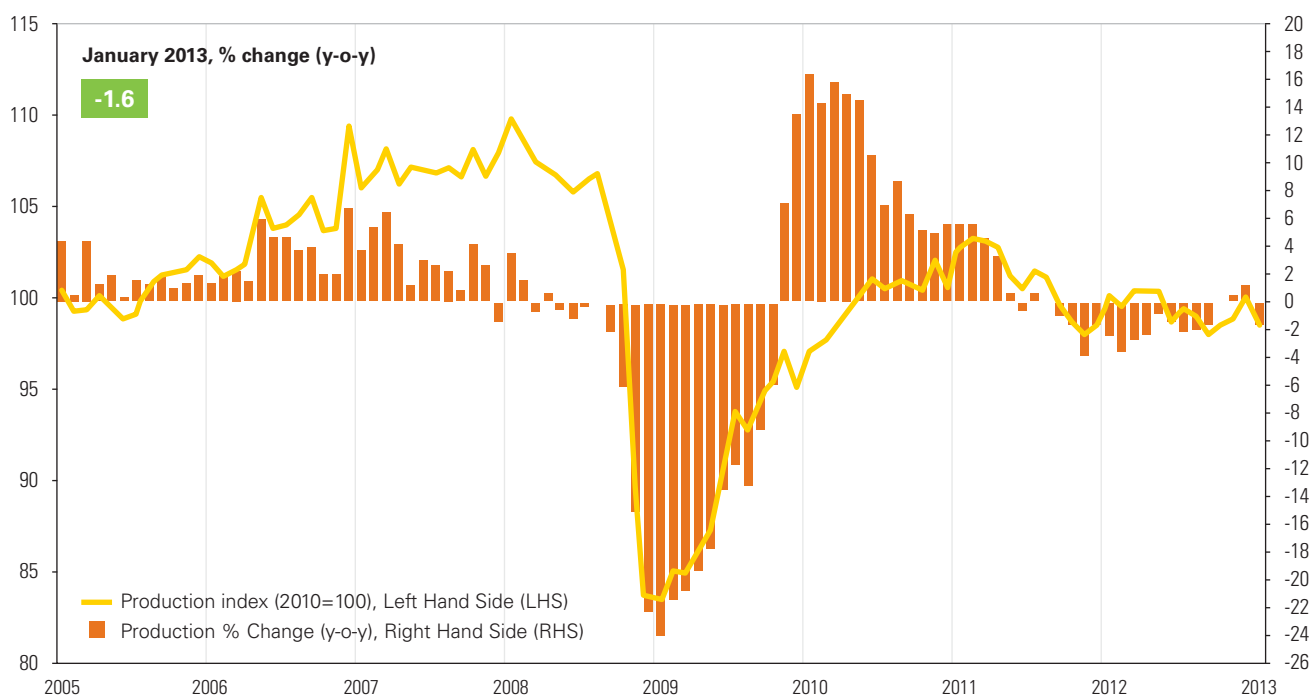
1. A return to boom and bust cyclicity in the US – the US commodity chemical industry is currently well rationalized – perhaps for the first time ever – with much of the historic cyclicity removed and commodity chemical businesses enjoying stable long-term returns. If US chemical companies are unwilling or unable to develop customers for their products outside of the US, we are likely to see the return of cyclicity, resulting in large margin swings through the cycle, the closure of old plants at the bottom of the cycle and all the other ills historically attributed to the commodity industry in the US.
2. Price and margin erosion in Asia – the Asian market is currently predominantly served by local product supplemented by vast imports from the Middle East. As US product starts to flow to Asian markets, we may see increased price competition – which may become increasingly fierce if some of the implications above have already started to affect the US market – making producers increasingly desperate to sell their product whatever the cost.
3. Doomsday for European petrochemical production – large parts of the European commodity chemical industry are characterized by over-capacity and older, less efficient plants. Should US producers export directly to Europe, or should Middle Eastern producers respond to increased competition in Asia by switching their export focus to Europe, many European commodity chemical producers will find themselves at a severe cost disadvantage, making it difficult for them to compete.

“ The **Asian market** is currently predominantly **served** by local product supplemented by vast **imports** from the **Middle East**. ”



# Challenges for Europe

## EU Chemicals\*: Production



Source: Cefic Chemdata international, \*Chemicals (excluding pharmaceuticals, New Nace Rev2. C20)

Overall, Western Europe continues to be afflicted by long-term structural issues, most of which have been widely documented such that there is no need to repeat them here. For the commodity chemical industry on the continent, there is also the specter of low cost competition resulting from the development of the shale based chemical industry in the US as discussed above. Indeed, many global chemical companies are focusing activities in their European business units on cost reduction, downsizing and rationalization.

However, all is not lost for the European chemical industry. Despite not showing any growth, the European Union (EU) remains a large market with 739 million consumers and a huge base of downstream manufacturing industry such that efficient chemical producers with differentiated products are still able to make reasonable returns. There is also something of an East/West divide. Too often, chemical companies are quick to relegate Europe as a whole to the bottom of their list of destinations for investment capital – a strategy which

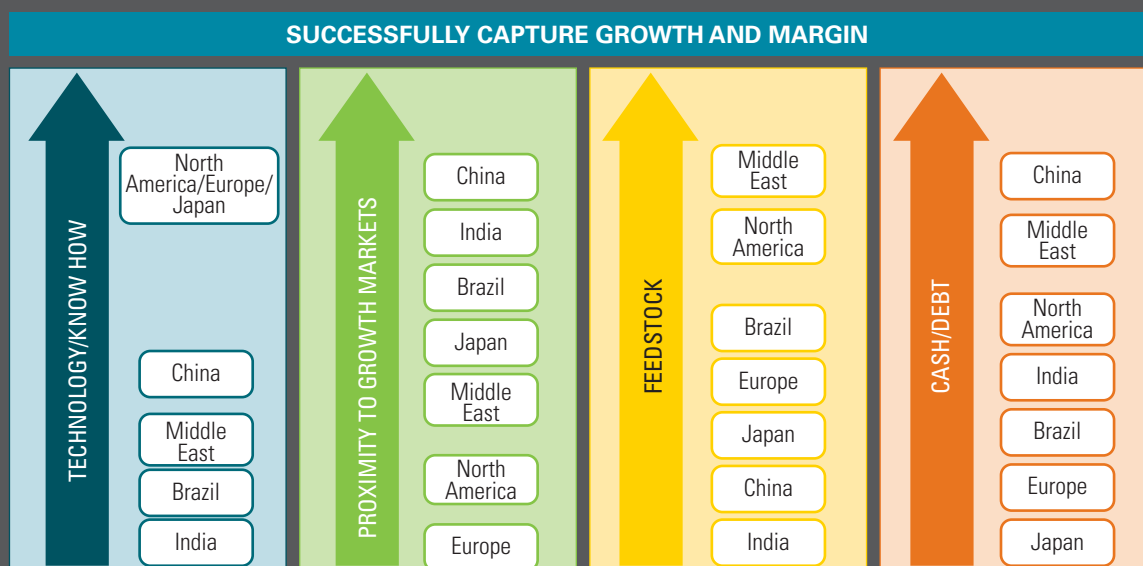
neglects the growth to be found in Eastern Europe and a number of the CIS countries, particularly in segments such as automotive where OEMs continue to move their manufacturing base to low cost Eastern European countries.

Europe also remains home to some of the most advanced IP and technology within the global chemical industry. Long-term success for European chemical companies is dependent on investing in and retaining this technological advantage, while leveraging it as an asset to provide access to growth in

emerging markets. We believe more care needs to be taken over the decision to license technology – particularly where alternative arrangements may offer better long-term returns. Establishing joint ventures (JVs) with emerging market competitors may be time consuming and there are plenty of examples of JVs gone wrong, but in a chemical industry

where emerging market companies have things that the Europeans do not have – an abundance of cash and ready access to high growth markets – there seems to be a clear opportunity for the European companies to better utilize the one thing they have that the emerging companies need – technology – in order to level the playing field.

## Leveraging strengths for mutual benefit



Source: KPMG International, 2013

Finally, there needs to be a rational debate about the development of shale gas in Europe and we call on the chemical industry to lead this. While certain countries, including France, appear to have indefinitely ruled out fracking, the UK is making strides to develop its shale resources. Large deposits exist elsewhere – Germany and Poland in particular – and while the gas pipeline infrastructure is nowhere near as developed as the UK or the US, there undoubtedly exists the potential to unlock a cheap supply of energy and

feedstock. Experience in the US over the last few years has already shown what this could mean for the chemical industry.

“Many global **chemical companies** are **focusing** activities in their **European** business units on **cost reduction, downsizing** and **rationalization**.”

# Lost direction in emerging markets

**W**e discussed earlier the importance of emerging countries as the future markets for chemical industry products, based mainly on their rapidly growing and rapidly developing populations and what that means for demand for an array of products across the spectrum of nutrition, automotive, consumer goods and construction.

Despite this emerging market growth trend being well established, we believe there has been a loss of focus, both from established market chemical companies and by emerging market companies themselves.

Established market chemical companies appear to have slowed the pace of emerging market development. In fact, in a recent KPMG survey, 30% of industry executives surveyed said they did not currently have an emerging market strategy. For those that do, there is an over-dependence on China. While we do not question that a China strategy should be close to the top of any chemical executives' issues list – even with recent cooling, 7.5% compound GDP growth is higher than almost anywhere else on the planet – there is an obvious danger of relying solely on one market for growth, particularly when unforeseen changes in government policy can have a large, direct impact on economic activity.

Failure to develop a wider emerging market strategy also results in companies missing many of the benefits available elsewhere. We see a broad array of countries in the next wave of chemical industry growth as their economies develop along a similar growth path to that of the BRIC countries over the last twenty years. Hotspots for chemical industry growth are likely to include Eastern Europe (discussed above), Vietnam – which has overtaken China as the low cost manufacturing base in Asia – Indonesia – with a potential market of more than 200 million consumers – Thailand, Malaysia and the Philippines.

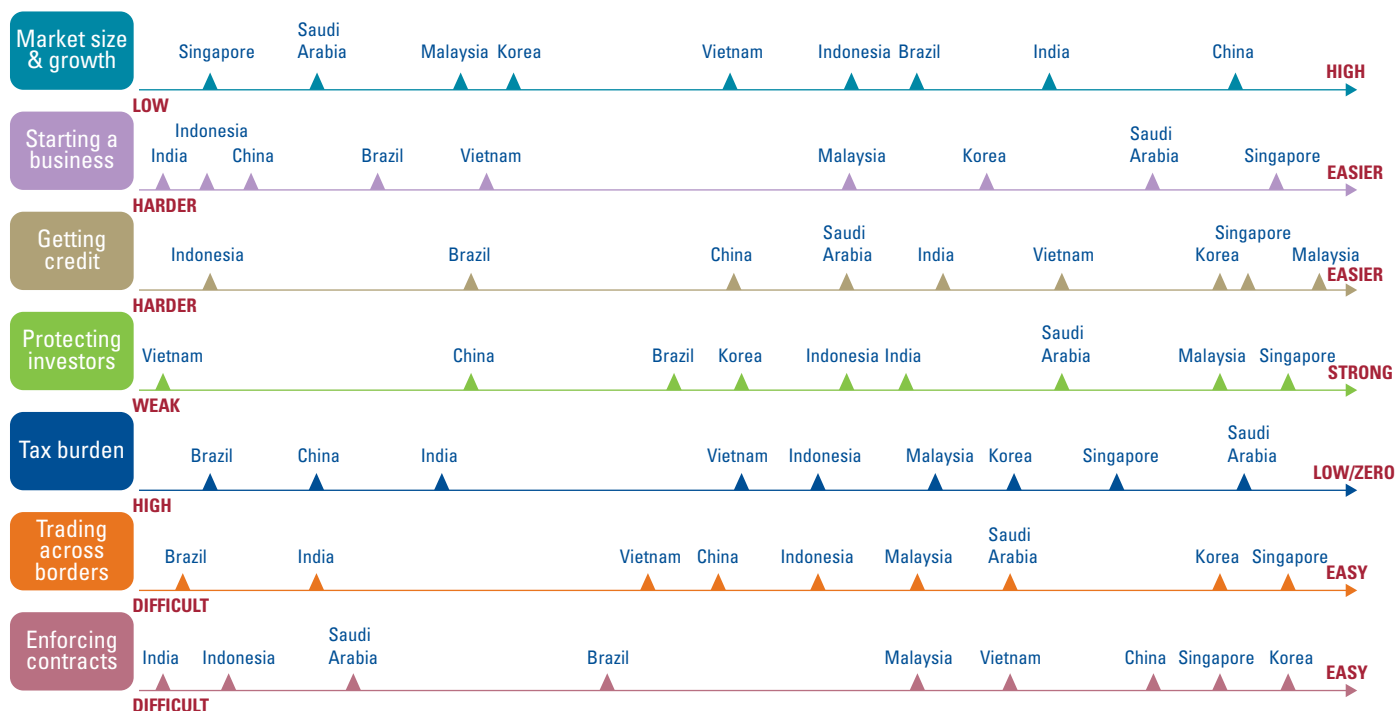
While global chemical companies have undoubtedly failed to capitalize on the advantages offered by these markets, they cannot be entirely blamed for the slow pace of development. Barriers to business remain rife in a number of countries including poor infrastructure, the ability to enforce contracts, the rule of law (particularly in respect of anti-bribery practices), and the opacity of ownership structures all of which make it difficult for established market companies to invest. There is a challenge for the respective governments to focus on establishing laws and regulations that provide a more attractive investment landscape to foster chemical industry growth as a base for wider industrial

development. Even in more established emerging markets such as India and Brazil, recent regulatory change, particularly in the areas of tax and duties are hindering chemical industry investment and growth.

For emerging market chemical companies themselves, there has also been a pause in development. For much of the last twenty years, their strategies were an almost unmitigated success as many of them became established as global power-houses in the commodity chemical sector – rising rapidly up the league tables of the world's largest chemical companies as measured by revenue. However, despite a concerted effort to develop downstream chemical production in the Middle East (discussed in KPMG's 2011 paper entitled *The GCC in 2020: Downstream expansion of the Middle East chemical industry*) and despite specific downstream policy pronouncements in the Chinese government's latest five-year plan, there has been a paucity of development in this area such that it is the established market chemical producers who continue to dominate production in higher value specialty chemical areas.

Undoubtedly, R&D efforts have been boosted but this does not provide a realistic method for catching up with an industry that has been developing

## A portfolio approach to emerging market development



Source: KPMG International, 2013

for over 100 years in places like Europe, the US and Japan. M&A offers the quickest route to closing the gap but with a few notable exceptions – the largest being SABIC's acquisition of GE Plastics, now 6 years past – there have been very few examples of emerging market chemical companies stepping out of their established boundaries and using M&A to further their strategic objectives of developing downstream. Cultural issues continue to inhibit deal activity. Emerging market companies, particularly those with an element of government ownership, find it hard to obtain the necessary approvals to enable them to move quickly enough in a deal environment, while none have yet been able to balance the requisite

acquisition of technology with the associated perceived disadvantage of holding assets in low-growth, established markets.

Aligning the critical elements along the supply chain from feedstock through technology and process know-how to end customer demand offers a winning formula. No one business, country or region is currently holding all of the cards and to the extent developed market producers continue to take a cautious approach to emerging market expansion; while emerging market companies fail to build a technology base, billions of dollars of globalization efficiencies are being lost.

“ Failure to **develop** a **wider emerging market strategy** also results in companies **missing** many of the **benefits** available elsewhere. ”



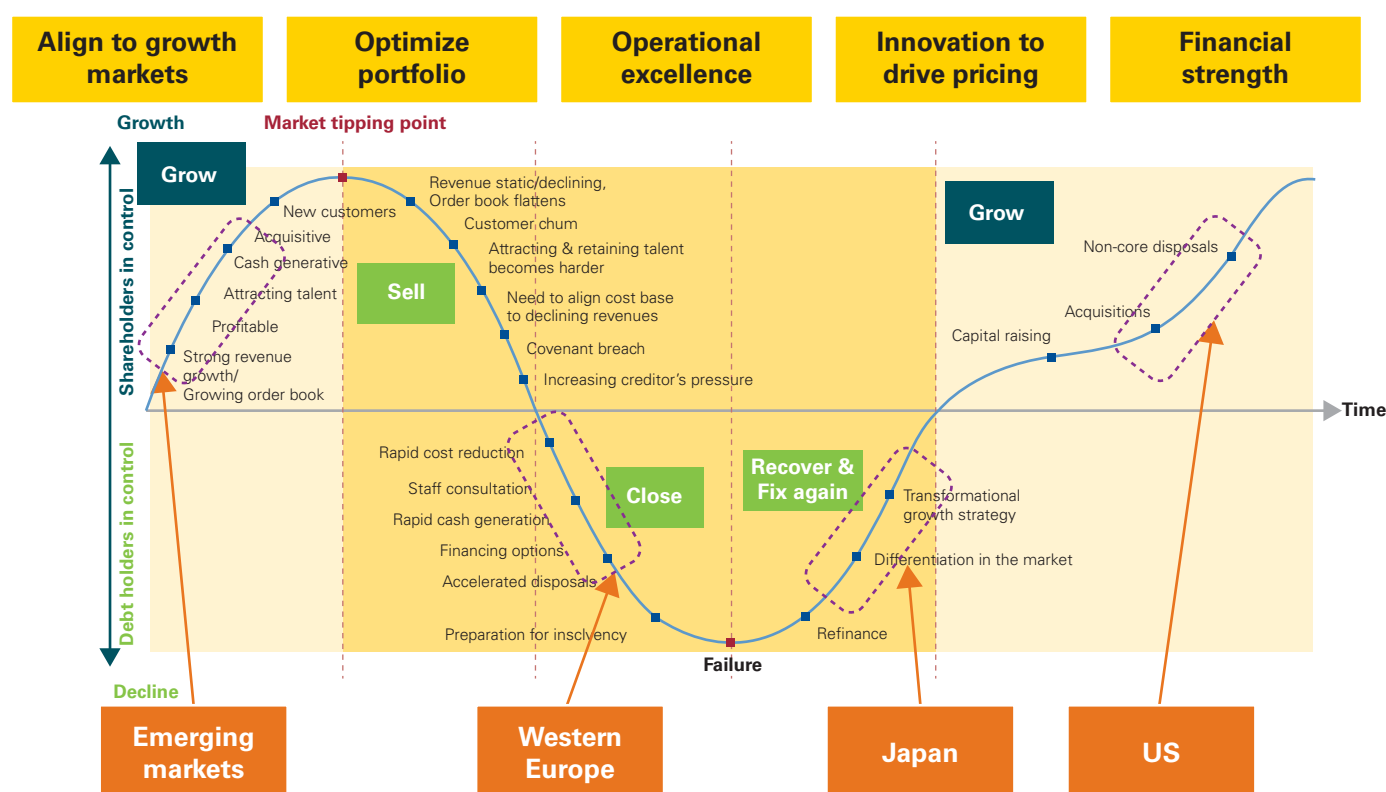


# Five strategic actions for success

The majority of large chemical companies are global such that the opportunities and challenges in the different regions of the world, discussed above, are not discrete – chemical company executives need to build all of these into their global business strategy, such that running a global chemical company in today's world is extremely challenging.

However, we believe the pace of change within the industry has slowed inexorably since 2009-10, when the focus on survival was driving activity. To successfully capture the advantages and offset the disadvantages inherent in today's chemical world, we believe companies need to base their immediate and long-term strategies on the following initiatives:

## Running a global chemical company is a challenge



Source: KPMG Analysis, 2012



## Align to growth markets

A large number of large chemical companies have been successful at establishing an emerging market footprint over the last twenty years. DuPont, for example, now earns approximately 30% of its total global revenue in fast growing markets, while BASF has over 25 subsidiaries in Greater China. For others, however, the pace of investment has been much slower – a glance at the annual reports of many chemical companies will reveal a clear under-exposure to emerging markets. Often, this results from a lack of clear strategy, or inherent phobia about emerging markets – where companies use concerns about local market issues such as potential Foreign Corrupt Practices Act (FCPA) violations or repatriation of cash as an

excuse to defer investment. In other instances, even where the will to invest is strong, a lack of experience has de-railed companies from fulfilling their emerging market expansion goals. Too often, we see companies wasting huge amounts of management time and not progressing investment plans (be it M&A or greenfield investment) to completion because they have failed to understand the cultural dynamics and have not accessed the decision makers on the other side of processes.

A similar lack of experience and inherent caution is preventing emerging market chemical companies from achieving their development goals. The emerging markets will be the chemical markets of the next fifty years but we believe

too many companies are prevaricating or playing it safe. Companies in both established and emerging markets need to get better at building partnerships that align their respective strengths while off-setting their respective weaknesses for a genuine win/win that will drive value and development for the global chemical industry. That will allow established market companies to align themselves to growth markets in terms of application, industry and business type, with particular emphasis on establishing a broad geographical footprint in high-growth areas; while also allowing emerging market chemical companies to access the technology and know-how they require to move themselves up the value chain.



## Optimize portfolios

Companies need to take a hard, realistic look at businesses and products, deciding whether to hold, fix or divest according to strategic goals. Dow Chemical is planning to divest non-core businesses totalling more than US\$1 billion over the next few years; Solvay and INEOS have recently announced a JV for their European PVC assets, but more needs to be done.<sup>20</sup>

Too many companies have developed deep, historical attachments to legacy business units (BUs) and continually defer decisions to divest despite the fact that they are clearly non-core. Holding onto such BUs provides a drag on management time, drives cost and erodes differentiation. Companies at

the other end of the spectrum have been too quick to bring non-performing assets to market and have been disappointed by either a lack of buyer interest or low valuation multiples.

We believe companies need to take a more aggressive view of their entire portfolios and categorize BUs as either 'hold, fix or divest'. Where the decision is to fix, there needs to be a clear focus on strategic value improvement – using clear financial and organisational baselines and an analytical numbers driven approach to drive improvement across the holistic breadth of the BU, including procurement, logistics, supply chain, manufacturing, R&D and finance and control. For BUs to be divested,

the key to maximizing value on disposal is taking time to prepare for sale. Fix underlying performance issues before bringing assets to market, undertake robust financial and operational carve outs to disentangle businesses, and have a clear view of both the value proposition of the business and the likely bidder community – recognizing that the value proposition may be different for different bidders.

<sup>20</sup> Wall Street Journal, March 14, 2013



**“ Complexity masks underlying business performance making it hard to make informed business decisions. ”**

## Reduce business model complexity

Most global chemical companies have grown up over many years through a combination of organic growth and acquisition. Some companies in the industry excel at integrating and simplifying structures. Others have become increasingly complex as they have grown – from bloated central structures which confuse and complicate; to multiple ERP systems which limit the ability to extract quality Business Intelligence (BI); to complicated internal cross-selling and cross-charging, which

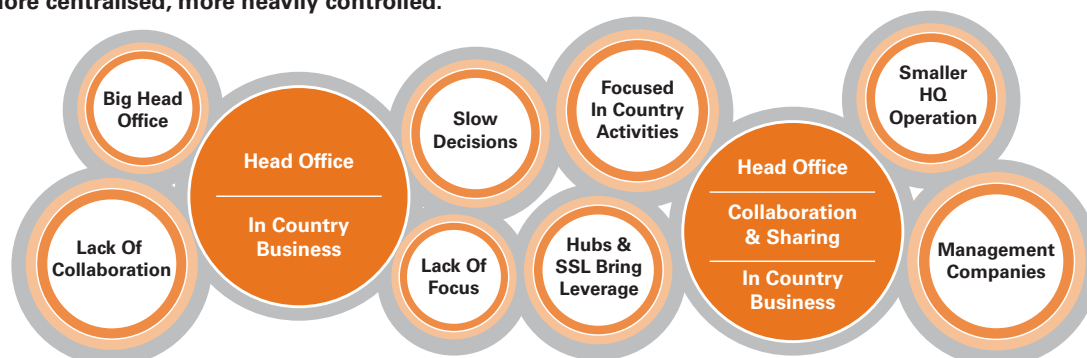
mask underlying business performance. With these and other issues, many executives are finding it hard to make informed business decisions. While in the 1990s and early 2000's, heavy integration was the preferred model, it is no longer helpful as it reduces flexibility – a critical failing in a world where the issues in the external world are driving huge complexity and rapid change.

Solvay has recently announced a plan to decentralize and simplify the company's

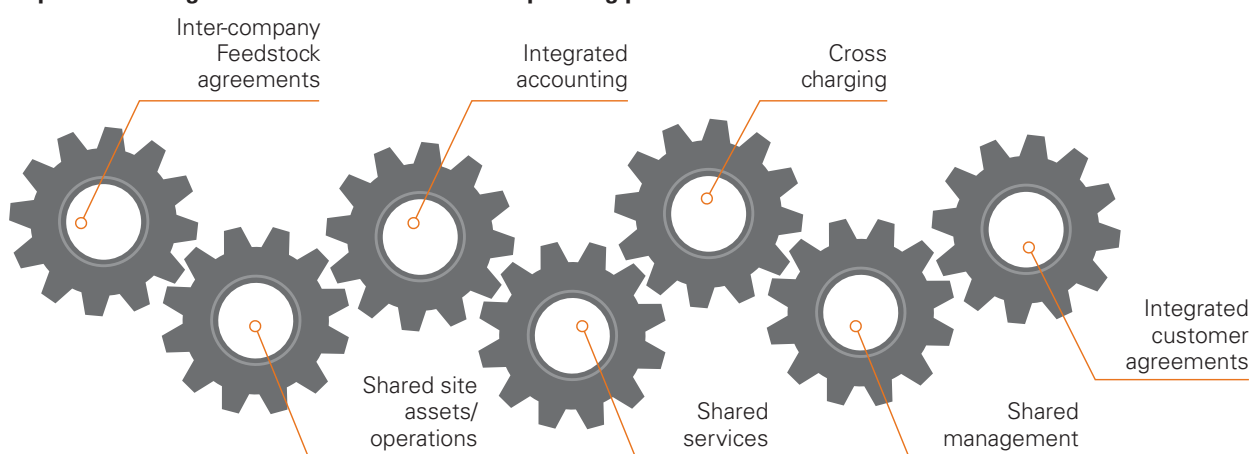
structure, while Dow has announced plans to decentralize decision making taking it closer to the customer. More companies need to deliver a clear focus on flexibility to simplify and remove unnecessary complexity from their operations. With sufficient flexibility, management can navigate macro-economic and business trends while responding to changing customer demands.

## The pains of centralized structures

Flexibility is vital in today's volatile markets. Many businesses have invested heavily to be more integrated, more centralised, more heavily controlled.



Interdependencies and a lack of stand alone functionality create problems when a business is seeking to shift its portfolio and get a clear view on individual operating performance.



Source: KPMG International, 2013

## Innovate to drive competitive pricing and new product entry

Innovation is the platform that has driven the chemical industry throughout its entire history. As humanity faces huge global issues including feeding a growing population and responding to climate change, it is the products provided by the chemical industry that are now, and will continue to be the solutions. With these trends in place, we have seen many established market chemical companies over the last ten years drive an increased focus on science and technology applications, moving ever further towards the specialty end of the value chain.

In 2012, DuPont had a record number of new product introductions. At DSM, sales from new products and applications introduced in the last five years accounted for 18 percent of total sales – a value of €1,644 million. By 2015, DSM wants innovative products and solutions to account for 20 percent of its total

sales. Many forward-thinking chemical companies already have local-market specific R&D centres in places like India and China – although a few still cling to the problems of IP protection as an excuse not to take such a step. With so many other critical challenges facing chemical company executives, it is important that a clear focus on R&D remains central to the fabric of the organization.

For many emerging market chemical companies, innovation still remains an aspiration. Overall, the IP base in the emerging chemical markets remains low, with a reliance on established market companies to either supply the product or to supply the technology via a license. Often the technology licensed will not be the most cutting-edge and even then, we find many examples of emerging market companies not getting the technology to work effectively or efficiently as they

do not have the requisite operating expertise. If emerging market chemical companies are serious about developing their operations downstream, now is the time to take serious steps to bring that to fruition.

The technology they require exists within established market chemical companies. Negotiating JVs which incorporate an element of technology transfer provides an optimal route to doing this. Where they can't find a willing partner, then outright acquisition needs to be the model. Emerging market companies need to conquer their fear of holding assets in western markets. In such situations, careful integration holds the key to success – integrating not just the assets and the processes, but the people so that the innovation culture is preserved and protected allowing osmosis of leading practices into their existing businesses.

Open	838.63
High	856.45
Low	836.23
Close	845.12
on Close (50)	NA
on Close (100)	NA
on Close (200)	NA



## Optimize financial strength

At 31 December 2012, the largest 30 chemical companies (by revenue) had combined cash reserves of \$59.9 billion. Initially, balance sheets were strengthened through 2009-10 when companies were focused on liberating cash from operations to help ensure their survival. More recently,

cash generation has been the happy consequence of the return to economic growth and the impact of improved profitability resulting from cheap feedstock and energy in the US.

As a result, many chemical companies have taken their eyes off the ball with respect to tight control of all aspects

of the cash cycle which was prevalent just a few years ago. In total, analysis suggests that returning third and fourth quartile performers among the world's 50 largest chemical companies to median cash performance would liberate \$24.9 billion for growth and expansion.

We see four pillars of working capital efficiency being challenging strategic parameters and decisions that drive structural working capital; changing operating cash cycles and how policies, procedures, people and systems can improve cash performance; releasing trapped cash (e.g. from treasury, tax and other areas) to cleanse the balance sheet; and embedding a cultural foundation for sustainable cash flow improvement. The industry was extremely successful at the first three of these during the downturn. It is time to re-focus and this time; ensure that improvements stick for the long-term.

In addition, we see too many companies in a state of inertia, returning the cash they do have to shareholders for lack of a clear strategy. Using that cash to tackle the issues we describe above would provide shareholders with a far greater long term return and would help companies position themselves strategically for the challenges that lay ahead.

“ Achieving median cash performance could **unlock USD \$24.9 billion** for growth and expansion. ”





# Conclusion

**T**he global chemical industry has been exceptionally successful over a long period of time at leveraging its core competencies to drive growth and development. Never was this more in evidence than during the dark days of 2009-10 when the industry took huge strategic steps to ensure its long term survival.

However, with the return of growth, contradicted by recurring economic uncertainties and the shale boom in the US which has driven cash generation, many global chemical companies find themselves in a state of paralysis – driven either by uncertainty or over-confidence. Meanwhile, the global chemical industry continues to experience dynamic change driven by complex macro-economic and macro-global issues.

We believe the time has come for global chemical companies to drive a renewed focus on core competencies of aligning to growth markets, optimizing portfolios, reducing business model complexity, innovating to drive margin and pricing, and optimizing financial strength. Successful delivery across these five strategic platforms will optimally position global chemical companies for the future.





# KPMG in the industry

In this feature, we update you on some of the ways member firms have been involved in the industry since the last edition of Reaction. It has been a busy few months for our Global Chemicals & Performance Technologies team as we stay embedded in the heart of the industry.



## Chemicals Market in Africa Workshop

KPMG in Germany recently co-sponsored the German Chemical Association's (VCI) full-day workshop on the Chemicals Market in Africa. Nick Matthews, Head of M&A in South Africa spoke on industry trends and the key to doing successful M&A deals in Africa.

Vir Lakshman, Chemicals and Pharmaceuticals Sector Head in Germany moderated a lively discussion with an experienced panel from BASF, Bayer CropScience, Boehringer Ingelheim and Merck KGaA who shared their experiences of doing business in Africa.



## Chemical Business Association

### CBA Lunch

KPMG in the UK recently hosted a table at the CBA's Annual Luncheon in London this past April, the biggest chemical industry event in the UK was attended by over 1,000 industry members and their guests.



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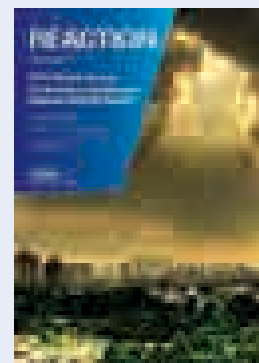
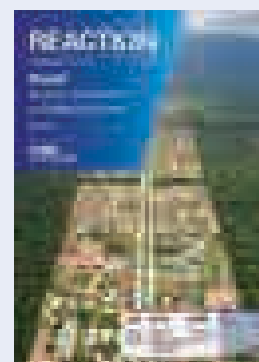
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Designed by Evalueserve.

Publication name: Reaction Magazine – Eleventh Edition

Publication number: 130330

Publication date: July 2013

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