

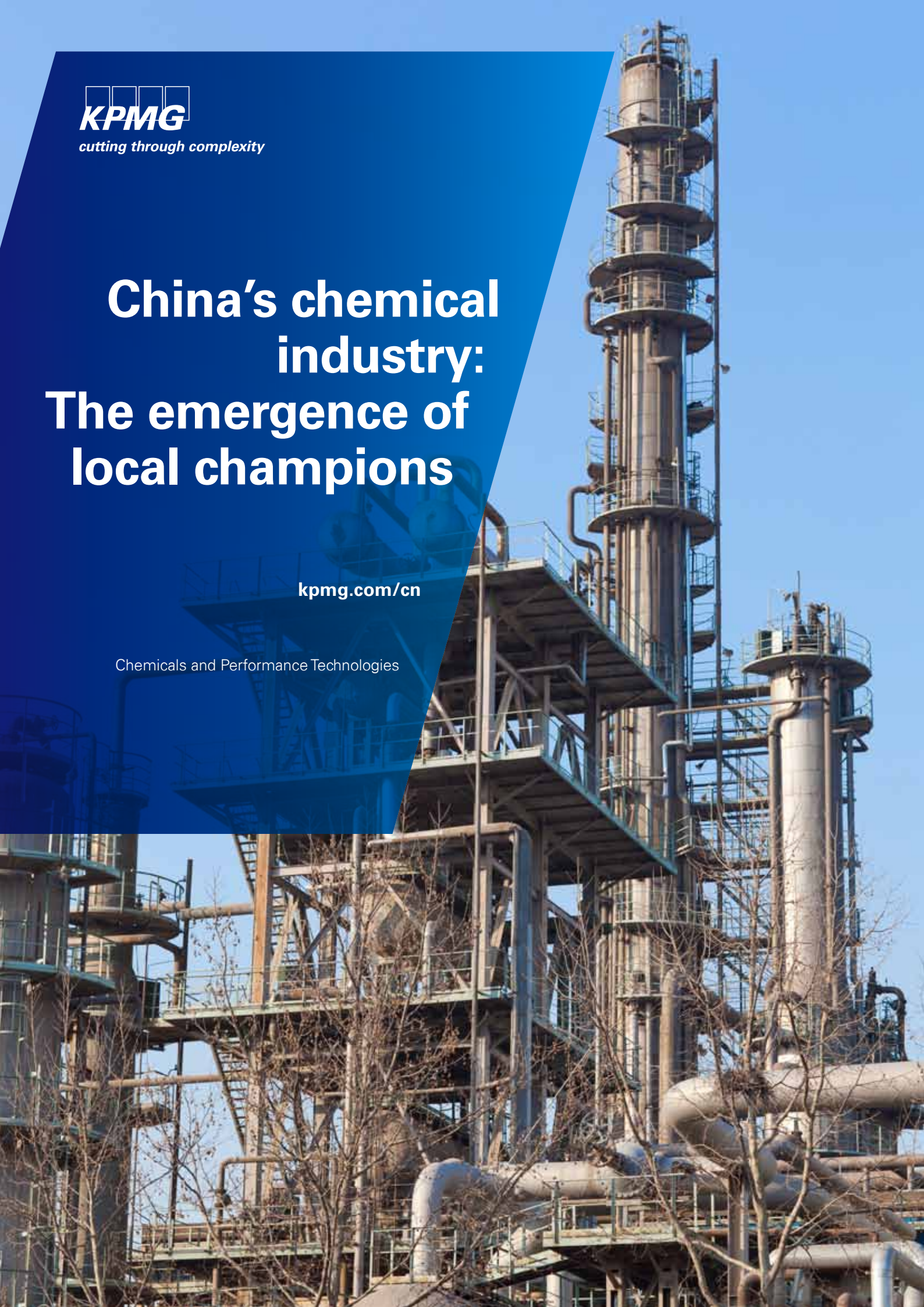


cutting through complexity

China's chemical industry: The emergence of local champions

kpmg.com/cn

Chemicals and Performance Technologies



A photograph of an industrial facility, likely a gas processing plant, featuring a long row of large, vertical, grey metal pipes. Each pipe is equipped with a prominent, bright red handwheel valve. The pipes are set against a background of green grass and a clear blue sky. A semi-transparent red and blue graphic overlay is positioned in the upper left and center of the image, framing the title text.

Executive Summary

China has entered a unique stage of development. Economic growth is slowing down, but in a controlled fashion, with the country now heading down a more sustainable path. This is the 'new normal', an age where China's growth rate will be modest and a more mature economy will reorient itself away from an investment-led model to one that focuses on consumption and services.

But how will a slower growth rate — around 7 percent on average — impact the domestic and global chemical industry?¹ According to KPMG's analysis, this stable pace, along with steady urbanisation and infrastructure plans, ambitious sustainability targets, and a large Chinese middle class driving demand for consumer, auto, IT and electronic products will provide ample growth opportunities. This will enable the chemical industry in China to grow by between 9 and 11 percent in the period 2013-2015.

In this report, we attempt to examine the nature and unique character of Chinese chemical companies — not by looking at the powerful state-owned enterprises (SOEs) that have made their mark internationally, but by focusing on the more low profile, yet incredibly strong, players in the industry. These 'local champions', both state-owned and private, are influential, have large economies of scale, can innovate and upgrade, and harbour aggressive overseas ambitions.

The nature and characteristics of Chinese companies have changed dramatically over the years. Historical data and development trends of top domestic enterprises reveal certain unique traits. KPMG's evaluation indicates three distinguishing features that have enabled some companies to emerge as formidable competitors in a complex, globalised environment. These traits include: gigantic scales of operations and extensive product portfolios; technological innovation; and improved quality and branding.

Along with setting up mega production bases and expanding their product range in an integrated manner, Chinese companies have begun to innovate and are swiftly incorporating technological changes into their production processes. Enterprises have also shifted their priority from production to brand management and are in the process of internationalising their businesses. A number of companies are keenly promoting their brands in the global market and are continuing to examine overseas investments and acquisitions.

In fact, it can be said that overseas investments have now reached a turning point. Earlier, large Chinese petrochemical companies showed a tendency to be audacious, targeting big-ticket acquisitions. This trend has changed recently, with companies now considering mid-cap foreign assets, which will provide them with specific technology and international marketing networks.

Chinese companies have reached a certain stage of development and are now increasingly exposed to global competition. The government too has adopted ambitious targets with regards to sustainability and self-sufficiency and chemical companies are expected to respond to this challenge. Driven by these forces, the industry is trying to restructure itself in order to become more competitive and rise up the value chain. This is evident from the emergence of the synthetic materials and specialty chemicals segments and the marginal retreat of basic chemicals.

But even as the industry grows bigger, the nature of its challenges become more complex. From feedstock to human resource issues, every level poses its own difficulties. Although China is trying to plan ahead by securing cheap feedstock supplies in the form of coal chemicals or gas-based cracker plants, this may require a massive technological overhaul and will need time and investment. Sustainability continues to haunt the industry, but efforts are being made to correct imbalances. Finally, as China integrates even more closely with the global supply chain, management skills are of increasingly paramount importance.



Norbert Meyring
Partner, China and Asia Pacific
Head, Chemicals
KPMG China

¹ 'China sees 7% as bottom-line growth tolerable', 23rd July, Bloomberg

Contents



01	Chemical industry balances growth amid challenges	5
	I. Coping with slowdown	
	II. China economy - A 'new normal'	
	III. China chemicals : A struggle with slowdown and overcapacity	
	IV. Growth led by urbanisation	
	V. Feedstock patterns and the petrochemical industry	
02	New challengers change chemical industry landscape	13
	I. Policy impact	
	II. China chemicals consolidate and compete	
	III. Unique characteristics of Chinese chemical companies	
	IV. Internationalisation and the power of outbound investments	
	V. Challenges facing the chemical industry	



01

Chemical industry balances growth amid challenges

I. Coping with slowdown

The global chemical industry is dealing with a vast range of external challenges. The paradigms are once again changing. The shale gas boom in the United States has shifted the supply base of the chemical industry back to the West, while markets strengthen in the Eastern hemisphere. Furthermore, environmental and sustainability issues have become more urgent. However, global companies, which streamlined their operations after the 2008 crisis, appear to have entered a comfort zone with the availability of cheaper gas feedstock.²

The economy is slowly getting back on its feet, but recovery is hesitant and uneven across regions. Growth figures remain moderate amid a tightening of international liquidity triggered by the United States (US) scaling back quantitative easing (QE) and persistent uncertainty due to the slowdown in the emerging markets of Brazil and India. The World Bank's growth forecast remains below trend at 3.6 percent for 2013.³

In 2012, global chemical companies were left dealing with depressed product demand against the backdrop of the tough economic situation in Europe and manufacturing slowdown and weak performance in key end-markets. Fortunately, the prospects for 2014 seem more positive. Efforts by European policy makers to stem the region's debt crisis have lessened risks to financial-market stability, while lower unemployment and stronger consumer sentiment will support growth in the US.

Large developing economies, which have driven global growth in recent years, will not experience the same kind of boom that they did before 2008, but economists emphasise that there is no reason to be pessimistic. Growth will be slower, not due to inadequate demand, but because the pre-crisis period boom was a 'bubble phenomenon'. It is likely that the positive fundamentals of the industry will outweigh the uncertainties of the financial markets, and that the nearly USD 3 trillion global chemical business will pick up in the second half of 2013 and beyond.

The game-changer in the last two years has undoubtedly been the dynamic shift in the US natural gas markets. New methods of extraction, such as horizontal drilling and hydraulic fracturing, are boosting shale gas production.

Leveraging the abundant natural gas supply and cost advantage, chemical companies in US are investing billions of dollars in setting up facilities (crackers) that produce ethylene from ethane. Over 50 projects have been announced by chemical manufacturers in the US, representing capital investment of more than USD 40 billion, according to the American Chemistry Council (ACC).⁴ The US housing sector, a key consumer of chemicals, has also shown signs of recovery lately, although demand from this segment remains well below historic levels. The ACC foresees a rise in US chemical output (excluding pharmaceuticals) of 1.9 percent in 2013 and 2.3 percent in 2014.⁵

Chemical enterprises from the European Union continue to be important players in the global landscape and remain in a position to benefit from trade opportunities. The EU segment registered a solid recovery in 2010 and was a key driver of growth and competitiveness in the industry. In 2011, this region generated an extra-EU trade surplus of EUR 41.7 billion, which represents the third highest level since 1999.⁶ In 2012 and 2013, however, there has been an overall dip in European chemical output.

Between 2009 and 2012, in order to increase profits, Western chemical companies cut operating costs, closed inefficient plants, increased prices, and used their healthy balance sheets to pay down high-cost debt. Many moved into higher margin businesses by buying specialised firms. For the most part these strategies worked. Global chemical production (excluding pharmaceuticals) rose 2.6 percent in 2012, down from the 3.8 percent rise registered a year ago.⁷ Furthermore, the output of the global chemical industry is expected to grow 4.3 percent in 2013 and 4.7 percent in 2014.⁸

Also, the recovery of the global chemical industry since 2011 has been led mainly by Asian chemical production, which has surpassed that of the rest of the world. Emerging economies have outpaced industrial countries in chemical production, while China and the rest of the Asia-Pacific region attract the bulk of chemicals investment. In fact, chemical makers in the emerging economies are expected to deliver a 7.5 percent production gain in 2013.⁹

2 'Strategic re-alignment in the global chemical industry', KPMG Reaction Magazine, July 2013 Edition

3 World Bank Latest Forecast, July 2013, World Bank

4 American Chemistry Council Website

5 'Chemical industry stock outlook', May 2013, Zacks Equity Research

6 'Facts & Figures 2012', European Chemistry Industry Council (CEFIC)

7 'Chemical industry stock outlook', May 2013, Zacks Equity Research

8 American Chemistry Council Website

9 'Chemical industry stock outlook', May 2013, Zacks Equity Research

II. China's economy - A 'new normal'

China has entered a unique stage of development. Economic growth is slowing down, but in a controlled fashion, with the country now heading down a more sustainable path. The World Bank estimates that the Chinese economy will grow by 7.7 percent in 2013, a pace which has been acknowledged as the 'new normal'.¹⁰

This slowdown has been seen as a cause for concern in some circles, given that China used to grow at 10 percent annually and was pulling much of the world along with it. Over the past few decades, China has relied heavily on exports and government-led investment to drive its economy. However, this export-oriented growth received a rude shock when the key markets of the US and Europe collapsed in 2008. China is now trying to reorient itself away from investment-led growth to a greater focus on consumption. This represents a more mature Chinese economy registering what will become the 'new normal' for the next decade or so. Indeed, the current average GDP growth of approximately seven percent is a much more powerful stimulant than the high 12 percent growth of the early 1990s. China's annual GDP is over USD 8 trillion, and a 7 percent growth rate adds nearly USD 60 billion a year to the global economy, which is higher than the volume during the 1990s.¹¹

Furthermore, the new political leadership, which took over this year, has breathed fresh life into the reforms programme and has assured the world that there will be no going back. China is expected to import around USD 10 trillion worth of goods in the next five years, while outbound FDI by Chinese companies could reach USD 500 billion. This will require a deepening of the reforms process, capital account convertibility and freer flows of the CNY.¹² Admittedly, the pace of reforms in the financial and monetary sector remains slow as of now, but China has been surprisingly swift in initiating industrial reforms. The government is now considering a detailed plan to eliminate outdated industrial production capacity in sectors such as steel, cement, electrolytic aluminium, plate glass and shipbuilding. The plan will boost the sectors' utilisation of existing capacity by setting industry access standards and modernising production. More than 1,400 companies in 19 sectors have been instructed to shut down outdated production capacities by the end of September. They will not be allowed to relocate their outdated units elsewhere.¹³

According to a survey conducted by the European Chamber of Commerce, among foreign multinationals operating in the country, China is still perceived as one of the best regions for investment in a challenging global environment. Although net profit margins are down due to lower domestic demand, the region continues to be a priority in global strategies and a mainstay for global revenue generation. European companies remain committed to the China market, which is still rated as the one of the top three countries for future investments.¹⁴ However, the Chinese economy faces severe challenges and there are several risk factors when conducting business in China. Domestic investors and manufacturers are worried mainly about liquidity and the extent of local government debt.

The issue of liquidity remains a confusing one. The People's Bank of China is trying to discipline the country's banks against engaging in shadow banking activities, which funnel cash away from the real economy. In mid-2013, it took strong steps to squeeze liquidity, resulting in a cash crunch and fears of a financial crisis. While the crisis has retreated as of now, the second half of 2013 will be an era of tight liquidity as the central bank tries to discipline its lenders.¹⁵

Local government debt also continues to be a high risk factor in China. In July, the National Audit Office began a nationwide assessment of borrowing by public bodies, triggering fears that thousands of local councils and state-owned businesses may have overstretched themselves. China's myriad local and state enterprises borrowed heavily to invest in property, new factories, infrastructure and machinery and racked up huge debts. Standard Chartered, Fitch and Credit Suisse have estimated local government debt in China at the equivalent of anywhere between 15 percent and 36 percent of the country's output, or as much as USD 3 trillion.¹⁶

¹⁰ 'World Bank cuts global outlook amid "hesitant and uneven" recovery', 13 June 2013, Bloomberg

¹¹ 'Is China in for a hard landing, or is this the new normal?', 15 July 2013, BBC

¹² Xi Jinping, Bo'ao Forum for Asia Annual Conference, 7 April 2013

¹³ 'China plans to slash outdated production capacity', 30 July 2013, Xinhua

¹⁴ 'European Business in China: Business Confidence Survey 2013', European Chamber of Commerce

¹⁵ 'Bank of China cash injection soothes bank crisis fears', 30 July 2013, China Daily

¹⁶ 'China to audit local authorities and state enterprises over debt fears', 29 July 2013, The Guardian

III. China chemicals: A struggle with slowdown and overcapacity

The China chemical industry is maturing and will grow at a much more settled pace than during the previous boom years. This new but stable GDP growth rate of around 7 percent, along with urbanisation, rise in domestic consumption, greater demand for auto and electronic products and ambitious sustainability targets will provide ample growth opportunities. KPMG estimates that this will enable the Chinese chemical industry to grow by between 9 and 11 percent in the period 2013 to 2015.

This appears to be a far more dependable pace than the chemical industry's breathtaking revenue CAGR (compound annual growth rate) of 22.3 percent between 2007 and 2011. The industry generated whopping revenue of USD 1.02 trillion in 2011. In comparison, the Japanese and Indian markets grew at a sedate pace of 6.6 percent and 12.8 percent CAGR, respectively, over the same period, achieving respective values of USD 243.9 billion and USD 85.1 billion in 2011.¹⁷

Despite strong and stable growth in chemical manufacturing, China continues to have a net chemical deficit and is heavily dependent on imported material. This dependency makes the sector vulnerable; it has been affected by price trends in the world market caused by renewed international demand for raw materials, petroleum and other chemical inputs since last year.

According to the China Petroleum and Chemical Industry Federation, the output of major chemical products was slow to increase during the first half of 2013. The reasons: a number of large transportation and infrastructure projects are nearing completion; also, there are fewer big-ticket investments, so demand for basic raw materials and other bulk products have slowed down this year. In the absence of significant stimulus from the government, market capacity has basically stabilized, which is a healthy sign in the long run. Furthermore, chemical manufacturers have not cut down drastically on production — companies are afraid to lose workers, while local governments are prevailing upon enterprises to maintain job stability and production.¹⁸

Industry factsheet: According to figures released by the National Development and Reform Commission (NDRC), domestic chemical players, which total 25,169 companies, registered modest growth in the first half of 2013. The main business revenue of the chemical industry reached RMB 3.8 trillion, up 13.2 percent year on year, while profit was RMB 171.71 billion, up 10.6 percent. Investment in fixed assets also went up 13.3 percent, reaching RMB 610.4 billion, while export volume was USD 71.3 billion, up only 3.6 percent year-on-year.

Significantly, the specialised chemical equipment manufacturing sector grew rapidly in H1, recording RMB 10.34 billion in total profits, an increase of 26.6 percent year-on-year. From the beginning of 2013, the chemical sector was greatly propelled by enterprises engaged in specialty chemicals, rubber products, organic chemical materials or synthetic materials manufacturing, which respectively contributed 41.1 percent, 28.8 percent, 26.6 percent and 21.6 percent to the profit growth of the chemical sector.¹⁹

Industry Performance in 2012

Investment

- * Total chemical industry: RMB 1.23 trillion / Growth - 27.9% YOY
- * Synthetic materials: RMB 154.43 billion / Growth - 54.5% YOY
- * Basic chemical raw materials: RMB 407.25 billion / Growth - 43.5% YOY
- * Special chemical crystal industry: RMB 276.18 billion / Growth - 16.3% YOY
- * Rubber industry: RMB 133.31 billion / Growth - 5.7% YOY

Growth in overall market demand slowed in 2012

- * Total consumption of main chemical products: 434 million tonnes / up by 7% (3% below 2011)
- * Organic raw material consumption: up by 7% (12% below 2011)
- * Inorganic raw material consumption: up by 5.7% (6.7% below 2011)
- * Synthetic rubber consumption: up by 6.6% (1.4% above 2011)

Source: CPCIF

¹⁷ 'Economic performance of chemical industry in H1', July 2013, National Bureau of Statistics

¹⁸ 'Economic performance of the chemical industry in H1', July 2013, National Bureau of Statistics

¹⁹ China Petroleum and Chemical Industry Federation, research report for 10-year development of China's Top 500 chemical enterprises, 2013

IV. Growth led by urbanisation

The near-term prospects for the chemical industry in China are challenging but not entirely devoid of opportunities. The economy is expected to grow at a slower pace, which means chemical companies have to compete aggressively among themselves in order to take advantage of demand sources. Continuity in urbanisation, investment in infrastructure projects (including the water treatment and transport segment), and a rise in consumer spending will remain the conventional sources of demand for all varieties of bulk chemicals, specialty chemicals and high grade polymers.

Raising domestic consumption is one of the major targets of the present government, which is slowly weaning itself away from an export-led growth model. China's large population, its growing economy and household income, the expansion of new clusters of consumers, and governmental support for domestic consumption are all reasons for optimism. For instance, the retail market is expected to grow and private consumption will account for a bigger share of GDP, rising from 35 percent in 2009 to over 40 percent in 2016. Consumer electronics will grow by 23 percent a year between 2008 and 2015.²¹ Furthermore, auto sector output increased by 15 percent in H1 and this trend is likely to hold for the entire year.²²

Consumption sources will also increase as urbanisation expands. China is expected to attain an urbanisation level of 60 percent by 2020 and infrastructure development remains a priority. The government's goal is to bring the entire nation's urban infrastructure up to the level of a middle-income country, while using increasingly efficient transport logistics to link the country together.²³ The cost of settling China's rural workers into city life could be about RMB 650 billion a year, according to the Chinese Academy of Social Sciences. The figure is based on the assumption that 25 million people a year settle in cities, with the government spending the money on healthcare and housing.²⁴ This will generate huge demand in every sector.

About 390 million more people from China's rural areas are expected to be urbanised before 2030, according to the 'Blue Paper on Cities: The Development of Chinese Cities' issued by CASS. The blue paper estimated that the Chinese Government needs to spend RMB 51 trillion (USD 8.3 trillion) to complete the process. Based on this, China's domestic consumption capacity may grow from RMB 16 trillion in 2011 to RMB 30 trillion in 2016, if urbanisation continues at its current pace.²⁵

Urbanisation will also accelerate infrastructure construction and investment in many related industries. The Chinese Government allocated USD 19.11 billion to fund local transport infrastructure construction in 2013. This will mainly be used to improve highway networks of trunk lines and rural roads. In the second half of 2012, authorities approved massive construction projects worth about RMB 1 trillion.²⁶

Demand for insulation materials in China is projected to grow by 9.4 percent per annum through 2016, reaching an annual value of RMB 65.7 billion. Continued increases in building construction and output in the manufacturing sector will drive gains. Further growth will be spurred by changes in building codes to reduce energy consumption in building applications as well as efforts to reduce energy use in manufacturing processes.

Building construction markets will continue to account for more than two fifths of China's total insulation demand; the residential and nonresidential segments will each expand at 10 percent per annum through 2016.²⁷ Construction will see 24 percent yearly growth until 2015.²⁸

Urbanisation, with a special focus on green buildings, will therefore remain a major growth driver. According to China's 12th Five-Year Plan, by 2015, at least 20 percent of all newly constructed building spaces must meet the Chinese 'Green Building' standard. As a result, green retrofitting polymer demand will be on the rise.²⁹

Water treatment is also one of the fastest growing markets, especially for the specialty chemicals sector. Rising water stress and environmental concerns across China generate huge potential for water treatment chemicals. One of the key factors contributing to the growth is the government's initiatives in the 12th Five-Year Plan, which have made 'Energy Conservation and Environmental Protection' a priority. The water treatment chemicals market in China is expected to be worth USD 3.3 billion per year by 2018.³⁰ Major growth is also expected in the waste water treatment chemicals segment. Multinationals are taking the initiative by developing 'green chemical' products and nanotechnology products in order to efficiently manage the water treatment programme.³¹

Over the years, Chinese state-owned and privately held enterprises have increasingly shifted focus to higher value sectors, venturing away from basic chemicals. A precisely-guided urbanisation plan and stable demand in the consumer electronics, packaged foods, automotive, wind & solar energy, water treatment and construction sectors will feed the need for fine and specialty chemicals related to these sectors.

21 'Taming the dragon: Retail opportunities in China', 2012, Value Partners

22 China Association of Automobile Manufacturers website

23 '2020: China's urbanisation level will reach 60%', 6 July 2013, Xinhua

24 'China urbanisation cost could top \$106 billion a year: think-tank', 30 July 2013, Reuters

25 'Cost and benefit of urbanisation', 31 July, China Daily

26 'China plans 120 billion yuan transport infrastructure investment', 11 February 2013, Xinhua

27 'Demand for insulation in China to reach RMB 65.7 billion in 2016', January 2013, China Chemical Reporter

28 'China's chemical industry: Flying Blind', 2012, AT Kearney

29 'Green buildings in China: Aspirations versus realities', 4 June 2013, asiagreenbuildings.com

30 'China water treatment chemicals market forecast and opportunities', May 2013, PR Web

31 'Thrust towards energy conservation and water management to drive Chinese water chemicals market', 28 June 2013, PR Web

V. Feedstock patterns and the petrochemical industry

The Chinese Government's aggressive energy targets and the demands of a booming economy have led to huge investments in unconventional energy sources. In the years to come, this will impact China's petrochemical and chemical sectors profoundly.

Boosting the consumption of natural/shale gas can help China develop its low-carbon economy. For the chemical industry, natural gas could be used to produce synthetic ammonia and methanol, bringing economic benefits 20-30 times higher than those generated by coal and petroleum. China has approximately 26 trillion cubic metres of recoverable shale gas, close to America's 28.3 trillion cubic metres. The US produced 87.8 billion cubic metres of shale gas in 2009, and if China's output could reach one third of that, its natural gas gap of 30 billion cubic metres could be bridged.³² However, technology is a precondition for success in this sector and China has a long way to go — it needs to promote shale gas exploration, deepen basic research in geology and improve exploration technologies before it can harness the industry's full potential.

The energy sector is also urgently exploring the potential of coal bed methane (CBM) reserves to bridge the huge gap between supply and demand of natural gas. The gap-to-output ratio was 26.82 percent in 2011 and it is estimated that it will reach 46.24 percent in 2015 and 71.32 percent in 2020.³³ Industry experts believe that the CBM sector is currently better placed than shale gas to feed the demands of the chemical sector. In 2011, output of CBM increased 54.06 percent year-on-year, while that of natural gas increased only 12.1 percent. By 2015, domestic CBM output will reach 21.5 billion cubic metres per annum.³⁴ A handful of chemical SOEs have ventured into this field, especially in the Qinshui Basin, Ordos Basin and northern regions of Henan province.

Overcapacity fears

China's petrochemicals industry is growing rapidly, particularly in olefins, but it faces several challenges, primarily due to overcapacity. The level of demand is insufficient to absorb ongoing increases in capacities, with China currently constructing a large number of production facilities — both mega and medium-scale — undertaken by Sinopec, PetroChina, CNOOC and other SOEs. In 2012, petrochemicals demand growth underperformed the expansion of the wider economy. The country's domestic consumption of ethylene was estimated at 32.5 million tonnes last year, which represented a sluggish annual growth rate of 3.8 percent.³⁵

In its obsession for self-sufficiency, China had boosted its ethylene sector, making it the second largest producer in the world. By the end of 2011, it had 30 large ethylene units with a combined capacity of 15.29 million tonnes per annum (mtpa), among which five units had individual capacity exceeding 1 mtpa. In the period 2012 – 2017, global ethylene capacity will increase by 62.15 mtpa, representing growth of 40 percent. Around a quarter of that increase will occur in China, with the US coming in a distant second at 12 percent.³⁶

Naphtha-based units: Currently, naphtha-based units form the majority of the new enterprises being established by state owned companies. Six integrated petrochemicals complexes based on conventional technology — planned by PetroChina and Sinopec — will add 4.6 mtpa of ethylene.³⁷ Furthermore, Sinopec announced plans in July 2012 to build a 642,000 barrels per day refinery in Jiangsu Province, which will be the nation's largest. PetroChina Fushun Petrochemical Co's 800 000 tpa and PetroChina Daqing Petrochemical Co's 600 000 tpa ethylene units are now ready, while Wuhan Petrochemical's 800 000 tpa and Sichuan Pengzhou Petrochemical's 800 000 tpa ethylene units are expected to be put into operation in 2013.³⁸ Other projects expected to go into production before 2015 include: Sinopec Shanghai Petrochemical's 800 000 tpa and Sinopec Yangzi Petrochemical's 800 000 tpa ethylene expansion projects, and a 1 mtpa ethylene project (still awaiting approval) of CNOOC Huizhou.³⁹

Even the post-2015 period will see the construction of large-scale ethylene capacity. This will include a 1 mtpa Sinopec ethylene project with Kuwait Petroleum Corporation in Zhanjiang, Guangdong; Sinopec Qingdao Refining & Chemical's 800 000 tpa project, Sinopec Shanghai Gaoqiao Petrochemical's 1 mtpa unit in Caojing, Shanghai; Hainan Refining & Chemical's 1.2 mtpa ethylene plans, and PetroChina's 1.2 mtpa project in Taizhou, Zhejiang province. By 2020, China's capacity is expected to exceed 37 mtpa.⁴⁰

32 'Shale gas industry means a lot to China's natural gas supply', 21 January 2013, China Chemical Reporter

33 'CBM opportunity emerges as natural gas in short supply', 21st January 2013, China Chemical Reporter

34 'CBM opportunity emerges as natural gas in short supply', 21st January 2013, China Chemical Reporter

35 'BMI China Petrochemicals Report Q113'

36 'BMI China Petrochemicals Report Q113'

37 'BMI China Petrochemicals Report Q113'

38 'BMI China Petrochemicals Report Q113'

39 'What is the path forward for China's ethylene industry?', China Chemical Reporter

40 'What is the path forward for China's ethylene industry?', China Chemical Reporter

Coal chemicals: The rising cost of oil imports has also driven policy makers to utilise coal as feedstock for the petrochemicals industry. Growth in coal-to-olefins (CTO) technology in China is set to contribute a third to the 16 mtpa rise in the country's ethylene capacity by 2017, with 10 CTO plants due to be commissioned and a further 30 on the drawing board.⁴¹

In recent years, international crude oil prices have remained high, greatly reducing the competitiveness of ethylene made from naphtha. Since 2005, China has invested heavily in this segment. It now has 400,000 TPA of coal-based ethylene and 1.4 mtpa of coal-based propylene in operation. China is currently operating three coal-based plastics projects — two are owned by China Shenhua, the country's biggest coal producer, and one is operated by Datang Group.⁴² In 2012, 75 percent of China's methanol and ammonia capacity, 85 percent of its PVC capacity and 25 percent of its benzene production were based on coal feedstock, although much of the capacity is located far from coal deposits so the feedstock has to be transported several thousand miles.⁴³

Summary: Despite the slowdown in China's economy, the chemical industry is poised for growth, thanks to continued urbanisation and industrial restructuring. Large SOEs are at the forefront of capital-intensive projects to ensure cheap feedstock supply, while others are swiftly shifting to advanced chemicals with large scale use. The next section of the report focuses on the globally lesser-known but equally influential chemical companies, which are posing a challenge to sophisticated global multinationals, and analyses their strengths and future growth prospects.

41 'BMI China Petrochemicals Report Q113'

42 'BMI China Petrochemicals Report Q113'

43 'Coal to olefins economics are a major challenge' 5th April 2013, ICIS



02

New challengers change chemical industry landscape



China's chemical industry is heading towards a new level of maturity by pursuing self-sufficiency and sustainability. The '12th Five-Year Petroleum and Chemical Industry Development Guide', released by the China Petroleum and Chemical Industry Association in 2012, requires Chinese enterprises to choose a new path of industrialisation, create 'national champions' and work towards sustainability.

This section of the report examines the impact of government policy on restructuring the chemical industry, focusing on the development and evolution of top Chinese companies, or 'local champions', over the past decade. It analyses their unique strengths and competitiveness, their long-term strategies and ambitions, and the difficult challenges they face in the future.

I. Policy impact

Five year plans continue to play a crucial role in China, serving as 'business plans' for the government and industry to follow. As such, the 12th Five-Year Plan (2011-2015) remains a sound point of reference for predicting future trends in the chemical industry. Policy-makers have demarcated seven strategic emerging industries, four of which are related to the chemical sector. The emphasis on new energy, new materials, new energy automotive and energy-saving has triggered what amounts to a race among Chinese chemical companies to power ahead in the higher grade chemical segments and evolve aggressive acquisition strategies towards this end.

Until now, medium-to-large Chinese companies were mostly engaged in the bulk chemicals side of the business, while a relatively small number of foreign multinational corporations dominated the niche market in specialty and high-end chemical segments.

Since chemical manufacturers have high fixed costs and produce commoditised products, it was difficult for them to differentiate and expand their portfolios. As a result, each player developed dominance over their respective segments and the markets of local and global corporations seldom overlapped. All this is now changing. Chinese companies are relentlessly expanding their product portfolios and seeking new world markets, a startling development that may change the global chemical landscape forever.

Creation of 'national champions': Most significantly, the 12th Five-Year Plan seeks to create 'national champions' to increase China's self-sufficiency in chemicals and establish an environment that promotes sustainability. In other words, domestic manufacturing companies are being encouraged to enhance their value chains and compete internationally.

For chemicals, the starting point for self-sufficiency is the growth of segments like specialty and fine chemicals. There are several sectors in which China is a net importer and has set a goal of 80 percent self-sufficiency by 2015. In new chemical materials, the goal is to increase self-sufficiency

from 56 percent in 2009 to 76 percent by 2015. The fine chemical segment is also undergoing structural adjustment and product innovation — the value of China's fine chemical production is expected to reach RMB 1.6 trillion by 2015, more than double the amount in 2008.⁴⁴

Although China is the biggest producer of chemicals, it still suffers from a deficit between total chemical demand and its supply. As of now, demand for chemicals used in plastics far outpaces local capacity and this deficit is expected to remain until 2020, which is a cause of considerable concern for the government.

Domestic chemical companies are now expected to rise to the challenge by adapting to a new round of upgrades and reforms. They are expected to be world class enterprises and to employ a variety of strategies to gain greater access to Western technology and processes. With this target in mind, SOEs, as well as private companies, are enhancing their product portfolios, seeking breakthroughs by means of innovation, and working on proactive strategies in order to pursue business opportunities wherever they become available.⁴⁵

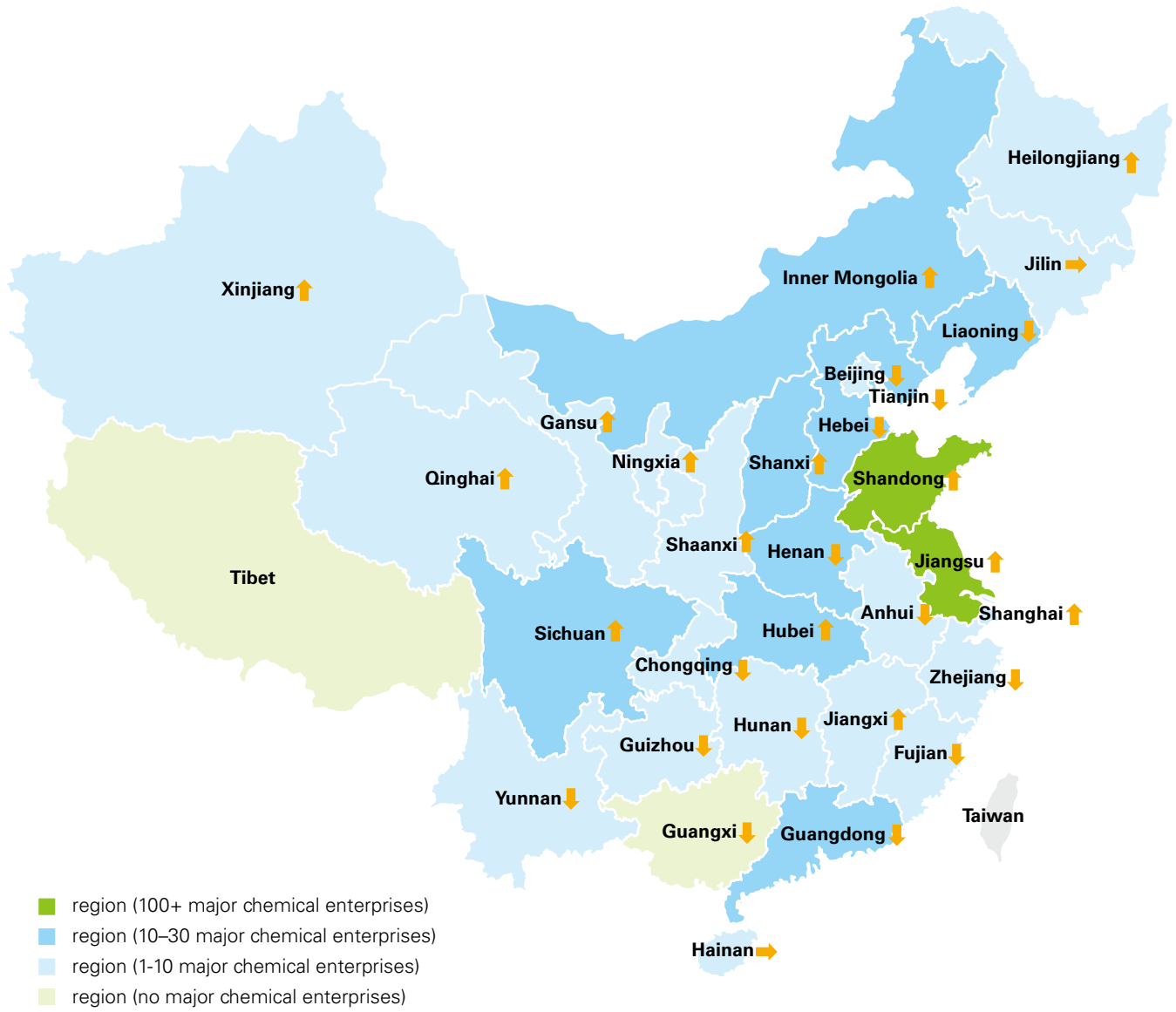
Another vital component of the 12th Five-Year Plan is the government's determination to balance the geographic spread of its industries and shift economic activity to the inland areas of central and western China. The petrochemical and chemical industries have played an important role in changing this balance.

While the industrial East still remains the nerve centre of activity, growth in the central and western regions has accelerated greatly. The Inner Mongolia Autonomous Region now has 12 major petrochemical and chemical enterprises, while Xinjiang Uygur Autonomous Region and Ningxia Hui Autonomous Region have built seven and four major chemical bases, respectively, over the last 10 years.⁴⁶ Interestingly, enterprises operating in western regions such as Qinghai and Xinjiang have enjoyed the highest profit margins in the industry in the last few years.

⁴⁴ '2012 market report on China's fine chemical industry', China Import Forum
⁴⁵ '2012 Sinochem Annual Report'

⁴⁶ 'Research Report on 10-year development of China's Top 500 chemical enterprises', 2013, CCEMA/CCIA

Regional distribution of China's chemical industry in 2011 indicating changes compared with 2002



- region (100+ major chemical enterprises)
- region (10-30 major chemical enterprises)
- region (1-10 major chemical enterprises)
- region (no major chemical enterprises)



II. China chemicals consolidate and compete

Making sense of more than 25,000 domestic companies dotting the landscape is a challenging task. Large state-owned companies are highly visible by virtue of their financial and operational scale. It is the medium-scale enterprises, a large number of which are privately owned, which make categorisation difficult. Also, ownership patterns can at times be confusing with state-owned companies acquiring stakes in smaller private entities.

In order to bring some method to classifying and analysing the sector, the China Chemical Enterprise Management Association (CCEMA) and China Chemical Intelligence Information Association (CCIIA) conduct comprehensive studies of developments in the chemical industry. The associations publish annual studies, including 'China's Top 500 Chemical Enterprises' (referred to as the 'Top 500'), which ranks companies on the basis of the previous year's revenue and performance. The study uses data from the National Bureau of Statistics, its own research results, and historical records of companies, as well as large scale surveys and supplemental data from the industry. The rankings have become an important reference point for the government and industry to analyse sector trends, competition, challenges and strategic direction.

According to the National Bureau of Statistics, enterprises are categorised on the basis of their volume, ownership and corporate functioning. Large enterprises are mainly categorised as 'above designated size' and can include state-owned, private or foreign-invested enterprises, as well as collectively-owned enterprises or joint-ventures. For instance, in 2012, there were 23,629 chemical enterprises of 'above designated size' – that is, companies with annual revenue equal to or above RMB 20 million. The total revenue of these enterprises was RMB 6.89 trillion and their total assets were worth RMB 5.28 trillion.⁴⁷

A data break down of the 500 big enterprises and chemical sub-sectors provides important insights into the changing nature of the industry and how core trends have unravelled over the past decade. Companies at the top are increasingly scaling up, consolidating and growing more competitive, with a greater number of high end polymers and specialties entering the fray. The number of basic chemicals manufacturers at the top has dipped, but overcapacity still haunts some product segments. Significantly, the contribution of SOEs to the chemical assets and revenue pie has shrunk over the years, as we witness private enterprises and multinationals increasing their share.

Consolidation: Over the past decade, the effect of globalisation and the government's consolidation plans for the chemical industry have had a strong impact. A number of smaller non-viable companies are being slowly phased out of the Top 500 bracket, as is evident from the sales revenue structure over the past 10 years. In 2002, not a single company managed sales revenue higher than RMB 5 billion, but by 2011, there were as many as 7,141 companies in that range. In fact, the government's efforts to consolidate the fragmented chemical sector seem to have paid off. Companies with sales revenue of less than RMB 1 billion numbered 460 in 2002, but now there are none — they have either been shut down or acquired by bigger entities. [See table]

Another sign of consolidation is the way a smaller number of companies are now generating a bigger proportion of revenue. In 2002, the proportion of revenue generated by the Top 500 was 21.6 percent of the sector's total revenue. By 2011, this had increased to 36.6 percent. Also, the proportion of total industry assets held by the Top 500 rose from 22.1 percent in 2002 to 41.7 percent in 2011.⁴⁸

Changes in the composition of Top 500 enterprises according to sales revenue bracket

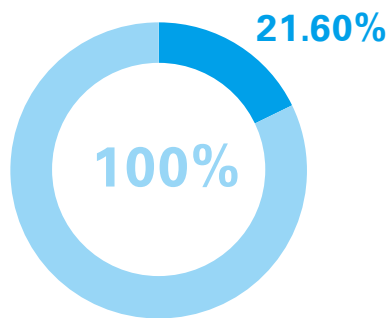
Sales Revenue (RMB)	Number of companies in 2002	Number of companies in 2011
20 to 34.8 billion	0	7
10 to 20 billion	0	36
5 to 10 billion	0	98
1 to 5 billion	31	359
0.5 to 1 billion	60	0
Less than 0.5 billion	409	0

Source: China Chemical Enterprise Management Association/China Chemical Intelligence Information Association

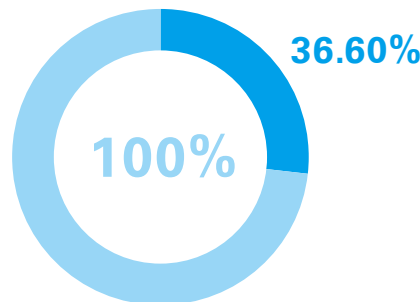
⁴⁷ 'Powerful enterprises are the basis of a powerful country: Research Report on 10-year development of China's Top 500 chemical enterprises', 2013, CCEMA/CCIA

⁴⁸ 'Powerful enterprises are the basis of a powerful country: Research Report on 10-year development of China's Top 500 chemical enterprises', 2013, CCEMA/CCIA

Top 500's share of total chemical industry revenue in 2002



Top 500's share of total chemical industry revenue in 2011



■ TOP 500 ■ Chemical industry

Source: China Chemical Enterprise Management Association/China Chemical Intelligence Information Association

A recent example of consolidation driven by globalisation and market forces can be seen in the polysilicon industry. To survive the crisis, triggered by US anti-dumping measures and pressure from Europe in 2012, many domestic polysilicon companies lowered output, stopped production, or went bankrupt. Others adopted different measures, including reducing costs, avoiding market risks, cutting jobs, improving efficiency and upgrading technology. Market leader Jiangxi LDK Solar Hi-tech Co., Ltd, a giant of the poly voltaic (PV) sector, undertook massive reorganisation. However, the impact of huge losses was too big to be reversed and many enterprises shut down, leaving fewer than seven companies in operation.⁴⁹

Another important aspect of the consolidation process is the change in ownership patterns and the rise of private enterprises. Understanding ownership models can be a complex process, especially with corporate diversification and cross-industry mergers and acquisitions occurring frequently. Many large chemical companies turned into non-chemical conglomerates, even as upstream petrochemicals enterprises extended the industrial chain downstream to enter the chemical industry.

Like other industrial sectors of China, the chemical industry too has various successful models of ownership; these are either SOEs, private owned companies (POEs), foreign-funded enterprises or collectively-owned, collective associate or other joint-stock enterprises. The most impressive development, however, has been the rise and adaptability of the private sector, which has contributed to a strong domestic chemical industry.

An indication of the transformation and consolidation process can be gauged by the perspective of foreign multinationals operating here. Global companies in China have experienced slower business growth for the past two years. A new challenging aspect is the competition from domestic players, which is increasingly impacting the business performance and outlook of foreign firms.

Local players, particularly domestic POEs have improved in areas in which European firms have traditionally been strong. These entities, along with SOEs have surged ahead over the past two years in terms of production, brand recognition, and marketing and sales.

Industry surveys show that domestic POEs hold a competitive advantage in marketing and sales and, along with SOEs, pose a considerable threat to foreign businesses. Domestic POEs are widely perceived as being stronger competitors than SOEs. This is possibly due to the fact that they compete in more open markets, which has forced them to be more efficient and effective.⁵⁰

The fact that private enterprises have gained in strength can also be gauged from the 10-year data of the Top 500. The number of state-owned enterprises decreased from 279 in 2002 to 127 in 2011. Against this, the number of private enterprises increased substantially, from 26 in 2002 to 93 in 2011. Their performance over the last decade indicates that private enterprises have a better level of economic operational quality than state-owned enterprises.

49 '2012 — A hard year for China's polysilicon industry', January 6 2013, China Chemical Reporter

50 'European Business in China: Business Confidence Survey 2013', European Chamber of Commerce

“Domestic chemical companies claim an increasing market share in China for certain chemical sectors, based on a higher technical standard and an improved product expertise. We see them currently as fierce day-to-day competition in China and as a serious global contender in the years to come. But we are also confident to bring our innovative strengths to markets due to our new ‘Innovation Campus Asia Pacific’ in Shanghai.”

– Dr. Albert Heuser, President, Functions, Asia Pacific President & Chairman Greater China, BASF

Competitiveness: The competitiveness of Chinese companies has increased substantially over the years, linked as it is to the transformation of the economy itself. Policy-makers have been trying to shift from an investment driven model to raising domestic consumption and rebalancing the trade deficit by increasing imports from advanced economies. The IT sector is growing exponentially and, most importantly, the middle class population is now more environmentally aware.

These economic trends and the changing nature of demand have had a positive effect on the competitiveness of Chinese chemical companies. Their total contribution to industry profits and assets increased significantly in the past decade, as they increased their business scale from ‘large to mega’. The 2002 combined annual profit of the Top 500 was recorded as RMB 6.60 billion; by 2011, this amount had shot up to RMB 174.52 billion, a 25.4-fold rise. This was much higher than the industry average of 12.7-fold growth in the same period. The proportion of profit generated by these 500 enterprises within the chemical industry rose from 25.3 percent in 2002 to 37.3 percent in 2011.

This massive profit increase indicates how focusing on quality rather than volumes has paid off. Driven by the 2008 global financial crisis and rising international competition, top companies have restructured themselves and became more competitive. This is evident from the emergence of the synthetic materials and specialty chemicals segments, the marginal retreat of basic chemicals and the significant dip in fertilisers and pesticides companies.

In a radical change from the past, by 2011, the largest proportion of Top 500 firms was operating in the synthetic materials segment, followed by basic chemicals enterprises and then specialty companies. The number of fertiliser, chemical pesticides, chemical mining and coatings companies has been considerably reduced within a decade. By 2012, the total number of specialty chemicals companies was 6,341, overtaking basic chemicals enterprises which stood at 5,666. [See table for Trends]

Change in industry structure (Top 500 trends)			
Sector	2002 Number	2011 Number	
Synthetic materials	33	105	Up
Basic chemical raw materials	81	87	Up
Specialty chemicals	49	80	Up
Tyres, etc.	26	43	Up
Fertilisers	136	67	Dn
Chemical pesticides	40	13	Dn
Paint, printing ink, pigments, dyes	20	12	Dn

Source: China Chemical Enterprise Management Association/China Chemical Intelligence Information Association

Comparison of sales revenue of the Top 500 companies (expressed in RMB billion)

Sector	Sales revenue		% of total revenue	
	2002	2011	2002	2011
Synthetic materials	175	515.2	10	21.6
Basic chemical raw materials	297	433.9	17	18.2
Speciality chemicals	131	379.2	7.5	15.9
Tyres, etc.	146	283.9	8.4	11.9
Fertilisers	422	280.9	24.2	11.8
Chemical pesticides	126	47.7	7.2	2.0
Paint, printing ink, pigments, dyes	48	43.8	2.8	1.8

Source: China Chemical Enterprise Management Association/China Chemical Intelligence Information Association

In terms of revenue generation, new-age synthetic materials companies were the most profitable, accounting for more than one fifth of the sales revenue of the Top 500. This segment was followed by basic chemicals, specialty chemicals and tyre-makers. Significantly, the space for fertiliser companies has decreased, dropping them from their former front-running position to fifth place in the revenue scale. [See Table]

A trend to watch out for is the way domestic companies deal with specialty sector demand, which has grown in a spectacular manner. In 2012, the gross production value of China's specialty chemicals exceeded RMB 2 trillion, while total domestic output exceeded 100 million tonnes. China imported about 10 percent of its specialty chemicals and more than half of its electronic chemicals in 2012, indicating that there is still a lot of scope for internal growth.⁵¹

The priority of industry managers is now on developing: a) high-performance electronic chemicals and fluoro coatings; and b) high-end specialty chemicals, such as safe food additives and feed additives, eco-friendly adhesives, plastics additives and water treatment agents.

Among all specialty chemicals, China is least self sufficient in electronic chemicals, which now represent an RMB 30 billion market that has room for further growth. Electronic chemicals have a wide range of uses, including in new energy batteries, color printers, integrated circuits (IC), liquid crystal displays, color plasma display panels and thin-film-transistors.

Secondly, China has become the world's largest producer, consumer and exporter of food additives, but the product structure still needs to be optimised and upgraded. Here too, there is scope for chemical companies to explore and expand.

The third area in which Chinese companies are lacking is in adhesives. Although China is the world's largest producer and consumer of adhesives, producing over 15 million tonnes in 2012, local companies still lack the ability to produce eco-friendly high-performance adhesives, such as those used in strategic emerging industries like aviation, aerospace, solar cells, etc.

"The challenge for domestic chemical players is to avoid repeating with specialty chemicals the large overcapacity built in the last decade for basic chemicals such as methanol and PVC. Hopefully the tighter credit will somewhat prevent them from taking opportunistic paths. Apart of course from the very large coal to chemicals projects which replace imported fuels and basic chemicals, the assets, the synergies and the maturity of the existing chemical companies in Eastern China tend to be instrumental in helping them develop downstream and specialty chemicals and grow faster than their Western China counterparts which are mainly state-owned and can no longer rely on low cost feedstocks, especially natural gas."

- Emmanuel Schmidt, VP Market & Technology, Air Liquide China

⁵¹ 'Prospects of high-end specialty chemicals in China', 21 August 2013, China Chemical Reporter

III. Unique characteristics of Chinese chemical companies

The nature and characteristics of chemical companies have changed considerably over the years. Historical data and development trends of top Chinese enterprises reveal certain common, yet unique, characteristics.

Evaluation of a large number of companies reveals three distinguishing features which make chemical enterprises strong survivors and trend setters. These are: a) scale of operations and strong product portfolio; b) technological innovation; and c) quality and branding ability.

Top 30 chemical enterprises in China			
Rank - Company	Ownership	HQ	Main Business
1. Sinopec	SOE	Beijing	Petroleum, petrochemical & chemical products
2. CNPC	SOE	Beijing	Oil & natural gas, chemical & petrochemical products
3. CNOOC	SOE	Beijing	Offshore energy exploration
4. Sinochem Group	SOE	Beijing	Agro-chemicals, fertilisers, chemical logistics
5. Shenhua Group	SOE	Beijing	Coal mining, distribution & coal chemicals production
6. China National Chemical Corporation	SOE	Beijing	New chemical materials, specialties, basic chemicals
7. Yanchang Petroleum International Limited	SOE	Shanxi	Oil & gas, petrochemical engineering, salts & chemical engineering
8. Tianjin Bohai Chemical Industry Group Co., Ltd.	SOE	Tianjin	Vast range of chemical products, basic & specialties
9. Shanghai Huayi (Group) Company	SOE	Shanghai	Fine chemicals, new materials, fluorine chemicals
10. Chongqing Chemical & Pharmaceutical Holding (Group) Company	SOE	Chongqing	Chemicals, pharmaceuticals and salt production
11. Hubei Yihua Group Limited Liability Company	SOE	Hubei	Coal chemicals, basic chemicals & salt chemicals
12. Yuntianhua Group Co., Ltd	SOE	Yunnan	Organic chemicals, new fibreglass materials, salt and salt chemicals
13. North Huajin Chemical Industries Group Corporation	SOE	Liaoning	Petrochemical products, PVC, fertilisers, fine chemicals
14. Befar (Group) Co., Ltd	POE	Shandong	Caustic soda, inorganic chemicals, fly ash products, salt products
15. Hengyi Petrochemical Co., Ltd	POE	Zhejiang	Pure terephthalic acid (PTA) and polyester fibre products
16. Sichuan Hongda Co., Ltd	POE	Sichuan	Poly metals, large number of organic chemicals including phosphate fertilisers etc
17. Jiangyin Chengxing Industrial Group Co., Ltd	POE	Jiangsu	Phosphate-based chemicals, fertiliser varieties, polyesters, liquid chemical logistics
18. Shandong Jincheng Petrochemical Group	POE	Shandong	Petrochemical products
19. Lihuayi Group Co., Ltd	POE	Shandong	Petroleum and construction material/chemicals
20. Hixih Rubber Industry Group	POE	Shandong	Rubber, tyre and conveyor production
21. Jiangsu Sanfangxiang Group Co., Ltd	POE	Jiangsu	Chemical fiber raw material and other fabric products
22. Hangzhou Zhongce Rubber Co., Ltd	SOE	Zhejiang	Synthetic tyre production
23. Shandong Chambroad Holding Co., Ltd	POE	Shandong	Non-petroleum products and chemical trading

Top 30 chemical enterprises in China			
Rank - Company	Ownership	HQ	Main Business
24. Yunnan Coal Chemical Industry Group Co., Ltd	SOE	Yunnan	Coal mining, coal to olefins production via gasification and liquefaction process
25. Risun Holding Co., Ltd	POE	Beijing	Chemicals & coal chemicals
26. Shangdong Dongming Petrochemical Group Co., Ltd	SOE	Shandong	Oil processing, petro-chemicals, coal chemicals, chlor-alkali etc
27. Transfar Group	POE	Zhejiang	'Green chemicals' & innovative products
28. Wengfu (Group) Co., Ltd	SOE	Guizhou	Phosphate mining and related compound fertilisers
29. Rongsheng Petrochemical Co., Ltd	POE	Zhejiang	Petrochemicals products and polyester material
30. Kailuan Energy Chemical Co., Ltd	SOE	Hebei	Coal mining and associated chemical products

Ranking compiled by KPMG, based on sales revenue, with data inputs from China Chemical Enterprise Association & China Intelligence Information Association

a) Scale of operations and strong product portfolio

Major Chinese companies have been able to establish vast scales of operations, conquering domestic markets and making inroads into global distribution channels. Some of these companies not only have scale advantages, but are extending their industrial value chains while trying to ensure product quality. The Top 30 companies, however, are traditional enterprises whose core business remains bulk chemicals, fertilisers and pesticides.

Sinochem is a primary example of a large-scale diversified enterprise. It is China's fourth largest national chemical and petrochemical company, with a vast range of activities spanning energy, agriculture, chemicals, real estate and financial services. [See Top 30 list above] It is also the biggest fertiliser supplier and distributor in the chemicals business and has a formidable chemical logistics infrastructure, including tankers and shipping services. Sinofert Holdings is Sinochem's flagship fertiliser arm, whose product line includes nitrogen, phosphate and potash. It is also China's leading pesticide company — it has two national pesticide R&D centres and three mega production bases in Shenyang and Nantong. The SOE has extended its operations to other Asian countries, Europe and America.

Some of the Top 30 Chinese companies have breathtaking scales of production. Hubei Yihua Group is the world's biggest polyol producer, with an annual output of 110,000 tonnes, and has a domestic market share of 80 percent. It is also one of the largest fertiliser manufacturers, producing 500 tonnes of urea and two million tonnes of ammonium chloride annually, among other products. The Group is also a large chlor-alkali producer, with an annual output of 1 million tonnes of PVC, 0.8 million tonnes of caustic soda and 1 million tonnes of calcium carbide. It is the largest mineral salt producer in Asia, producing two million tonnes of vacuum salt annually. At least 60 percent of its markets are in Southeast Asia, Africa and South America. It also sells in North America, the Middle East, Eastern Europe and East Asia.

This state-owned Group has more than 20 subsidiaries, including two public companies, Hubei Yihua Chemical Industry Co. and Hubei Shuanghuan Science and Technology Stock, both of which are listed in Shenzhen. The company has five joint ventures, 26 R&D centres and subsidiary entity companies across China, as well as a joint venture in Vietnam. Yihua focuses on the coal chemical industry, phosphorus chemical industry, salt chemical industry, natural gas chemical industry and mine development. This enables the company to have a 52-strong product portfolio.

Yuntianhua Group has a similar trajectory. It is a state-owned limited liability company with a vast product range and is a leader in the nitrogen fertiliser industry. From a single nitrogenous fertiliser production enterprise, it has graduated to organic chemical products, new fibreglass materials, and fine chemical products, including electronic yarns for infrastructure, furniture, automobiles, electronics and aviation. An important contributor to Yuntianhua's success is the strategic relationships that it cultivated with multinationals like DuPont and GE early on.

Similarly impressive is the evolution of Jiangsu Sanfangxiang Group, which started as a modest synthetic fibre plant and went on to become one of China's top enterprises, with a complete industrial chain that integrates research, production and trading of polyester, chemical fibres and textiles. To extend the industrial chain, the group is investing in the upstream sector. In September 2012, it put into operation a 600,000 tonnes per year PTA project. It also has three large-scale projects — a 1.2 million tonnes per year EPTA project, a 600,000 tonnes per year ultra denier long thread project, and a 300,000 tonnes per year food level thin membrane project. Once these projects are completed, the Sanfangxiang group will be one of the world's largest production bases for polyester.

Hongda Group is another large conglomerate with integrated business covering poly-metal mining, smelting, chemicals, finance and real estate. The chemical business focuses on phosphorus fertiliser units and dominates the market for phosphate-related products. The group has an annual production capacity of 1.2 million tonnes of phosphate and its products are mostly used in a range of industries, from fertilisers to the food sector. Based in Sichuan, the group has 58 subsidiaries and affiliates at home and abroad, and controls two A-share listed companies, Hongda Co, Ltd. and Jinlu Group.

Another unique characteristic of the Chinese chemical industry is the willingness of large and traditional players to reform themselves. Despite the industry being a capital intensive one, characterised by high fixed costs, difficulties in managing inventory and stringent regulations, big and medium-sized companies are engaged in a transformation process, improving safety and management systems, investing along the entire value chain and changing their product portfolios to include new materials and green products.

One company that stands out as a success story for bold innovations is Tianjin Bohai Chemical Industry Group, which has an incredible portfolio of 3000 varieties of chemicals, covering bulk raw materials to electronic chemicals. The company also has a strong history of expansion. [See case study]

Tianjin Bohai Chemical Industry Group: Strong base, large portfolio

The Tianjin Bohai Chemical Industry group is a large SOE, owned by State-owned Asset Supervision and Administration Commission of Tianjin Municipal Government, and has grown to a formidable scale. In 2012, it ranked 182nd among China's Top 500 enterprises, owning 105 state-owned and state-holding enterprises, 31 joint ventures, one state-level enterprise technological centre, ten provincial level technology centres and seven scientific research institutes, among many others. In 2012, the company recorded operating revenue of RMB 66 billion.

Challenges & solutions: Despite being a large group, Tianjin Bohai, like several non-central SOEs, faces several challenges, such as, control over feedstock. Be it coal and natural gas and condensate oil - non-central SOEs lack influence; when compared to central SOEs, there is a great discrepancy in their ability to dominate internationally.

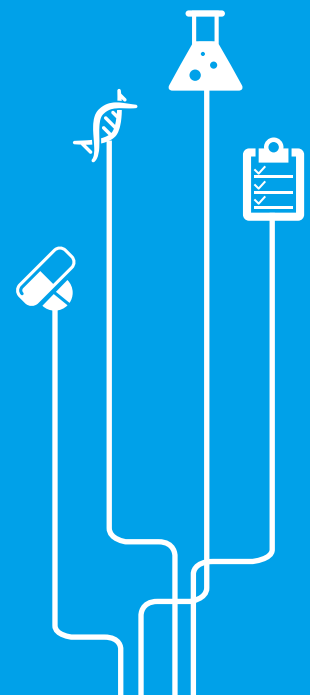
Bohai Industrial Group chairman Zhao Lizhi said, the company is dealing with these issues at various levels. According to him, the group is adjusting its product structure, industry and capital structure along with management and human resources to make the company more influential.

The SOE is trying to better manage its feedstock supply, tapping mainly domestic coal-based sources and global gas and shale gas supplies. With the support of the Tianjin municipal government, the company is investing in Western China provinces of Ningxia and Inner Mongolia. It is also venturing into Russia, US and Canada, in co-operation with foreign partners.

Tianjin Bohai is focused on enhancing product and technology innovation, combining existing products with new innovations to create niche markets, working on process optimisation and reducing emissions. For this, the company is spending heavily on R&D; at least 3 percent of its annual sales revenues have gone into its own research efforts, apart from acquiring foreign technology.

Human resource is also a major focus area for the company. With plans to extend its global ambitions, lack of international management experience often becomes a hurdle. Like most Chinese companies, until now, Tianjin Bohai's international exposure is only through import and exports, but in order to make overseas acquisitions, the company is trying to acquire the requisite international talent.

**- Zhao Lizhi, Chairman,
Tianjin Bohai Chemical
Industry Group**



b) Innovate and upgrade

An important characteristic of Chinese companies is their ability to innovate, spend on research and incorporate technological changes into their production processes. Enterprises are investing considerable resources and capital in the manufacturing of new chemical materials used in information technology, aviation, aerospace, energy, automotive and green construction. Such companies pose a strong challenge to foreign multinationals by their sheer ability to invest along the entire value chain.

Prominent domestic companies have a distinctive record of technological innovations and combine the ambitious aims of achieving self sufficiency and sustainability with capturing new market spaces. For instance, The Wanhua Chemical Group focused exclusively on revitalising the national polyurethane industry through the acquisition of technology. In its earlier avatar as Yantai Wanhua Polyurethane Co., Ltd. it developed intellectual property rights of MDI manufacturing technology and depended on independent innovation as a core driving force. [See case study]

Wanhua Industrial Group: Vision to upgrade & expand

Wanhua Group is a leading example of a Chinese chemical company with phenomenal domestic growth and strong overseas ambitions.

It represents the uniquely Chinese model of business - combining the nimbleness of a private enterprise with the safety net of local government equity share. Wanhua Chemical Group, one of its five major subsidiaries, is now a leading producer of MDI (methylene diphenyl diisocyanate) controlling 44 percent of the domestic market, and 20 percent of the international market.

Wanhua is said to have the largest integrated MDI manufacturing base in the world at its Ningbo plant, with 1,200kt/y capacity. This will be complemented by an upgrade of its MDI plant in Yantai, with a planned capacity of 800kt/y.

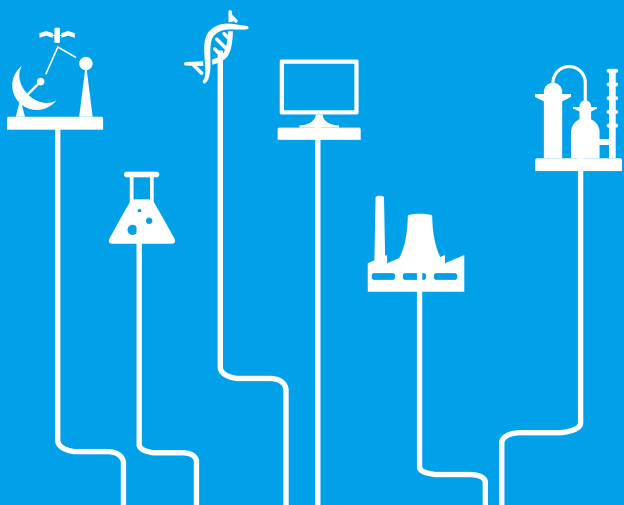
So far, Wanhua Chemical Group has weathered the economic downturn, making a net profit of RMB 1.54 billion in the first half of 2013; while in 2012, profits touched RMB 2.35 billion. The chemical division's future growth is expected to come from petrochemicals, specialty chemicals, especially ADI, acrylics, and surface materials. It has focused substantially on R&D. In 2012, its total R&D spending was roughly RMB 500 million (4 percent of the Group's sales revenue).

Future strategy: With the Chinese chemical industry going through a period of transformation, Wanhua is upgrading its value chain with strategic integration of five segments – from upstream to downstream - based on its core MDI and polyurethanes business. This includes petro-and-coal chemicals, MDI, TDI, ADI and PU derivatives, construction and energy-saving materials.

The focus of the company is now on building a 'green chemical chain' that caters to the sustainability market. Wanhua Industrial Group chairman Ding Jiansheng says his biggest mission is to make the company a chemical market leader – or 'China's BASF' – as he puts it. At present, the Group's biggest challenge is to diversify its portfolio and expand its market.

Overseas expansion is thus a crucial part of Wanhua's strategy. It intends to expand its European capacity of MDI & TDI and has a major investment plan for the US. In 2011, Wanhua created a buzz by acquiring majority stake in Hungarian company BorsodChem for EUR 1.26 billion.

- Ding Jiansheng, Chairman, Wanhua Industrial Group



Rising Sun Holdings (Risun), another heavyweight company, along with its subsidiary, Xu Yang Holdings, is China's largest coal chemical product manufacturer and a supplier of coke, coal tar, crude benzene, methanol and crude phenol industrial naphthalene. In order to establish its strength in a new sector, Risun used advanced technology from Germany and other patented technology from international research institutes. Headquartered in Beijing, Risun has three coal chemical industry bases — Xingtai, Dingzhou and Tangshan. A web of subsidiaries and joint ventures allows the company to produce on a large scale with a massive turnover.

Many private companies are also competing efficiently with state-owned enterprises and foreign-funded enterprises in the race to innovate. These include companies like Nanjing Red Sun Group, which has developed low toxicity, environmentally friendly pesticides through its own efforts. Nanjing Red Sun has 52 professional labs and 1700 technical staff, and holds independent intellectual property rights. It manufactures nearly 168 high-tech pesticide products and is among the top 10 global pesticide companies. It has built the largest pesticide production centre in the Asia-Pacific region and achieved sales worth RMB 6.7 billion in 2011.

Another example is Jiangyin Chengxing Industrial Group, a prominent company with total sales of RMB 20.5 billion in 2012. This company has been part of various government research initiatives, including the 'National Torch Projects', set up to encourage high-tech enterprises.

Similarly, Transfar Group is a strong private enterprise that has competed impressively with SOEs. It has diversified businesses and has been declared one of the most valuable brands in China. It is also known for its innovation in experimenting with the circular economy. The group is constantly restructuring and upgrading to put in place a value chain that enables low carbon, environmentally friendly solutions and emission reductions. Its subsidiary, Xin'an Chemicals, has successfully developed a core, patented technology that ensures circular utilisation of production resources. The company has collaborated closely with government bodies to develop energy-efficient products. The Group has two listed companies, six national high-tech enterprises and one national-level technological centre.

For the Chinese chemical industry to remain competitive, business leaders ought to envisage a transition from 'made in China' to 'invent in China'. The journey will not be a smooth one, but companies need to set sail now.

— **John Sun, General Manager, Organometallics, Chemtura Europe GmbH**

In addition, successful Chinese companies have taken full advantage of the infrastructure support provided by the Chinese Government in terms of industrial/technology parks. Some of them have tried to restructure themselves organically through R&D investments, while others have relentlessly adopted foreign technology and opted for tech-driven joint ventures.

China's commitment to R&D has risen and is expected to increase by 11.6 percent in 2013, following an 11.3 per cent increase in 2012. By some estimates, China's R&D could realistically match and even surpass that of the US before the end of the decade. The country is investing in all aspects of R&D at record rates. It out-produces the US in scientists and engineers and its share of technical papers has steadily increased over the past 10 years. Indeed, the UK's Royal Society estimates that China's total research paper output could surpass that of the US in 2013. Much has been said about the modest quality of China's technology paper output, but in many areas, such as materials science, chemistry, and engineering, China is now a global leader.⁵²

According to the EU Industrial R&D Investment Scoreboard from the European Commission's Joint Research Centre, total R&D investment in the global chemical sector increased from EUR 456 billion in 2010 to EUR 511 billion in 2011, and Chinese investment in chemical R&D showed the largest increase, amounting to 1 percentage point.⁵³

⁵² BRIC-China, 12 December 2012, R&D online

⁵³ '2012 EU Industrial R&D Investment Scoreboard, Facts and Figures' 2012, Cefic, Copyright: Wiley-VCH Verlag GmbH & Co KGaA, Weinheim

c) Quality & branding

Powerful Chinese enterprises have gradually shifted their priority from product management to brand management and are in the process of internationalising their businesses. A number of companies are aggressively promoting their brands in the global market and have formulated unique approaches.

Shandong Linglong Group, a Top 500 company, has a well-placed strategy of focusing on quality and acquiring patents to market tyres in the international market, which is a very competitive sector. The company manufactures high-end car tyres for the American and European market and has acquired patents for its heavy truck designs in China, the US and Australia. It also became the first Chinese enterprise to break through the technological monopoly of western countries in the 'run-flat' tyre category. Before 2001, Linglong Group was an average performer in the tyre industry, but its strategy of manufacturing high-value brands and building a capacity of 3.5 million tyres a year has transformed it into a global company.

Similarly, Hixih Rubber Industry Group focuses on quality control as an essential strategy, which the company ensures via ventures with top Western manufacturers Pirelli, Goodyear and Carlyle Group. Hixih has a vast range of products, ranging from the development and manufacture of tyres and conveyor belts to products in the environmental protection industry. Its main specialisation, however, is in steel radial truck tyres, car tyres, conveyor belts, high pressures hoses and automobile exhaust filters; it is now the world's largest conveyor belt manufacturer and a top tyre-maker.

Shanghai Huayi Group is heavily invested in quality. It has a strong focus on R&D and collaborates with multinationals in order to gain advanced technical knowhow and ensure product quality. [See case study]

Shanghai Huayi Group: Invested in quality

Shanghai Huayi Group is a non-central state-owned enterprise with a diversified product portfolio, strong brands and an expansionary market, which extends overseas. The Group has 17 major subsidiaries, and eleven R&D centres and has three listed companies - Shanghai Chlor-Alkali Chemical Co, Double Coin Holdings Ltd, Shanghai 3F New Materials Co and its 2012 sales revenue touched RMB 45 billion.

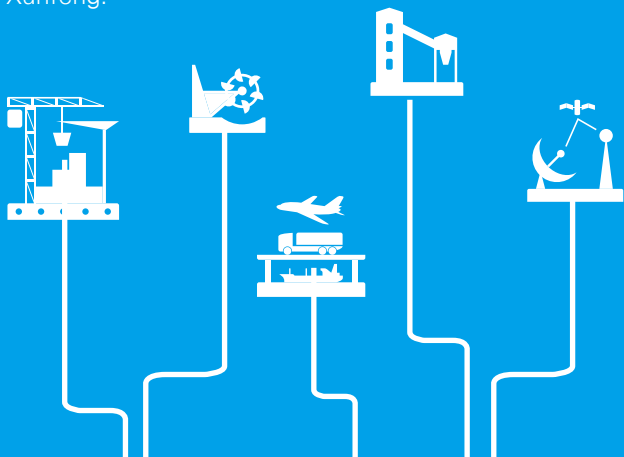
The Huayi Group has managed to build an extensive downstream product range – from steel radial tyres, to fine chemicals, coatings, pigments SAP, MMA, methanol, acetic acid, energy chemicals, advanced polymers like PVC, ABS, PTFE and refrigerants. Its development strategy revolves around three key pillars – resource, market and economic benefits, according to Chairman Liu Xunfeng.

The Group is heavily invested in R&D, with 2 to 3 percent of its total sales revenue annually spent on research, through its own centres, including co-operation with domestic and overseas universities and institutes. It has 35 joint ventures, mainly with multinationals such as BASF, Dupont, Honeywell, Michelin, Akzo Nobel, and others. According to Liu Xunfeng, the main challenge for the group is how to integrate its five core business segments. The chemical industry is becoming more and more market-driven, with intense competition from central SOEs, multinationals and even private companies.

Safety and environment concerns are the second major challenge, especially for mid-sized chemical companies. The one way to meet this pressure is through consolidation and more M&As in the next 10 years. Chairman Liu stated that consumers are becoming increasingly aware about environment issues and chemical companies need to pay more attention to CSR, make efforts to improve technology and reduce pollution. One of Huayi Group's listed companies has already joined the pilot carbon emission scheme, initiated by the government.

For Huayi, the outlook for the chemical downstream sector is still optimistic because of demands due to urbanisation and industrial upgrading.

- Dr. Liu Xunfeng, Chairman, Shanghai Huayi Group



In addition to producing quality products, Chinese companies are also stepping up the quality of their services. Compound fertiliser industry leader Hubei New Yang Feng, also among the Top 500, is an example of a company which has built a national sales team, established a nationwide sales network, and developed a set of advanced marketing concepts and a cutting edge management model. The company has more than 400 expert sales staff, more than 2,000 first-level agents and nearly 30,000 second-level retailers nationwide. They have diversified the company's service content to include soil survey testing, dissemination of fertilisation knowledge, and agricultural management.

Wengfu Group, a Top 30 company, has a strong international reputation and its products sell in more than 30 countries and regions. The company has devoted considerable effort to making its brands 'greener'. Wengfu is a traditional large state-owned enterprise that integrates phosphorite mining with other fertiliser products. Working with hazardous materials, Wengfu is cautious about its global image and relentlessly works on waste utilisation and optimum use of resources at its four major production and R&D bases in Guizhou, Gansu Jinchang, Sichuan Dazhou, and Fujian Shanghang.

Befar Group, also a big league player, exports to 20 countries and is the largest domestic provider of propylene oxide and trichloroethylene, as well as a leading producer of caustic soda and a major player in the chlor-alkali industry. Befar focuses on sustainability and quality by cultivating long-term customers within China and globally. Located in the Shandong peninsula, Befar's production units also make use of a cyclic production chain, which helps it position itself as an environmentally conscious company.

Unlike in the past, Chinese chemical companies are not solely focused on scale economies. Nowadays, they are also keen on developing quality in order to become world-class enterprises on a par with European and American multinationals. The high-end product market, especially in paints, dyes and fine chemicals, continues to be controlled by foreign enterprises. For instance, the industrial gases sector is almost exclusively the domain of Air Liquide, Linde Group, Air Products and Praxair. This remains a major challenge and concern for policy-makers and the industry.



IV. Internationalisation and the power of outbound investments

Establishing world-class chemical companies is one of the important and urgent missions of domestic companies, in addition to securing energy sources. For some years now, cash-rich Chinese companies have been struggling to develop an internationalisation strategy that includes acquiring global talent, carrying out internal reform and making overseas investments and acquisitions.

In fact, it might be said that overseas investments have now reached a turning point. Earlier, large Chinese petrochemical companies showed a tendency to be audacious, targeting big-ticket, sensational acquisitions. This trend has changed, with many now considering mid-cap chemical MNCs for acquisitions. Although Asia remains the leading investment destination for Chinese chemical enterprises, acquisitions in Europe and North America have noticeably increased over the last few years.

China started making a move towards Europe in 2007, and the trend of focusing on targeted acquisitions will continue. In a break from the past, natural resources now account for around 60 percent of these investments, compared to 75 percent in 2010.⁵⁴ The new 'environment and sustainability' objectives of China's 12th Five-Year Plan dovetails with Europe's production system, making investments in advanced chemicals and technology China's new top sector of activity. This strategy of internationalisation has also allowed private companies to finally break through the monopoly of state companies. Unlike large SOEs, private entities seem less threatening, especially when they acquire a minority stake in Western companies. Another advantage is that private companies are able to move more quickly (less government approvals required) than SOEs, which is important in the fast-paced M&A auction process.

SOE strategy: The USD 15.1 billion acquisition of Canadian Nexen by CNOOC in December 2012 was typical of the controversy that surrounds the West's discomfort about deep-pocketed Chinese Government companies taking over strategic assets. In 2005, CNOOC gave up on a USD 18.5 billion bid for Unocal in the United States after political opposition.⁵⁵ In 2010, Sinochem backed away from buying Potash Corporation of Saskatchewan for similar reasons.

But Canada and other Western nations may find it difficult to entirely rebuff the overtures of well-financed Chinese players. Major oil and gas deals require enormous financing, and Canada needs to further develop its oil sands. All of that requires money, which the Chinese Government-owned companies have. Nexen has also run into trouble in

its own backyard. OPTI Canada, Nexen's partner in an oil sands operation in Long Lake, Alberta, went bankrupt after a series of production delays. CNOOC then acquired OPTI Canada for USD 2.1 billion, giving the Chinese company a 35 percent holding in the project.⁵⁶

To help drive China's growth, the government has been amassing natural resources in North America, and in riskier areas like Africa and Venezuela. In North America, Chinese companies have mainly focused on acquiring stakes in energy companies, rather than buying them outright. In July 2012, Sinopec agreed to pay USD 1.5 billion for a piece of the North Sea operations of Talisman Energy, another Canadian oil company.⁵⁷ We are yet to see major Chinese interest in downstream assets, but it is likely to increase as domestic companies expand their portfolios in specialty areas.

Faced with various challenges in their global activities, successful Chinese SOEs have developed a conscious strategy of reform and internationalisation. Sinochem Group has changed its traditional marketing model and become more customer focused, in both the domestic and international markets. It has conducted a thorough process of reform, which involved reorganising its global resources and overhauling its marketing operations.

Sinochem's new industrialisation path entails better control over global resources and more access to international markets. It has successfully implemented an 'upstream-downstream integration' and fine tuned its 'industrial chain management'. In a nutshell, it has adopted a 'merger, acquisition and cooperation' approach, while continually strengthening its primary business chain and strengthening its international operations.

Much of Sinochem's investments are now made upstream. It has announced a planned investment of USD 1.5 billion in the BC-10 oilfield owned by Brazil's Petrobras. The 35 percent stake will mark the third major acquisition Sinochem has made in Brazil's oil and gas market.⁵⁸ The chemical giant's global deployment strategy is mainly in the upstream sector, under which it acquired stakes in 34 oilfields in the US, Brazil, Columbia, Peru, Syria and Indonesia.⁵⁹

54 'Energy sector remains focus of China's ODI', 8th Aug 2012, Xinhua

55 'Canada clears \$15bn Chinese takeover of an energy company', 7 December 2012 New York Times

56 'Canada clears \$15bn Chinese takeover of an energy company', 7 December 2012 New York Times

57 'Sinopec completes \$1.5bn deal with Talisman', 23rd July 2012, Wall Street Journal

58 'Sinochem plans further investment in Brazil's offshore oil', 21st August 2013, Xinhua

59 'Sinochem plans further investment in Brazil's offshore oil', 21st August 2013, Xinhua

Another SOE which is committed to going global is China BlueChemical, a subsidiary of CNOOC. This large-scale, modernised SOE, which is listed in Hong Kong, is engaged in the development, production and sales of mineral fertilisers and chemical products. Along with Chinese company Guoxin, it made a strategic equity investment in Canada's Western Potash Corp this year.⁶⁰ The alliance gives the Canadian company project financing, technical expertise in large-scale project construction and marketing channels for future potash sales. Headquartered in Beijing, China BlueChem's production facilities are located in Hainan Province, Inner Mongolia Autonomous Region and Hubei Province.

Interestingly, the global pesticides sector is also witnessing a lot of dynamism. The Chinese Government expects to see an increased effort by domestic agriculture-chemical companies to sell their own brands in the United States, which would increase China's market share in the global industry.

In 2011, China's largest generic agricultural-chemical company, China National Chemical Corp, or ChemChina, which has achieved annual sales of nearly USD 32 billion, put up USD 2.4 billion to acquire the world's largest generic agricultural-chemical producer, Israel-based Makhteshim Agan Industries Ltd. The deal not only helped ChemChina to expand its production capabilities, but also better positioned the company to break into the US pesticide market.⁶¹

One of the difficulties for any company looking to enter the US, or any other foreign market, is figuring out a way to break into the distribution system. In fact, Chinese companies are being advised to establish local joint ventures in order to enter foreign markets. In 2007, ChemChina and the Blackstone Group of the US established a strategic cooperative partnership, with the latter investing USD 600 million to buy a 20 percent stake in BlueStar, a subsidiary of ChemChina.⁶² Relying on its own advantages in the chemical industry and the international capital advantages of the Blackstone Group, ChemChina announced it would build BlueStar into the world's leading company in the field of new chemical materials and specialty chemical products.

ChemChina and its equally ambitious subsidiary BlueStar have a strong history of overseas M&A. In 2005, ChemChina acquired a 100 percent stake in French Drakkar Holdings, the parent company of Adisseo, at a price of EUR 400 million. The same year it acquired 100 percent shares of Australian company Qenos. In 2006, BlueStar secured a 100 percent acquisition of Rhodia's organic silicone and sulphide business.⁶³

Early on, ChemChina shifted its focus to new chemical materials and rapidly became an industry leader. It then went on to secure a large share of the world market through international M&A. It has acquired six overseas companies through M&A in recent years and owns production bases, R&D centres and marketing offices in up to 140 countries and regions.

Mid-level acquisitions are also increasing. China is fast evolving beyond its energy obsession and is now focusing on downstream chemical sectors as well. Chinese policy-makers are equally keen that domestic chemical companies undertake overseas investments to entrench themselves as part of the global value chain; as a result, these companies are increasingly looking to acquire targets in developed, overseas markets.

Growing political and financial support from the local and central government is also pushing Chinese companies to go abroad. In July 2013, the State Council said the financial sector should support economic structural adjustment and industrial upgrades, partly by helping Chinese companies to go abroad. The Ministry of Industry and the NDRC also released guidelines to promote M&A deals in some important industries.⁶⁴

Chinese companies have conducted a total of 1,145 outbound M&A deals since 2008. The total value of outbound M&A deals in 2012 was USD 141.3 billion, which was the highest in the last five years. SOEs have led most M&A deals in the energy sector, but now mid-level companies too are taking the plunge. Between 2008 and 2012, there were 12 outbound M&A deals in the chemical sector, with a combined value of around USD 6.9 billion.⁶⁵

In fact, many Chinese investors are eyeing acquisitions in developed countries across a range of industries, including chemicals, solar, wind, autos and aviation. A number of recent M&A transactions highlight how cash-rich local companies are highly motivated to seek higher returns and upgrade their technology.⁶⁶

Zhejiang Longsheng Group (Lonsen) also has a bold strategy of internationalisation. It is trying to acquire requisite skills and experience for overseas investments. [See case study]

60 'Western Potash Corp. receives strategic investment from China BlueChemical', 2 June 2013, Western Potash

61 'Chinese pesticide firms aim to grow US market share', 16 August 2013, China Daily

62 ChemChina Website

63 ChemChina Website

64 'Chinese firms on the hunt for distressed US assets', 12 July 2013, FinanceAsia

65 Mergermarket Data

66 'Chinese firms on the hunt for distressed US assets', 12 July 2013, FinanceAsia

Zhejiang Longsheng Group: Building brand overseas

Zhejiang Longsheng Group (Lonsen) one of the top 50 chemical companies in China, has a bold strategy of internationalisation. In 2010, it acquired German company DyStar and gained a substantial hold of the global dyestuff market. With this acquisition, Lonsen became the world's largest textile chemical producer, controlling more than 20 percent of the global market, and also contributed to improving Chinese chemical brands internationally.

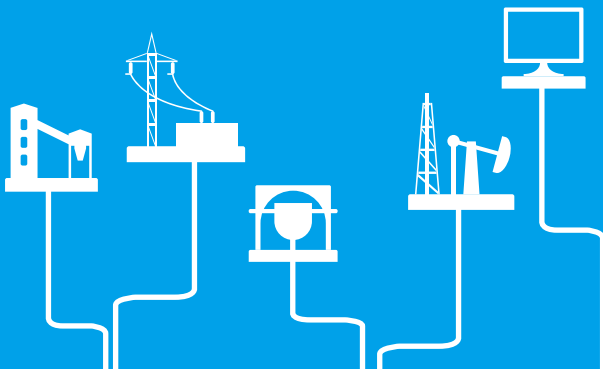
Lonsen benefited highly from DyStar's valuable patents, brands, network, sales channel and technology. At the same time, DyStar saw a revival with Lonsen's capital inputs, product layout and management. After the acquisition, in order to be close to the market, DyStar's headquarters moved from Germany to Singapore and its sourcing and sales hub moved to China. Lonsen spent USD 200 million to complete the process of corporate restructuring.

According to Chief Financial Officer, Luo Bin, Lonsen's ultimate ambition is to be a leading global chemical company. For this, it is acquiring experience and talent to conduct more outbound investments, especially in the fine chemicals segment, where big SOEs are absent.

Mr. Luo feels in the next decade, sustainability will be a major focus area for Lonsen – both as a challenge and opportunity. The company will need to balance environmental protection targets and business costs. As a leader in the dyestuff industry, Lonsen tries to play a proactive role in energy saving and emission reduction by adapting recycling practices, Mr. Luo said.

The company has a strong product base, ranging from textile and construction chemicals, to fine chemical, intermediaries and inorganic chemicals. With an annual production capacity of 1 million tonnes, it distributes its products to more than 70 countries and regions. Through its product chain, Lonsen also follows the principles of circular economy and sustainability.

- Luo Bin, Chief Financial Officer, Zhejiang Longsheng Group



The Wanhua Industrial Group, a Chinese polyurethane raw materials producer, acquired a majority stake in BorsodChem Zrt, a Hungary based chemical group involved in production and processing of plastic raw materials and isocyanate, during the period 2010-2011, for a total consideration of EUR 1.26 billion. The transaction enabled Wanhua to enter the European market.⁶⁷

During the period 2010-2011, Sino Polymer New Materials Co., one of the newer companies based in Hong Kong, signed a definitive agreement to be acquired by China's Lumena Resources. Sino Polymer is engaged in mining, processing and manufacturing of natural thenardite products. Lumena Resources Corp., a listed China based company headquartered in Chengdu, is an investment holding entity engaged in processing and sale of powder

thenardite, specialty thenardite and medical thenardite, as well as the mining, processing and manufacturing of natural thenardite products. The acquisition matches Lumena Resources's strategy of vertically integrating the business by exploring downstream business expansion opportunities.

Another company with world-wide expansion plans is Hubei Yihua Chemical Industry, which struck a sensational deal with the large Russian ammonium and urea producer Togliattiazot in 2012. The firm is one of Russia's largest chemical combines, with an annual production capacity of up to 3 million tonnes of ammonia. The deal will allow the Chinese enterprise to significantly strengthen its positions in prospective European and US markets, which are the primary sales markets of Togliattiazot.⁶⁸

67 'VCP Vienna deal announcement', 1 February 2011

68 'Hubei Yihua Chemical acquires production plant in Russia', 15 August 2012, Demotix

Similarly, in February 2012, YongLe Tape Ltd. acquired CHT (Holdings) Ltd., a Singapore based manufacturer of adhesive products, polyvinyl chloride film and pressure sensitive adhesives. YongLe is a China based acquisition vehicle created by Shaw Kwei & Partners Ltd., a private equity firm. The acquisition was meant to expand the scale of operations for CHT and enable YongLe to obtain leverage in new markets and enhanced profits, as well as higher revenues and turnover.

Fulida Group Holdings, a China based conglomerate engaged in textiles business, acquired Neucel Specialty Cellulose, a Canadian cellulose producer in 2011. The acquisition provided Fulida with a stable supply of dissolving pulp, along with cost advantages and quality assurance. In addition, by becoming a wholly owned subsidiary of Fulida, Neucel also expects to gain new markets and growth opportunities.

Another major company which made a daring investment abroad is Zhejiang Hengyi Group, of the Hengyi Group Founded in the 1990s, Hengyi is a large private enterprise with a highly integrated industrial chain. The company's wholly-owned subsidiary, Zhejiang Hengyi Petrochemical Co., will construct an integrated refinery and aromatics complex at Pulau Muara Besar, Brunei. To date, this is the largest overseas investment project set up by a private Chinese petrochemical company. The approval for the complex was granted in February 2013. The total investment amounts to USD 4.32 billion — \$1.5 billion is self-financed by Zhejiang Hengyi and the remaining \$2.82 billion is secured through bank loans.⁶⁹

China's synthetic rubber industry has also been very active in overseas M&A and has promoted its 'go-global' activities. In 2012, Dalian Rubber & Plastics Machinery Co. and Tianjin Machinery Import & Export Corporation jointly invested RMB 110 million to purchase Buzuluk (Czechoslovakia), holding 90 percent and 10 percent shares in BUZULUK, respectively.⁷⁰ This gives Dalian Rubber access to advanced technologies and marketing channels in Eastern Europe.

The rubber company Sailun Ltd. was established in Tay Ninh, Vietnam at a cost of USD 95 million, and is mainly engaged in tyre production and R&D of mold equipment and rubber products. Hangzhou Zhongce Rubber Co. will construct tyre projects in Thailand.⁷¹ The company is a top Chinese tyre manufacturer and also a top 10 global tyre company.

In order to leapfrog to the next stage of strength and competitiveness, Chinese companies are sharpening their skills and instincts in acquiring the best overseas assets. A robust period of M&A in the global chemical industry therefore lies ahead. According to KPMG, market conditions are now better and more supportive of these transactions, which may have been in the works for several years.

Most M&A deals in the chemical sector will involve companies moving up the value chain. There will be a trend towards middle-sized deals, and big deals, if they come, will mostly emanate from emerging markets such as China or the Middle East, which seem to be under government pressure to continue to expand and develop downstream.⁷²

69 'Hengyi Petrochemical's Brunei-based PX project gets approval', 26 February 2013, CCFEI

70 'China's rubber industry promotes M&A and go-global strategies', March 2013, China Chemical Reporter

71 'China's rubber industry promotes M&A and go-global strategies', March 2013, China Chemical Reporter

72 'A global chemical merger-acquisition season could soon take off', 19 March 2013, ICIS



V. Challenges facing the chemical industry

Despite the opportunities and growth drivers available to Chinese chemical companies, both within China and abroad, there are formidable and complex challenges ahead. The three most visible problems are the challenge of feedstock change, the sustainability crisis, and human resource management.

Complexities of feedstock change

China has been grappling with alternate sources of feedstock, but there are several challenges to overcome before making drastic changes to the nature of supply. The chemical industry is without a doubt heavily exposed to global feedstock developments, and with China itself a new player in the alternative feedstock sector, the future could become increasingly complex for end user-chemical companies.

Changing the energy mix will inevitably impact chemical companies. Dramatic changes in the US energy and petrochemical sectors are a precursor to what China may face in future. The American shale gas bonanza has brought cheap natural gas into the market and existing cracker capacities have switched from heavy feedstock to lighter feedstock — new gas crackers are replacing existing naphtha capacity.

While this technological change has been achieved smoothly in the US, doubts remain as to whether China will be able to handle a similar feedstock shift. As noted in Section 1, China continues to invest heavily in naphtha-based ethylene capacities, with mega investments lined up between 2012 and 2017.

At present, it leads the world in the expansion of ethylene and propylene production. In terms of feedstock, the country's crackers are heavily dependent on the refining sector and naphtha represents 75 percent of the feedstock slate.⁷³ In view of this dependence, Chinese policy-makers are rushing to tap the country's immense shale gas potential and harness its ample coal reserves to promote coal-to-gas technology.

The question is — has China made sufficient strides in bringing alternate feedstock into production? It is easy to observe that, despite all the hype, this process is still at a very early stage of development.

The shale gas sector is only just being explored, while the 'coal as feedstock' model faces huge hurdles. China is using its abundant coal resources to develop coal-to-gas and then produce synthetic natural gas through gasification, purification and methanation. The technology is well developed and the process is relatively simple.

However, coal-to-gas is still at a very early stage. So far, not a single coal-to-gas plant has started commercial production. Around 2010, a large number of enterprises planned such projects, but the state soon ordered all coal chemical projects to stop at once. Now, the NDRC has once again approved four coal-to-gas projects.⁷⁴

Despite the approvals, major challenges remain — coal-to-gas projects have long industrial chains and require very large investments, which may not be forthcoming in the short term. China's pipeline capacity is insufficient and long distance pipelines call for huge capital costs. Furthermore, complying with stringent environmental protection requirements is a major issue. Coal-to-gas processes consume great quantities of water. At best, an efficiently-run plant producing 4 billion cubic metres of gas annually will consume around 16 million tonnes of fresh water a year.

Sustainability solutions

Sustainability continues to be a pressing issue for the chemical industry. Although companies today are taking major steps to create a more sustainable sector, more needs to be done. Pursuing a sustainable agenda is 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.

Unlike the situation in many forward looking Western companies, where sustainability has become a top business initiative, Chinese management teams are yet to work out long term plans. It will be some time before they fully embrace the concept that sustainability not only reduces environmental impacts and carbon footprints, but also provides opportunities to significantly lower costs and meet both customer and consumer requirements.

Although leading Chinese companies view sustainability as a growth driver for new markets, their primary focus is still on increasing the scale of their operations and entering new overseas markets. Industry analysts believe that the continual increase in the number of Chinese companies opting for acquisitions in Europe and America will trigger a greater commitment to sustainability. The experience of Chinese pesticides companies forging joint ventures in the US has resulted in greater compliance with international safety standards.

Enterprises producing dangerous chemicals are taking steps to eliminate high risk, polluting and high energy consumption, but the key question is whether the Chinese chemical industry is doing enough to change the industry paradigm.

⁷³ 'BMI China Petrochemicals Report Q3 2012'

⁷⁴ 'Coal to gas enters new development stage', 21 August 2013, China Chemical Reporter

The Chinese Government has outlined its goals with regards to sustainability —cutting carbon emissions on an ambitious scale and promoting clean energy. The country will soon use scientific methods to record enterprises' carbon emissions in major industries and find ways to allocate emissions quota appropriately, as preparations for a nationwide carbon emissions trading market begin.

The government has planned pilot carbon emissions trading schemes in seven provinces and cities in 2013 and 2014 to curb greenhouse gas emissions with the help of a market mechanism.⁷⁵

The carbon intensity, or the amount of carbon produced per unit of gross domestic product, of the 635 industrial companies involved will drop by 32 percent as compared with 2010 levels by 2015. Under the trading program, those that emit below their quotas may sell their surplus emissions to other emitters, or even to investors, for a profit. Following Shenzhen, six other areas — Beijing, Tianjin, Shanghai, Chongqing, Hubei and Guangdong — will soon launch the scheme.

As part of the project, Shanghai announced that companies with annual CO₂ emissions exceeding 20,000 tonnes in ten industrial sectors, including petrochemicals and chemicals, must obtain a carbon allowance, manage and report their carbon emissions, and get their emission reports verified by a qualified, third-party verification body.

The challenge for the government is to persuade heavy industries, including the chemical sector, to balance profit growth with environmental protection. Companies in the chemical, steel and cement sectors have expressed willingness to participate in carbon emissions trading, but fundamental structural problems need to be resolved before the scheme can succeed. China has pledged to reduce carbon dioxide emissions by 40 to 45 percent per unit of GDP by 2020, compared with the levels in 2005, but it still relies heavily on energy-consuming, high-polluting industries for economic development and poverty relief.

Experts and industry leaders, however, warn of potential difficulties in terms of legislative laws, carbon financing, statistics gathering, quota allocation, and monitoring and assessment systems, all of which are key to building a mature market. There is a danger that carbon emissions trading will remain an inefficient market until these problems are solved.

Sustainability, however, cannot remain the sole preserve of the government, which is why big companies will need to shoulder their share of responsibility. Some

enterprises are achieving this by investing in new products, seeking alternative feedstock, communicating with all stakeholders, and training supply chain participants to be more environmentally conscious. The chemical industry is becoming increasingly aware of the importance of transparency and of reporting their activities in a manner that stands up to high standards of global scrutiny.

Last year, KPMG surveyed companies who agreed that sustainability will become an integral part of their strategic planning process and key business decisions.⁷⁶ Despite these good intentions, difficulties remain in overcoming the knowledge gap, as most organisations are unable to link their business strategies to larger sustainability goals. In future, China will only be able to make a smooth transition to a cleaner economy if chemical companies succeed in making sustainability a core business practice that is deeply embedded in their cost and profit structures.

Smarter management

Over the past few years, there has been a greater realisation that Chinese enterprises follow different management practices to global multinationals. Many large companies remain over-staffed with excessive hierarchical layers. The situation is more serious at SOEs, which have dozens of functional departments, over-lapping management levels and low levels of working efficiency.

Industry leaders recognise the need to constantly innovate and reform company structures, especially with global markets and raw material sources becoming increasingly complex and competitive. Top management teams need to attract talented employees to their companies who are capable of driving diversification, internationalisation and introducing flexibility to company operations.

A number of companies are beginning to understand the importance of standardising corporate governance structures. In the past, cultural differences have led to hurdles in the post-integration phase of M&A deals, which is why top enterprises are beginning to invest in human resources and are making greater efforts to retain talents.

China has become increasingly integrated into the global supply chain and a greater number of chemical companies are planning overseas investments as a key way of taking their businesses to the next stage of development. In fact, many companies now see overseas direct investment as a channel for achieving a transformation of their business and a way of overcoming skills barriers, according to a recent KPMG survey report.⁷⁷ It is therefore essential that Chinese companies effectively restructure their internal management and staff training programmes.

⁷⁵ 'Carbon emissions trading gains momentum in China, despite challenges', 21 July 2013, Xinhua

⁷⁶ 'China's chemical industry enters new era with sustainability', September 2013, KPMG

⁷⁷ 'The dream goes on: Rethinking China's globalisation', August 2013, KPMG

Also, China-based chemical manufacturers are increasingly working with foreign multinationals, Western research institutions and global supply chain companies. They need to maintain close working relationships across their supply chain, understand the motivations of their trading partners and determine the best way to work together. An increase in overseas acquisitions will require a new breed of managers who can control operations in a foreign culture. This requires a new spirit of partnership, transparency and visibility.

Summary: The modern Chinese chemical industry is based on the two pillars of self sufficiency and sustainability. This has thrown up a large number of 'local champions' who represent formidable competition to global companies. While SOEs have scaled up their operations and ambitions abroad, private companies have also consolidated their operations, becoming more competitive and profitable and restructuring their management systems. The data of the last 10 years indicate that Chinese companies have graduated from makers of bulk chemical raw materials to upgraded products and are now keen to conquer overseas markets. However, as the Chinese chemical industry grows bigger, it faces a number of increasingly complex challenges. From feedstock to HR issues, every level poses its own difficulties. There is still a long way to go, but the whole world should be aware that this is an era of rapid and far-reaching transformation in China's chemical industry.



Contact us

KPMG China

Norbert Meyring

Partner, China and Asia Pacific
Head, Chemicals
KPMG China
T: +86 (21) 2212 2707
E: norbert.meyring@kpmg.com

Daisy Jia

China and Asia Pacific Executive
Chemicals
T: +86 (21) 2212 2753
E: daisy.jia@kpmg.com

Leah Jin

Partner, Risk Consulting
KPMG China
T: +86-(21) 2212 3633
E: leah.jin@kpmg.com

Miguel Montoya

Partner
Transaction and Restructuring
KPMG China
T: +86 (21) 2212 3590
E: miguel.montoya@kpmg.com

Rainbow Wang

Partner
Transaction and Restructuring
KPMG China
T: +86-(21) 2212 3557
E: rainbow.wang@kpmg.com

Terry Chu

Partner in Charge
Industrial Markets
KPMG China
T: +86 (10) 8508 7017
E: terry.chu@kpmg.com

Cheng Chi

Partner, Transfer Pricing
KPMG China
T: +86 (21) 2212 3433
E: cheng.chi@kpmg.com

William Zhang

Partner, Tax
KPMG China
T: +86 (21) 2212 3415
E: william.zhang@kpmg.com

Ross Macallister

Director, Management Consulting
KPMG China
T: +86 (10) 8508 7078
E: ross.macallister@kpmg.com

KPMG Global Chemicals

Mike Shannon

Global Chair, Chemicals
KPMG in the US
T: +1 973 912 6312
E: mshannon@kpmg.com

Paul Harnick

Global Sector Executive, Chemicals
KPMG in the US
T: +1 215 407 1911
E: paulharnick@kpmg.com

Acknowledgement

This report was developed by KPMG's China Chemical team, with contributions from numerous KPMG subject-matter experts. We gratefully acknowledge the following team members who contributed their understanding, insight, experience and administrative support for this report – Suranjana Roy Bhattacharya, Daisy Jia, Paul Harnick, Kevin Huang, Jason Yu, Joyce Zhao, Limin Tang, Daniel Clutton, and Tanya Jayasuriya.

We are also grateful to our interviewees, Dr. Albert Heuser from BASF, Mr. Emmanuel Schmidt from Air Liquide China, Mr. Zhao Lizhi from Tianjin Bohai Chemical Industry Group, Mr. Ding Jiansheng from Wanhua Industrial Group, Mr. John Sun from Chemtura Europe GmbH, Dr. Liu Xunfeng from Shanghai Huayi Group and Mr. Luo Bin from Zhejiang Longsheng Group.

Mainland China

Beijing

8th Floor, Tower E2, Oriental Plaza
1 East Chang An Avenue
Beijing 100738, China
Tel : +86 (10) 8508 5000
Fax : +86 (10) 8518 5111

Chengdu

18th Floor, Tower 1, Plaza Central
8 Shuncheng Avenue
Chengdu 610016, China
Tel : +86 (28) 8673 3888
Fax : +86 (28) 8673 3838

Chongqing

Unit 1507, 15th Floor Metropolitan Tower,
68 Zourong Road,
Chongqing 400010, China
Tel : +86 (23) 6383 6318
Fax : +86 (23) 6383 6313

Foshan

8th Floor, One AIA Financial Center
1 East Denghu Road
Foshan 528200, China
Tel : +86 (757) 8163 0163
Fax : +86 (757) 8163 0168

Fuzhou

25th Floor, Fujian BOC Building
136 Wu Si Road
Fuzhou 350003, China
Tel : +86 (591) 8833 1000
Fax : +86 (591) 8833 1188

Guangzhou

38th Floor, Teem Tower
208 Tianhe Road
Guangzhou 510620, China
Tel : +86 (20) 3813 8000
Fax : +86 (20) 3813 7000

Hangzhou

8th Floor, West Tower, Julong Building
9 Hangda Road
Hangzhou 310007, China
Tel : +86 (571) 2803 8000
Fax : +86 (571) 2803 8111

Nanjing

46th Floor, Zhujiang No.1 Plaza
1 Zhujiang Road
Nanjing 210008, China
Tel : +86 (25) 8691 2888
Fax : +86 (25) 8691 2828

Qingdao

4th Floor, Inter Royal Building
15 Donghai West Road
Qingdao 266071, China
Tel : +86 (532) 8907 1688
Fax : +86 (532) 8907 1689

Shanghai

50th Floor, Plaza 66
1266 Nanjing West Road
Shanghai 200040, China
Tel : +86 (21) 2212 2888
Fax : +86 (21) 6288 1889

Shenyang

27th Floor, Tower E, Fortune Plaza
59 Beizhan Road
Shenyang 110013, China
Tel : +86 (24) 3128 3888
Fax : +86 (24) 3128 3899

Shenzhen

9th Floor, China Resources Building
5001 Shennan East Road
Shenzhen 518001, China
Tel : +86 (755) 2547 1000
Fax : +86 (755) 8266 8930

Tianjin

Unit 15, 47th Floor, Office Tower
Tianjin World Financial Center
2 Dagu North Road
Tianjin 300020, China
Tel : +86 (22) 2329 6238
Fax : +86 (22) 2329 6233

Xiamen

12th Floor, International Plaza
8 Lujiang Road
Xiamen 361001, China
Tel : +86 (592) 2150 888
Fax : +86 (592) 2150 999

Hong Kong SAR and Macau SAR

Hong Kong

8th Floor, Prince's Building
10 Chater Road
Central, Hong Kong
23rd Floor, Hysan Place
500 Hennessy Road
Causeway Bay, Hong Kong
Tel : +852 2522 6022
Fax : +852 2845 2588

Macau

24th Floor, B&C, Bank of China Building
Avenida Doutor Mario Soares
Macau
Tel : +853 2878 1092
Fax : +853 2878 1096

kpmg.com/cn

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavour to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act upon such information without appropriate professional advice after a thorough examination of the particular situation.

© 2013 KPMG Advisory (China) Limited, a wholly foreign owned enterprise in China and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. All rights reserved. Printed in Hong Kong.

The KPMG name, logo and "cutting through complexity" are registered trademarks or trademarks of KPMG International.

Publication number: CN-IM13-0001

Publication date: September 2013