FICCI

INDIA CHEM 2014

Spurting the growth of Indian Chemical Industry

Handbook on
Indian Chemicals and Petrochemicals Sector

October, 2014









Knowledge Partner & Strategy Consultant

TATA STRATEGIC MANAGEMENT GROUP

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प्रधान मंत्री

Prime Minister

MESSAGE

I am happy to know that the Department of Chemicals and Petrochemicals, Government of India, in collaboration with the Federation of Indian Chambers of Commerce and Industry is organizing the 8th Biennial International Exhibition and Conference, 'INDIA CHEM 2014' on 9-11 October, 2014.

I hope 'INDIA CHEM 2014' will help India in enhancing trade and investment environment which is beneficial to all stakeholders in the Chemicals and Petrochemicals Industry.

On this occasion, I convey my best wishes to the organizers and participants of 'INDIA CHEM 2014'

(Narendra Modi)

New Delhi
18 September, 2014



Message

The Indian chemical industry is a critical part of the Indian economy. The industry contributed approximately 6% to the country's GDP and accounted for ~13% of the total Indian exports in 2013. With more than 80,000 products for downstream industries like automotive, textiles, pharmaceuticals, personal care, consumer durables, construction & engineering, food production and processing, the Indian chemical industry is playing a critical role in nation building and enhancing the quality of life.

The Indian chemical industry stood at INR 819,000 Cr.(USD 140 Bn) in 2013 which accounts for ~3% of the global chemical industry. Increasing urbanization and per capita disposable income is resulting in a strong growth outlook for several key end use industries. This will positively impact the growth in Indian chemical industry and sustained growth of the sector is expected. The sector has huge unrealised potential which needs to be facilitated.

I am happy to note that Department of Chemicals and Petrochemicals, Government of India and FICCI are jointly organising the India Chem 2014 which will bring focus to this important sector and discuss its issues as also the way ahead. I am also sure, this Handbook will also be found very useful by all. I wish India Chem 2014, all the success.



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Dr A. Didar Singh
Secretary General



Message

The Indian chemical industry is an integral component of the Indian economy. The industry is a vital part of the agriculture and industrial development in India and has key linkages with several other downstream industries such as automotive, consumer durables, engineering, food processing etc. The industry produces and supplies more than 80000 products. With Asia's increasing influences as a key consumption region, India emerges as one of the focus destinations for chemical companies worldwide.

This sector has huge unrealised potential. I am happy to note that FICCI jointly with Department of Chemicals & Petrochemicals, Government of India is organizing India Chem 2014 which includes an international exhibition and Conference. A Handbook on Chemicals & Petrochemicals Industry is also being brought out which provides detailed picture of the sector as also strategy for growth. The conference will debate important issues being faced by the sector and help in chartering the way forward.

I wish India Chem 2014 all success.

A Didar Singh

Foreword



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This report on Indian Chemical and Petrochemical Industry is a part of TATA Strategic Management Group (TSMG) Chemical Practice's endeavor to highlight the importance of chemical industry for the Indian economy. TSMG has been regularly tracking the trends in chemical and associated industries. The resulting knowledge and experience gives us an additional advantage to prepare this report.

This report encompasses an assessment of the chemicals industry in India, within the context of the global industry, and the opportunities and challenges it presents. The country's chemical industry was estimated at USD 118Bn in 2013 and we believe that it has the potential to reach USD 173billion by 2018 growing at a CAGR of 8 percent. The growth is expected to be driven by rising demand in end-use segments and expanding exports fuelled by increasing export competitiveness.

The new Government is giving thrust on some of the key ease of doing business parameters like setting up a fully functional single-window system for all clearances, reforming labour laws and easing the land acquisition rules which would give necessary push to 'Make in India'. We sincerely believe that India has the potential to become a global chemical manufacturing hub if the government and domestic players rise up to the challenge.

We are grateful to the inputs provided by industry leaders who agreed to interact with us. Their knowledge and guidance helped us shape the report.

The report is a result of FICCI's objective to highlight the importance of chemical industry in national economy and business opportunities present in the sector. We are thankful to FICCI for providing us an opportunity to develop a report which can play a pivotal role in achieving this objective.

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Executive Summary

This report on Indian Chemical and Petrochemical Industry is developed by Tata Strategic Management Group with support of FICCI as the knowledge paper for the India Chem 2014 conference.

Global chemical market size was estimated at USD 3.9 trillion in 2013 and is expected to grow at 3-4% per annum over the next 5 years to reach USD 4.7 trillion by 2018. India currently accounts for approximately 3% of the world chemical market. The Indian chemical and petrochemical industry expanded in 2013 despite weakness in key export markets and subdued growth in the domestic market.

The Indian chemical and petrochemical industry currently stands at USD 118 Bn and is expected to grow at a CAGR of 8% for the next five years. The share of this sector in the manufacturing GDP was 15% during 2012-13 and it accounted for ~9% of the total India's exports. Bulk chemicals form the largest sub-segment of Indian chemical industry with 40% market share whereas specialty chemicals with ~19% market share is the fastest growing segment. Together, Gujarat, Maharashtra and Uttar Pradesh account for more than 50% of Gross Value Add (GVA) and Gross Output of the chemical and petrochemical industry.

The current low per capita consumption across industries and segments and strong growth outlook for the key end use are the key growth drivers for this industry. To meet the increasing demand either the local production will have to ramp up or it will be met by imports. In the past decade, India didn't tap its manufacturing potential to the fullest which led to a surge in the chemical imports. Net imports have grown at ~20% between FY09 and FY13 where in the same period the domestic output has grown by ~4%.However, going forward, 'Made in India' could become the next big manufacturing growth story. The Government has set an ambitious plan of increasing the share of manufacturing in GDP from 16% to 25% by 2022.

To realize this dream the Government will need to address some of the pressing problems like availability, allocation and pricing of key feed stocks and providing for adequate infrastructure. Competitiveness of domestic manufacturers is also marred

due to lack of R&D capabilities, access to advanced technology, and talented human resources, all of which will need to be overcome. The R&D intensity of Indian companies has been limited, but it is expected that R&D investment for companies in India is expected to grow above2% of their revenues thereby bridging the competitive gap to a certain extent. The industry is also observing increasing tie ups of industry and academia which will facilitate the technology access further.

Innovation is a good way to ensure sustainability over a long term and address challenges occurring due to recession, cyclicality etc. Innovation is not only constrained to R&D but is applicable to the entire value chain. Innovations in market delivery, supply chain, go to market propositions etc. could help increase competitiveness. Indian manufacturers have been developing market access quite strongly with increased understanding of regional needs and more focus on brand development. Development of these assets will most certainly provide competitive advantage to domestic manufacturers.

CONCLUSION

Strong end use industry growth is expected to boost demand of the chemical products and thereby offers an opportunity for chemical companies to grow. The focus of Government is going to be on ensuring that this demand be met through domestic production. Strong outlook for chemical demand is likely to result in significant investment in capacity additions and hence import substitution.

However, increasing local production requires global competitiveness to withstand imports as well as for exports of surplus. Key success factors needed are availability of feedstock at competitive cost, value chain access, access to advanced technology and low cost capital, investments in R&D and talent development.

Adoption of integrated cluster in cluster approach can enhance the competitiveness of domestic manufacturing for both domestic and multinationals. India is today seen as a growth market for large MNCs who are looking to expand in Emerging markets. Domestic companies have built significant assets and have the opportunity to leverage the same. It could be worthwhile to explore partnerships, in select areas, for mutual beneficial development.

Overview of Indian Chemical Industry

Chemical industry is a knowledge as well as capital intensive industry. It plays a significant role in the global economic and social development. It is also a human resource intensive industry and hence employs a large number of people. Globally, more than 20 million people are expected to be employed in this industry. The diversification within the chemical industry is large and covers more than eighty thousand commercial products.

Indian chemical industry comprises of both small scale as well as large scale units. The large scale units are able to set up capital intensive projects with long gestation periods. While the fiscal incentives provided to small scale units earlier led to development of large number of small and medium enterprises (SME). Over the last five years Indian chemical industry has started to evolve rapidly.

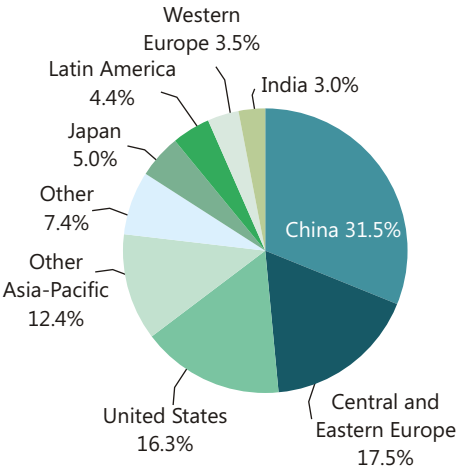
With a large talent pool available, the focus has also been towards investments in R&D. India's competence in this knowledge intensive industry is increasing; however the tapped potential is very limited. The current low per capita consumption (~10 kgs for polymers in India as compared to world average of 25 kgs) suggests that the demand potential is also yet to be realized. Moreover India has a very strong outlook for the key end user industries (e.g. Packaging is expected to grow at ~15% p.a. over the next five years, Electronic is expected to grow at ~12% p.a. over the next five years, Construction and Automotive both sectors are expected to grow at ~12% p.a. over the next five years). Hence, going ahead the demand of chemical products is expected to surge at 7-8 % p.a. over the next five years.

SIZE AND CHARACTERSTICS

Global chemical market size was estimated at $3.9 trillion in 2013* and is expected to grow at 5-6% per annum over the next decade to reach ~$5.1 trillion by 2018. Despite its large size and significant GDP contribution, Indian chemical industry currently accounts for only ~3 % of the world chemical market.

Geographical breakdown of global chemical shipments in the year 2013:

Country/Region	Sales (US$ billion)
China	1228
United States (US)	635
Central & Eastern Europe	682
Japan	211
Latin America	172
Western Europe	136
India	118
Other Asia-Pacific	484
Others	233



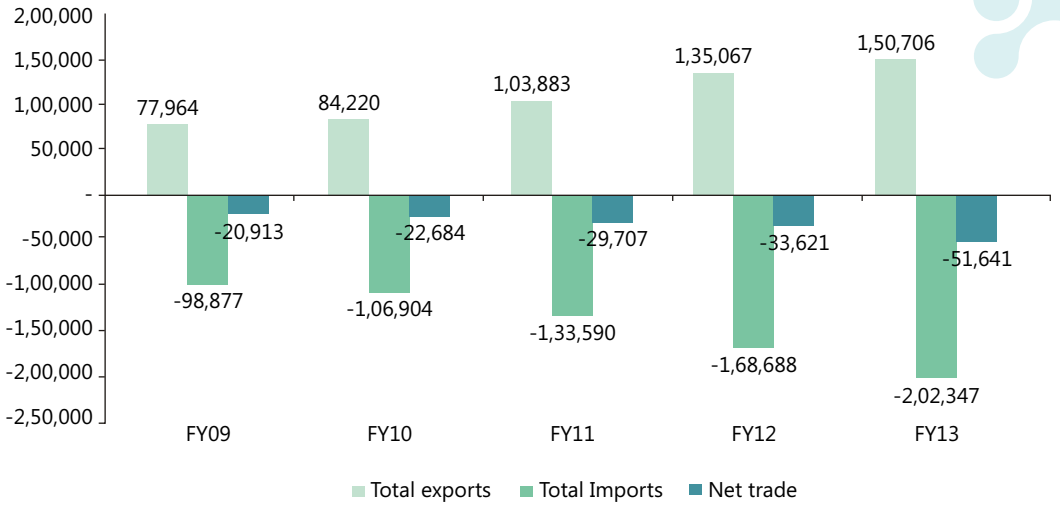
**Source: Cefic Report 2013, Analysis by Tata Strategic*

CURRENT SCENARIO

Chemical and chemical products sector accounted for 2.11% of the GDP (at 2004-05 prices) in 2012-13, compared to 2.06% in 2011-121. The share of this sector in the GDP for manufacturing sector at 2004-05 prices was 15% during 2012-13.

The export of major chemicals & petrochemicals was Rs. 1,50,706 crore during 2012-131. It contributed 9.2% of the total exports during 2012-13 and 2011-12. The import of major chemicals & petrochemicals was Rs. 2,02,347 crore during 2012-13. Its share in the total imports was 7.6% during 2012-13, compared to 7.2% during 2011-12.Net imports have grown at ~20% between FY09 and FY13 (Fig 1). Import - Export trend from FY09 to FY13 is shown below:

Figure 1: Import – Export Scenario of Indian Chemical Industry (in Rs.Crore)

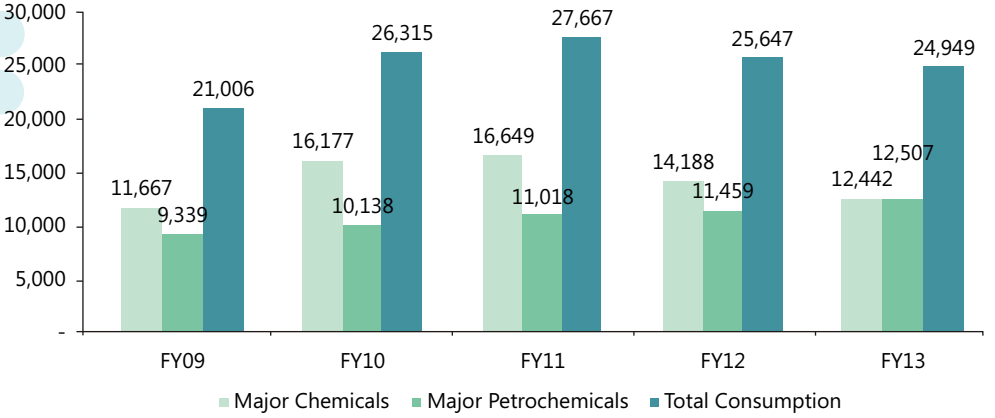


**Source: Chemicals & Petrochemical Statistics at a Glance: 2013*

Consumption of major chemicals has also witnessed 6% CAGR between 2009 and 2013 (Fig 2). At the end of 2013, annual consumption figures of major chemicals and petrochemicals stood at 24 MMTPA. Top seven States, namely, Gujarat (33.5%) Maharashtra (19.7%), Uttar Pradesh (6.0%), West Bengal (5.0%), Himachal Pradesh (4.7%), Tamilnadu (4.1%) and Andhra Pradesh (4.1%), contributed 77.2% in the Gross Value Added (GVA) for the chemical & chemical products sector and the same seven States, namely, Gujarat (30.6%) Maharashtra (16.3), Uttar Pradesh (5.4%), West Bengal (6.4%), Himachal Pradesh (3.1%), Tamilnadu (5.3%) and Andhra Pradesh (5.8%), contributed 72.8% in Value of Output.

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Figure 2: Major Chemical Consumption Trends in India (in 000'MT)



**Source: Chemicals & Petrochemical Statistics at a Glance: 2013*

INDUSTRY SEGMENTS

Chemical industry is broadly classified as the following sub groups:

1. **Bulk Chemicals:** It includes basic organic chemicals (methanol, acetic acid etc.) and basic inorganic chemicals (caustic soda, chlor alkali etc.).

2. **Specialty Chemicals:** Specialty Chemicals, also known as performance chemicals, are low-volume but high-value compounds. These chemicals are derived from basic chemicals and are sold on the basis of their function. Paint, adhesives, electronic chemicals, oilfield chemicals are some examples of specialty chemicals.

3. **Agro Chemicals:** Chemicals essentially meant for protecting agriculture crops against insecticides and pesticides are covered under this sub-group.

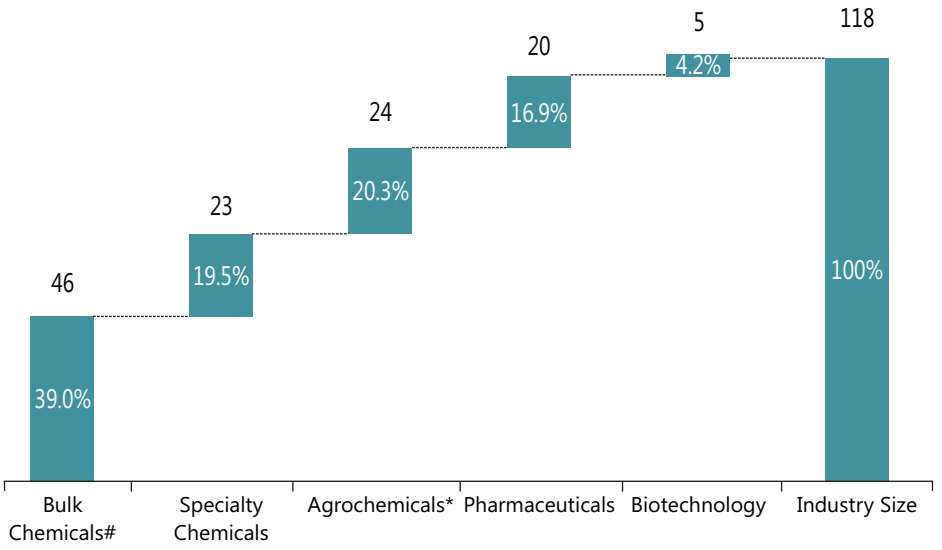
4. **Petrochemicals:** Petrochemicals are chemical products derived from petroleum. The two most common petrochemical classes are olefins (including ethylene and propylene) and aromatics (including benzene,

toluene and xylene isomers).

5. **Fertilizers:** Fertilizer is any organic or inorganic substance which supplies chemical elements required for plant growth. Fertilizer sector manufactures critical raw materials for agriculture which is a major occupation of the country.

Of the five segments, Bulk chemicals (~39% share)is the largest followed by agro chemicals (~20%) and then specialty chemicals (19%). In terms of potential growth, specialty chemicals is the fastest growing segment followed by bulk chemicals.

Figure 3: Sector-wise Breakdown of Indian Chemical Sales in FY13 (in USD Bn)



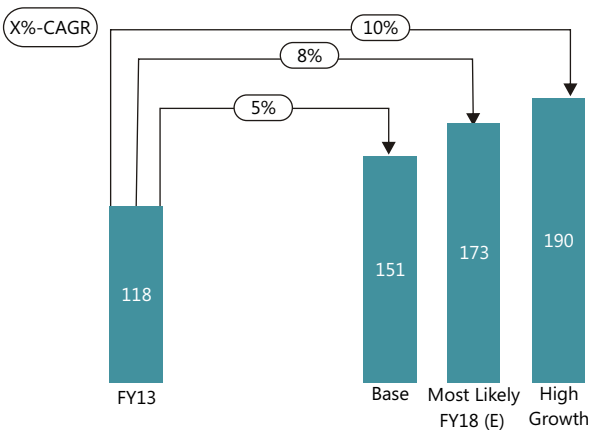
**Source: Industry reports, Analysis by Tata Strategic (#Includes petrochemicals, *Includes Fertilizers)*

FUTURE OUTLOOK

To address the macro level uncertainties associated with an industry level growth estimate, Tata Strategic has developed three scenarios to look at the possible growth outlook of Indian chemical industry based on the growth rates of its sub-segments.

In the base case the market size is estimated at $151 Bn by FY18. The most likely case growth rate is pegged at ~8% with a market size of $173 billion. And the optimistic case is likely to achieve a growth of ~10% p.a. over the next five years resulting in an industry size of $190 Bn.

Figure 4: Growth projections of Indian chemical industry market size in (USD Bn)



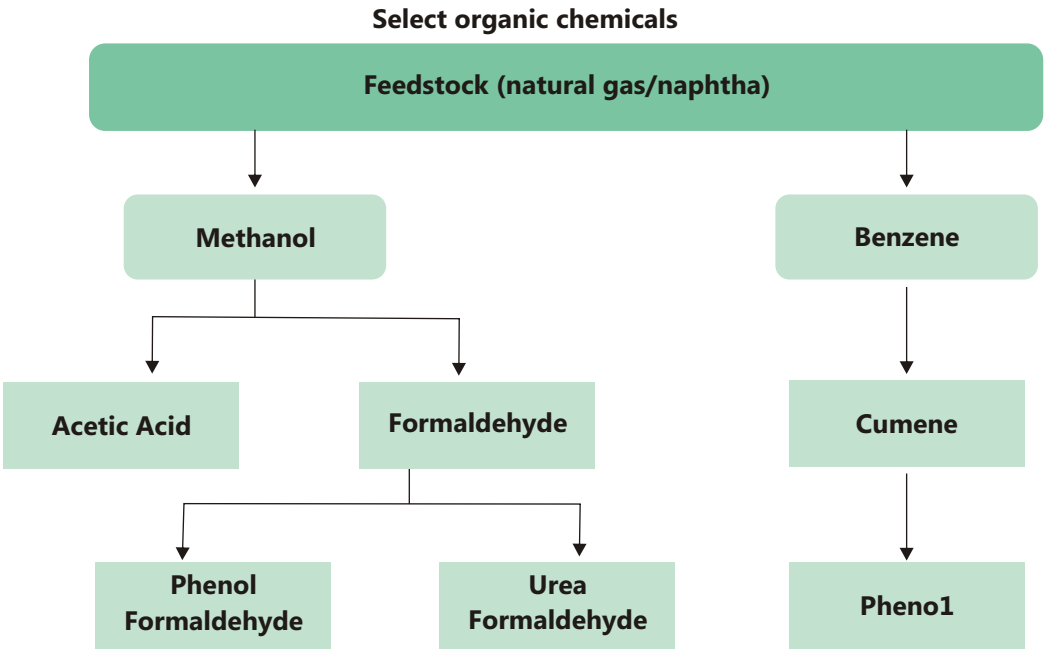
Bulk Chemicals

a. Basic Organic Chemicals

INTRODUCTION

Organic chemicals are a significant part of chemicals industry. Availability of natural gas for use as feedstock is a critical part of the production process for organics chemicals. For example, formaldehyde and acetic acid are important methanol derivatives and are used in numerous industrial applications. Similarly, Phenol is an aromatic compound and derived from Cumene, a benzene and propylene derivative. The chart below shows some of the major organic chemicals.

Figure 5: Classification of Organic Chemicals



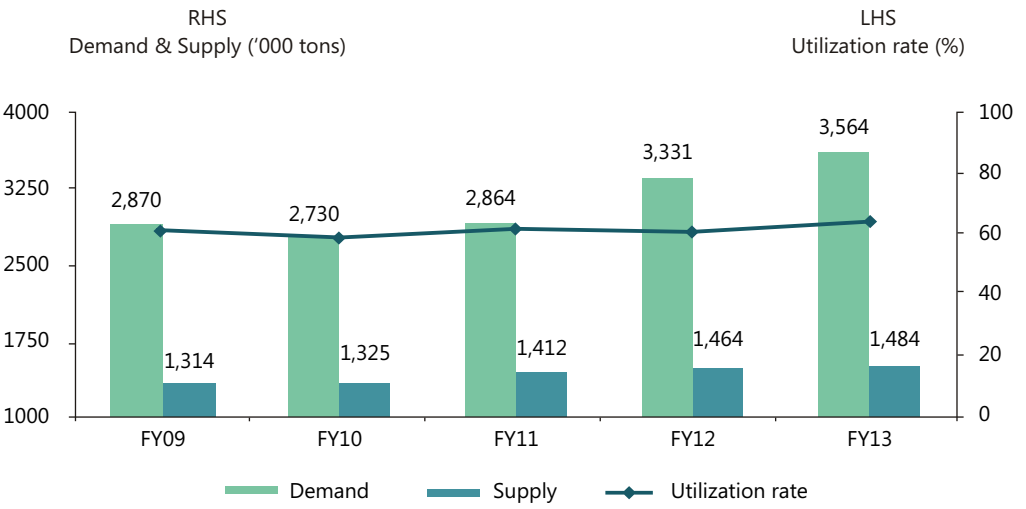
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IINDIAN ORGANIC CHEMICAL INDUSTRY

Five major organic chemicals produced in India are Methanol, Aniline and its derivatives Formaldehyde, Acetic Acid and Phenol. Together, they contribute to ~2/3rd of Indian basic organic chemical industry. The balance 1/3rd of the organic chemical consumption in the country is accounted for by several other wide varieties of chemicals like chloro methanes and ethyl acetates.

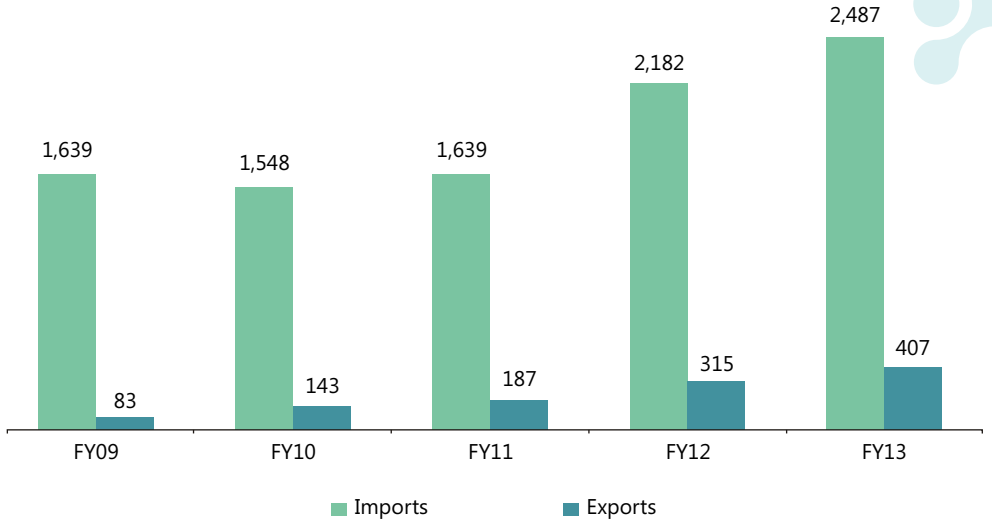
The demand for organic chemicals in India has increased at nearly 7.8% between 2009-13 to reach 3.6 million tons in 2013 (Fig 1). The domestic supply has however grown at a much slower pace and has essentially been stagnant in the last three years. This has resulted in widening of demand supply gap which was primarily bridged through imports. Domestic production has increased at ~ 2.4% per annum (Fig 2) and imports grew at a rate of 8.7% between FY09 and FY13 (Fig 3). The stagnation in the domestic production is largely attributed to the large volume imports taking place from countries like China, resulting in low utilization rates of ~ 60%.

Figure 6: Supply - Demand Scenario of Organic Chemicals in India



Source: Dept of Chemicals & Petrochemicals

Figure 7: Import - Export Scenario of Organic Chemicals in India (in 000'MT)



Source: Dept of Chemicals & Petrochemicals

b. Basic Inorganic Chemicals

INTRODUCTION

Alkali chemical constitutes the oldest segment of the chemical industry. These chemicals serve as key inputs for a number of industries such as aluminium, soap, detergent, glass, tyre, rubber, pulp and paper, pharmaceutical, water treatment, textiles, leather, fiber etc. The key chemicals in the chlor-alkali industry are

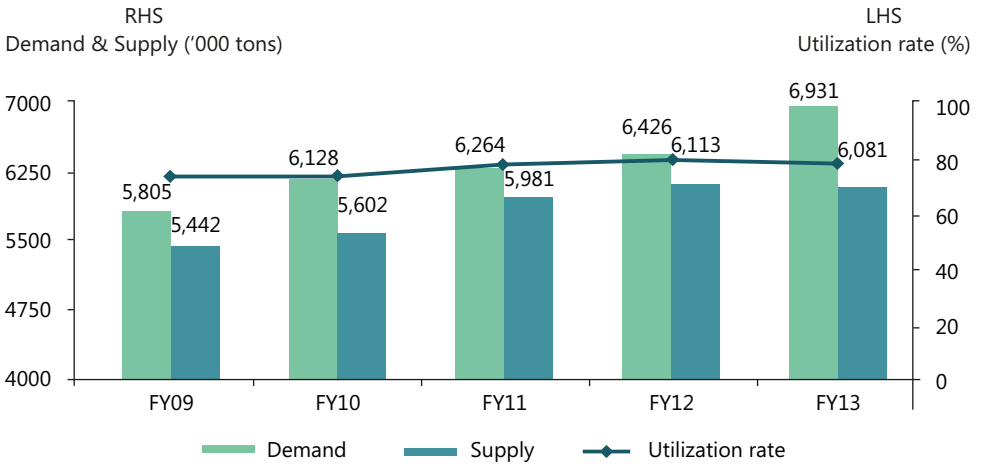
- Caustic Soda
- Chlorine (including liquid chlorine)
- Soda Ash

INDIAN INORGANIC CHEMICAL INDUSTRY

The demand for inorganic chemicals in India has been increasing at nearly 3.6% from 2009-13 and has reached the level of 6.9 million tons. The domestic supply has however grown at a slower pace resulting in gradual widening of demand supply gap

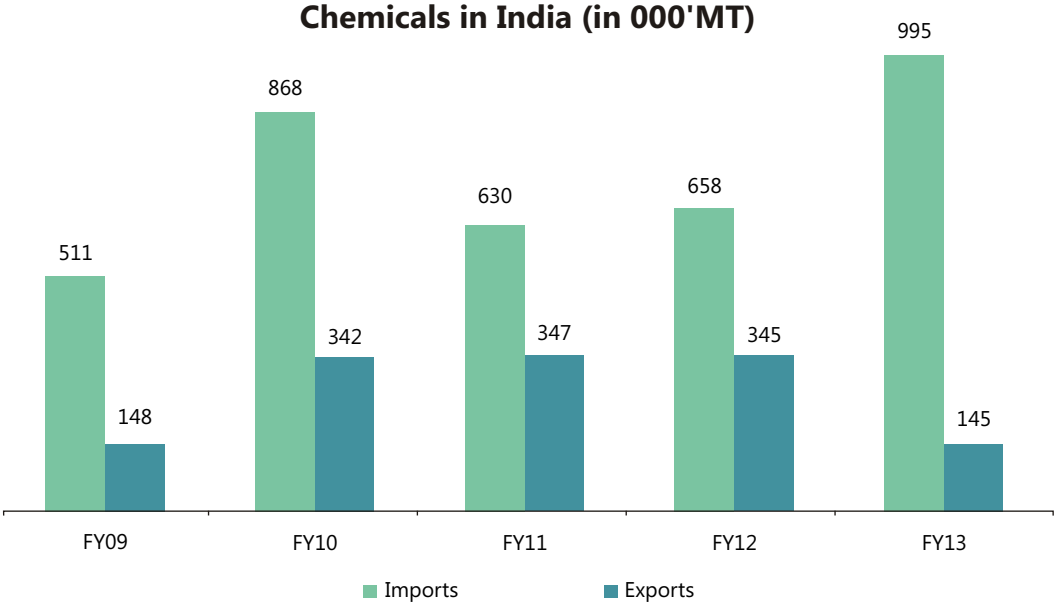
which was primarily bridged through imports. Domestic production grew at ~2.2% per annum and imports grew at a rate of 12.5% between FY09 and FY13. The capacity utilization levels have remained stable at 75%.

Figure 8: Supply - Demand Scenario of Inorganic Chemicals in India



Source: Dept of Chemicals & Petrochemicals

Figure 9: Import - Export Scenario of Inorganic Chemicals in India (in 000'MT)



Source: Dept of Chemicals & Petrochemicals

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KEY TRENDS IN BULK CHEMICALS

Market Trends

- Initial trends (Between FY01 and FY 10) indicated a shift in production of Bulk chemicals from OECD countries to economies in transition. However, TSMG's analysis indicates that few countries with economies in transition are increasingly moving towards specialty and fine chemicals. This gradual shift is clearly visible in countries like China, India and Middle East.
- Consistent with trends from the past decade, China is expected to record highest annual growth rate in the bulk chemical production. On average China's chemical production is expected to grow at 10% between FY14 and FY21.
- Technology transfer happening from developed economies to economies in transition as a result of increased M&A activities, JVs and acquisitions has helped these economies play a larger role in the global market.
- Domestic utilization rates are expected to reach high levels of 90 percent by the end of 2018, given the healthy growth in the end-user market.

Regulatory Trends

- Government of India continues to provide duty protection to domestic manufacturers. Historically, the Government has also levied anti-dumping duty on import of phenol to protect domestic players from imports. In Oct 2008, an anti-dumping duty was levied on imports from Singapore, South Africa and EU for a period of 5 years. In 2010, anti-dumping duty of up to $547/tonne was imposed on imports from Japan and Thailand for a period of five years. In 2014, anti-dumping duty of up to $80/ton was imposed on imports from China and up to $194/ton was imposed on imports from any country other than China for a period of six months.

KEY CHALLENGES

- **Lack of world class infrastructure:** Given the poor infrastructure with lack of adequate facilities at ports and railway terminals and poor pipeline connectivity, domestic manufacturers will continue facing difficulty in procuring raw materials at a cost competitive with the global peers.

- **Power:** Uninterrupted power supply plays a major role in the efficient production of chemicals. In India, power supply has not increased at the same rate as demand, leading to interruption in the supply. India's distribution losses which are well above the global benchmarks are only compounding the problem. Large Indian chemical companies have started investing in captive power plants to ensure continuous supply of power to their plants. But this problem is plaguing the small & medium players of the industry. Thus, uninterrupted power supply is a challenge that confronts the bulk chemical industry.

- **Logistic Issues:** Indian bulk chemical industry is mainly concentrated in the west in Gujarat. Though the manufacturers enjoy easy access to raw materials, they face difficulty in supplying to end-use industries which are located in southern & eastern regions. For example, soda ash manufacturers are located in Gujarat, whereas ~40% of the end use industries (glass, detergent and soap units) are located in south. This increases the transportation cost, thus making imports cheaper when compared to internal transport. (US$ 50 per metric tonne (PMT) freight cost for transportation from western part to eastern part compared to US$25 to US$30 PMT average freight for imports).

- **Lack of cheaper raw material availability:** Feedstock (naphtha and natural gas)and power are critical inputs for both organic& inorganic chemicals industry. Costs of these raw materials are high in India compared to countries like China, Middle East and other South East Asian countries such as Thailand and Indonesia.

- **No domestic price discovery:** Domestic prices of organic chemicals are highly correlated with international prices. Given the small scale of domestic operations, local manufacturers are more influenced by global demand and supply forces.

- **Large global capacity additions:** Apart from the current oversupply in global markets, there is another cause of concern for domestic manufacturers, with further large capacity additions happening in global markets. For example, globally, methanol industry is expected to witness excess capacity in the future due to a spate of capacity additions in gas rich countries such as US, Middle East and Russia.

KEY OPPORTUNITIES

- **Improved feedstock supply:** Domestic organic chemicals players don't have the advantages of backward integration and hence, they lack pricing flexibility. However, given the new finds of natural gas reserves in the country, domestic manufacturers will be able to get supply of feedstock at stable prices.

- **Wider product portfolio:** Commodity chemicals companies can improve their product portfolio by adding specialty chemicals such as polymers additives, water treatment chemicals, lubricating additives, etc. This will help in improving their margins but requires significant R&D efforts.

- **Forward integration:** Petrochemical companies producing benzene and propylene can look for forward integration opportunity given the demand-supply deficit in phenol market. Similarly, an opportunity exists for companies with better access to natural gas supply to venture into the methanol market facing continuous supply deficit.

- **Outbound approach:** Even successful companies from west are shifting their base to resource rich nations like Saudi Arabia, Qatar, Russia, etc. Indian organic chemical companies may also explore opportunities outside the country either through Greenfield or brownfield projects.

- **Setting up of Chemical Parks or Mega Chemical Estates to Make in India:** In order to address the issue of capacity expansion and for creation of common infrastructure, the chemical industry, with support of Government could establish exclusive Chemical Parks - a concept similar to the one set up in Germany. Each of the German chemical parks and sites has its particular strengths which are reflected in its individual portfolio of services. The object of these initiatives is to support the chemical sites in their respective regions and to make them better known internationally. To this end, the industries work closely with the governments of the individual states, municipalities, universities and economic development agencies under public-private partnership model.

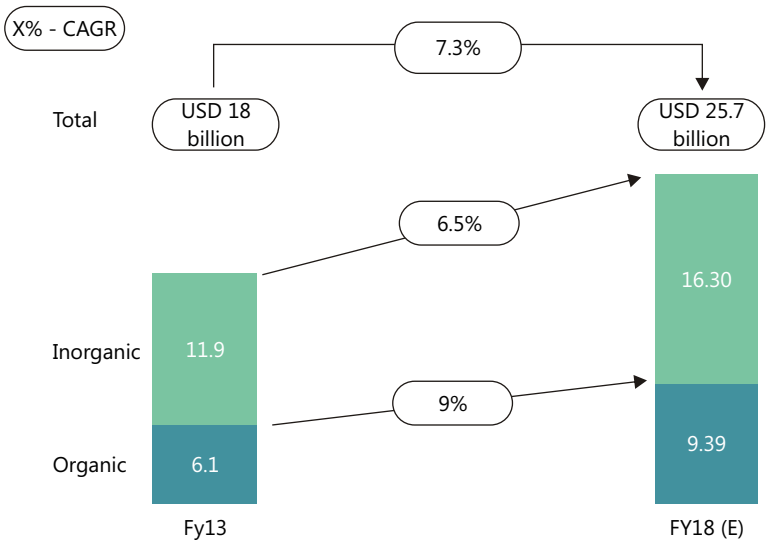
- **Coal to Chemical opportunity:** With no improvements in sight in the domestic production of natural gas and crude oil, Indian bulk chemical manufacturers should actively pursue the coal to chemical process to ramp up their manufacturing capacities. Government should take cognizance of the issue and make policy changes to encourage this route of bulk chemical manufacturing.

FUTURE OUTLOOK

Domestic demand of basic organic chemicals is expected to grow at 9% between 2014-18, mainly led by the growth in the end-user market. Domestic utilization rates of the Indian plants are expected to be around 90% by the end of 2018. Imports as a percentage of domestic consumption is expected to widen from the existing ~11% to ~20% by the end of 2018.

Domestic demand of basic inorganic chemicals is expected to grow at a stable 6-7% CAGR over FY14 to FY18, mainly led by the growth in the end-user market like alumina, textiles, paper and detergents. Domestic utilization rates of the Indian plants improved to 81% in FY13 from 73% in FY09. The same is expected to reach ~92% by the end of FY18. Imports as a percentage of domestic consumption would increase from 11% in FY13 to 15% in FY18 despite the anti-dumping duties levied on major exporting countries.

Figure 10: Bulk chemical market growth projections



Source: Industry reports, Analysis by Tata Strategic

Specialty Chemicals

INTRODUCTION

Specialty chemicals are defined as a "group of relatively high value, low volume chemicals known for their end use applications and/ or performance enhancing properties." In contrast to base or commodity chemicals, specialty chemicals are recognized for 'what they do' and not 'what they are'. Specialty chemicals provide the required 'solution' to meet the customer application needs. It is a highly knowledge driven industry with raw materials cost (measured as percentage of net sales) much lower than for commodity chemicals. The critical success factors for the industry include understanding of customer needs and product/ application development to meet the same at a favourable price-performance ratio.

The key specialty segments in India are agrochemicals, paints coating and construction chemicals, colorants, Active Pharmaceutical Ingredients (APIs), personal care chemicals and flavors & fragrances. The critical success factors for most of the

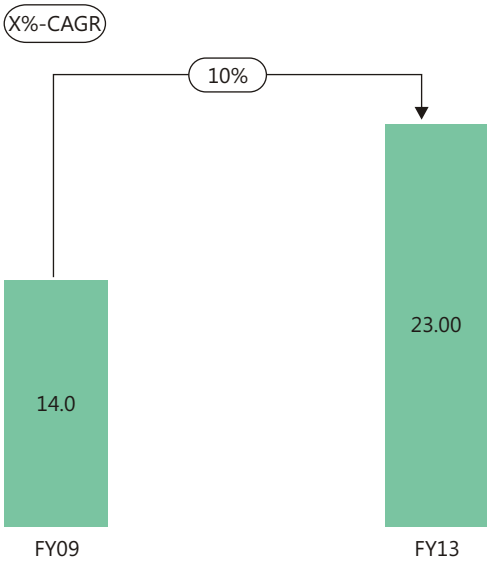
specialty chemical segments include understanding of customer needs and product/ application development to meet the same at a favourable price-performance ratio.

INDIAN SPECIALTY CHEMICAL INDUSTRY

The Indian Specialty Chemical market is valued at ~$23 billion as of FY13.It has seen a high growth rate of ~8% from its FY09 level when the market size was just ~$14 billion. The past growth has been mostly due to growth in end use industries, which has resulted in increased consumption for specialty chemicals. Going ahead, the growth potential of the specialty chemicals consumption in India is strong and it is expected to reach ~$ 42 billion by FY18.

India exports specialty chemicals to nearby Asia-Pacific countries which don't have competitive scale of productions. India also exports to developed countries of Europe and USA where it leverages its low cost of production and quality talent pool. Compliance with global regulations and India's manufacturing competitiveness has helped the export market to grow significantly.

Figure 11: Past Growth of Specialty Chemical Market (in USD Bn)



Source: Industry reports, Analysis by Tata Strategic

KEY TRENDS

- **Development in Nanotech/Biotech**: There are new developments that are taking place in the end user industries which would have implications on the specialty chemical usage. New opportunities are emerging in areas like electronics, food, textiles, tools etc.

- **Focus on sustainability & Green chemistry**: there is a growing preference for environmental friendly products/processes as there is a growing emphasis on sustainable development. The companies are taking a holistic view at key functions like R&D, Supply chain and Marketing.

- **Local market gaining critical size**: There is a growing demand for specialty chemicals in the local market. The industry is achieving critical economies of scale to cater to the domestic market itself. Further, sophistication of products is driving proportional usage of chemicals. These trends are having a positive influence on the local production.

KEY CHALLENGES

While chemical industry addresses growing need for materials required by different sectors, the industry employs highly complex manufacturing process that often involves handling of toxic and hazardous chemicals. The process being energy intensive, the importance of safety, security and environmental protection cannot be underestimated. The export performance of specialty chemicals so far has been good. However, regulations like REACH may impact export performance.

- **Feedstock availability**: Crackers in India use the basic building blocks like ethylene, propylene to manufacture commodity petrochemicals. The availability of these basic building blocks for specialty chemicals is a concern. If this scenario continues to prevail then there may always be lack of building blocks for specialty chemical industries and domestic production of specialty chemicals may never grow rapidly. Setting up of consortium crackers is a positive step however the progress has been slow. Some of the Indian companies have overcome this challenge by using alternate feedstock. India is

rich in alternate fuel availability like rapeseed oil, castor oil etc. India glycol is successfully using molasses for MEG production.

- **Availability of quality catalysts**: India lacks good catalysts and processes for better processing and value addition to feedstocks. Lack of autonomous research centres are one of the primary reason. Government support, strengthening of resources and focused research in this field, especially by centres such as IIP and NCL, could help develop better catalysts.

KEY OPPORTUNITIES

- **Large addressable market**: To address the country's large and dispersed end-user market, companies have to start adopting a key-account strategy for large customers and partnership with other companies to build distribution networks across geographies. Companies have to realize the importance of having a strong vendor base and partnership arrangements with cost effective local companies to achieve a leadership position.

- **India as an R&D hub for specialty chemicals**: Large MNCs have started tapping the India's cost advantage by investing in production for exports and also moving some of their R&D work to India. There is a large untapped potential in this space.

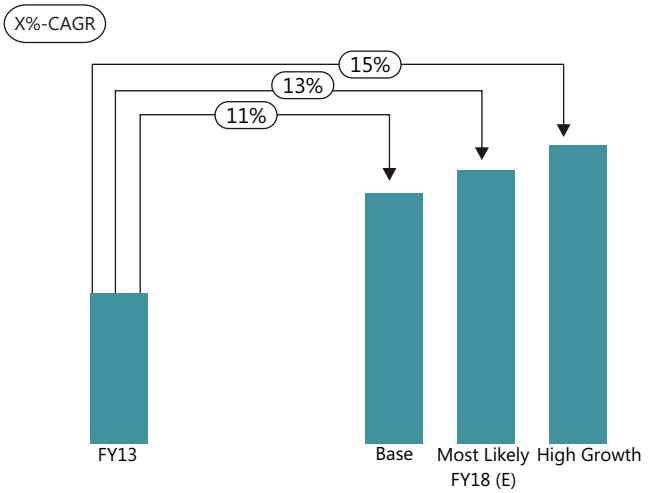
- **Opportunities for local customization**: A key success factor in the Indian specialty chemical market is the local customization. Many customers are willing to sacrifice on some of the product attributes for a lower product price. These offerings can also be expanded to other Asian markets.

FUTURE OUTLOOK

Tata Strategic has developed three scenarios to look at the possible growth outlook of specialty chemicals. The market size of specialty chemicals in India has the potential to reach $39 billion by FY18. The most likely case growth rate is expected to be higher than the XIIth five year plan targets with an expected growth of ~13% p.a. And the optimistic case is likely to achieve a growth of ~15% p.a. over the next decade.

The base case scenario growth is mostly driven by the expected growth in end use industries and increasing penetration of specialty chemicals in them which results in almost ~2X GDP growth rate. The enablers for a most likely growth or higher growth of ~13% p.a. are accelerated trends of urbanization, infrastructure development, increasing economic wealth, technology enhancement etc. which could lead to rise in demand for high performance products/ processes. The extent of accelerated trend could result in varying scenarios.

Figure 12: Growth projections of specialty chemicals market size (in USD Bn)



source: Industry reports, Analysis by Tata Strategic

Agrochemicals

INTRODUCTION

Agrochemicals are the substances manufactured through chemical or biochemical processes containing the active ingredient in a definite concentration along with other materials which improve its performance and increase safety. For application, these are diluted with water in recommended doses and applied on seeds, soil, irrigation water & crops to prevent the damages from pests.

There are broadly 5 categories of crop protection products:

- Insecticides: Manage the pest population below the economic threshold level
- Fungicides: Prevent the economic damage due to fungal attack on crops . . . Ø Herbicides: Prevent/ inhibit/ destroy the growth of unwanted plants in a crop field
- Bio pesticides: These are derived from natural substances like plants, animals, bacteria & certain minerals. These are non-toxic & environmental friendly
- Plant growth regulators

With increasing population, demand for food grains is increasing at a faster pace as compared to its production. Moreover, every year, significant amount of crop yield is lost due to non-usage of crop protection products.

It is estimated that the present food grain production can jump by additional ~33% through use of crop protection products. Therefore, Pesticides have been recognized in India as essential in increasing agricultural production by preventing crop losses before & after harvesting

INDIAN AGROCHEMICALS INDUSTRY

India is the fourth largest producer of crop protection chemicals globally, after United States, Japan & China. The crop protection industry is a significant industry for the Indian economy and accounts for ~3% of the total chemicals market.

For FY14, Indian Crop market is estimated at ~USD 4.3 Bn and has been growing in double digits in the recent years. Greater export opportunities & introduction of newer molecules have led to high growth rates. Currently, the exports of crop protection chemicals are estimated at ~50% of the market.

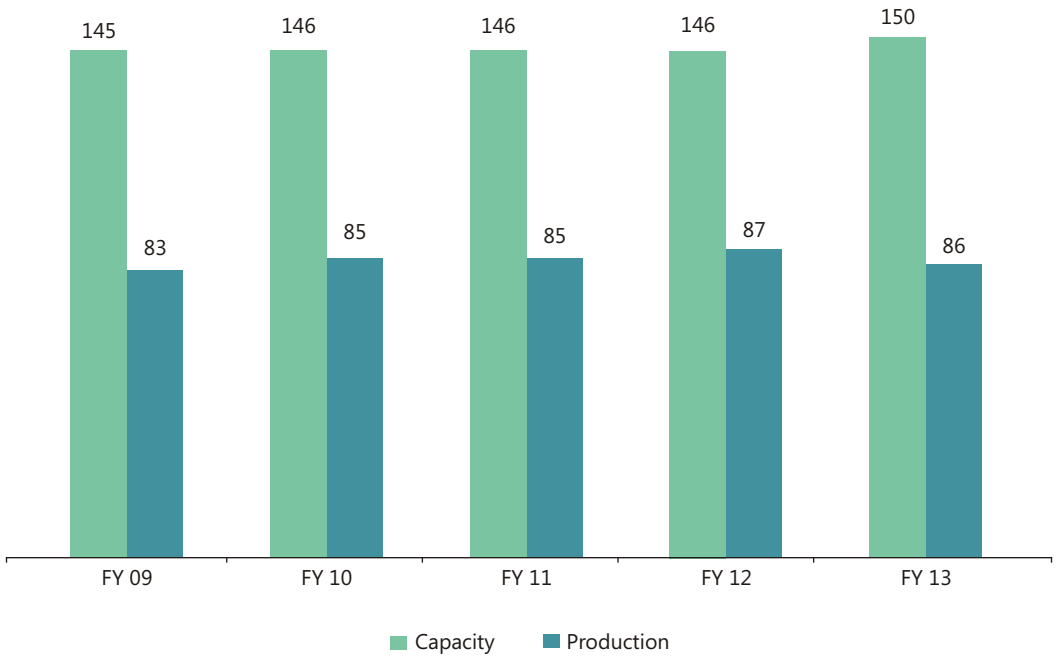
High spent on food and large employed population makes agriculture a significant part of economy. Agriculture even though accounts for only ~13.7% of GDP it employs 47% of the workforce. However Indian agriculture is faced with challenges like limited farmland availability and low crop yields. India's crop yields in major crops like Rice, lentils, corn and soya-bean are ~ 50% below China's. And one of the major reasons for this has been the low average crop protection consumption in India.

India's agrochemicals consumption is one of the lowest in the world with per hectare consumption of just0.6 Kg compared to US (7Kg/ha) and Japan (12 Kg/ha). In India, paddy accounts for the maximum share of pesticide consumption, around 28%, followed by cotton (20%).

The Indian agrochemicals market is characterized by low capacity utilization. The total installed capacity in FY13 was 150,000tons and total production was 86,000 tons leading to a low capacity utilization of ~57%. The industry suffers from high inventory (owing to seasonal & irregular demand on account of monsoons) and long credit periods to farmers, thus making operations 'working capital' intensive.

India due to its inherent strength of low-cost manufacturing and qualified low-cost manpower is a net exporter of pesticides to countries such as USA and some European & African countries. Exports formed ~37% of total industry turnover in FY13.

Figure 13: Agrochemicals installed capacity & production (in 000'MT)



Source: Government of India, Tata Strategic Estimates

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Import/ Exports

Pesticides industry in India has witnessed a trend of increasing exports. This is due to its competence in low-cost manufacturing, low-cost manpower. Seasonal domestic demand, domestic overcapacity and better price realization in the overseas market has also led to this trend. India has emerged as the thirteenth largest exporter of pesticides in the world. However, most of the exports are off-patent products.

Currently, the total export value of crop protection chemicals amount to USD 2.1 Bn. America, Asia (excluding Middle East) & Europe are the major exporting destinations.

KEY TRENDS

Market Trends

- Focus on developing environmentally safe pesticides by the industry as well as the Government. The Department of Chemicals has initiated a nationwide programme for "Development and production of neem products as Environment Friendly Pesticides" with financial assistance from United Nations Development Programme (UNDP).
- Focus by larger companies on brand building by conducting awareness camps for farmers and providing complete solutions.
- Increase in strategic alliances among large players for greater market reach and acquisitions of smaller companies globally to diversify product portfolio. For example: Rallis has a marketing alliance for key products with FMC, Dupont, Syngenta, Bayer and Nihon Nohayaku. In addition, UPL has had a series of small acquisitions globally to enter new geographies and gain product expertise.

Technology Trends

- Increased R&D expected for development of new molecules and low dosage, high potency molecules.
- Focus on R&D in bio-pesticides segment with increasing preference for environmentally safe products in the market.

KEY CHALLENGES

- **Stringent regulations**: Stringent environment regulations across the world are increasing the cost of developing new products and simultaneously delaying the introduction of new products in the market. For instance, in the European Union any agrochemical product if found to be mutagenic, carcinogenic or endocrine disruptor would not achieve registration or re-registration irrespective of the level of exposure generated. It takes almost nine to ten years to bring a new product.

- **Low focus on R&D by domestic manufacturers due to high costs**: The industry is facing a serious challenge owing to the rising R&D costs. It takes almost USD 250 million in research and development to introduce a new product in the market. This prevents the companies to invest in R&D activities and focus more on the generic products which require low investments in research and development.

- **Lack of education and awareness among farmers**: It is important to educate the farmers about the appropriate kind of pesticide, its dosage and quantity and application frequency. However it is not easy to reach the farmers owing to infrastructure issues, regional languages and dialects. The main point of contact between the farmers and the manufacturers are the retailers who don't have much of a technical experience and are unable to provide a proper product understanding to the farmers. It is also very difficult for the farmers to convey their needs effectively to the manufacturers.

- **Need for efficient distribution systems**: The large number of end users and the market being predominantly generic in nature makes a strong and efficient distribution network essential for the crop protection market. However, the industry is facing problems due to supply chain inefficiencies and inadequate infrastructure which results in post-harvest losses estimated at INR 45,000 crore every year, thereby impacting the farmers. The lack of efficient distribution system also makes it difficult for the agrochemical companies to reach the farmers to promote their products and educate them about their usage and benefits.

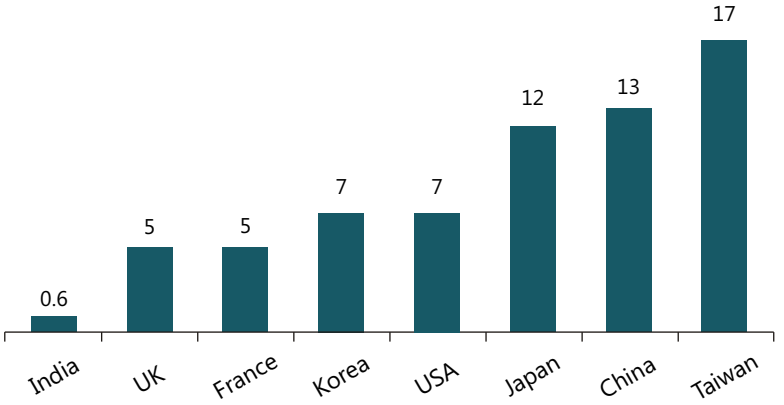
- **Non-genuine products**: There is a significant share of non-genuine pesticides which can be counterfeit, spurious, adulterated or sub-standard. According to industry estimates the non-genuine pesticides could account for up to 40% of the pesticides sold in India in FY13. These products are inferior formulations which are unable to kill the pests or kill them efficiently. Some such products do perform but leave by-products which may significantly harm the soil and environment. The damage through such products is multifold. Apart from crop loss and damage to soil fertility, use of non-genuine products leads to loss of revenue to farmers, agrochemical companies and government. Some of the key reasons for use of non-genuine products are lack of awareness amongst the farmers, difficulty in differentiating between genuine and non-genuine products, supply chain inefficiencies, law enforcement challenges and influencing power of distributors/retailers. In association with FICCI, TATA Strategic has taken up a study focusing on this subject.

- **Long gestation period for new products**: It takes almost 10 years to bring a new molecule into the market. Even for the generic products, it can take up to 5 years to get the product registered. The regulatory bodies do not have adequate resources and infrastructure to execute timely registration of products. Sometimes the rules are not clearly defined creating interpretation challenges for the regulatory bodies, leading to confusions thereby adding to the complexities for the crop protection chemical companies.

KEY OPPORTUNITIES

Low consumption of pesticides in India: Per hectare consumption of pesticides in India is amongst the lowest in the world and currently stands at 0.6 kg/ha. On the other hand consumption in developed nations ranges from 5-7 kg/ha whereas at 13 kg/ha China is almost 20-30 times as compared to India. In order to increase yield and ensure food security for its enormous population agrochemicals penetration in India is bound to go up.

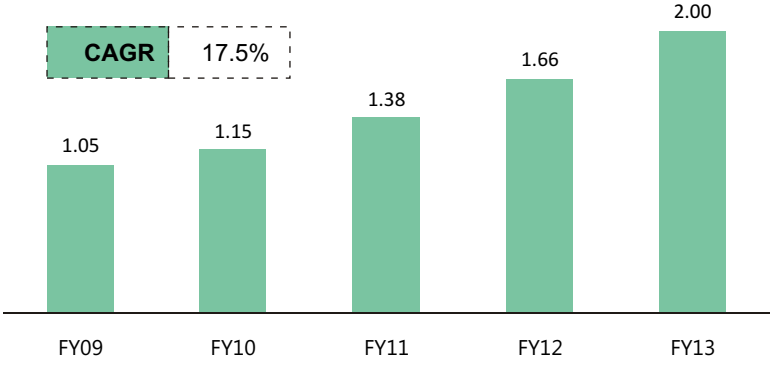
Figure 14: Pesticide consumption comparison (in Kg/ha)



Source: Industry reports, Analysis by Tata Strategic

Export Opportunities: The export of pesticides from India has seen a strong growth over the last few years. Globally, India is the thirteenth largest exporter of pesticides. Most of the exports are off-patent products. The major exports from India happen to Brazil, USA, France and Netherlands. The key growth drivers are India's capability in low cost manufacturing, availability of technically trained manpower, seasonal domestic demand, overcapacity (Production capacity of 1,50,00 MT against production of 86,000 MT in FY13), better price realization globally and strong presence in generic pesticide manufacturing (India has process technologies for more than 60 generic molecules).

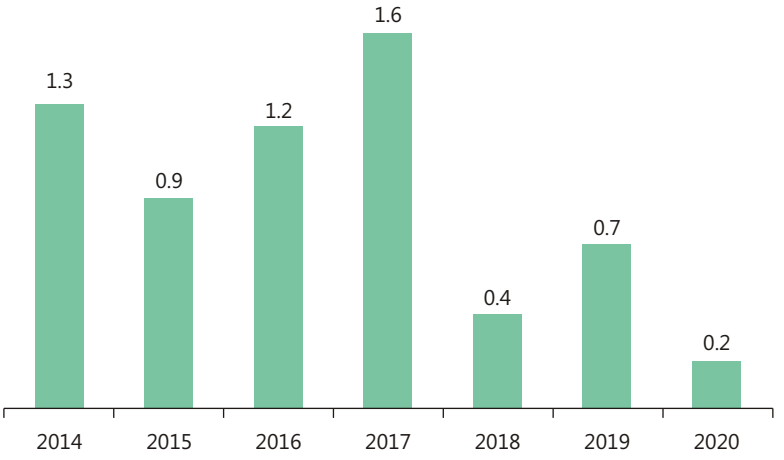
Figure 15: Indian Agrochemical Exports (in USD Bn)



Source: Trademap Statistics, Tata Strategic Analysis

Growth in generic products: During the period of 2014 - 2020 products worth USD 6.3 billion are expected to go off-patent providing opportunities for the Indian generic product manufacturer's organic growth opportunities and expand their market presence.

Figure 16: Agrochemicals Going Off-Patent (in USD Bn)



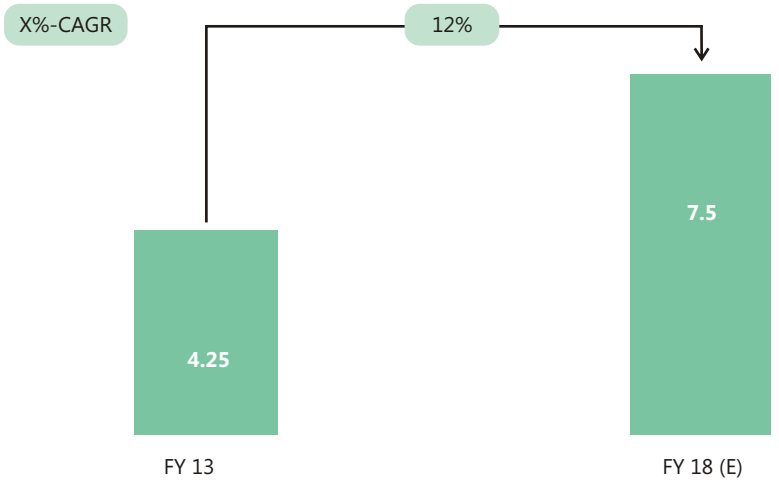
Source: Industry reports, Analysis by Tata Strategic

Growth in herbicides and fungicides: Labor shortage, rising labor costs and growth in GM crops has led to growth in the use of herbicides. The herbicide consumption in India currently stands at 0.3 USD billion and is expected to grow at a CAGR of 15% over the next five years to reach 0.6 USD billion by FY18. On the other hand the fungicide industry in India has grown due to the growth in Indian horticulture industry, which has grown at a CAGR of 7.5% over the last five years.

FUTURE OUTLOOK

The Indian crop protection industry is estimated to be USD 4.25 billion in FY14 and is expected to grow at a CAGR of 12% to reach USD 7.5 billion by FY18. Exports currently constitute almost 50% of Indian crop protection industry and are expected to grow at a CAGR of 16% to reach USD 4.2 billion by FY18, resulting in 60% share in Indian crop protection industry. Domestic market on the other hand would grow at 8% CAGR, as it is predominantly monsoon dependent, to reach USD 3.3 billion by FY18. Globally, India is fourth largest producer of crop protection chemicals, after United States, Japan & China.

Figure 17: Indian Crop Protection Industry Growth Outlook (USD Billion)



Source: Industry reports, Analysis by Tata Strategic

Petrochemicals

INTRODUCTION

Petrochemicals play a vital role in economic development & growth of a country. The growth of this industry is closely linked to economic growth of a country. Petrochemicals are considered as enablers for growth of other sectors of the economy. Today, petrochemical products permeate the entire spectrum of daily use items and cover almost every sphere of life like clothing, housing, construction, furniture, automobiles, household items, agriculture, horticulture, irrigation, packaging, medical appliances, electronics and electrical etc.

Petrochemicals are derived from various chemical compounds, mainly hydrocarbons. These hydrocarbons are derived from crude oil and natural gas. Among the various fractions produced by distillation of crude oil, petroleum gases, naphtha, kerosene and gas oil are the main feed-stocks for the petrochemical industry. Unconventional feedstocks are also gradually coming up like shale gas, coal, CBM, pet coke etc.

Ethane, propane, butane and Natural Gas Liquid (NGL) obtained from the natural gas are the other important feed-stocks used in the petrochemical industry. The basic building blocks olefins (ethylene, propylene & butadiene) and aromatics (benzene, toluene and xylene) are the major raw materials from which most of the chemicals are derived.

The two major segments for petrochemicals are:-

- Basic petrochemicals and
- End-product petrochemicals

The feedstocks are used to derive the basic petrochemicals. Basic petrochemicals can be reclassified as olefins (ethylene, propylene and butadiene) and aromatics (benzene and xylene). These basic petrochemicals are then used to produce end product petrochemicals.

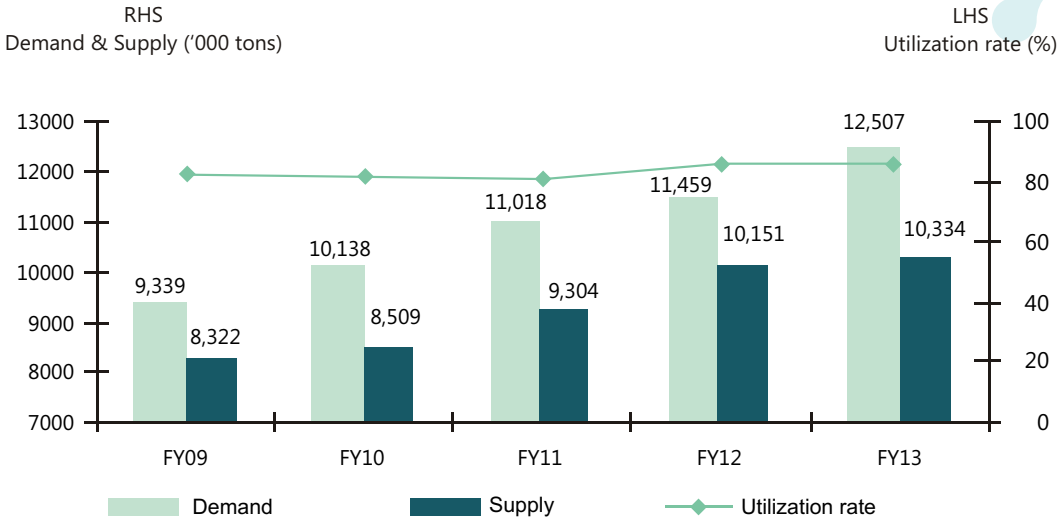
INDIAN PETROCHEMICALS INDUSTRY

As a downstream industry of exploration and refining business, the petrochemicals industry is a significant industry for the Indian economy. The Indian basic petrochemicals market (including end products market which includes polymers, synthetic fibers, elastomers and surfactants) the total petrochemical market has grown at a CAGR of 11% from USD 19.3 billion in FY11 to USD 24 billion in FY13.

By global standards, its contribution to global market size is not very large, primary reason being low per capita consumption of polymers in India, only ~9.7 kgs, compared to world average of ~25 kgs.

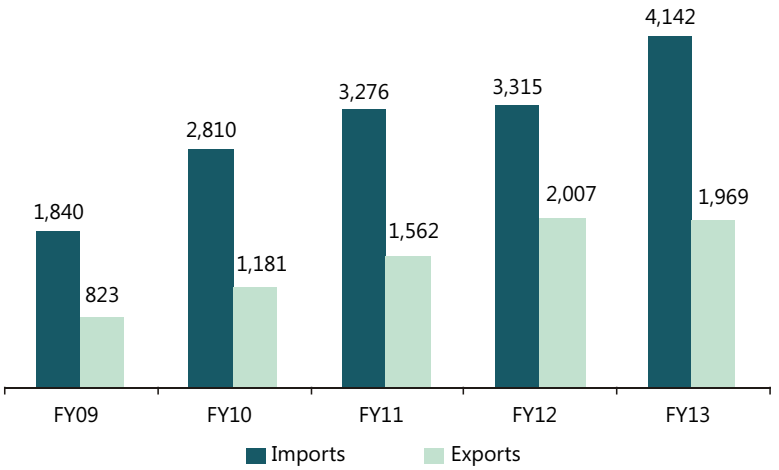
The total installed capacity of major basic petrochemicals (ethylene, propylene, butadiene, styrene, benzene & toluene) in FY13 is 12.2 million metric tons per annum (mmtpa) against the total demand of12.5 mmtpa (Fig 5). In FY12, there was a surplus capacity of ~1 mmtpa, but in the last two years overall demand has crossed the installed capacity. Imports have grown at a CAGR of 17% between FY09 and FY13, whereas the exports have grown at a higher rate of 19% in the same period (Fig 6).

Figure 18 :Supply - Demand Scenario of Major Petrochemicals in India (in 000'MT)



Source: Dept of Chemicals & Petrochemicals

Figure 19: Import - Export Scenario of Major Petrochemicals in India (in 000'MT)



Source: Dept of Chemicals & Petrochemicals

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KEY TRENDS

Market Trends

Indian petrochemical sector is highly dependent on exports (~40%), making it strongly correlated with the global markets. Following are some of the global trends which are expected to shape the Indian petrochemical industry:

- **Increase in global demand:** Global demand for ethylene is forecasted to grow at a CAGR of 5-6% and that of propylene to grow at a CAGR of 5.5% between period 2014 and 2018. Ethylene and propylene will continue to have major share (70-75%) of total petrochemicals demand.
- **Capacity expansion:** Between 2014 and 2018 ethylene capacity additions are expected to grow by 30 million tonnes globally. Major capacity build up is happening in US, China and Middle East.
- **Depressed margins:** With oversupply hinging in the global petrochemicals market, margins will increasingly come under pressure.

Technology Trends

- **Product switch:** Linear low density polyethylene is increasingly replacing the usage of low density polyethylene in India. Only 1 ton of ethylene is required to produce 1 ton of LLDPE whereas > 1 ton of ethylene is required to produce 1 ton of LDPE.
- **Change in feedstock mix:** With increased availability of shale gas, natural gas and new gas finds, the dependency on naphtha as major feedstock for petrochemicals complexes have reduced. In Middle East, substantial capacity additions will be based on ethane as a feedstock.

Regulatory Trends

- **Reduced fiscal benefits:** As India is fast becoming a refining and petrochemical surplus nation; Government has also taken away the income tax holidays and other fiscal benefits from the industry. Only oil exploration companies now enjoy the benefits based on the profit-sharing mechanism with the government.

KEY CHALLENGES

- **Volatility in raw material prices:** More than 50% of global petrochemical capacities are based on naphtha, a crude oil derived product. The prices of crude oil products have witnessed significant volatility, thereby making petrochemicals prices highly volatile.

- **Increased competition:** Large capacity additions taking place in ethane rich Middle East and shale gas rich US. Shale gas brought a renewed competitive advantage to the US petrochemical sector. Out of the 30 million tons of ethylene capacity additions expected during period 2014 and 2018, 12.5 million tons is expected in the US alone. Since, ethane& shale gas based petrochemical products are cheaper than petrochemical products in India; domestic producers are expected to witness margins pressure.

- **High entry barriers:** Given the capital intensive nature of the petrochemical plant and tariff barriers, new entrants and small and medium size companies are prohibited from easily entering into the market.

- **Low capacity utilization:** Due to oversupply in global markets, prices of petrochemicals have taken a steep decline, thereby forcing the domestic companies to underutilize their plants operating levels. The average capacity utilization has fallen from 95% levels before global economic crisis to 80% in 2013.

KEY OPPORTUNITIES

- **Backward & forward integration:** Given the volatility of crude oil prices and India's heavy dependency on oil imports, there is opportunity for oil and oil related companies to reap benefits of increase in presence across the value chain. For e.g. Reliance Industries Ltd. successfully backward integrated from refining and petrochemical company to oil and gas exploration. ONGC which is primarily an exploration company recently built a Greenfield petrochemical project (OMPL).

- **Improved feedstock supply:** Availability of feedstock dictates the location of the plant. Domestic products are uncompetitive due to high costs of naphtha when compared with ethane based products from Middle East.One means to improve the competitiveness of the domestic products is by improving the infrastructure support as is the case inMiddle East, China and Singapore. Also going forward, as more natural gas becomes available in India, the domestic players are likely to shift from naphtha to cheaper natural gas thereby increasing their competitiveness in the market.

- **More value-add products in portfolio:** Demand for performance plastics such as biodegradable polymers is expected to be on rise across the world including India. Given the environment concerns with traditional plastics, companies should look at expanding their portfolio and include more value add products.

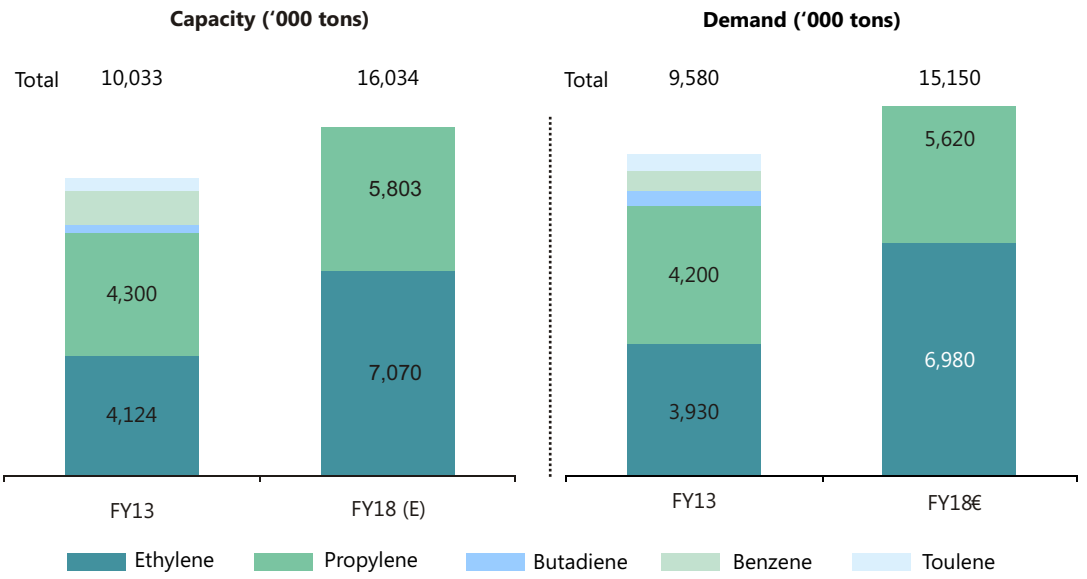
- **Increased geographical presence:** Given the capital intensive nature of the project and high costs associated in India (due to no duty waivers, no/ very less tax exemptions and high interest costs), the domestic companies may also look outside for organic and inorganic opportunities. Many western companies such as Dow, Shell, etc. are increasing their presence in energy rich countries like Saudi Arabia, Kuwait, Qatar, etc. and setting up manufacturing facilities.

- **Opportunity for reverse SEZ:** Industry players can work closely with the Indian government to set up reverse SEZs in countries like Mozambique, Iran and Myanmar. As a part of this, the Indian company can setup a gas cracker to produce ethylene and its derivatives which can be sent to India for the manufacture of further downstream value added products or they can co-invest in upcoming plants with off-take agreements. Government has to take initiative in incentivizing the imports from these countries; also it has to work closely with these governments to safeguard the Indian investments.

FUTURE OUTLOOK

The demand for basic petrochemicals is expected to grow at a CAGR of~10% to reach 16 mmtpa by FY18. At this point the market will be oversupplied to the tune of ~0.9 mmtpa. The demand growth will be driven by olefins segment including ethylene, propylene and butadiene. Demand as well as capacity growth in aromatics such as benzene and toluene will be marginal compared to overall market size.

Figure 20: Basic petrochemicals: Demand and supply forecast

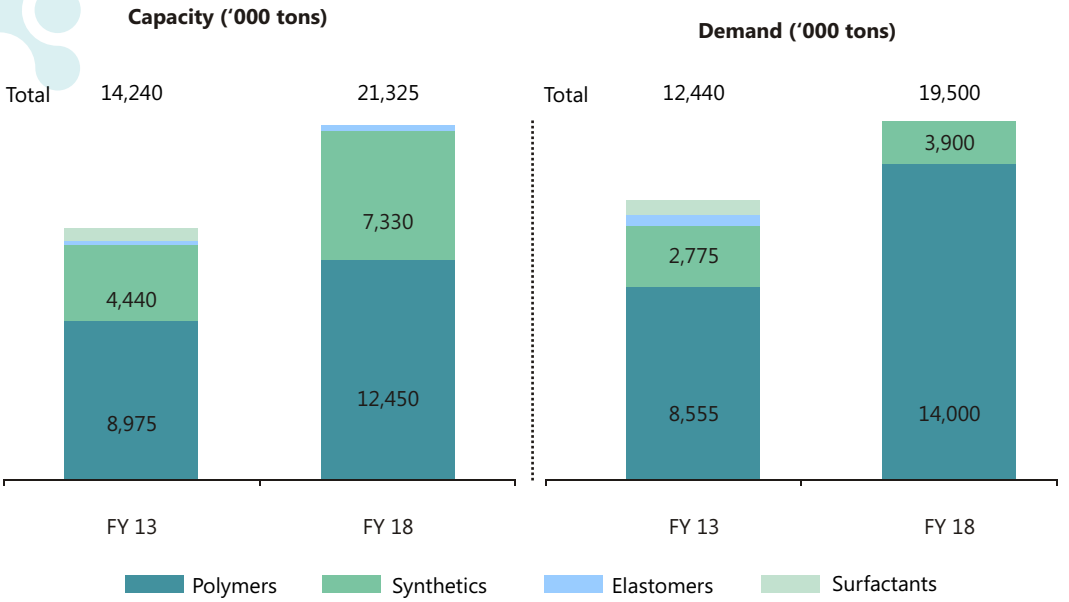


Source: Crisil Report, Department of Chemicals & Petrochemicals (GoI), Tata Strategic analysis

Indian end products petrochemicals market is also expected to grow at a CAGR of~10% to reach 19.5 mn tons by FY18. The surplus capacity is expected to be ~1.8 mmtpa in FY18.

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Figure 21: End products petrochemicals: Demand and supply forecast



Source: Crisil Report, Department of Chemicals & Petrochemicals (GoI), Tata Strategic analysis

Fertilizers

INTRODUCTION

Agriculture sector is the mainstay of the Indian economy, contributing about 17 per cent of national Gross Domestic Product (GDP) and more importantly, about ~57 per cent of the India's population is dependent on agriculture and allied activities for their livelihood. Successive Five Year plans have stressed on self-sufficiency and self-reliance in foodgrains production and concerted efforts in this direction have resulted in substantial increase in agricultural production and productivity. This is clear from the fact that from a level of about 52 million tonnes in 1951-52, food grains production rose to above ~247 million tonnes in 2012-13. More and more food will be needed to meet the demand of an increasing population in the country, and the world in general. Substantial evidence has demonstrated that chemical fertilizer have played an important role in sustaining food. Chemical fertilizers have played a vital role in the success of India's green revolution and consequent self-reliance in food-grain production. The increase in fertilizer consumption has contributed significantly

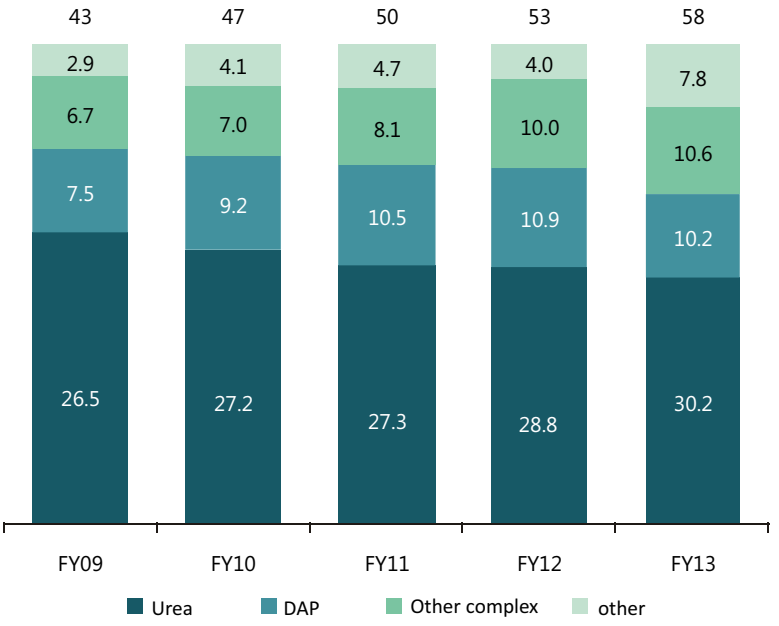
to sustainable production of food grains in the country. With the limited arable land resources, and burden of increasing future population numbers, chemical fertilizers will continue to play an important role in sustaining food security in India. It is expected that India's available arable land (net sown area) might drop below the current level of about 140 million hectares, if the use of farmland for commercial/non-agricultural purpose is not restricted in the near future. Therefore, the only way to improve food security is to increase crop yields through the scientific use of fertilizers using the limited arable land, with an emphasis on protecting the environment.

INDIAN FERTLIZER INDUSTRY

India is one of the major regions contributing to the rising fertilizer demand. Fertilizer consumption (product terms) increased from 43 million tonnes in FY09 to an estimated 58 million tonnes in FY12, led by a rise in phosphorus and potash consumption. The rise in fertilizer consumption was supported by High Minimum Support Prices (MSPs) and continued government support.

The fertilizer demand in India is expected to grow at 3% CAGR from FY13 to reach 70 Mn tons in FY18, higher than the global growth rate of 2% during the same period.

Figure 22: Fertilizer Product Consumption (Million Tonnes)



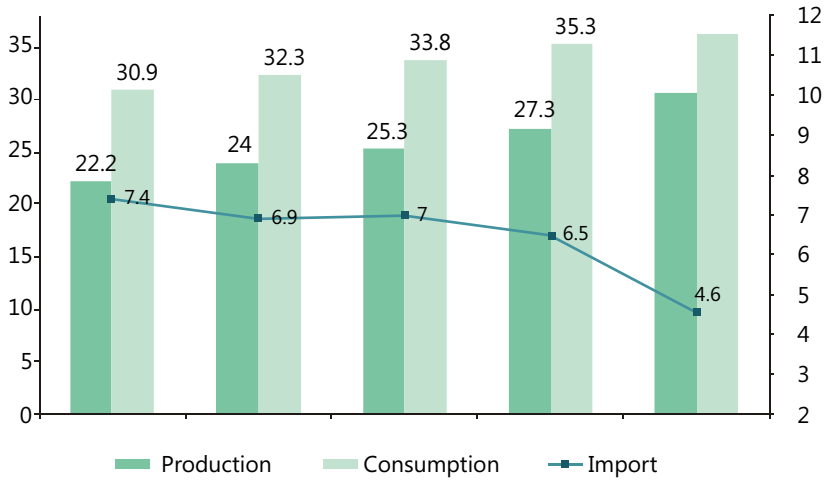
Source: Crisil, IFA

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INDIA UREA OUTLOOK

India currently relies heavily on import to fulfil its urea demand. India imported ~8 Mn tons of urea in FY13 to meet its demand of 30.9Mntons.

Figure 23: Trend in Urea demand-supply scenario(Million Tonnes)



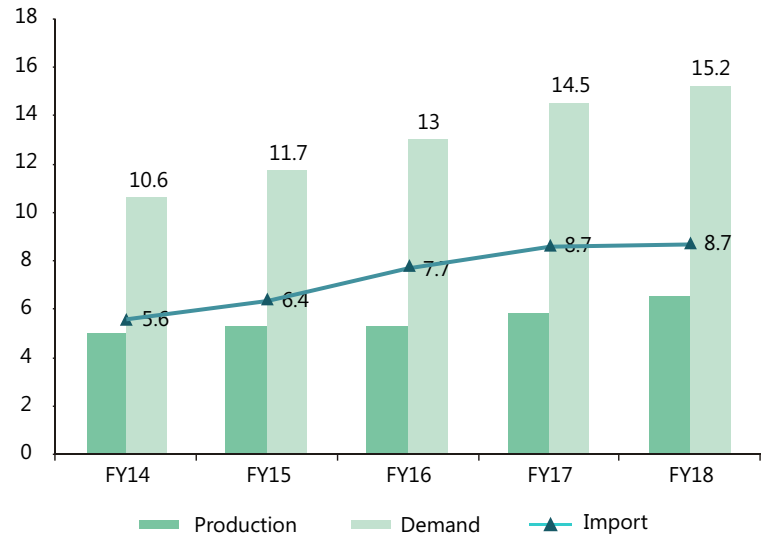
Source: Tata Strategic analysis, FAI

This dependence on import is expected to continue in near future since urea capacity is not expected to increase enough to meet the ~5% annual increase in demand. India's urea demand is expected to reach ~36Mntons in FY18 whereas domestic capacity is only expected to supply ~30Mntons.

INDIA PHOSPHATIC FERTILIZER OUTLOOK

Indian DAP demand is expected to increase by 7% CAGR to reach 15.2Mntons by 2018.

Figure 24: Trend in DAP demand-supply scenario (Million Tonnes)



Source: FAI

Domestic DAP production in FY13 stood at 5 Mn tons. The rise in DAP consumption was met by increasing imports. India is currently the largest importer of DAP in the world.

Import of DAP is expected to rise from 5.6 Mntons in FY13 to ~8.7Mntons in FY18.

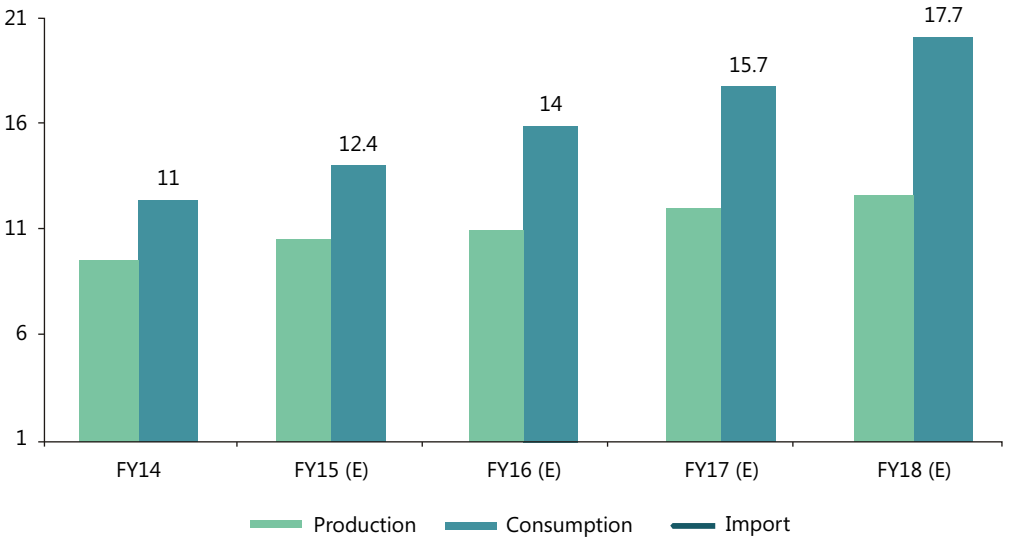
DAP and other complex fertilizers can be manufactured in same unit. The availability of other complex fertilizers is very limited in the international market compared to DAP availability. Hence, producers are expected to manufacture greater quantities of other complex fertilizers in the unit and meet DAP deficit through imports. International DAP prices have moderated after reaching its peak in 2008. This has made import of DAP more sustainable.

INDIA POTASH OUTLOOK

Consumption of 'K' nutrient declined from 3.7 Mn tons in FY10 to 3.5 Mn tons in FY11. The demand for 'K' nutrient in India is expected to grow at ~8% CAGR from FY11 to FY16 to reach 5.2Mn tons (nutrient) by FY16.

The demand for complex fertilizers is expected to increase by ~13% CAGR and reach ~17.7 Mntons (product) by FY18.

Figure 25: Complex Fertilizer (Excluding DAP) Supply Scenario (Million Tonnes)



Source: Crisil, FAI

With no domestic potash reserves, India imports potash largely as potassium chloride at around ₹ 19,000/ ton. Indian Government offers a large subsidy on this and sells it to farmers for ₹ 4,000/ton. Due to India's large dependence on imports, a significant change in global industry dynamics could impact Indian govt.'s subsidy bill. India could still try to use its big buyer advantage andget favourable terms.

Recent Policy Developments in India:

Greenfield projects at IPP-linked prices

Govt. of India introduced an investment policy in 2012to overhaul production of urea in the country and reduce dependence on import. As a part of this policy revamping of existing urea unit plants and brown field projects were encouraged through IPP-linked prices.

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The policy benchmarks realisation of urea for new projects to import parity prices, subject to floating floor and ceiling prices, which are in turn linked to gas prices. As per the policy, the floor-cap prices of urea increase in line with the gas prices till the gas price of $ 14/mmbtu.

In the event that the delivered gas price crosses $ 14/mmbtu, the units shall be paid only the floor price based on the delivered gas prices and the concept of ceiling price will not be applicable. The new policy is in line with the demand of the industry to do away with the gas price ceiling of $ 14/mmbtu in the earlier proposed policy. Further, it provides downside risk protection through a cost-plus mechanism (minimum implicit RoE of 12%) and upside benefit through import parity price (IPP)-linked pricing mechanism (with a maximum implicit RoE of 20%) for new projects.

Nutrient based subsidy scheme (NBS)

The NBS scheme, in effect from April1 2010, is an attempt by the government to encourage balanced fertilizer consumption in India. As per the policy, subsidy on complex fertilizers would be calculated based on nutrient level and not at the product level. Through this, govt. has changed the subsidy from constant farm gate prices to constant subsidy. Producers now have the freedom to charge retail prices. Following the policy announcement, players hiked DAP prices by around ` 600 per ton. Prices of other complex fertilisers were also raised.

Urea has been kept out of this policy, but its maximum retail price was increased by10% from ₹ 4,830 to ₹ 5,360 per ton with effect from April 1.

The government is also encouraging players to develop and market newer formulations which would be customized to specific regional soil and crop requirements. Since subsidy would be accorded on the nutrient basis, players developing newer formulations will be able to price the products based on demand.

Opportunity for reverse SEZ

Industry players can work closely with the Indian government to set up reverse SEZs in countries like Mozambique, Iran and Myanmar. As a part of this, the Indian company can setup a fertilizer plant which can cater to the demand of both the countries. Government has to take initiative in incentivizing the imports from these countries; also it has to work closely with these governments to safeguard the Indian investments.

Growing through proactive M&A in Indian Specialty Chemicals

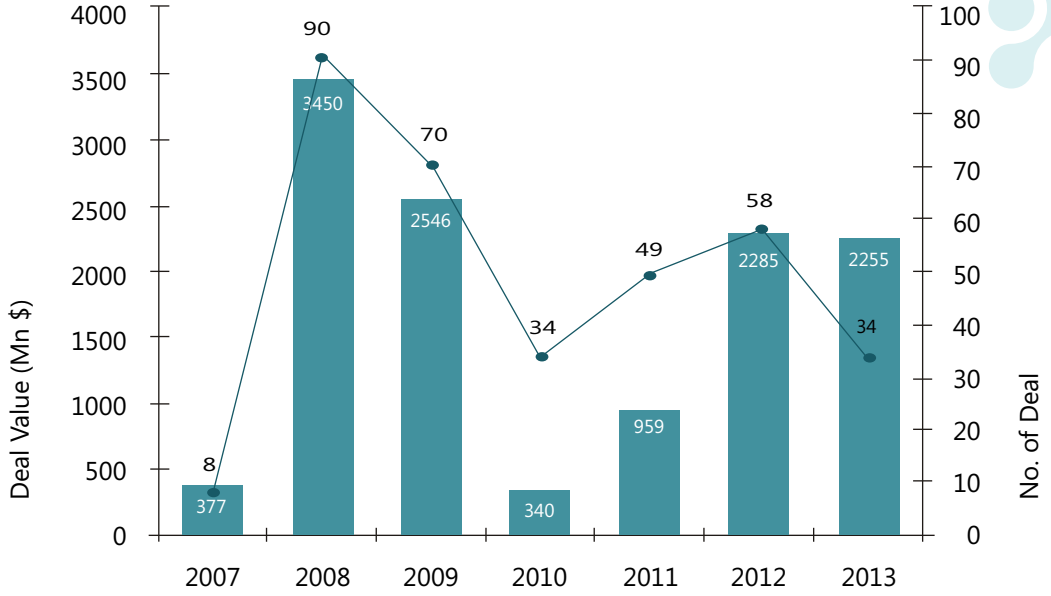
Indian specialty chemicals industry is currently valued at USD 23 Bn and is expected to grow at ~14% per annum over next decade. The industry is fragmented with around ~500 companies largely dominated by family owned companies. Indian chemical companies have strong domestic presence, products with unique value proposition and an established distribution network. To make the most of the opportunity, global companies need to grow their business in *India through proactive M & A say* ***Manish Panchal, Charu Kapoor, and Binay Agrawal*** of Tata Strategic Management Group.

Industry: Current State

The Speciality Chemicals market in India is currently valued at USD 23 Bn and is expected to grow at ~14% per annum to reach USD 90 Bn by 2023. This projected growth is significantly higher than the global chemical industry projected growth rate of ~3% per annum or growth rate of Indian chemical industry of ~8% per annum. The key drivers for this growth will be revival in Indian economy, increasing demand for higher quality products across various end use industries and possible inflection points in several segments in near future.

M&A has been playing a critical role in shaping the industry and in past 5 years, several large and medium sized global specialty chemical companies have used the acquisition route to establish their

Figure 1: M & D Deals in Indian Chemical Sector



Notes : Deal value in Particular year is estimated as value of few deals is not available
Source : Bloomberg, TSMG Deal Tracker

presence in India. For example, during2013 alone there were 34 deals in chemical industry in Indiawith an estimated value of USD2.2Bn(Ref: Figure 1). This trend may get more pronounced provided companies adopt a proactive approach to M&A.

Traditionally, most companies have adopted a reactive M&A approach by expecting target listing through financial institutions or past database through self-search. Often this approach has led to time and effort wastage due to very low deal closure rates. Instead, TATA Strategic recommends that companies should adopt a proactive approach to M&A for growing their businesses for higher success rates.

Opportunities in M&A

Indian chemical inustryis a highly fragmentedindustry with few integrated large companies. According to our estimates, as on today, there are ~500 specialty chemical companies in India having revenues between USD 20 Mn to USD 200 Mn. Our close interactions with industry players reveal that a large number of companies show the following traits:

- The companies in the sector have a strong domestic presence and an in-depth understanding of customer needs.Over the years, companies have fine-tuned their productsthereby making them unique in terms of value proposition for Indian market and neighbouring geographies
- Several companies, though small in size, have established unique positioning and are today leaders in their product segments. As a result, revenues from exports are higher than domestic revenues for such companies
- Numerous companies lack resources and know-how to scale up operations. With access to right technology, technical expertise and other resources they can provide better solutions and value propositions to the Indian market
- A significant portion of specialty chemical companies in India are family owned businesses and some of the 1st generation entrepreneurs are facing a succession void due to unwillingness of 2nd generation to join the business. Such owners are looking for exit options through sell-outs.

Because of the above, several Indian chemical companies are looking for alliances, partnerships, and exit options. This offers attractive opportunities for global chemical companies looking to establish or expand presence in India. In past few years, several European companies have seen this opportunity and expanded their business by acquiring companies in India (Ref: Figure 2).

Figure 2: Acquisition by European Companies in India



Source: Tata Strategic Deal Tracker

Why M&A Route?

- **Speed to market** - Indian companies dominate regional markets in chemical industry. Several players have built an established network of distributors and channel partners across the vast geographic landscape of India. These companies also have a team of skilled trained people and possess required licences and clearances. M&A option provides global companies an opportunity to leverage these strengths and create a pan-India presence from day one. Several large domestic and global manufacturers have realized this advantage. For example, in 2009, German specialty chemical major Lanxess acquired Mumbai based Gwalior Chemical Industries.

- **Stronger presence along value chain** -M&A in India provides for both backward integration option to secure feedstock or intermediates and forward integration into downstream products to build integrated presence in the value chain. For example, Arkema acquired Ihsedu Agrochem in 2012 to get access to castor oil since India is one of the largest producers of castor oil in the world. Through this Arkema will get secure and consistent access to castor oil for manufacturing bio-based polyamides at competitive prices.

- **Product-portfolio optimization**-India is emerging as a hub for product development. Utilizing the talent pool in India, several Indian companies have reverse engineered and developed cost effective products. Several MNCs have also set up their R&D facilities or innovation centres in India to develop products for India and other middle income countries. This is critical to capture the growing market in Asia, Africa and Latin America. MNCs with their global reach can benefit multi-fold from M&A in specialty chemicals by immediately having access to products which provide suitable value propositions. For example, with acquisition of Plastichemix, Clariant will have a stronger product portfolio and can cater to a larger customer base in master batches.

While growing through M&A does offer significant benefits, only the successful M&A's create sustainable value. Therefore, it is imperative for companies to ensure that they adopt a proven approach for M&A activity. TATA Strategic recommends the following levers for successful M&A's.

Levers for successful M&A in India

Various levers are necessary for a successful M&A in India

1) **Define strategic intent**- Decision for opting M&A should be based on clearly defined strategic intent. As mentioned earlier, speed to market, access to select segments or raw materials could be some of them but there could be specific needs such as brand acquisition, getting access to adjacencies etc.An in-depth evaluation on why the company needs to make an acquisition and whether the strategic intent is in line with its global vision and aspirations is a must.

2) **Target Identification**- It is said that "Well begun is half done". This is particularly true in case of identification of right M&A targets. While the chemical companies in India are aplenty, understanding of their business realities is the key to decide whether they can be part of shortlisted candidates for acquisition. Moreover, the targets identified should be in line with the defined strategic intent. Companies being shortlisted should be gauged on their willingness to sell or partner beforehand as in some cases the owners do not wish to lose control. The above activities when performed meticulously leads to potential targets where the chances of completing the acquisition are high.

3) **Business Due Diligence-** Several Indian companies have small scale compared to global standards and operate in niche space. Hence a detailed evaluation of the company's business needs be done to establish the actual benefits to the acquirer. While it is a given that financials need to be looked at in detail to avoid overpaying, other aspects such as product quality, track record of company etc. which are critical in evaluating such companies. This helps the acquirer in taking the right decision.

4) **Successful post-merger integration**- As most companies are family run businesses, the execution team has been built over many years. In such cases, the integration needs to especially take into account that no unwarranted fears regarding lay-offs, restructuring, reporting relationships in employees creep up. Since many of the specialty chemical companies are structured differently as compared to global companies, organizational structure and roles and responsibilities needs to be appropriately defined for a smooth integration.

An opportunity not to be missed

India's specialty chemical sector has demonstratedgood growth in the past years and is expected to continue to grow around 2 times the GDP in coming years. M&A activities have shaped up the industry to where it is today and in future this trend is expected to accelerate as Indian companies are seeking partnerships for scaling up or are looking for exit routes through sell-outs.

Several successful M&A's in the sector show that acquisitions do provide a significant growth opportunity and give international players quick access to Indian markets. Global companies looking to establish presence in India and planning to ride the growth wave in specialty chemical sector should proactively look-out for hidden jewels in Indian specialty chemical sector.

Strategies for Indian Pharma in a volatile world

Fragmented Indian pharmaceutical market is facing high volatility and uncertainty. Increasing number of drugs in NLEM and price controls, changing FDI Policy, compulsory licensing, aggressive acquisition investments by MNCs, and declining global generic market opportunity is creating a new normal. Pharmaceutical companies need to re-visit their traditional growth strategies to succeed in a volatile world, say ***Manish Panchal, Charu Kapoor and Mansi Mahajan*** of Tata Strategic Management Group.

Indian Pharmaceutical Market

Indian pharmaceutical industry is valued at USD 12 Bn in 2013. The market is primarily driven by exports to regulated as well as semi-regulated markets. Currently, India exports drugs to more than 200 countries and vaccines and bio-pharma products to about 151 countries. Globally, India ranks 3rd in terms of volume and 14th in terms of value.

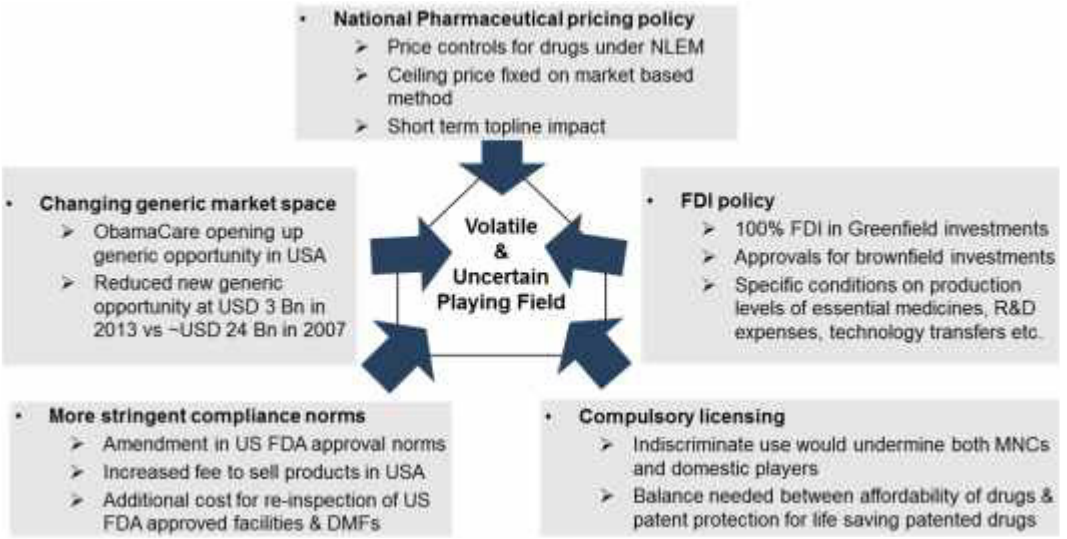
Indian pharmaceutical industry is fairly fragmented with top 10 companies contributing to 41% of total sales. The next ten companies contribute to 22% of sales while the remaining companies contribute to 37% of the total sales. Urban regions (Metros and Tier I cities) contribute to about 60% of total sales while the remaining country contributes to the balance 40%. Tier I cities are growing at ~10% p.a. while rural areas are growing at ~14.5% p.a. The growth has been driven by increased access to healthcare, improved infrastructure and greater penetration of pharmaceutical companies into Tier 1 cities and rural areas.

Changing market dynamics

The year 2013 has seen deceleration of industry growth rate from 16.6% in 2012 to 9.8% in 2013. During the year, the industry faced a different type of regulatory headwind; the patent office ruled against the intellectual property rights for several notable drugs, including Pfizer's Sutent, Bayer's Nexavar, etc. A still more daunting

challenge for MNCs operating in India has been compulsory licensing and uncertainty about patent validity. Domestic companies, on the other hand, have been equally impacted by the Drug Prices Control Order and the ensuing stalemate of stocks stuck at various levels in the distribution chain. The Parliamentary Standing Committee recommended multiple mandatory conditions for allowing FDI in brown field projects while allowing 100% FDI in Greenfield projects. (Ref. Figure 1)

Figure 1: Key industry trends impacting Indian Pharmaceutical Market



Industry estimates show that generic drug user fee amendments in USA, compulsory licencing and national pharmaceutical pricing policy have increased the legal expenditures of the top 10 drug makers in India by ~50% in the past three years. NPPP is expected to lead to value erosion to the tune of INR 1,600 Cr post implementation for the year 2013-14.

With the notification of the order, the NPPP 2012 comes into effect and 348 drugs under NLEM, which account for 60 percent of total domestic pharmaceutical market amounting to nearly INR 29,000 Cr, would come under price control. (Ref. Figure 1)

These factors, coupled with general elections in 2014 and a host of high-profile M&A deals and aggressive investments by MNCs in India clearly indicate that the industry is going through a period of significant volatility and uncertainty which has created a new normal for the companies.

In such an uncertain playing field, it is imperative for companies to ask "How do we grow our business from here?" Companies will need to reinvent their business model or take on some disruptive new approach as traditional strategic approach would have limitation in this transient world.

Strategies for success in uncertain and volatile environment

TATA Strategic analysis suggests that companies which quickly adapt to the uncertain and volatile environment will be the possible winners in 2014 and beyond. Going forward, the companies will need to build their business using one or more of the following five levers (Ref: Figure 2):

Review product portfolio

The new pricing mechanism as specified in the NPPP 2012 would impact near term earnings of companies. The companies most affected will be the ones with higher dependence on Indian market, premium pricing approach and having higher share of acute therapy segment. On the other hand, the impact of the new policy would not be substantial on companies that have sizeable share of earnings from regulated markets, especially U.S. generics. Therefore, it will be vital for companies to re-look at its geographic spread and to re-new their portfolios by focusing on; therapeutic class synergies, increasing share of prescription, adding innovative and better margin products.

Build customer centricity

To succeed in such a complex environment, companies will need to take a customer centric view to re-look at the value proposition for each major customer segments. For each customer segment in the value chain, be it channel partners, practicing physicians, or direct patients, companies need to look at building distinctive forms of customer connect through advanced mechanisms of sales force engagements, consolidation of field force, strengthen marketing channels with adoption of digital marketing, and organize patient education programs. Companies should not just promote their products but see themselves as a disease prevention and management company.

Figure 2: Levers for success



Strengthen operational capability

Companies will need to revisit their operations to ensure that no complacency has set in. The legacy processes might be driving up costs due to outdated technologies or high e-factor1. Companies will need to focus on process innovations by adopting latest technologies such as micro reactors or critically evaluating and reducing the number of process steps. Furthermore, benchmarking of manufacturing processes and supply chain optimization will help in establishing the extent of improvement required to be achieved by the company.

Value creation by JV / M & A

Companies need to look for inorganic value creation and speed to market opportunities. Alliances could help in deeper customer and market penetration with value creation happening in many forms such as co-production to reduce compliance costs, co-marketing through use of common marketing channels and co-promotion to reduce advertisement & promotion costs by leveraging common distribution

channels. It will also help companies to capitalize on licensing opportunities presented by international pharmaceutical players as they increasingly invest in emerging economies. Recent JV / M&A activities as highlighted in Figure 3 highlight the consolidation trend in the industry.

Figure 3: Recent JV / M&A in Indian Pharma



Source: Research by Tata Strategic Team

Organizational agility

To successfully respond to uncertainty, companies will have to create a culture of agility and innovation. They will need to take a fresh look at their organizational structure, especially the number of layers in the organization, the relationship between business units, and the mix of organizational boundaries. They will need to significantly redefine business processes to enable quick decisions and lower cycle times while also meeting increased compliance requirements. The leadership team and senior management will also have to be trained to accept the new normal as a "way of life" and respond to change quickly.

Way forward

The regulatory environment in the pharmaceutical sector is more challenging now than ever before. To meet the new normal, companies will have to invest in re-establishing their competitive position. Optimization of product portfolio to target high return products and building distinguishing capabilities to stay ahead of competition would be the key to success.

Both domestic and multi-national players will need to look at inorganic growth opportunities including value creation through partial carve outs as it would play a key role in defining the long term sustainability of the companies. The winning companies will be the ones which analyze their competitive position and meet the rapid changes happening in the industry by evaluating and speedily implementing the five levers outlined above.

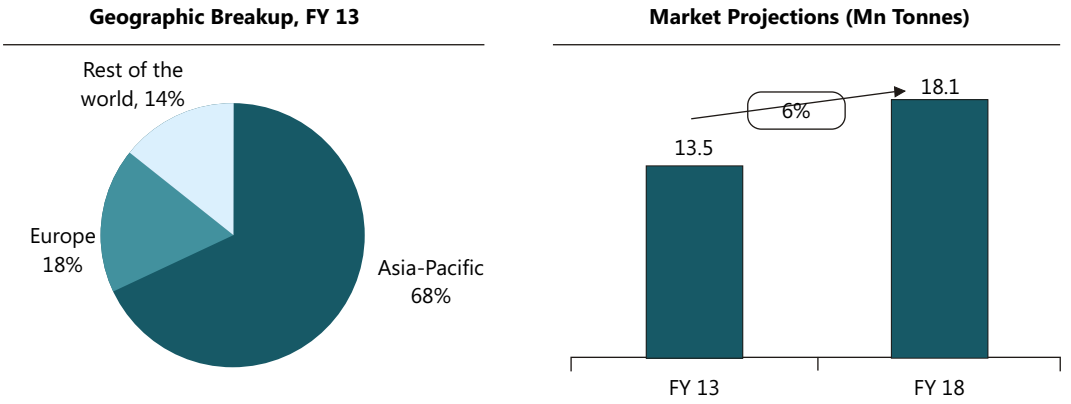
Oleochemicalsgaining prominence in speciality chemicals

Increase in demand for bio-degradable products and sustainable solutions coupled with changes in regulations in recent times areincreasing the influence of oleochemicals in various segments of chemical industry.The global oleochemicals market is likely to reach 18 MnTonnes by 2018. Recent advances have creatednew applications invarious segments such as in polymers, lubricants and biosurfactancts which offer significant opportunities for companies in the long run. Chemical companies which explore organic and inorganic growth options in this space could be poised for major growth, say **Manish Panchal, Charu Kapoor** and **Binay Agrawal** of Tata Strategic Management Group.

Introduction

Traditionally, oleochemicals have been used for applications such as surfactants, personal care, soaps and detergents and food additives. However, various new applications of oleochemicals such asbiolubricants, biopolymers, and biosurfactants are emerging as replacements of petroleum based products creating exciting growth opportunities.

Figure 1: Global Oleochemical Market



Source: Transparency Market Research, Analysis by Tata Strategic

The global oleochemicals market in FY13 was estimated at 14 Mn Tonnes and is expected to grow at 6% p.a. over the next five years. Asia Pacific accounts for68% of the global oleochemicals market and is expected to grow at 8% p.a. over the next five years. Surfactants, home care and personal care are the largest end use segments for oleochemicals.

Key Growth Drivers

Demand for sustainable solutions, biodegradable products, and REACH (Registration, Evaluation, Authorisation and Restriction of Chemical substances) like regulations are major growth drivers for oleochemicals based products and are hence driving innovation in this area. Customers increasingly prefer products based on natural sources and this trend is likely to become more prominent across geographies in future.

Chemical companies are also increasingly committing to sustainable development as part of responsible care initiatives which are further driving requirements for such products, e.g. Solvay wants to increase its share of raw material through bio-sources from 11% in 2010 to 20% in 2020.

Combination of these growth drivers have resulted in emergence of new products and applications based on oleochemicals and one of the major beneficiary of the same is Plastics, e.g. Polyamide, an engineering plastic, is now made from castor oil with available and proven technology. Similarly, Polyols, which are inputsfor polyurethane, are being increasingly made through oleochemicals route with technologies and processes refined over the years.

Emerging Application Sectors

Chemical companies focusing on lubricants, polymers, and surfactants can explore diversifying their product portfolio based on oleochemicals. The biggest advantage with such diversification is that companies not only continue to serve their core businesses but also significantly lower their portfolio risk and their carbon footprint.

Biolubricants

Petroleum based lubricants have been leading the industry since decades. However, these do not readily degrade and therefore pose an environmental hazard. Once used, their disposal becomes a challenge, the cost of properly disposing such material is high and improper disposal can create several health and environmental hazards. This presents a strong incentive to produce lubricants which are bio-degradable.Currently lubricants market is estimated at 38 Mn Tons out of which bio-lubricants account for ~3% share (1.2 Mn Tons). Conservative estimates reveal that the global lubricant market is expected to reach approximately 45MnTonnes by 2020 out of which bio-lubricant will account for ~9% (4 Mn Tons) of the market. Some companies have already spotted this opportunity and working towards building a biolubricant based product portfolio e.g. Cargill has developed an electrical insulation fluid based fully on soybean oil.

Biopolymers

Like biolubricants, biopolymers are substituting traditional petrochemicals based polymers due to their better bio-degradability. The market for bio-polymersis in its infancy and estimated at ~1.3 Mn Tonnes globally in 2012 as compared to the global polymer demand of ~180 Mn Tonnes. It is expected to grow at a rate of 40% annually to reach ~20MnTonnes by 2020 accounting for 7% of the global polymer market. This rapid penetration of bio-polymers offers growth opportunity for companies. MNC's such as BASF, Solvay, DuPont, DSM and Lanxess as well as few small companies like Earth Soul and Harita have spotted this opportunity and are working towards building polymers based on vegetable oils.

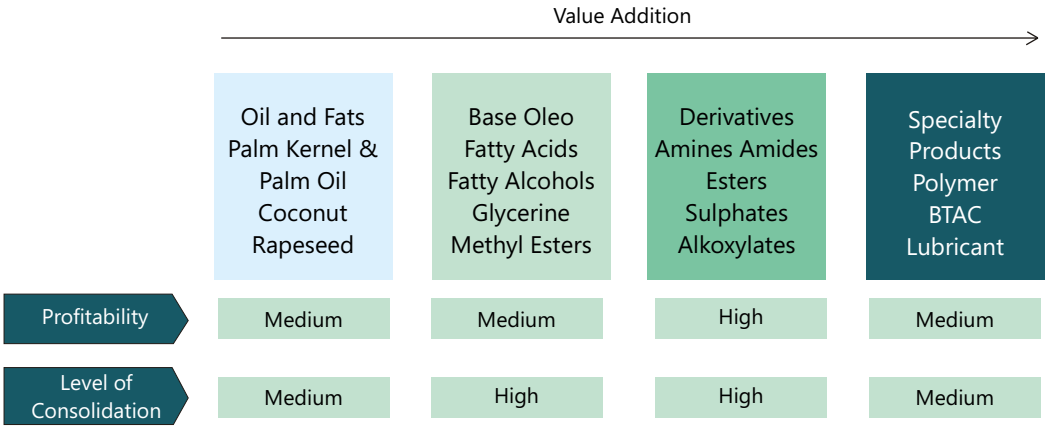
New Age surfactants (MES, Non Ionics)

Methyl Ether Sulfonate (MES) is anoleochemical based substitute for Linear Alkyl Benzene Sulfonate (LABS). Till now, the development of MES has been hindered by the lack of installed production capacity but interest in this space is becoming more intense due to benefits of MES, which scores better than LABS on multiple counts. MES has excellent characteristics such as high purity and active level, and is devoid of

any volatile organic compound (VOC). It is also gentle on the skin, has low percent of di-salt, is white/near white in color, and is suitable for both liquid and powder detergents.

In 2011, Jiangsu Haiqing Biotechnology setup a 100,000 Tonnes / year MES plant in China which is the largest plant of MES to go on stream. Going ahead, such activities are further expected to drive growth of MES and it will potentially start replacing LABS at a rapid pace. The current LABS global market is estimated at ~3 MnTons and MES constitutes less than 1% of the same. It is expected that by 2020 MES will replace one third of LABS demand to reach 1.2MnTonnes.

Figure 2: Opportunity in Oleochemical Value Chain



Source: Tata Strategic Database

Opportunities exist in Asia

Asia is not only a major consumer but also a major producer of oleochemicals and related products and today accountsfor 68% of the world consumption and 60% of world production of oleochemicals. Malaysia and Indonesia are major producers of base oleochemicals such as fatty acids and fatty alcohols and have attracted investments from almost all major global companies such as Emery Oleo, Wilmar, BASF etc.

This scenario has dramatically changed in recent years. Just over two decades ago, ~90% of all oleochemicals and derivatives were produced in developed countries such as USA, Europe and Japan. Today the majority of installed capacities are in Asia and new capacities are also being added in this region. Large captive consumption and availability of key raw materials such as palm oil and palm kernel oil has been a key reason behind the industry's shift to Asia.

This shift to Asia led to capacity overhang in base oleochemicals over the past years. To curtail it and to ride over reduced profitability, large plantation companies in Asia such as IOI Chemicals have invested in downstream processing of their feed stocks. Many plantation companies have also created partnerships with chemical companies over the last three years leading to further strengthening of Asia as a major hub for oleochemicals and downstream products.

Imperatives for Chemical Companies

Oleochemicals based products provide significant diversification opportunity for chemical companies. Various levers including partnerships, acquisitions, and organic growth can be used to establish a presence in this segment.

Strategic Partnerships

Opportunities exist for entry in any part of the oleochemicals value chain (Figure 2).

Ajoint venture option can be explored with a technology provider for setting up an oleochemical derivatives manufacturing unit close to customers. This will help meet the unique needs of speciality chemicals customers.

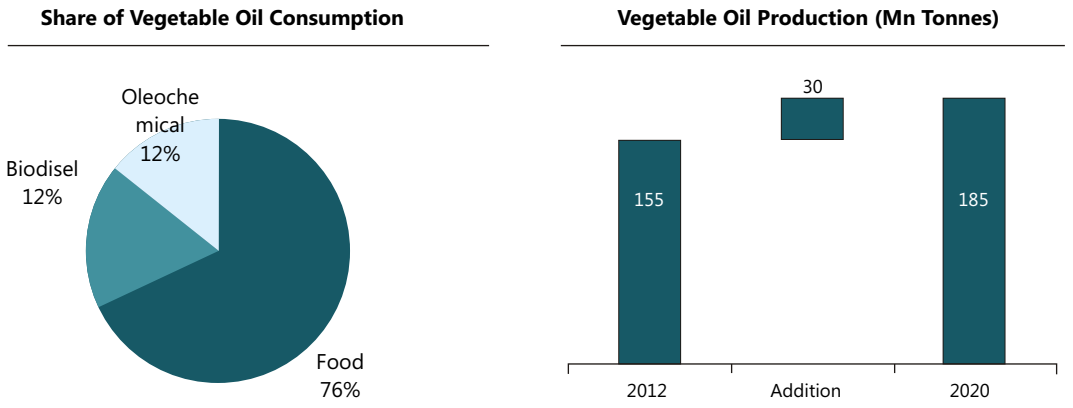
Exploiting local feedstock availability

In Asia, countries such as Indonesia and Malaysia are rich in palm oil and palm kernel oil whereas Indiais the third largest producer of high erucic rapeseed oil and the world's largest producer of castor oil. Chemical companies can explore the business ofoleochemicals and its derivatives related to these feedstocks. Companies can explore manufacturing of value added (downstream) products or position themselves to cater to the entire value chain.

New Applications

Companies with strong R & D capabilities can also explore building a successful business in oleochemicals by introducing new molecules. For example, a country to country initiative and company to company initiative can be undertaken for joint research in oleochemicals. Indian companies have already taken this initiative in agrochemicals and have been quite successful. This can be replicated in oleochemicals to develop new products for global market.

Figure 3: Vegetable Oil Supply



Source: Industry Sources

Challenges

Shift to Biodiesel

Biodiesel (methyl esters of various chain lengths) is one of the uses of oleochemicals (Ref Figure 3). Any change in Govt. regulations and blending norms for biodiesel can significantly impact economics of oleochemicals based products. Increased requirement from biodiesel could push prices of oils higher thereby making them less attractive vis-à-vis petroleum feedstocks. However, this risk is largely mitigated due to a significant shift worldwide towards shale gas as the new and economically viable energy source.

Feedstock availability

Continuous availability of feedstocks is a concern which remains at the top of the mind of companies operating in oleochemicals. Historically, about 12% to 14% of the world's vegetable oil production has been used foroleochemicals production. The emerging applications discussed above would require an additional ~ 8MnTonnes of vegetable oil by 2020. Estimates show that this can be metwith the increasing global vegetable oil production which is projected to increase from 150 MnTonnesin 2012 to 185 MnTonnes by 2020.

Besides the above, companies are fast realizing that there are other geographies around the world which offer climatic conditions suitable for palm oil plantations. Sierra Leone and Liberia form a major part of what is called the new frontier for palm oil production in West Africa.For example, Golden Veroleum plans to invest up to $1.6 billion in Sierra Leone and is eyeing over half a million hectares of land for palm plantations.

Way Ahead

Oleochemicals based products offer a significant diversification opportunity for chemical companies. Asia is the preferred geography with a growing market and availability of feedstock.

To capitalize on this opportunity, companies can explore partnerships / mergers with base oleochemicals companies or think about integrating forward / backward themselves. Going further, companies can also plan to establish their footprint in new geographies which could provide them a first mover advantage and position them as a strong integrated player.

Industries such as lubricants, polymers and surfactants are likely to be impacted with replacement products based on oleochemicals and companies which capture major portion of the value chain or spot trends early could benefit significantly in the long run.

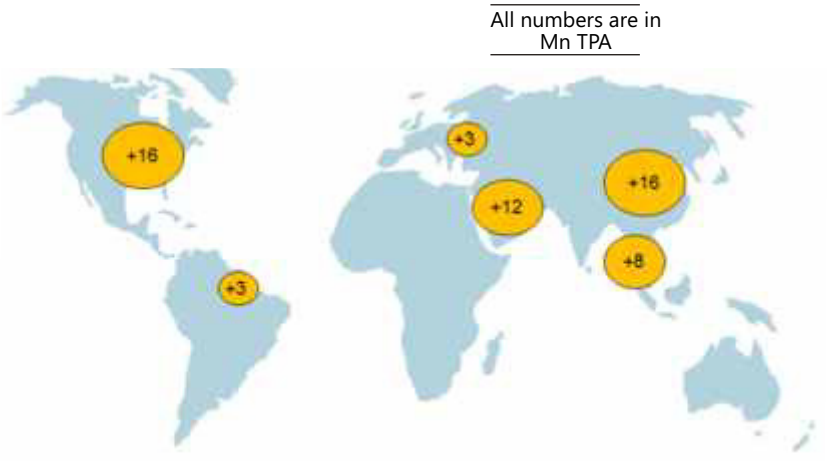
Opportunities in India in the evolving Global Petrochemical Industry

The global Petrochemical industry is changing with shale gas discovery in USA, recession in developed economies and emergence of Asia as a major consumption hub. This creates both challenges and opportunities for a growing economy like India. Challenges include competitive imports from North America in basic olefins. As Indian Govt. looks to promote domestic production through various incentives, there is an opportunity for the industry to explore different product mix from naphtha, use alternate sources of feedstock say **Manish Panchal, Siddharth Paradkar** and **Binay Agrawal** of Tata Strategic Management Group.

USA Shale looks east for Market

The global economy is on a narrow path of slow and fragile recovery. Asia has been the major growth driver of the global economy in last two decades and is expected to remain so going ahead. Chemical sales in Asia have increased from $880 Bn in 2007 to $1,100 in 2012, constituting nearly 33% of the Global market. Asian demand has been

Figure 1: Ethylene Capacity Additions 2012-2020



Source: Industry Sources, Analysis by Tata Strategic

primarily met through domestic production and imports from the Middle East. However, the future could be very different on account of large shale gas discoveries in USA and investments planned utilizing this low cost gas. Competitive North American producers will be able to tap into the growing demand of Asian market. This may create further challenges for the domestic industry in Asia which is currently based on Naphtha as feedstock.

The following four trends are likely to play a key role in the evolving global dynamics in chemical industry going ahead

1. With availability of low cost Shale Gas as feedstock, USA could become major manufacturing and processing hub
2. As growth becomes anaemic in home markets, western companies would look to expand presence in Asia
3. Commodity chemical companies will look for M&A route for entry into Specialty Chemicals for Growth and profitability
4. Asian producers will have to look at alternate sources of feedstock (e.g. coal to olefin in China) and right product mix to remain competitive

India Opportunity in Petrochemicals

India is a major growth market for petrochemicals. In the last decade it has grown at an impressive 14% p.a. Domestic production growth has lagged consumption opening up a major market for imports. To reduce the high current account deficit, Indian Govt. intends to increase share of manufacturing from current 16% of GDP to 25% of GDP by 2022. Domestic manufacturing is hence being promoted through formulation of a new policy for setting up National Manufacturing Investment Zones. Indian Govt. has recently increased import duty on polymers from 5% to 7.5% to encourage domestic production. Emphasising on cluster based approach, Govt. of India is also setting up PCPIRs; the progress has however been slow.Multinational companies who are looking to serve the Indian market for long term need to explore setting up a manufacturing unit in India. Considering India is surplus in Naphtha it offers specific manufacturing opportunities which can be globally competitive and

Figure 2: FCC units and Aromatics Complexes in India



Source: Tata Strategic Database

provide the right entry options for MNCs. PX-PTA complex, propylene derivatives and py-gas derivatives are a few such opportunities. The right location and a local partner can help these companies overcome challenges related to infrastructure and complex regulatory approval process in India.

Aromatic Complex for PX-PTA

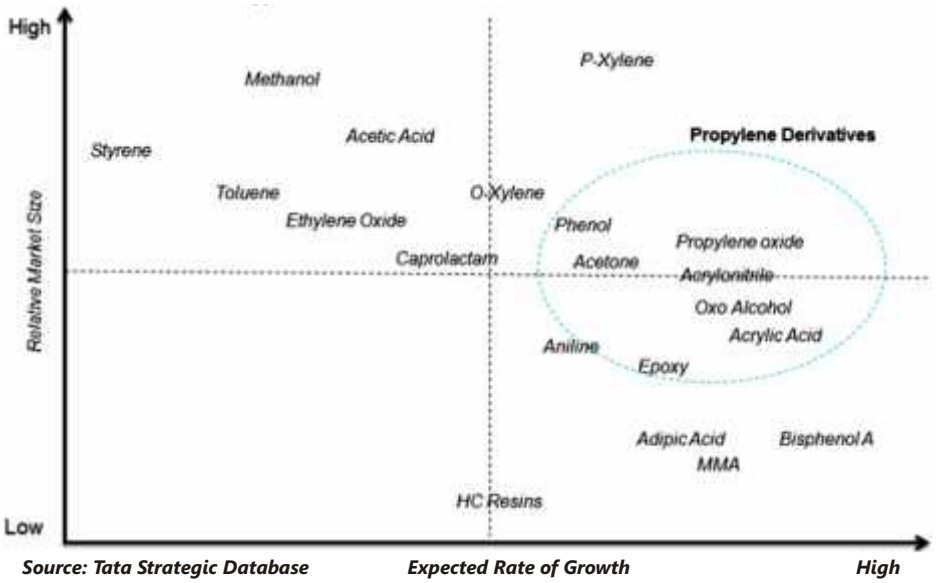
Ethane based crackers cannot produce Aromatics. India is a large market for polyster and hence PTA. Growth in synthetic textiles industry is a key demand driver for polyster. Raw material for PX-PTA units is available either from naphtha cracker or refinery (naphtha). 5 PX-PTA units have been set up in India downstream from refineries (Figure 2). Mitsubishi PTA has setup a large scale PTA plant in Haldia using

imported PX. Based on announced capacity additions plans, India is still expected have a supply shortfall of ~3 Mn Tonnes of PTA by FY21. This is an opportunity that large MNCs can address through a tie up with a refinery in India. There are medium to large scale refineries in India who will be willing to explore such a possibility. JBF has got licence for BP's latest generation technology to set up a 1.25 MnTPA PTA plant in Mangalore. This plant is backward integrated to MRPL refinery. Similar such arrangements can be made to utilize India's advantage as a naphtha surplus country.

Propylene Derivatives

Upcoming crackers globally are based on ethane. Propylene yield from ethane is low. Fluid Catalytic Cracking (FCC) units of refineries are a good source for propylene production. Three refineries in India already have FCC units (Figure 2) and there is potential for such units in other refineries as well. Propylene from these units can be used to make propylene derivatives (other than Polypropylene). With growing captive consumption Indian market has reached critical size in many C3 derivatives (Figure 3) and some are expected to reach inflexion points in next 5 years. However, production in India is either minimal or non-existent.

Figure 3: Petrochemical Opportunities in India



This is an opportunity which companies with interest in downstream petrochemicals can address. BPCL has formed a partnership with LG Chemicals to make some of these derivatives by setting up a FCC unit in its Kochi refinery. Other similar FCC units can be set up through a JV between a technology provider and a refinery in India.

Figure 4: Upgrade Options from Py-Gas of Naphtha Cracker

C5-C12	Products	Market Size in India (2012, TPA)	Usage
C5	Piperylene, Dicyclopentadine	5,000	Hydrocarbon Resins → Adhesives, Paints, Rubber
C7	Toluene	4,00,000	TDI → Polyurethane
C8	Xylene	20,00,000	PX → PTA
C9	Resin Oil	5,000	Hydrocarbon Resins → Adhesives, Paints, Rubber
C10	Naphthalene	60,000	Dyes, SNF, Beta-Naphthol, H-Acid
C11-C12	Aromatic Solvents	5,00,000	Paint, Detergent, Pharma

Source: GTC, Tata Strategic Database

Value-Potential from Py-gas in Naphtha Cracker

Naphtha crackers in India would have to look at optimizing their product mix to remain competitive. In basic polymers like PE, naphtha crackers would find it difficult to compete with the gas crackers in North America and Middle East. There is opportunity to explore products which can only be made from a naphtha cracker e.g. C5 to C12 derivatives. The Py-gas stream accounts for 19% of total output from a naphtha cracker. Various value-added products that can be extracted from py-gas are listed in Figure 4.

Other Opportunities

Other specific opportunities include use of alternate feedstock and setting up R&D centres in India.

Alternate Feedstock- Off-gas from large scale refineries in India could be a competitive feedstock. Reliance is already exploring setting up a cracker from off-gas in Jamnagar. India is also one of the largest producers of certain bio-feedstock like castor oil. An engineering plastic Polyamide can be made from castor oil.

Investment in R&D- India has a vast pool of scientists which can be leveraged to set up R&D centres in India. Major specialty chemical companies including BASF, DuPont, DSM and Dow Chemical have already set up R&D or technology centres in India. India's R&D capability was one critical success factor for the development of the API industry in India. The same strengths can be leveraged to replicate the API success story in specialty chemicals and downstream petrochemicals.

Conclusion

The evolving global petrochemical outlook has opened up specific opportunities in India. With support from Government, which is encouraging domestic production, the Indian industry can certainly look to explore these options. These opportunities also provide an attractive entry options for petrochemical MNCs. With anaemic growth in developed markets India is an attractive market that must be tapped strategically. Partnership opportunities with refineries/ naphtha crackers can be explored to establish a presence in India in these opportunities.

GST: A sweet pill for Indian pharma

GST is high on the agenda for the new government and its rollout is a priority. The cascading effect of local taxes and complexity of the current regulatory structure of central and state bodies are adding to the inefficiencies of the Indian pharmaceutical sector already under margin pressure from rising costs and increasing span of drugs under price control.GST will benefit the Indian pharmaceutical manufacturers by rationalizing the tax structure and optimizing distribution. Even a 2% reduction in production or distribution cost will add to the profits by over 20%. It could be the single biggest shot in the arm for the Pharmaceutical industry and create competitive advantage for those who move early, say **Manish Panchal (Practice Head - Chemicals, Lifescience & Supply Chain)** and **Siddharth Paradkar (Principal - Logistics & Supply Chain)** of Tata Strategic Management Group.

Introduction

The Indian Pharmaceutical industry with a domestic turnover of over USD 15 billion is amongst the largest producers of pharmaceutical products in the world (by volume). While the sector has been witnessing high growth over the past decade it has been burdened with diminishing margins. The domestic industry is facing pressures of increasing span of price controlon account of changing regulations, price erosion with more generics and increasing competition added by lack of R&D productivity and limited new molecules. Multistage taxation in the pharmaceuticals industry i.e. Customs duty on imports, Central excise duty on manufacture, Central Sales Tax (CST) / Value Added Tax (VAT) on sale of goods, Service tax on provision of services and levies such as entry tax, octroi, cess by the State or municipalities; loss of credit of tax paid, adds to the inefficiencies and cost. GST will help in rationalizing the tax structure and could be the single biggest shot in the arm for the Pharmaceutical sector.

What is Goods and Services Tax (GST)?

GST is an evolution of the current tax regime, transforming the complex and cascading structure into a unified value added system of taxation. Under this, a value

added tax would be levied at every point of the supply chain providing for credit for any / all taxes paid previously.

Keeping in line with the governance structure of the country GST would be levied simultaneously by the Centre and State (CGST and SGST respectively). All essential characteristics in terms of its structure, design applicability, etc. would be common between CGST and SGST, across all states.

GST is expected to replace most of the current applicable indirect taxes as listed in Exhibit 1.

Exhibit 1: Taxes subsumed under GST

Central Taxes	*State Taxes*
• Central Excise Duty	• VAT / Sales Tax
• Service Tax	• Entertainment Tax
• Additional customs Duty	• Entry Tax (not in lieu of Octroi)
• Surcharge and cesses	• Other Taxes and Duties (includes Luxury Tax, Taxes on lottery, betting and gambling, and all cesses and surcharges by States)

Benefits to the Pharmaceutical Industry

Implementation of GST will have significant impact and will change the manner in which business is carried out in comparison with the existing ways.

The application of a single tax rate across all goods and service will result in redistribution of taxes across all categories. This will lead to a reduction in taxes on manufactured goods and thereby impacting the pricing of the final product.

The integration of tax on Goods and Services through GST would provide the additional benefit of providing credit for service tax paid by manufacturers. Both CENVAT & VAT, which are being levied at present, give tax credit to the manufacturer

for the tax paid for raw materials (hence a tax is charged only on the value added by the manufacturer). More often than not, there are various services including logistics involved in getting the input material to its final customers. Service tax is paid on the cost of such services too. With the implementation of GST, cost of any service, including logistics, will be considered as value add, and the manufacturer will get tax credit for the service tax paid.

The biggest advantage to the industry would be that of reduction in transaction cost, with an immediate impact coming from the discontinuance of CST. The multistage taxation along with the inability to take full benefit of the CENVAT credit / refund has been an issue for the industry. With central GST expected to be a single rate for goods and services, going forward credit accumulation may not be an area of concern. Furthermore, if the legislation provides for carrying forward of the unutilised credit this would be an additional boost to the industry.

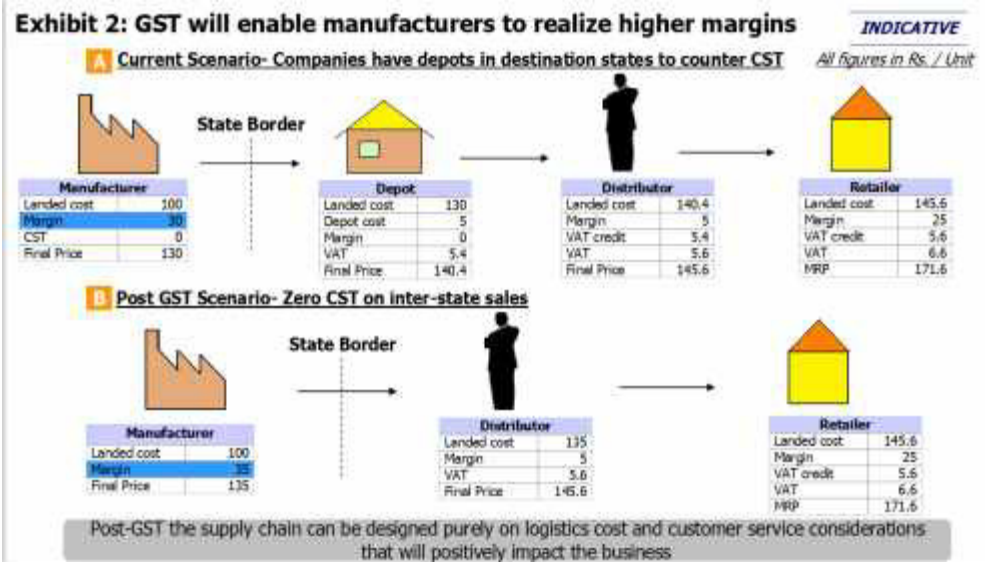
India a single common market

Under GST inter-state sales transactions between two dealers would be cost equivalent and comparable with stock transfers / branch transfers. Inter-state transactions would become tax neutral, making India one single common market no longer divided by state borders (Exhibit 2). This will result in lower cost which can add to margins or can be passed on to customers.

Exhibit 2: GST will enable manufacturers to realize higher margins

INDICATIVE

All figures in Rs. / Unit



Opportunity to explore alternate distribution models

Organizations will be able to explore different distribution models such as setting up mother warehouses and regional distribution hubs and consider stepping away from traditional C&F and distributor based models currently adopted. This will lead to logistics and distribution to evolve as a competitive advantage through improved service levels, faster turnaround times and better fill rates at lower costs.

Rationalization of Warehouses and Transport network

GST would do away with the existing penalties on inter-state sales transactions and facilitate consolidation of vendors and suppliers, eliminating the need to have state wise warehouses to avoid CST and the associated paperwork. This will enable companies to consolidate warehouses, rationalize their networks and take advantage of economies of scale, improved efficiencies, better control and reduction in inventory (i.e working capital deployed in the business). For example: By setting up a large warehouse in a place like Zirakpur, a large logistics hub with good infrastructure, a company can serve markets across the states of J&K, Himachal, Punjab, Uttrakhand and Haryana as against having five different warehouses to serve these markets in the current scenario.

Furthermore, the pharmaceutical sector currently enjoys various location based tax holidays on its manufacturing activities. Under the proposed structure of GST, such area based exemption will be done away with. However, taking into account past precedents suitable work around/refund process would be constituted to ensure that any existing hubs do not get impacted and continue to get the agreed benefits. However, the challenges faced in distributing from these remote locations could be addressed by designing logistics efficient networks of mother and daughter warehouses to ensure optimization of cost and superior availability of products.

While the qualitative benefits arising out of GST are well established, there is a definite impact to economics of companies as well. Logistics cost accounts for nearly 13-14% of our GDP. Of the total logistics cost transportation contributes ~35%, warehousing & storage ~10%, inventory holding cost ~25% and other inefficiencies' make up the balance 30%. Implementation of GST and alignment of a firm's supply chain to it will directly help in reducing cost on transportation, warehousing and inventory holding

by 5-8%, 10-12% and upto 28% respectively for each of the cost heads, leading to an overall savings in the range of 10-12% of the total logistics cost.

Looking Forward

The government has already begun the process of getting the necessary consensus from all the stake holders to pave the way for implementing this landmark tax reform. Though the exact details are still sketchy, the structure and deliverables have been clearly laid down for all to see. The government has set itself an ambitious target to roll it out by July 2015.

As Indian pharmaceuticals companies look forward to revenue growth on one side and the need to reduce costs, GST offers a great opportunity to revisit their Supply Chain & distribution strategy to develop an agile, customised and cost-efficient supply chain. Companies need to act now to assess the impact of GST on their businesses and functions and develop an action plan and road map for the future. Those who move early are likely to gain an advantage on cost and service levels over their competitors and deliver a better value proposition to the customer.

FICCI Concept - Reverse SEZ

The country is deficit in cheap energy source particularly natural gas and needs to depend more and more on fuels such as LNG. The local availability of gas which is priced around $ 4.5/mmbtuis very limited and unable to meet total needs and the country needs to depend on imported LNG which is available upwards at $15/mmbtu. On the international scenario with new discovery of shale gas in the USA and recent discoveries in Africa, the local gas prices in these countries are now between $2 to 3/mmbtu.

The total gas consumption in India for energy is largely for power, for fertilizer production and for petrochemicals. Due to the very high cost gas / LNG the country ends up with subsidizing output, there by creating huge subsidies running into tens of thousands of crores every year.

Learning from other countries, such as China where energy and mineral needs have pushed the country to source these inputs in far flung regions, such as Brazil, Africa etc.,India needs to similarly progress in order to secure its needs in energy and building blocks.

The closest energy/gas availability in abundance in countries around India isas those in Africa, Middle East and on the eastern boarder of India. However, since these countries are politically unstable, it is always a high risk for an individual Company to set up gas based manufacture of basic building blocks in these countries. It is therefore, proposed that the Indian Government help create a Special Economic Zone (SEZ) in these countries and maintain a politically stable relationship with the local Government. Various Indian Companies would be interested to invest into such an SEZ to use the cheap gas available to make chemical building blocks and bring them to India for the country's needs. One could term these SEZ as Reverse SEZ. The Reverse SEZ would be blessed with political stability due to the Indian Government and economic attractiveness due to cheap availability of gas in these countries.

The biggest beneficiary would first be the Fertilizer industry who would be able to get gas, its major input at a price which would be 1/4th of its current price. It is expected that every fertilizer plant with an individual capacity of 1500 tons/day would be able to save about a thousand crores every year, thereby contributing to reduce subsidies permanently.

The Petrochemical industry could look at making basic building blocks along with the Fertilizer industries in these Reverse SEZ areas such as Ammonia, Methanol and other C1 chemistry products. Cheap availability of C1 building blocks from the Reverse SEZ area will help assure large investments on downstream products in India (home market). Thus besides securing competitive inputs the Reverse SEZ would assure rapid investment in the downstream projects in India thereby creating large employment in the country.

India could also explore opportunities to make power based on crude/cheap Methanol being imported instead of LNG.

Following three countries have been shortlisted for exploring the Reverse SEZ opportunity, namely -

a. Mozambique

b. Iran

c. Myanmar

India can have a mutually beneficial business relationship with these countries. They are resource rich andLack technical know-how, capital or both to build their own industry. They are low on priority for other countries due to their macroeconomic insecurity .Indian companies can help these to develop their chemical/petrochemical industry by providing capital/technical know-how and in return obtain favorable business deals. The result will be mutually beneficial. Investment and employment will get created in these countries. At the same time, feed stock constraints of Indian Chemical and Petrochemical industry will get addressed. These will also have potential of developing into manufacturing base for supply to Africa/central Asia and facilitate closer bonding with the region.

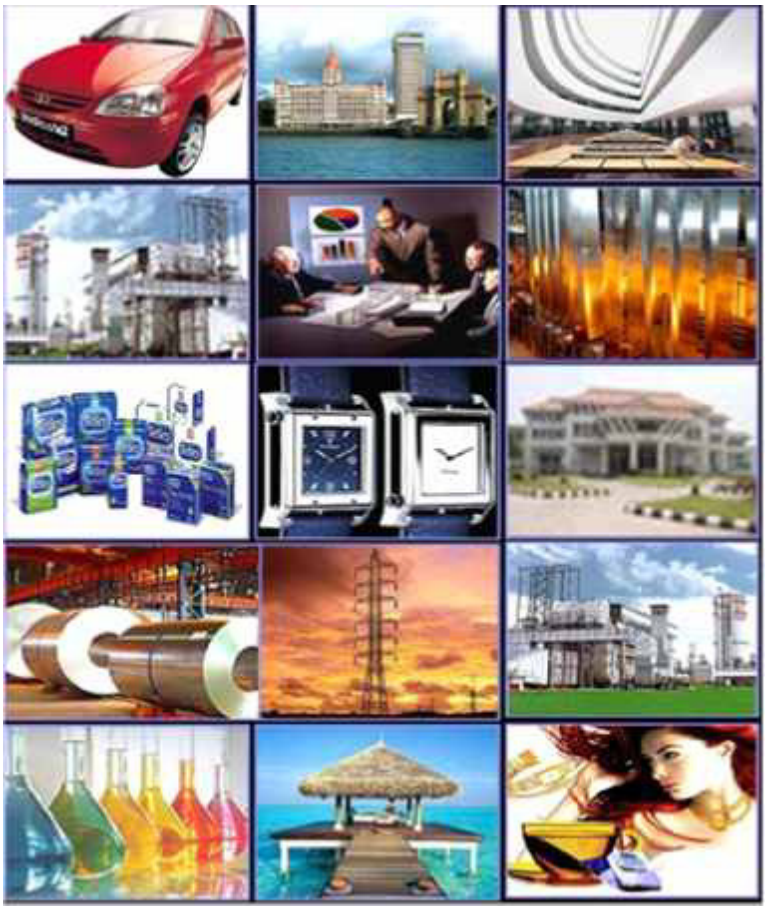
Necessary action on the above can be done for which cooperation/ joint commitment of the Ministry of External Affairs, Ministry of Commerce along with Ministry of Chemicals and Fertlizers will be essential. FICCI will actively participate in carrying forward the concept of Reverse SEZ.

About Tata Strategic

Founded in 1991 as a division of Tata Industries Ltd, Tata Strategic Management Group is the largest Indian own management consulting firm. It has a 50 member strong consulting team supported by a panel of domain experts. Tata Strategic has undertaken 500+ engagements, with over 100 clients, across countries and sectors.

It has a growing client base outside India with increasing presence outside the Tata Group. A majority of revenues now come from outside the group and more than 20% revenues from clients outside India.

Tata Strategic offers a comprehensive range of solutions covering Direction Setting, Driving Strategic Initiatives and Implementation Support



Our Offerings

Set Direction

Strategy

- Scenarios & Vision
- Market insights
- Entry/Growth Strategy
- CSR Strategy
- India Entry
- Alliance & Acquisition Planning
- Strategic due diligence
- Manufacturing Strategy

Drive Strategic Initiatives

Organization Effectiveness	Marketing & Sales	Operations
Organization Structure	Revenue Enhancement	Supply Chain Optimization
Culture & HR Transformation	Product Innovation	Throughput enhancement
Manpower Planning & Optimization	Market Share Growth Rural/Urban/B2b	Superior Fulfillment
Leadership Development & succession planning	Channel Effectiveness	Project Excellence
	Route to Market	Procurement Transformation
		Resource Management

Facilitate Implementation

Implementation Support

- Program Management
- Change Management
- Benefit Realization

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About FICCI

Industry's Voice for Policy Change

Established in 1927, FICCI is one of the largest and oldest apex business organizations in India. FICCI's history is closely interwoven with India's struggle for independence, industrialization and emergence as one of the most rapidly growing global economies. FICCI has contributed to this historical process by encouraging debate, articulating the private sector's views and influencing policy.

A not-for-profit organization, FICCI is the voice of India's business and industry.

FICCI draws its membership from the corporate sector, both private and public, including MNCs; FICCI enjoys direct and indirect membership of over 2,50,000 companies from various regional chambers of commerce and through its 70 industry association.

FICCI provides a platform for sector specific consensus building and networking and is the first port of call for Indian industry and the international business community.

Our Vision

To be the thought leader for industry, its voice for policy change and its guardian for effective implementation.

Our Mission

To carry forward our initiatives in support of rapid, inclusive and sustainable growth that encompasses health, education, livelihood, governance and skill development.

To enhance the efficiency and global competitiveness of the Indian industry and to expand business opportunities both in domestic and foreign markets through a range of specialized services and global linkages.

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