



The Indian chemical industry

New directions, new hope

in association with the CHEMTECH Foundation



KPMG India

Foreword

The Indian chemical industry is an integral component of the Indian economy, contributing around 6.7 per cent of the Indian GDP. It touches our lives in many different ways. Whether it is thermoplastic furniture we use, or a synthetic garment we wear, or a drug we consume – we are inextricably linked to it. The industry is a vital part of the agricultural and industrial development in India and has key linkages with several other downstream industries such as automotive, consumer durables, engineering, food processing, etc.

Globalisation poses several challenges to the industry that has predominantly developed in a protected environment. With World Trade Organisation (WTO) assuming an increasing role in international economics, there is an inevitable move towards an inter-linked global economy. However, there have been cases where certain segments of the industry such as pharmaceuticals and biotechnology have performed exceedingly well even at a global level.

In this context, several players are asking the question “How do we replicate these successes we find in isolated pockets of the industry at an aggregate level and unlock the intrinsic potential in the industry?”

As a significant step towards answering this question, CHEMTECH Foundation requested KPMG to study the Indian chemical industry in-depth and help formulate a vision for the industry supplemented with an action plan that could be implemented to achieve the same. The scope of the KPMG study comprises an assessment of the Indian chemical industry vis-à-vis the global industry and identification of the key imperatives and initiatives required to achieve this vision. The report projects where the Indian chemical industry is headed and highlights the new directions and hopes that face the chemical industry today. The findings of the study have been arrived at through a combination of intensive analysis of the global and Indian chemical industry and a survey of 75 key industry leaders. We sincerely thank KPMG for making this endeavour possible.

As the report highlights, the industry has the potential to grow to a size of USD100 billion through a series of concerted efforts. Given the broad canvas of the industry, we recognise that a ‘one size fits all’ approach will not work. The analysis has been conducted for three segments – Basic, Speciality and Knowledge.

We hope that this study will benefit the Indian chemical industry and the entrepreneurs who share the vision of making the industry a significant player in the global market. CHEMTECH appreciates the sincere efforts of KPMG in putting this report together.



Jasu Shah
Chairman
CHEMTECH Foundation



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Executive summary

This report discusses two scenarios that the Indian chemical industry can grow to by the year 2010 – the Base case scenario, where the Indian chemical industry will sustain its past performance and grow in line with the projected GDP growth rates as per the tenth plan; the Aspirational scenario, on the other hand, showcases the industry's potential to grow at a significantly higher rate by addressing certain key imperatives. The Aspirational scenario is what the industry can aspire to achieve and is the Vision 2010 for the Indian chemical industry.

Vision 2010 envisages a USD 100 billion chemical industry in India through an increased focus on the Speciality and Knowledge chemical segments.

Vision 2010

The chemical industry in India has the potential to grow to around USD 100 billion by 2010 according to KPMG's analysis based on a survey of the industry. This would imply an annual growth rate of 15.5 per cent. For the industry to achieve this size, Speciality and Knowledge chemical segments would need to grow at 16.4 per cent (current growth rate is 7.9 per cent) and 27 per cent (current growth rate is 12.3 per cent) respectively, while the Basic chemicals segment would need to sustain its current growth rate of 7.7 per cent. This would mean that the Indian industry's composition would change to match the profile of the chemical industry in global markets.

At USD 100 billion, the industry's contribution to India's GDP will grow from the current 6.7 per cent to 12.1 per cent and its share of the global industry will increase from 1.9 per cent to 3.9 per cent. Vision 2010 is an aspirational end-state for the Indian chemical industry in 2010. In order to realise Vision 2010, the industry needs to focus on new sources of growth like the Speciality and Knowledge segments.

At the Base case, if the current growth rates are maintained, the industry is expected to grow to USD 60 billion by 2010. In that case, the industry's contribution to India's GDP would increase to 7.1 per cent and its share of the global industry would increase to 2.3 per cent.

The industry would need to seek new directions in order to achieve the incremental USD 40 billion over the Base case scenario. This study seeks to discuss the drivers and imperatives for the industry's growth.

Vision 2010: ripple effect

At 12.1 per cent of India's GDP, the USD 100 billion chemical industry in India will have a substantial impact on the national economy. Some of the areas where the impact is expected to be significant include:

- emergence of a new breed of entrepreneurs and leaders who will steer the industry;
- rise in the level of intellectual capital being generated and a consequent increase in the number of patents filed;
- creation/ acquisition of manufacturing assets, as well as sales networks overseas by Indian companies;
- increase in direct employment within the industry from the current levels of around 0.9 million to around 1.3 million by 2010, with the indirect additional employment figures expected to be a multiple of about 4-6 times this number;

- development of core skills in chemistry, chemical engineering and general management with an emphasis on the Speciality and Knowledge segments;
- increase in the demand for chemical plants and equipment, fabrication and process automation services, with most of the demand being for Speciality and Knowledge chemical plants;
- closure of companies/ plants as a result of consolidation as well as relocation of plants to form clusters to reap cost benefits, share knowledge and improve coordination with buyers/ suppliers;
- improvement in safety, health and environmental (SHE) standards;
- increase in the overall investment levels as India moves towards becoming a global sourcing base for Speciality and Knowledge chemicals;
- extensive use of information technology (IT) within the industry for business as well as technical applications;
- emergence of Indian aggregators or trading houses offering value to end-customers as well as manufacturers through investments in global sales and distribution facilities, relationships and access to large capacities; and
- conducive regulatory and legal framework with changes in legislation pertaining to Value-added Tax (VAT), intellectual property rights, etc.

Imperatives for the Indian chemical industry

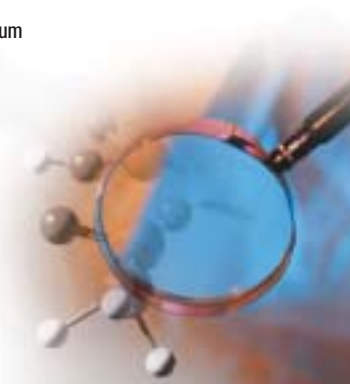
To realise Vision 2010, the key imperatives apply differently to the various industry segments i.e. Basic, Speciality and Knowledge.

Imperative	Basic	Speciality	Knowledge
Aggressive growth strategies <ul style="list-style-type: none"> ■ Stimulate demand ■ Access to global markets ■ Invest in new areas 	●	●	●
Consolidation	●	●	●
Research and Development (R&D)	●	●	●
Cost reduction <ul style="list-style-type: none"> ■ Operational ■ Financial 	●	●	●
Collaboration <ul style="list-style-type: none"> ■ Clusters ■ Co-opetition ■ Institutional interaction 	●	●	●

Degree of relevance

- High
- Medium
- Low

Figure 1: Imperatives for the Indian chemical industry



These imperatives have been built taking into account global developments in the industry that have relevance to the chemical industry in India. They are further supported by insights compiled from 75 industry leaders in the KPMG survey of the Indian chemical industry, 2002.

Global scenario

The size of the global chemical industry is estimated at approximately USD 1.5 trillion in 2002. The industry is currently under-performing and is in the trough of the business cycle. Some of the emerging trends of the global chemical industry that can be leveraged for growth are:

- increasing globalisation as growth in mature markets drives leading players to explore new developing markets;
- consolidation to leverage economies of scale in the Basic and Knowledge segments;
- increasing focus on core businesses, resulting in diversified chemical and multi-product companies divesting businesses or exiting non-core product lines;
- cost optimisation assuming critical importance in the face of slow growth coupled with a pressure on prices due to competition;
- increasing investments in R&D (especially in the Speciality and Knowledge segments) to gain competitive advantage;
- increasing use of IT to transact business – intra-company and across the extended supply chain.

Indian scenario

The USD 28 billion Indian chemical industry is a marginal player in the international market accounting for 1.9 per cent of the global chemicals market, while Indian trade (exports plus imports) accounts for just 1.3 per cent of the world chemical trade of USD 545 billion. Although certain sectors such as petrochemicals and pharmaceuticals have a trade surplus, the industry remains a net importer with a trade deficit of around USD 1.3-1.8 billion annually.

At the industry level, the Indian chemical industry is characterised by:

- high domestic demand potential, as the Indian markets develop and per capita consumption levels increase;
- high degree of fragmentation and small scale of operations;
- limited emphasis on exports due to domestic market focus and smaller scale of operation;

- low cost competitiveness as compared to other countries due to higher cost of power, import duties, taxes and cost of capital; and
- low focus on R&D despite initiatives to innovate processes to synthesise products cost effectively.

In spite of the disadvantages, a few proactive Indian companies have created sizeable international operations to become significant players in the global market place. The ability of chemical companies in India to perform better than global companies has already been reflected by a comparatively better performance of the Indian operations of some global companies. Operating Profit Margins (OPM) of these Indian subsidiaries range from 8 per cent to 13 per cent as compared to the global OPM range of less than 1 per cent to 6 per cent. The framework for realising the Aspirational case is given below.

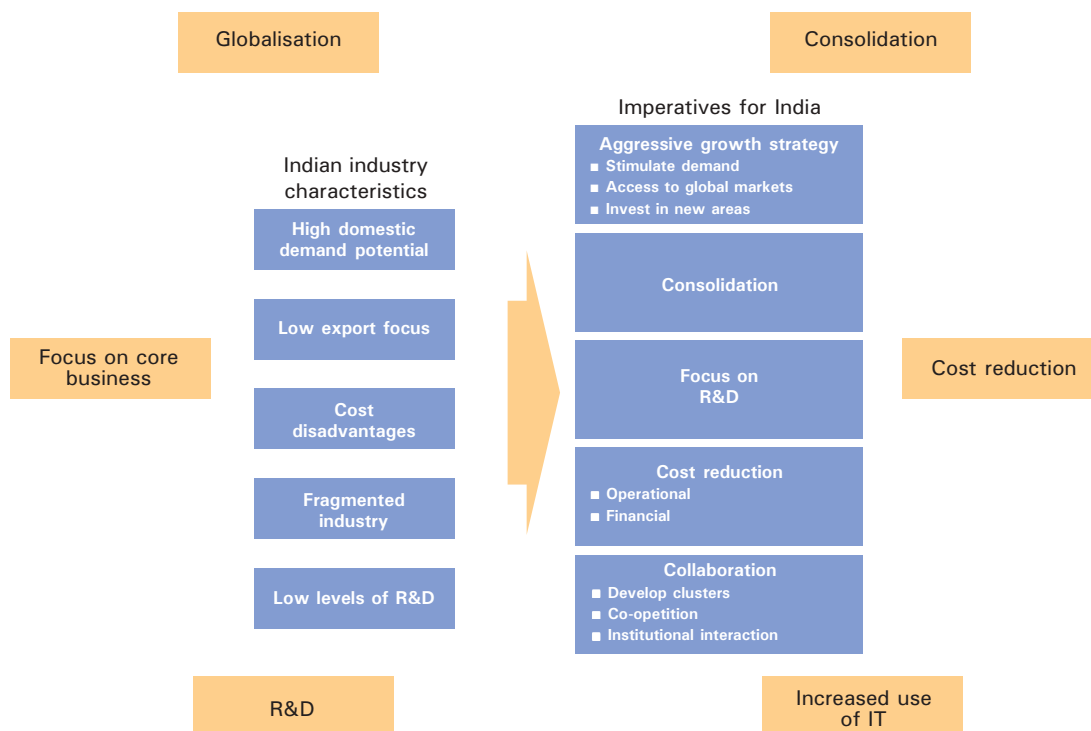


Figure 2: Vision 2010 - Imperatives for the Indian chemical industry



The global chemical industry

An understanding of the global landscape of the chemical industry in conjunction with an understanding of the characteristics of the Indian industry is essential to explore new directions for the Indian chemical industry.

What follows is an introduction of the global chemical industry, its characteristics across three broad industry segments, the challenges facing the global industry and the trends based on strategies commonly adopted by companies in the industry. Each of these are classified along the following six core themes as shown in Figure 3.

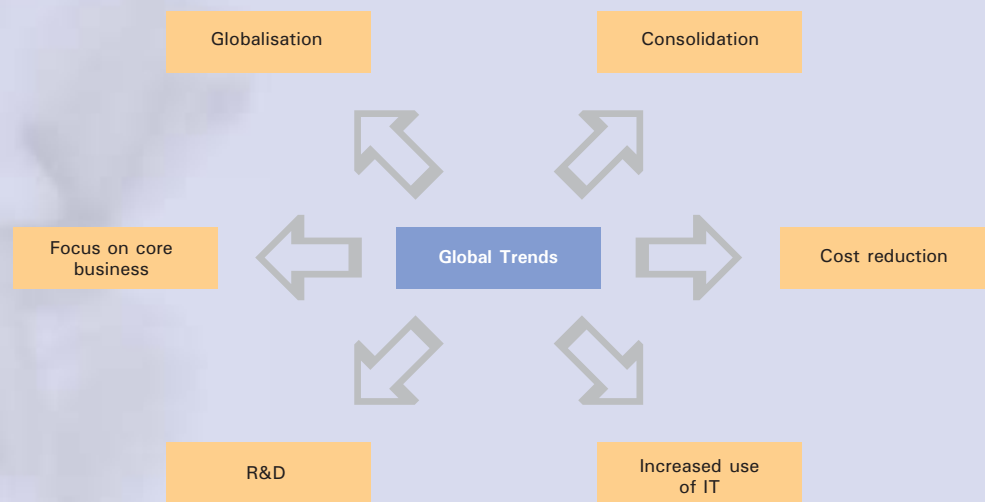


Figure 3: Global trends and core themes

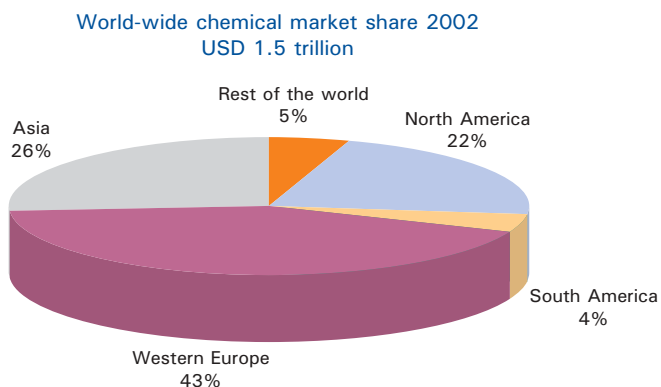
Introduction

The chemical industry is a key contributor to the world economy. It is a knowledge-based industry with significant investments in R&D. The industry supplies to virtually all sectors of the economy and produces more than 80,000 products.

In terms of consumption, the chemical industry is its own largest customer and accounts for approximately 33 per cent of the consumption. In most cases, Basic chemicals undergo several processing stages to be converted into downstream chemicals. These in turn are used for industrial applications, agriculture, or directly for consumer markets. Industrial and agricultural uses of chemicals include auxiliary materials such as adhesives, unprocessed plastics, dyes and fertilisers, while uses within the consumer sector include pharmaceuticals, cosmetics, household products, paints, etc.

The global chemical market is estimated at approximately USD 1.5 trillion in 2002. As shown in Figure 4, Western Europe is the largest chemical-producing region followed by North America and Asia.

Growth in revenues within the chemical industry depends largely on the overall growth of the economy and industrial production, and is often measured as a multiple of GDP growth.



Source: KPMG estimates, Cefic¹, American Chemistry Council (ACC)

Figure 4: Chemical industry geographic segmentation

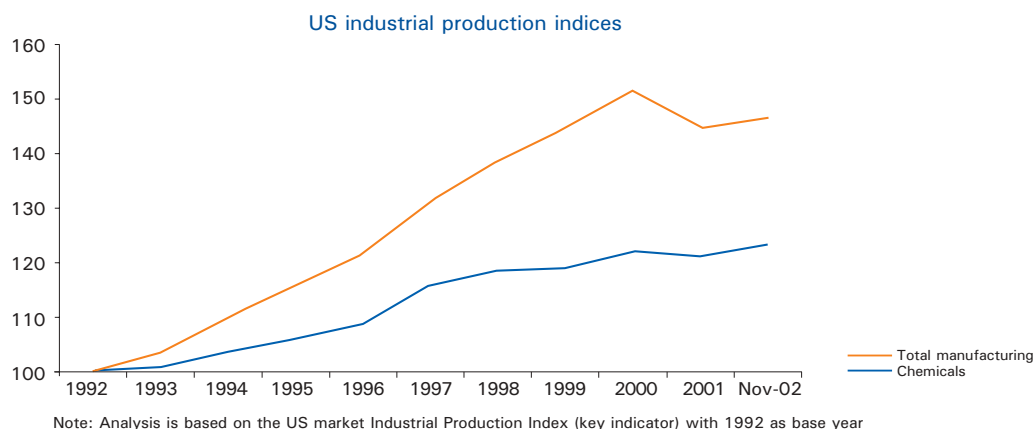
The chemical industry is a key contributor to the world economy. It is a knowledge-based industry with significant investments in R&D. The industry supplies to virtually all sectors of the economy and produces more than 80,000 products.

Industry characteristics

The industry characteristics have been analysed at two levels – at a macro level comprising all segments of the industry and at a segment specific level.

Dismal performance in the last decade

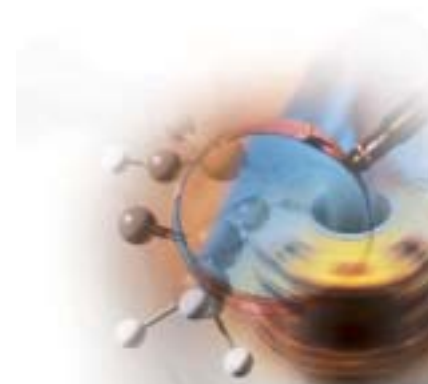
Historically, the chemical industry has been one of the better performers in the manufacturing sector. Over the past decade, however, it has under-performed vis-à-vis the overall manufacturing sector as shown in Figure 5. Declining GDP growth across industrialised nations has been the most significant cause. Other factors include discontinuities such as the Asian Crisis and the political uncertainty in the Middle-East, which has resulted in higher oil prices (a major source of feedstock).



Source: Federal Reserve Board, USA

Figure 5: Chemical industry performance vs. total manufacturing performance

¹European Chemical Industry Council



Increasing international trade

International trade in chemical products has been growing faster than global chemical production. The average annual growth rate in trade for the 1990s was roughly three times the growth in global production. Increasing globalisation has promoted the location of production capacities closer to sources of abundant, economical supplies of raw material/ feedstock or in markets that are experiencing higher growth. The emergence of large capacities in China with a focus on exporting into global markets has also contributed to enhanced levels of trade.

High susceptibility to variations in raw material prices

Raw material costs range from 30 per cent to 60 per cent of sales, and are a major constituent of costs. Typically, natural gas or crude is used to fulfil feedstock requirements. This makes the industry vulnerable to fluctuations in oil and gas prices as well as supply disruptions. In competitive markets, chemical producers have been unsuccessful in passing on cost escalations in feedstock to the end consumer. In addition, higher oil and gas prices have contributed to the economic slowdown, which in turn has reduced demand for chemical derivative products.

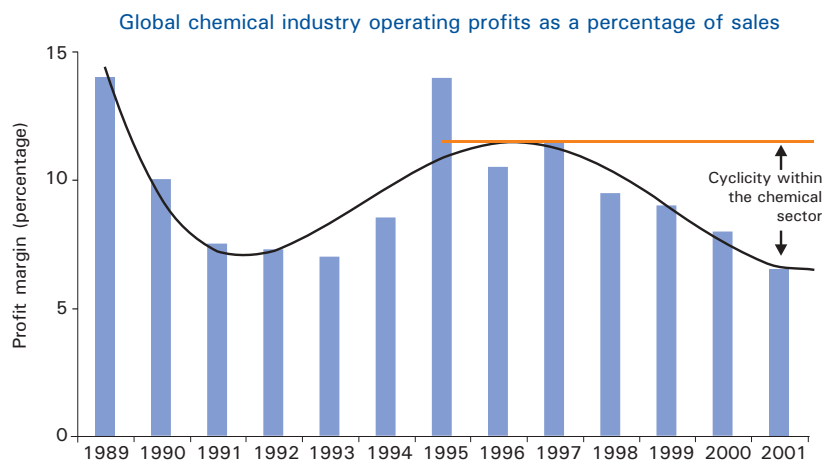
Logistics cost is also a significant component of raw material costs, especially for the commodity chemicals industry comprising mostly of voluminous raw materials.

Business cyclicality leading to over-capacity

The chemical industry is a cyclical industry and is driven largely by the business cycles of end customer segments. However, the effect of cyclicality is compounded by imbalances in demand and supply that arise due to inappropriate timing of capacity additions. Most players tend to add processing capacities towards the end of a growth phase, after the existing capacity is absorbed. This results in large facilities lying unused for long periods, when the business cycle goes into a trough. Companies undertake continuous generation of chemical output to cover costs during this period, resulting in oversupply and lower price realisations. Figure 6 highlights the impact of business cycles on operating profit margins.

Environmental and safety regulation

The industry is increasingly focussing on improving its commitment to the environment and responding to public concerns regarding the manufacture and use of chemicals. Several initiatives at the global, industry and organisation level have been undertaken to reduce pollution. The Kyoto protocol is an illustration of the commitment of developed countries towards reduction in emissions world-wide.



Source: Based on Chemical and Engineering News (C&EN) annual listing of top 50 chemical producers

Figure 6: Cyclicity in the chemical industry

The American industry has also set-up a Long-range Research Initiative (LRI), with a funding of USD 25 million per year on a three year rolling commitment basis, to conduct independent research into three areas:

- improved methods to evaluate potential risks of chemicals to public health and environment;
- identification of vulnerable groups, including children, and the characterisation of factors that may place them at higher risk; and
- monitoring of chemicals in the environment, including how they move and change along pathways from sources to humans and wild life.

Improving safety, health and environment – an industry-wide initiative

In the United States, members of the chemical industry are working on initiatives to continuously improve Safety, Health and Environmental (SHE) performance as well as improve the industry's responsible management of chemicals. Industry members spend about USD 9 billion annually towards improving SHE related aspects. The results of this initiative so far include:

- reduction in industry emissions by 60 per cent;
- reduction in incidence of work related illness and injury by 31 per cent; and
- increase in industry output volume by 30 per cent.

Source: KPMG research

Industry segmentation

The chemical industry includes a wide variety of products from commodity chemicals to research-driven specialised products. The characteristics of these products differ across the industry supply chain, from sourcing bases to their target markets.



A classification of the industry into three segments of Basic, Speciality and Knowledge chemicals facilitates its description and analysis. The common characteristics and constituent industries for each of these segments are shown in Figure 7:

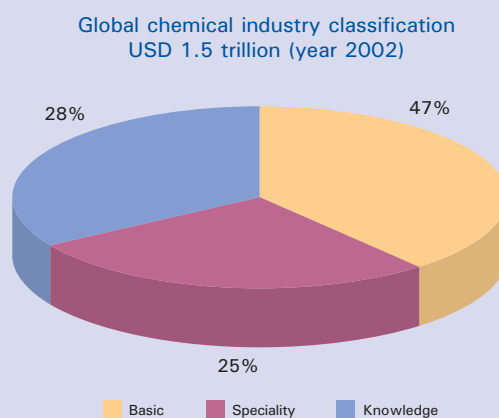
Segments	Characteristics	Constituent industries
Basic	<ul style="list-style-type: none"> High volume, low value-added Limited product differentiation across manufacturers High entry barriers on account of high capital spend and stringent regulations 	<ul style="list-style-type: none"> Petrochemicals Fertilisers Inorganic chemicals Other industrial chemicals
Speciality	<ul style="list-style-type: none"> High product differentiation and value-addition Typically smaller production units with more flexibility Low capital investment levels 	<ul style="list-style-type: none"> Adhesive sealants Catalysts Industrial gases Plastic additives
Knowledge	<ul style="list-style-type: none"> Differentiated chemical and biological substances used to induce specific outcomes in humans, animals, plants and other life forms High investments in R&D and marketing 	<ul style="list-style-type: none"> Agrochemicals Pharmaceuticals Biotechnology

Note: The categorisation is illustrative and representative and does not include the entire universe of chemical industries

Figure 7: Segmentation of the chemical industry

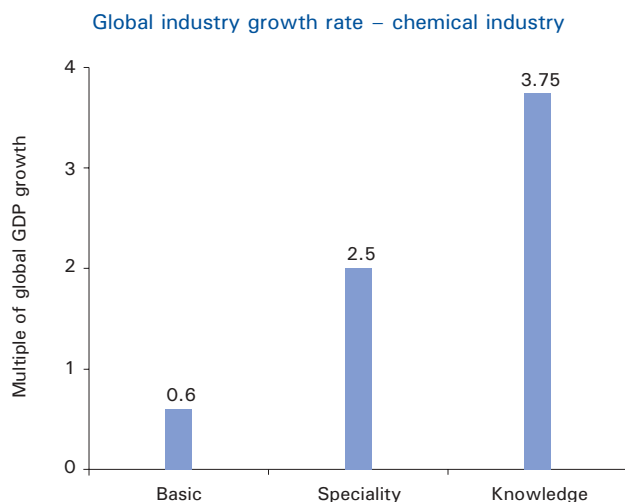
Globally, the Basic segment accounts for about 47 per cent of the industry, Speciality 25 per cent and Knowledge 28 per cent.

Knowledge is the fastest growing segment – growing at more than six times the growth rate of Basic. Speciality has a growth rate faster than Basic, but lags behind the Knowledge segment, as shown in Figure 9.



Source: ACC, Cefic, KPMG estimates

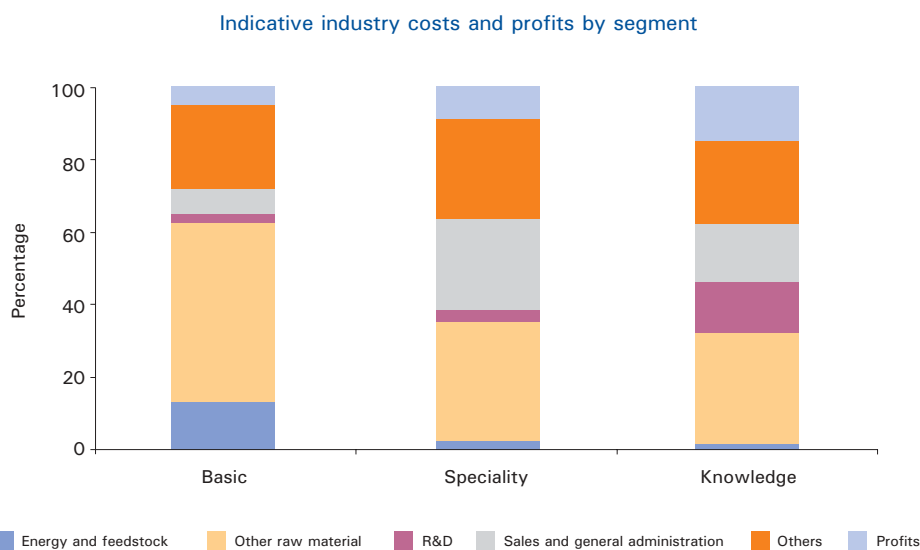
Figure 8: Global chemical industry classification



Source: ACC, Cefic

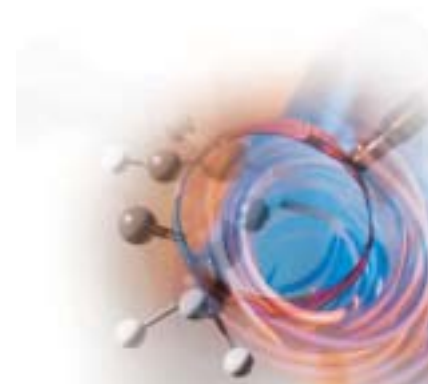
Figure 9: Global segmental growth rates as a multiple of global GDP growth

Cost structures of the three segments highlight distinct characteristics. Basic has high feedstock and other raw material costs, whereas Speciality has very high selling and product development costs. Knowledge segment, on the other hand is characterised by large spends on advertising and R&D. Basic is the most mature segment with the lowest profitability, while Knowledge chemicals have the highest profitability and growth projections.



Source: ACC

Figure 10: Indicative industry costs and profits by segment

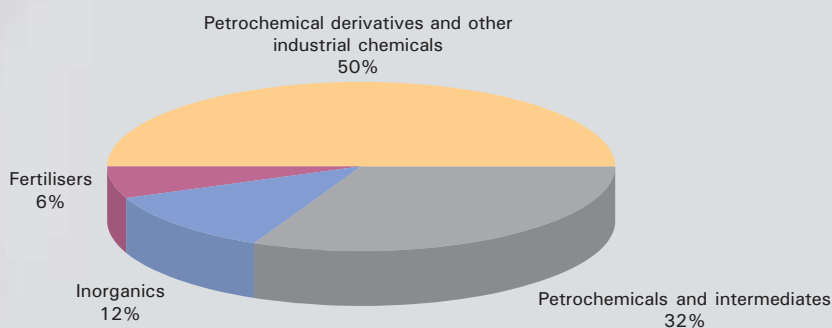


Basic chemicals

Basic chemicals comprised a USD 705 billion industry forming 47 per cent of the global chemical industry in 2002. This segment includes organic and inorganic chemicals, chlor-alkalis, aromatics, thermoplastics, thermosets, petrochemical intermediates and derivatives, and fertilisers. Raw material and energy costs form the largest cost components. There is therefore a strong emphasis on reducing feedstock usage and costs, energy requirements and labour costs, through engineering process improvements.

Volumes drive growth, as products are standard and there is very little product differentiation across manufacturers. This segment is characterised by high capital intensity and high entry barriers such as, stringent regulations on health, safety and environment because of the large volumes involved. R&D spends are limited and largely application oriented. Basic chemicals are used by other industries as raw material and converted to end-products. Hence their demand depends on the market dynamics of the end-use industries, which is often cyclical. Logistics play a key role in this industry since raw materials and finished products are voluminous and require special transport and material handling equipment. Manufacturing locations are therefore located either close to the raw material source or close to the consuming markets.

Basic chemicals – industry size and composition
Global industry size – USD 705 billion in 2002



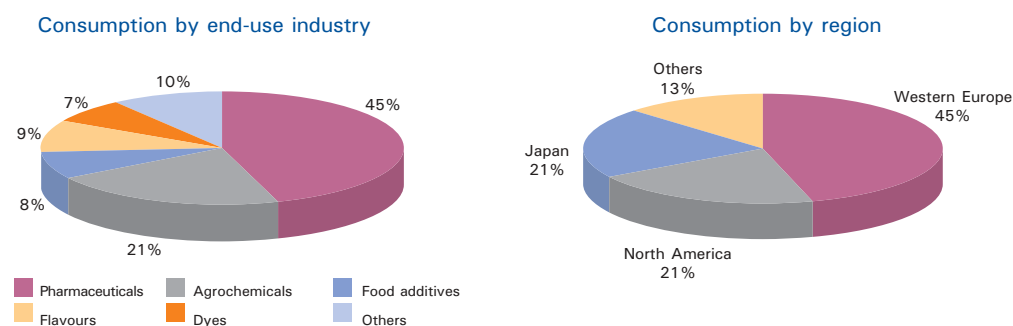
Source: ACC, 2002

Figure 11: Global Basic chemicals industry composition

Key revenue drivers include the ability to be flexible in pricing and growth in volumes, while profit drivers include optimising raw material costs, capacity utilisation, product mix and operating efficiency.

Speciality chemicals

Speciality chemicals is a USD 375 billion industry, accounting for 25 per cent of the global chemical industry in 2002. This segment includes paints and coatings, adhesives and sealants, additives for pharmaceuticals, lubricants and additives, catalysts, water



Source: ACC, Cefic

Figure 12: Global Speciality chemical industry

treatment chemicals and plastic additives. Speciality chemicals are characterised by vastly differentiated products with a high degree of value addition. Production units are typically smaller than Basic chemical units and have a greater degree of flexibility in terms of switch capacities as well as fewer imbalances between supply and demand. While capital investment requirements are relatively low, investment in R&D to develop new products and applications is high.

Western Europe is the largest regional market. Amongst end-use industries, the pharmaceutical industry accounts for a significant portion of the global demand (with consumption by end-use segment at 45 per cent of the output). The Speciality segment has also witnessed a pressure on earnings as Speciality products mature and transition into commodity chemicals, though to a lesser extent.

Knowledge chemicals

Knowledge chemicals constituted a USD 420 billion industry, accounting for 28 per cent of the global chemical industry in 2002. The Knowledge chemicals segment consists of highly differentiated chemical and biological substances used to induce specific outcomes in humans, animals, plants and other life forms. The segment is characterised by a high degree of research, intellectual capital and skilled manpower. The segment comprises agrochemicals, pharmaceuticals and biotechnology sub-segments, with pharmaceuticals being the largest. However in the future, biotechnology is expected to be the most dominant segment as product applications are being developed to either substitute or to provide improved manufacturing processes for each of the chemical segments viz. Basic, Speciality as well as Knowledge.

This segment relies extensively on R&D for new products. Most of the R&D is capital intensive and the scale of operations is important to provide the financial strength and access to global markets. Patents and the presence of appropriate regulations to protect intellectual capital is a key consideration for players wishing to enter new markets.



An enhanced geographical spread gives companies the ability to optimise their supply chain costs globally. As a result, companies tend to establish their manufacturing locations close to sources of feedstock or close to alternative markets.

The economic downturn has had little impact on the Knowledge chemicals industry with most products (largely pharmaceuticals) being price inelastic. However, other trends including the increasing presence of generics within the market and the need for shorter development cycles, resulting in earnings pressure on companies in this segment have had an impact. Growth within the segment has also been driven by longer life expectancy, population growth, greater spends on healthcare, improved agricultural techniques, etc.

Trends in the global chemical industry

Chemical companies across the world have adopted different strategies to face the present day economic realities. In addition to certain universal trends, there are differences in drivers and trends across segments.

Globalisation

Globalisation is a common theme across all three segments of the chemical industry. An enhanced geographical spread gives companies the ability to optimise their supply chain costs globally. As a result, companies tend to establish their manufacturing locations close to sources of feedstock or close to alternative markets. The destination countries too favour this strategy as is evident by the incentives offered for setting up plants. Some countries actively pursuing such opportunities are Canada, South Korea and China. Canada has distinct advantages such as cheaper energy and lower corporate taxes. China is being developed into a transportation, distribution and storage hub servicing the needs of the entire Asian chemical industry.

Some of the additional advantages of globalisation, specific to segments, have been outlined below:

Basic chemicals

Globalisation allows players in the Basic chemicals segment to hedge the impact of business cycles as these are not aligned across countries or regions.

Speciality chemicals

Globalisation has also been driven by the increasing commoditisation of Speciality chemicals, with customers focussing on reducing costs of Speciality chemicals that are used in large quantities. This has provided opportunities to players in low cost locations like China, India and South Korea to set-up global scale plants and to market these chemicals at lower costs globally. Typical industry sub-segments undergoing this change include printing inks, pigments, etc.

Knowledge chemicals

Players in this segment are setting up global scale plants to manufacture generics that can benefit from economies of scale to supply to global markets. There is also an increasing trend of migrating R&D centres to India to access low cost skilled manpower and cut down overall product development costs.

Growth through globalisation

A European Speciality chemicals company follows a global strategy for its businesses operating across a wide spectrum of consumer and industrial markets and geographies. It intends to be a leader by creating value for its customers and shareholders in its chosen markets. The key aspects of this strategy are to:

- focus on higher value-added Speciality products and brands to serve a wide range of markets including a number of niche markets;
- develop long-term relationships with customers by addressing their specific needs;
- innovate and use technology creatively to facilitate organic growth;
- invest in growth markets and build leading market positions;
- grow through organic growth supplemented by small, strategic, bolt-on acquisitions in its chosen growth areas;
- improve its operational performance; and
- pursue synergies across the group.

Source: KPMG research

Consolidation

Consolidation is a trend seen in Basic and Knowledge chemicals. However, the drivers for consolidation in the two segments are different.

Basic chemicals

Companies world-wide in this segment are seeking economies of scale through mergers and alliances to achieve cost advantages through larger capacities. Reduction in overheads and marketing expenses, greater efficiencies in logistics and procurement and improvement in geographical reach are the main drivers for consolidation.

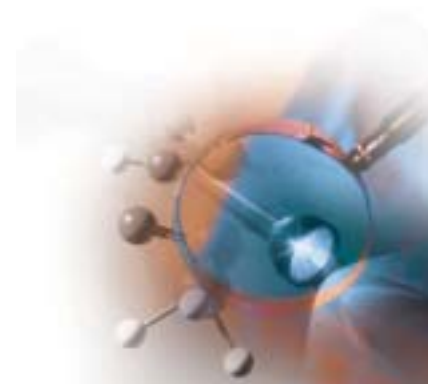
Players divest businesses because of a reluctance to make the investments needed to remain competitive, or to focus on businesses with better growth opportunities. In Europe and Japan the number of leading Basic chemical producers is expected to drop by 50 per cent while in the US their number is expected to reduce by 40 per cent.

Consolidation amongst players

An Asian Basic chemicals company has used consolidation as a strategy to increase the size and scale of its operations. It plans to merge its operations with one of its rivals, creating one of the world's largest chemical companies. It would be the largest in the domestic market.

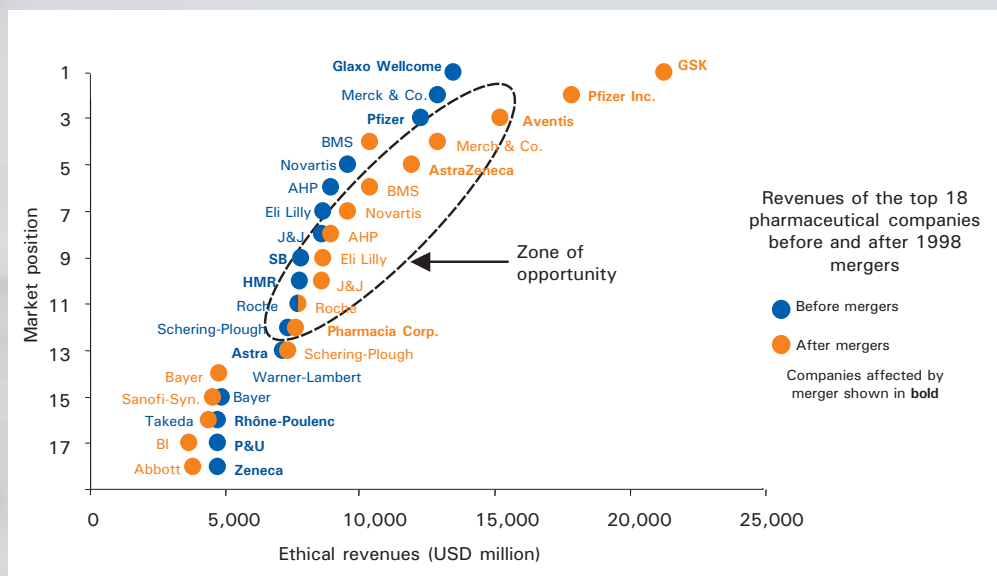
The merger is intended to give the combined company the scale it needs to compete with larger rivals. The new company also hopes to establish a firmer stronghold in the Asian Basic chemicals market by making huge investments.

Source: KPMG research



Knowledge chemicals

In the Knowledge segment, the key drivers for mergers and alliances include achieving cost advantages through enhanced product pipelines and portfolios; access to inlicensing agreements and regulatory approvals from the Food and Drugs Administration (FDA); reduction in R&D and marketing effort; and improved geographical reach.



Source: DataMonitor

Figure 13: Consolidation in the global pharmaceutical industry

Consolidation also helps companies realise synergies in procurement and production. An analysis of the global pharmaceutical industry shows that mergers and acquisitions (M&As) have helped the combined entities consolidate their position in the market and enhance their revenues. The mergers of Hoechst Marion Roussel and Rhone Poulenc to form Aventis, and Astra and Zeneca to form Astra Zeneca are examples of companies who have derived benefits from M&As.

Focus on cost reduction

While cost optimisation is important for any of the manufacturers, it is critical for the Basic and Speciality chemical manufacturers with their margins having been under pressure during the economic downturn.

Basic chemicals

As a traditionally cyclical business, this segment is vulnerable to macro-economic and socio-political factors. Since 1990, players have taken steps to cut excess costs, focus on building leadership within their business portfolios and deliver greater shareholder value.

Restructure to improve performance

A European Basic chemicals company has used business restructuring to make its businesses more cost competitive in the face of the economic downturn. The measures taken to improve its competitive position and maximise growth include:

- aligning capacity to meet reduced demand and elimination of more than 5,000 (6 per cent of the total workforce) positions to accomplish the alignment;
- completion of 230 cross-business improvement projects that resulted in approximately USD 20 million pre-tax earnings in 2001 and USD 90 million in 2002;
- concentrating on increasing market share in developing countries, including China and India that resulted in approximately USD 40 million in annualised pre-tax earnings in 2001; and
- purchase of USD 400 million of materials and services via Internet reverse auctions, saving over 15 per cent (this figure is expected to become USD 800 million in 2002).

Source: KPMG research

Speciality chemicals

As a high margin business, this segment has had little need for operational or financial cost reductions. Globalisation as well as growing usage of Speciality chemicals has led to a change in business dynamics. Companies today are focussed on reducing costs of manufacturing Speciality products for competitive advantage.

Restructure to improve performance

A leading European Speciality chemicals company has used a cost reduction strategy to cope with lower demand. The company has sold off a number of non-core businesses and closed under-performing facilities to reduce its net financial debt. In 2001, it closed eight high-cost facilities and reduced its headcount by 1,600. The company is now focussing on only five main businesses. In keeping with that strategy, it has acquired the assets of leading companies in these areas with the goal of migrating towards a more profitable and less cyclical product portfolio.

Source: KPMG research

Increasing focus on R&D

R&D is increasingly assuming importance for the entire industry but its focus varies across industry segments. Basic chemicals use R&D for making manufacturing process improvements to reduce costs and application development to boost demand, while Speciality and Knowledge chemical companies use R&D for new product development.

Speciality chemicals

R&D spending in Speciality chemicals is on the rise as players seek to maintain a competitive edge, gain revenue growth and extract further value from these performance chemicals. Increasing competition among the Speciality manufacturers has caused companies to partner extensively with key customers to deliver value-added services,



along with application development to cater to changes in the customer's manufacturing process. Industry-wide, about 22 per cent of sales are generated from products introduced in the last five years.

Investing in R&D

An American Speciality chemicals company manufactures and markets Speciality chemicals primarily used by the paper industry to improve both product performance and the manufacturing process. Although pricing is important to the company's competitive strategy, the company primarily competes based on the performance and quality of its products.

It strives to continually improve its products by investing resources in technology and R&D. Its R&D expenditures totalled approximately USD 65 million in 2002. Such expenditures enable the company to consistently bring to market products that have improved functional properties or offer similar properties at a lower cost. Customers have begun to value the commitment demonstrated by the company to provide new solutions and improve their product offerings.

Source: KPMG research

Knowledge chemicals

Companies in this segment have adopted R&D both as a means to achieve product leadership as well as to orchestrate process innovations and realise savings in manufacturing costs. R&D levels in leading companies within this segment are between 5-15 per cent of sales.

Application development strategy is also adopted effectively by Knowledge chemical companies. This includes techniques like evergreening, which involves finding new applications and delivery systems for existing drugs as a means for extending patent protection and hence revenue generation.

Biotechnology is another area where R&D efforts are being made in plant, animal and human application areas. The applications of biotechnology are expected to result in existing applications being performed/ serviced more efficiently. It will also result in the development of new features, hitherto unknown, leading to innovative new applications and drugs.

Increased focus on core business

Speciality and Knowledge chemical companies are becoming increasingly focused on their core area of expertise.

Speciality chemicals

With the increasing commoditisation of the Speciality chemicals industry, a strategy increasingly adopted by some of the global players is to focus on a few business segments, where they possess a competitive advantage over others. This strategy helps players build relationships with their customers in profitable segments and exit non-competitive industry segments.

Focus on core business

A large European Speciality chemicals company has decided to sharpen its business focus and move closer to high-end specialities, especially fine chemicals, and away from commoditised segments.

The company has divested its poly vinyl alcohol/ poly vinyl butyral (PVA/PVB) business and its stake in JV companies. The company has also restructured its remaining division into its five other business units to obtain greater efficiencies.

Source: KPMG research

Knowledge chemicals

Large Knowledge chemical companies as well as diversified companies with small operations in other areas are increasingly divesting non-pharmaceutical operations in order to provide greater focus on their more profitable pharmaceutical operations. Companies have also resorted to alliances with emerging biotechnology players to generate additional targets for product development.

Focus on core business

In 1998, a large American pharmaceuticals company tightened its focus on the pharmaceutical sector by divesting several non-core businesses.

The company has also been following a strategy of aggressive R&D spending, which gives it the rich pipeline needed to sustain revenue growth. It has revamped its R&D operations to conduct drug discovery from close to ten labs and develop and test at a new site.

The company has relied heavily on alliances with genomics firms and co-promotion deals with larger pharmaceutical companies to expand its product portfolio. The company's marketing organisation is ranked among the best in the industry, making it the partner-of-choice for other players seeking co-promotion deals.

Source: KPMG research

Increased use of information technology

Information technology (IT) has been extensively applied in technical areas like manufacturing and chemical process development. The increasing application of IT for equipment design, chemical engineering and process simulation has helped in reducing product and process development time. IT is also increasingly being used in the area of R&D for collaborative research, decreasing product development time as well as time taken for clinical trials. In silico, a technique of modelling chemical and biological properties on computers is also used to complement in vitro tests conducted in laboratories.

The ACC reports that sales by the chemical industry through e-commerce accounted for 2.3 per cent of Basic chemicals sales in 2000. Electronic Data Interchange (EDI), an electronic system that allows two or more companies to link their computers to share information, accounts for about 40 per cent of the e-business market. Internet sites

IT is increasingly being used in the area of R&D for collaborative research, decreasing product development time as well as time taken for clinical trials.



maintained by chemical companies account for about 35 per cent, while independent third party market places constitute the remaining 25 per cent of e-commerce sales.

With little differentiation across manufacturers, Basic chemical companies have been using e-commerce increasingly to transact business. Customer demands for lower pricing and convenience, along with the potential for new revenue sources and dramatic cost savings are driving the development of business-to-business (B2B) electronic commerce. These companies are using increased B2B activity to cut inventory levels, thus reducing capital needs.

Application of information technology

A large American Basic chemicals company has adopted a four-dimensional, interdependent approach involving:

- digitisation of the company's entire business process, adopting a Web-centric culture;
- offering e-commerce transactions on the internet to its customers in the US and Canada where customers could place and revise orders, review purchase summaries and track shipments;
- directing effort towards system-to-system connection with trading partners; and
- participating in a range of digital business ventures and neutral markets for chemical buyers and sellers to conduct real-time, online transactions.

In the longer term, the company expects the integrated direct system to account for roughly 50 per cent of its business. The company hopes to conduct 20 to 25 per cent of its business over its Web-site, and another 20 to 25 per cent through third-party exchanges that the company may use for both buying and selling.

Source: KPMG research

The chemical industry in India

While the Indian chemical industry exhibits several similarities to the global chemical industry, there are several characteristics specific to the Indian context across sub-segments. This section introduces the Indian chemical industry and its sub-segments and elaborates on five key characteristics (Figure 14). The highlights of the KPMG survey of the Indian chemical industry, 2002 are also presented. The survey findings help corroborate characteristics and trends and identify factors critical for success and competitiveness in the industry.

The USD 28 billion Indian chemical industry is a significant component of the Indian economy constituting 6.7 per cent of the GDP.

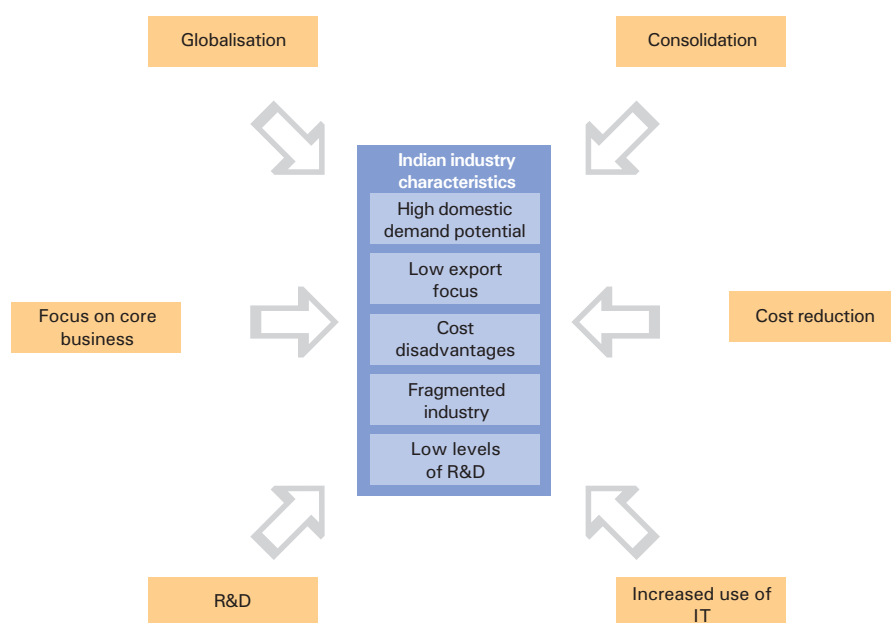


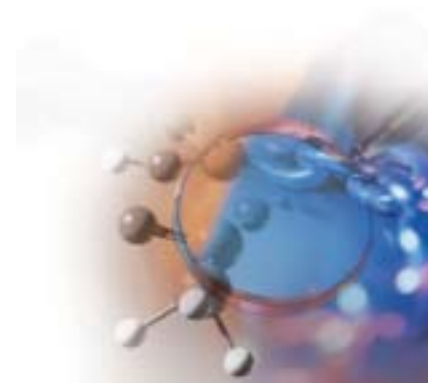
Figure 14 : Characteristics of the Indian chemical industry

Overview

The chemical industry is a significant component of the Indian economy with revenues at approximately USD 28 billion. It constitutes 6.7 per cent of India's GDP and 10 per cent of total exports.

The industry has changed over time to match the dynamic needs of the rapidly developing nation. The industry has evolved from being a producer of Basic chemicals in a highly regulated environment to becoming a mature industry, free to choose its product portfolio in an open economy.

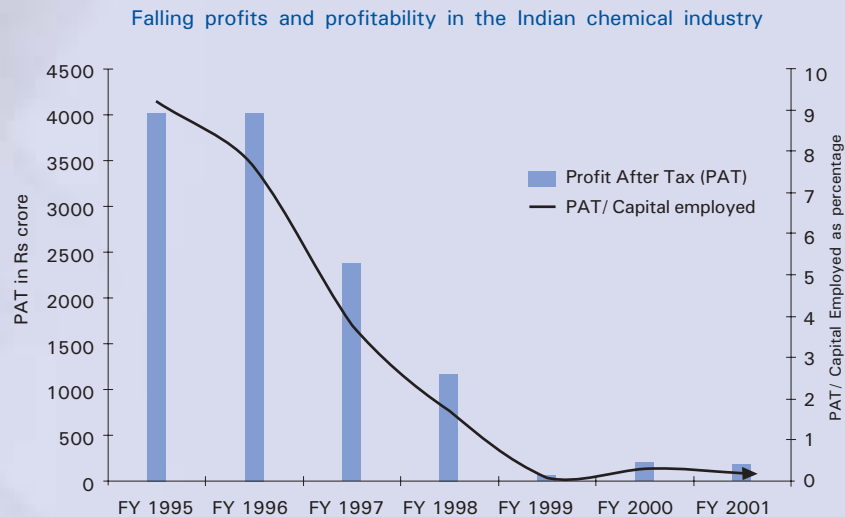
The Indian industry has emerged from a protected environment where it was largely a supplier to the domestic market. Hence manufacturing plants, built to meet this local demand, were small when compared to global scales and did not necessarily employ state-of-the-art technology. In many cases, the industry operated with assured margins, protected against the emergence of competition from within India through licensing, or from across borders through high import tariffs. Today, these legacy plants make the Indian chemical industry uncompetitive.



	Basic needs phase 1950-72	Establishment phase 1972-80	Consolidation phase 1980-92	Liberalisation phase 1992-95	Expansion phase 1995 onwards
Key events	<ul style="list-style-type: none"> Chemical products that protect crops and improve health – agrochemicals, fertilisers and pharmaceuticals – contribute to economic growth 	<ul style="list-style-type: none"> Public sector company established to develop a downstream petrochemical industry Basic feedstock imported and converted to petrochemical products 	<ul style="list-style-type: none"> Industry is largely fragmented with small capacities and high cost structures Artificial tariff and non-tariff barriers provide protection from international players Large profit margins due to protection 	<ul style="list-style-type: none"> Major investment plans by both Indian players and MNCs Lowering of tariff barriers exposes domestic industry to competition from imports Diminishing role of public sector companies 	<ul style="list-style-type: none"> Major investments especially in the petrochemical segment, driven by the growth of end-use segments Attempts to retain market share in spite of eroding prices and competition from low cost manufacturing countries like China Branding as a means of differentiation Alliances and partnerships to achieve scale Investments in plants and equipment to achieve economies of scale
Chemical sub-segment in growth phase	<ul style="list-style-type: none"> Agrochemicals Dyes Pharmaceuticals 	<ul style="list-style-type: none"> Plastics and fibres 	<ul style="list-style-type: none"> Paints, dyes, pharmaceuticals and detergents 	<ul style="list-style-type: none"> Petrochemicals, engineering plastics, speciality fibres 	<ul style="list-style-type: none"> Petrochemicals, Speciality chemicals Fertilisers Pharmaceuticals

Figure 15: Evolution of the Indian chemical industry

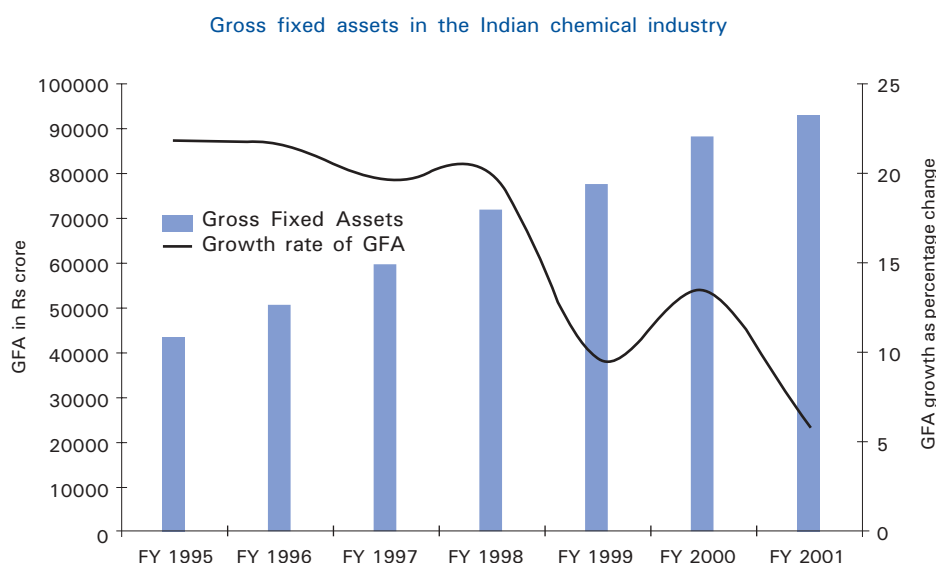
The industry is facing declining margins. Profits after tax have declined substantially during the period from 1994-95 to 2000-01.



Source: CMIE Economic Intelligence Series

Figure 16: Falling profits and profitability in the Indian chemical industry

Declining profitability has affected the availability of finance for capital investment adversely. Hence while gross fixed assets have increased in the industry, the rate of increase has fallen from 22 per cent in 1994-95 to 6 per cent in 2000-01. (Figure 17)



Source: CMIE Economic Intelligence Series

Figure 17: Gross fixed assets in the Indian chemical industry

With the current levels of performance, the Indian chemical industry ranks twelfth in the world production of chemicals and enjoys an impressive growth rate:

- The chemical industry has achieved a growth rate of 8.6 per cent over the last few years, making it one of the fastest growing sectors in India.
- The industry's growth rate has been twice the Asian growth rate over the last five years.

Thus while growth is higher than global levels, asset creation has been at its lowest. The industry needs to look for a new direction in order to improve its competitiveness in the global context. Discussions with industry leaders showcase the new aspirations that players in this industry need to work towards.

KPMG survey of the Indian chemical industry, 2002

KPMG interviewed CEOs and senior officers of 75 companies in India as part the KPMG survey of the Indian chemical industry, 2002. A broad spectrum of industries was included spanning across the Basic, Speciality and Knowledge segments. The mix of companies included global corporations operating in India (25 per cent of the sample), Indian private companies (60 per cent of the sample) and public sector units (15 per cent of the sample). The sample was chosen to ensure a balanced spread across size, including large and small global and Indian companies.

The survey reflects the aspirations and concerns of some of the key players while identifying areas that hold promise for growth and the enablers that can help realise this.

The KPMG survey of the Indian chemical industry, 2002 captures the aspirations and concerns of the industry while identifying areas that hold promise for growth and the enablers that can help realise this.



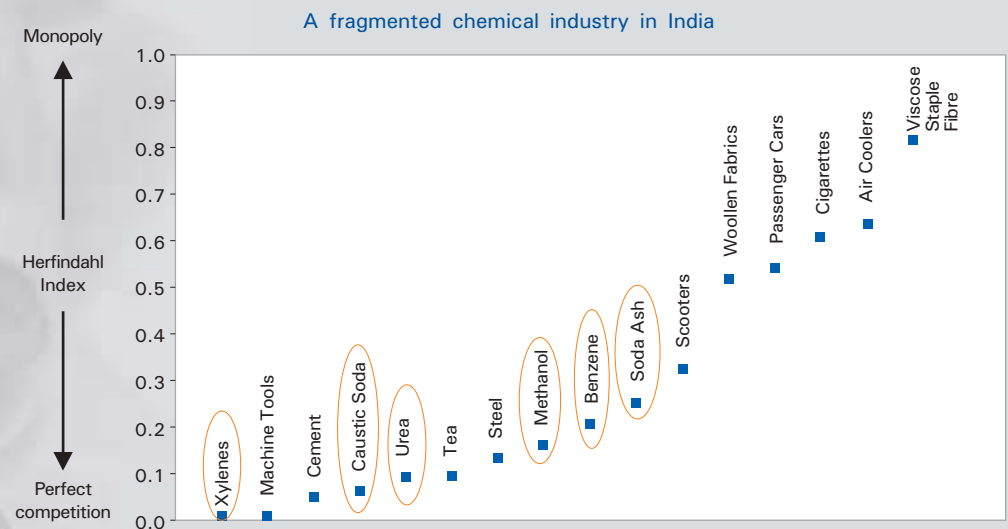
The survey findings demonstrate the fact that the Speciality and Knowledge segments hold significant potential while the Basic chemicals segment will need new strategies to ensure competitiveness.

Industry characteristics

The Indian industry is faced with multiple challenges. It is emerging from a protected environment into a highly competitive global market; at the same time the domestic market is on a path to maturity with a high demand potential for chemical end-products.

A fragmented industry with small capacities

The industry is highly fragmented when compared to global scales, as well as to other industrial sectors in India. Most sub-segments of the Indian chemical industry have a very low Herfindahl Index¹ indicating a high degree of fragmentation and competition in the segments.



Source: Market size and shares, CMIE - August 2000

Figure 18: High fragmentation in the Indian chemical industry

¹ Herfindahl Index, a measure of the 'concentration' in an industry, is computed as the sum of the market shares of the players in the market. The value of the index, H, is the sum of the squares of the market shares of all firms in an industry:

$$H = \sum_1^N (\text{market share}_i)^2$$

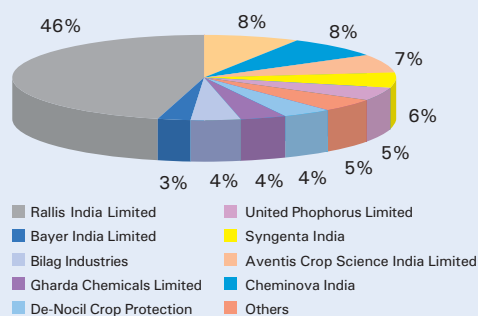
When the index value is one, it implies a monopoly where 100 per cent of the market share is held by a single player; while an index value of zero implies a situation where the number of players is very high and each holds a very small fraction of the total market.

The Indian agrochemical industry is an illustrative case.

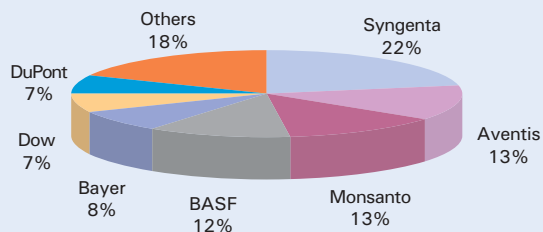
Fragmented Indian agrochemical industry

The Indian pesticide market is fragmented with no player having more than 10 per cent share. The top 10 players account for only 53 per cent of the total market.

Major players in Indian pesticide industry (1999-2000)



Leading global agrochemical chemicals



Source: SSKI Securities report 2002, KPMG analysis

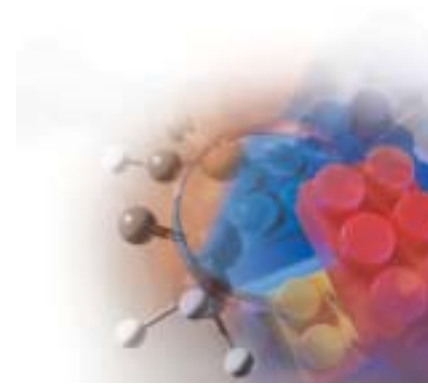
Figure 19: Agrochemical industry: Global and domestic industry concentration

In sharp contrast, the global agrochemicals market is highly concentrated with the top seven companies accounting for 82 per cent of its sales. The number of major agrochemical producers in India has fallen from over 20 in 1980 to six in 2002.

Source: KPMG research

Whilst global companies view the world as a potential market and a supply base, the focus of the Indian companies has been restricted to developing the domestic market. Capacities built to meet this demand are much smaller when compared to global scale plants.

Low economies of scale coupled with high industry fragmentation have rendered the smaller Indian companies non-competitive compared to the large capacity global players. This has resulted in fierce competition, often driving down prices and pressurising margins in the industry.

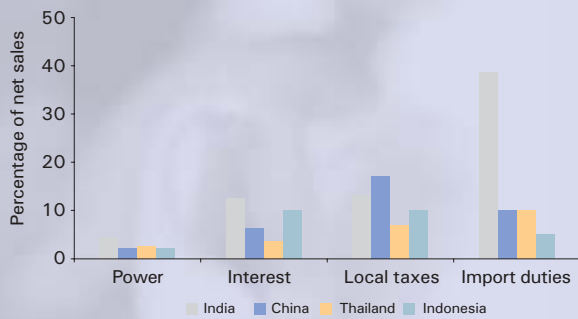


Cost disadvantages

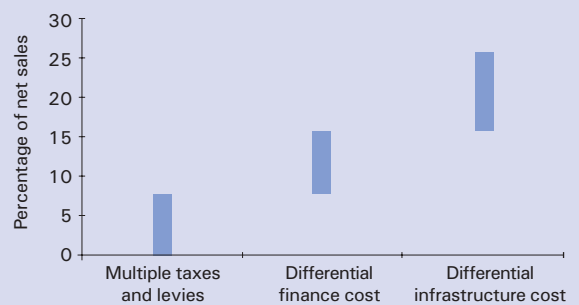
An analysis of the cost structure reveals that the Indian industry faces a number of disadvantages when compared to other developing countries. India has higher taxes, higher cost of finance and an unfavourable import duty structure. Poor infrastructure in the country makes it difficult to transport feedstock as well as finished goods. In addition, the high cost of raw materials, utilities and capital translate into higher manufacturing costs.

Other factors leading to non-competitiveness are labour laws, inefficient process technology and relatively low automation levels due to higher reliance on human resources.

Cost disadvantages - India vs other developing countries

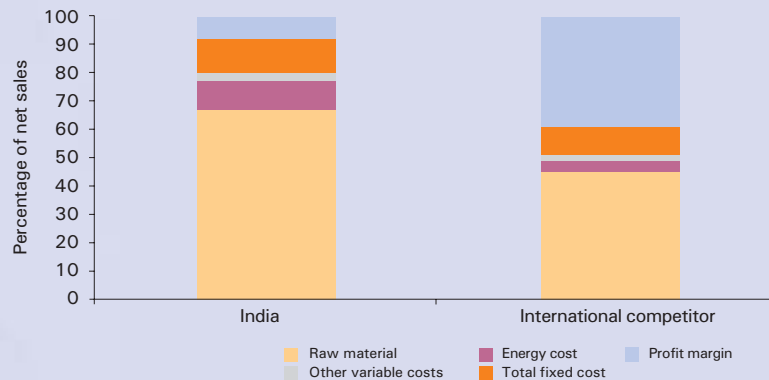


Source: Task force on chemicals, 2002, Ministry of Chemicals and Fertilisers, Government of India



Source: Task force on chemicals, 2002, Ministry of Chemicals and Fertilisers, Government of India

Costs and profits build-up - a sample comparison



Note : Cost comparison for organic chemicals. Costs are approximate and are meant to be illustrative.

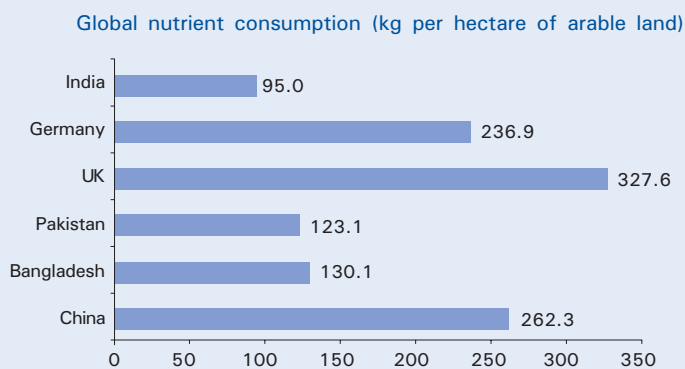
Source: Task force on chemicals, 2002, Ministry of Chemicals and Fertilisers, Government of India

Figure 20: Cost disadvantages for the Indian chemical industry

Potential for high domestic demand

Demand for the chemical industry is yet to reflect its real potential in India. The per capita consumption of chemical products in India is much below consumption levels in developed economies and even in most developing economies. This is illustrated by the case for fertilisers and petrochemicals in Figure 21.

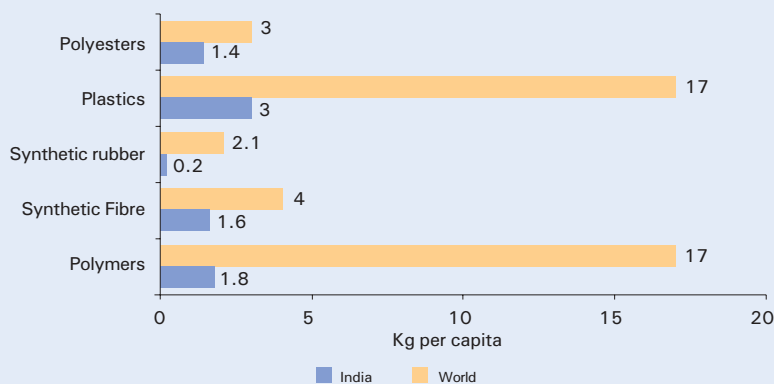
Potential for high domestic demand in the fertiliser and petrochemical industry



Source: FAQ, ICRA Information Service

The fertiliser consumption per hectare of arable land in India is amongst the lowest in the world. This is linked to low levels of productivity of Indian agriculture. The average yield of paddy is around 2,890 kg/ hectare as compared to the world average of 6,059 kg/ hectare.

Annual per capita consumption of petrochemical derivatives - India vs world



Source: Scope report on the Indian petrochemical industry

Figure 21: Per capita consumption - fertilisers and petrochemicals

Indian consumption of petrochemical derivatives is a very small fraction of the world levels indicating a potential for the future. Consumption is expected to rise with economic development and an improvement in life style.

Source: KPMG research



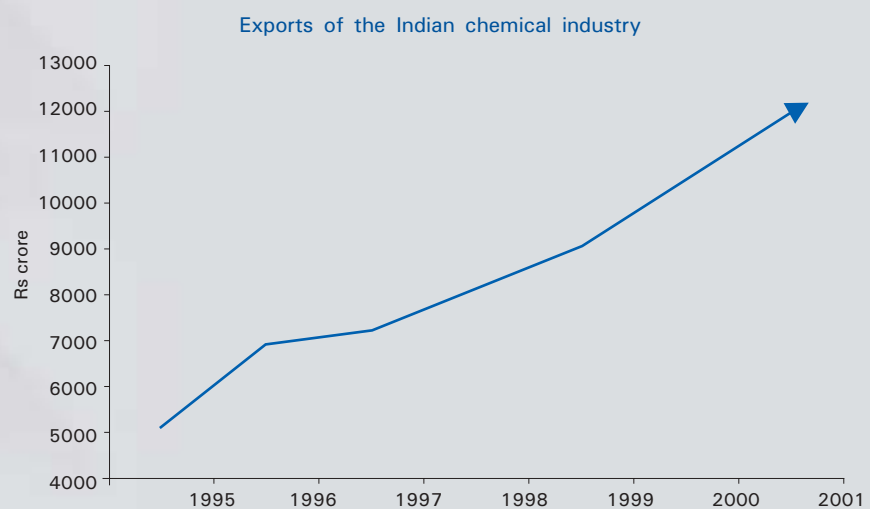
It is expected that constraints on the development of the Indian market (such as low per capita income, low human development index, etc.) will keep per capita consumption lower than that of developed countries. However, the gap in consumption is significantly large and even after accounting for these factors, there is a large unrealised demand potential.

A strong domestic market and a weak export focus

The historical focus on a growing domestic market has prevented a large part of the industry from focussing on exports. Barring a few niche players with a strong focus on global markets, most manufacturers have looked at exports as a hedge to the cyclical Indian demand or as a means to obtain export incentives. Excess capacity after servicing the domestic market was routed to export markets.

The Indian chemical industry is a marginal player in the international market accounting for 1.9 per cent of the global chemicals market, while Indian trade (exports plus imports) accounts for just 1.3 per cent of the world chemical trade of USD 545 billion. Although certain sectors (such as petrochemicals and pharmaceuticals) enjoy a trade surplus, the industry remains a net importer with an annual trade deficit of USD 1.3-1.8 billion.

Since 1991, export markets constitute an integral part of the players' strategies with annual export targets being set. This increase has been aided by developed nations looking at India as a manufacturing base. Low cost manpower, strong technical skills and relatively less stringent environmental norms have contributed to this newly placed confidence.



Source: Industry Financial Aggregates and Ratios, CMIE

Figure 22: Increasing focus on exports

Low levels of research and development

R&D in India is far below global levels. R&D is a critical element for the industry though its nature varies across segments.

Players have failed to invest in product R&D due to lack of skills and the necessary funds. Select large pharmaceutical players are beginning to invest resources in this area. While some companies have established an in-house R&D department, several others have entered into tie-ups with research institutions such as, National Chemical Laboratories (NCL), University Department of Chemical Technology (UDCT), Council of Scientific and Industrial Research, etc.

The government currently offers a number of incentives to promote R&D activities in the industry:

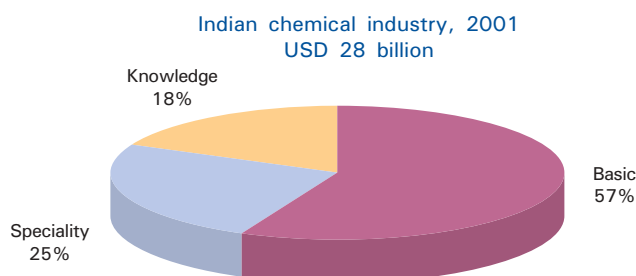
- tax deduction for expenditure (including capital expenditure other than on land) on scientific research related to business;
- weighted tax deduction at the rate of 125 per cent for donations made to approved institutions engaged in scientific research;
- weighted tax deduction at the rate of 150 per cent for expenditure incurred on approved in-house R&D by companies engaged in the manufacture or production of drugs, pharmaceuticals and chemicals; and
- tax holiday for companies established and scientifically approved for carrying on R&D.

However, the industry needs to realise the importance of R&D going forward and not depend on incentives for investments.

Segments of the Indian chemical industry

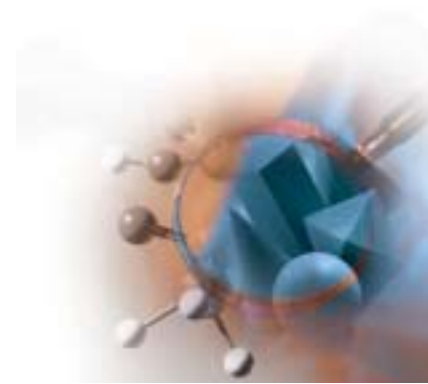
The Indian chemical industry manufactures a wide spectrum of products spanning the Basic, Speciality and Knowledge segments.

At 57 per cent, Basic chemicals comprise the largest segment of the Indian chemical industry (Figure 23). The composition of the industry, however, is shifting in favour of Speciality and Knowledge chemicals.



Source: www.tradepartners.gov.uk, KPMG Analysis

Figure 23: Indian chemical industry, 2001



Regulations have had a mixed impact – Knowledge chemicals benefited while Basic chemicals were at a disadvantage. This was because Knowledge chemical companies were able to leverage on the knowledge premium on patented products by developing improved processes. At the same time, protectionist policies made Basic chemical companies (like fertilisers) cost uncompetitive. Going forward, all segments of the industry need to prepare themselves to face fair competition in the absence of the erstwhile protectionist regime.

KPMG's survey ascertains that the industry sees possibilities of high growth in certain segments. Pharmaceuticals, biotechnology and Speciality chemicals are seen as high potential areas, both globally and in India, as highlighted in Figure 24.

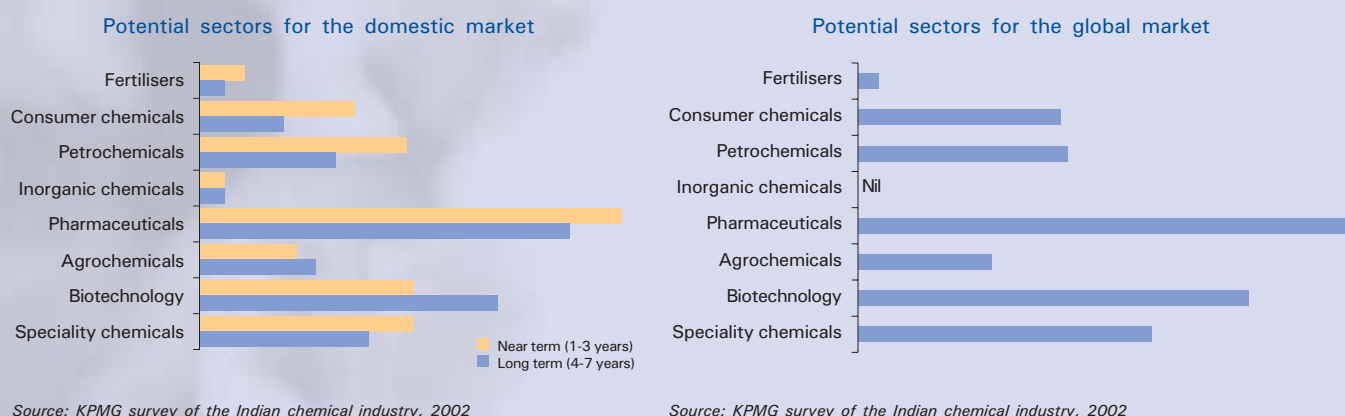


Figure 24: Segments with high growth potential

Basic chemicals industry

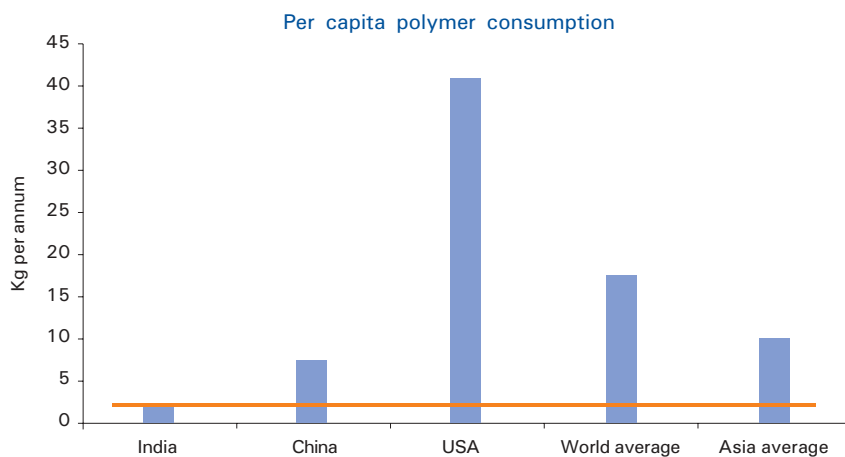
The industry expects Basic chemicals to grow in pace with the GDP of the country. This segment comprises old legacy capacities from the pre-liberalisation era and hence is faced with the biggest challenge in the current liberalised economy. The following sections detail the characteristics of a few key sub-segments of the industry.

Petrochemicals

The petrochemical industry is seen to hold good growth potential in the medium-term as domestic per capita consumption of petrochemical derivatives is a fraction of world levels, indicating significant potential for future growth in India (Figure 25).

Demand growth in India is fuelled by several factors:

- higher GDP growth than global rates;
- higher presence of traditional materials leading to greater opportunities for substitution; and
- increased application development carried out by large players to fuel downstream demand.



Source: CRIS INFAC

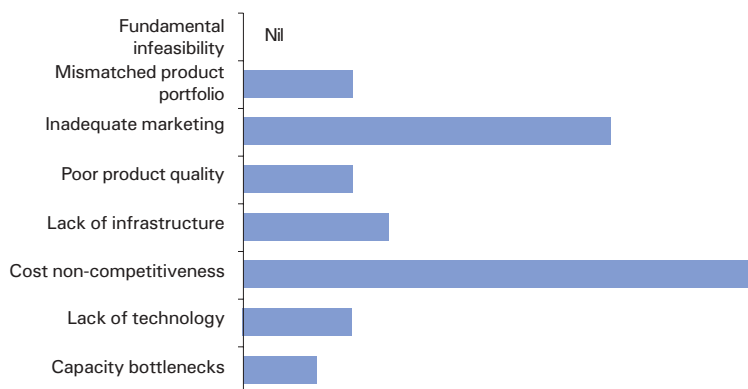
Figure 25: Per capita polymer consumption

The industry expects the petrochemicals industry to grow in polymers and fibre intermediates.

At 2.2 per cent of the global ethylene capacity and 2.5 per cent of the global polymer production, the size of the Indian petrochemical industry is insignificant. Enhanced scale of operations along with application R&D is expected to help increase product demand.

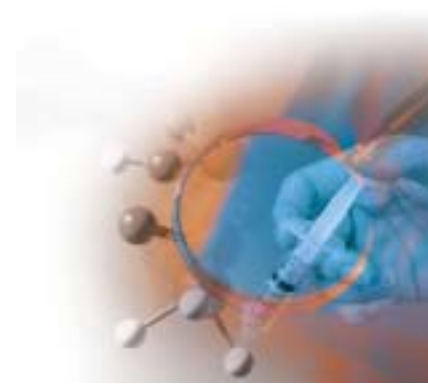
KPMG's survey shows that the Indian industry is not cost competitive under the present regulations and duty structures. The petrochemical industry uses naphtha as feedstock, while globally, gas crackers are more economical for petrochemical production. Currently, administered gas prices in India distort the economics of production. However, with the discovery of new reserves, this situation is expected to improve in the future.

Factors hindering the performance of the Indian petrochemical industry



Source: KPMG survey of the Indian chemical industry, 2002

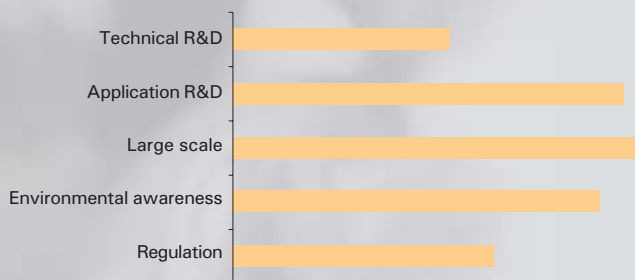
Figure 26: Factors hindering the performance of the Indian petrochemical industry



The margins of Indian petrochemical manufacturers are under pressure on account of exposure to global markets through import parity linked domestic prices and an inherently weak cost structure. Excessive capacity additions across the globe have further aggravated this.

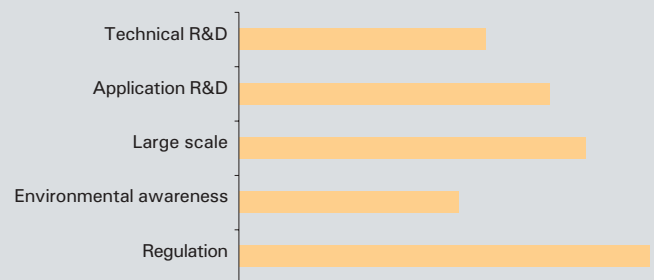
The Indian industry has benefited from the import tariff structure prevalent today. Current tariff levels are amongst the highest world-wide. However, tariffs are expected to reduce as India aligns with the World Trade Organisation (WTO). As per the survey, the industry expects the government to facilitate in building a more competitive position for Indian players vis-à-vis the global marketplace. The removal of artificial demand-supply distortions is one of the areas where the industry sees a role for regulators.

Factors for success of the Indian petrochemical industry



Source: KPMG survey of the Indian chemical industry, 2002

Competitiveness of the Indian petrochemical industry



Source: KPMG survey of the Indian chemical industry, 2002

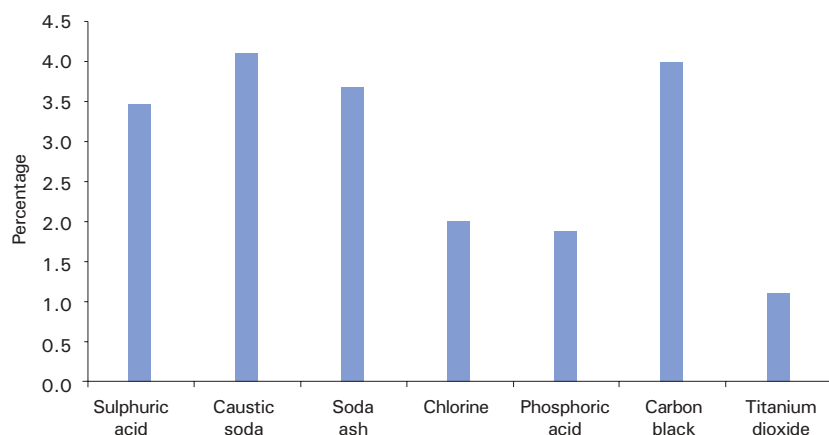
Figure 27: Factors for success and competitiveness of the Indian petrochemical industry

Inorganic chemicals and fertilisers

The USD 2.5 billion Indian inorganic chemicals industry is small, accounting for less than 4.5 per cent of the global market. The industry is characterised by a high degree of fragmentation even across high volume product areas. High energy costs, low import tariffs and infrastructural impediments affect its competitiveness.

The fertiliser industry continues to be a price-regulated industry in India. It is expected to grow faster than the global fertiliser industry, largely due to high, unrealised domestic demand. Fertiliser consumption in India is amongst the lowest in the world even when compared to other developing countries. India is also a net consumer of fertilisers. The industry is polarised with six players producing 64 per cent of nitrogenous fertilisers and two companies producing 44 per cent of phosphatic fertilisers, with a large number of smaller companies accounting for the balance.

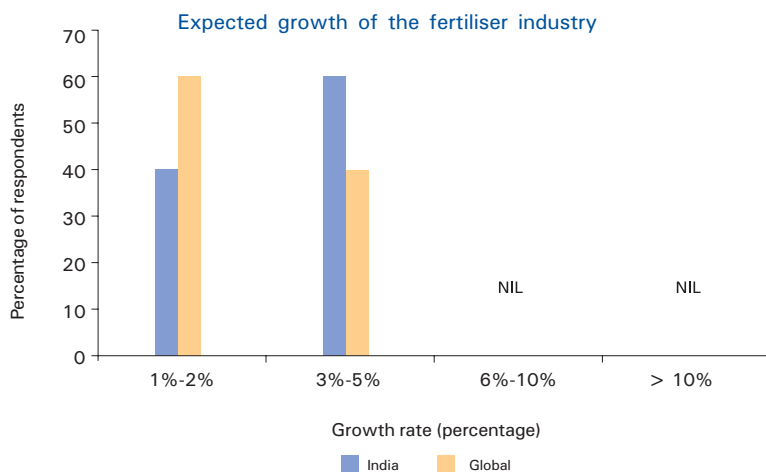
Production of Indian inorganic chemicals as a percentage of global markets



Source: CMIE August 2002, KPMG research

Figure 28: Production of Indian inorganic chemicals as a percentage of global markets

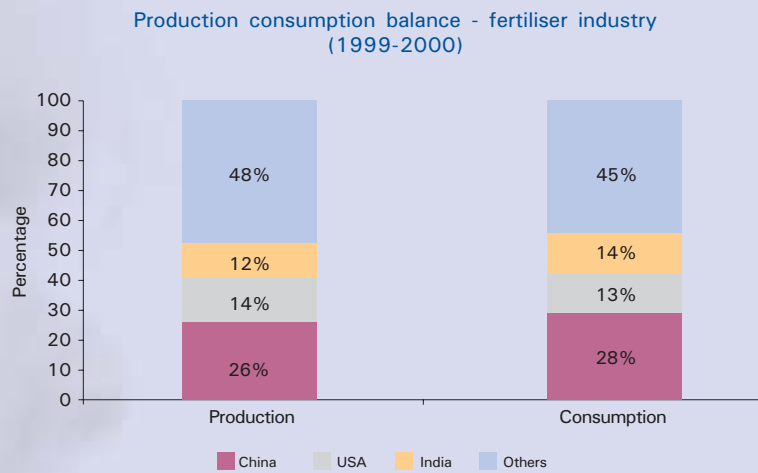
The industry expects the total fertiliser demand to grow at 4 per cent in India in the tenth plan period (2003-2007) as compared to a global growth rate of around 2 per cent (Figure 29).



Source: KPMG survey of the Indian chemical industry, 2002

Figure 29: Expected growth rate of the fertiliser industry



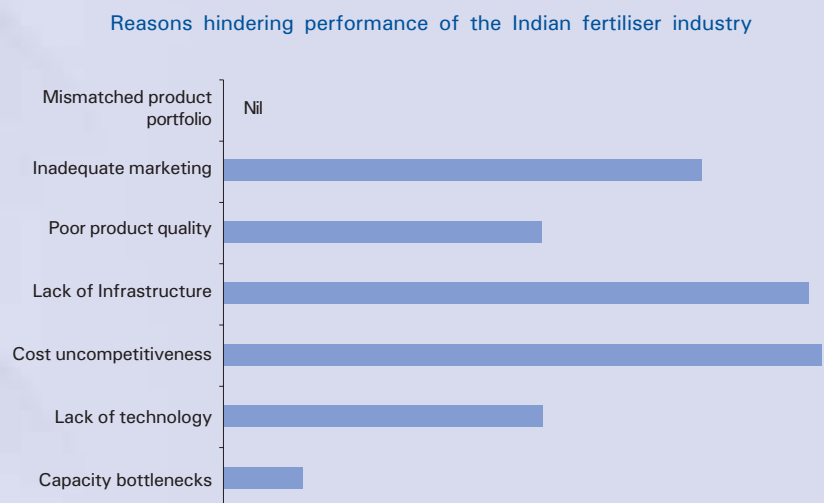


Source: ICRA Information Services

Figure 30: Production consumption balance – fertiliser industry

The KPMG survey indicates that the industry sees high costs (including uneconomical plant sizes) as the single largest factor hindering its competitiveness and growth. The competitiveness of the Indian fertiliser industry is negatively impacted by the prevalent protectionist policies (Figure 31).

Inadequate infrastructure for rural sales and marketing is seen as the next big deterrents to growth in the sector. Rural infrastructure is critical to educate farmers of the benefits of fertilisers and correct usage practices.



Source: KPMG survey of the Indian chemical industry, 2002

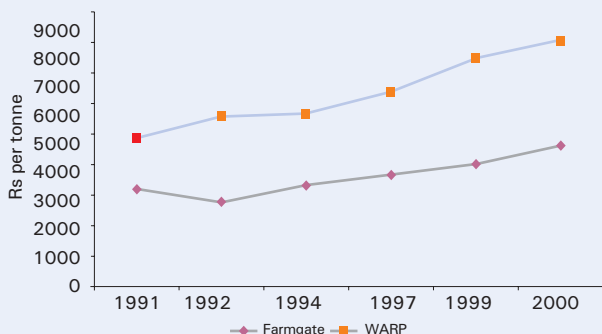
Figure 31: Reasons hindering performance of the Indian fertiliser industry

Protectionist policies in the fertiliser industry

Urea producing companies are given a 12 per cent post tax return on net worth. The farmgate price has been consistently lower than the retention price offered to players, resulting in high outflows to the exchequer. The current retention price varies between INR 5,000 and INR 13,000 per tonne while the cost, insurance and freight (CIF) price of urea is around INR 5,500 per tonne.

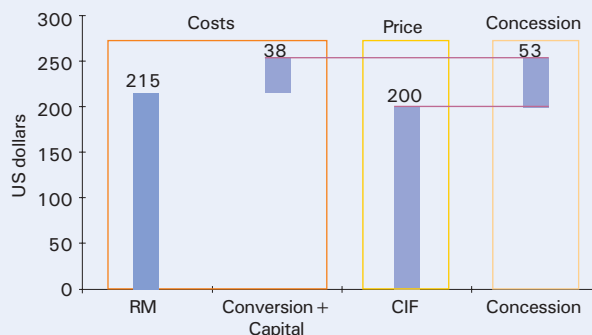
Decontrolled urea prices would threaten the competitiveness of Indian industry. The competitiveness of this sector has been significantly compromised as a consequence of the protection given to the sector in the past.

WARP² vs farmgate price



Source: ICRA Information Services

Concessions for DAP-2001 (in USD)



Source: ICRA Information Services

Figure 32: Protectionist policies in the fertiliser industry

Speciality chemicals industry

The industry sees Speciality chemicals as a high growth potential industry in India. Growth is expected to come largely in the organic speciality area. The agro-oriented Speciality chemicals are expected to register higher growth rates than what is expected globally, as they are driven by the domestic demand potential.

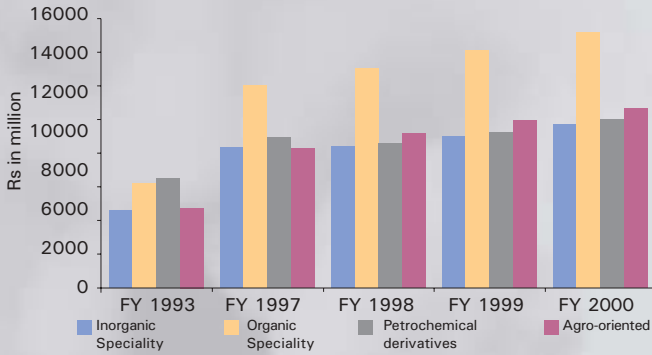
India had a slow start in Speciality chemicals. In the 1980s, a shift to a market-oriented approach led to impressive growth. With liberalisation in the 1990s, the industry took advantage of the lower production costs prevalent in the country and shifted to value-added products. The Speciality chemicals industry has since witnessed a high growth rate.

Low capital intensity of the industry, the availability of technical manpower and high profit margins have helped promote a large number of small manufacturing units. Most of these units exist in the small-scale unorganised sector where their cost advantage has deterred the entry of organised players.

² Weighted average retention price

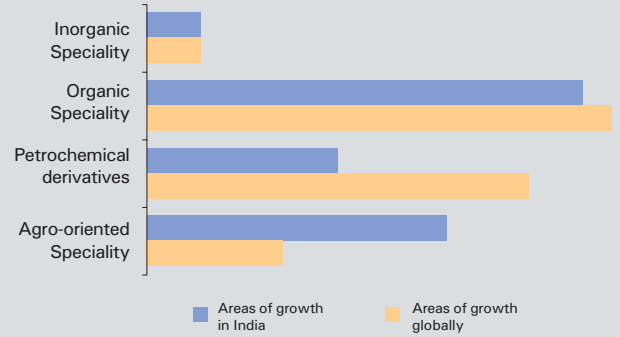


Growth in market size in Indian Speciality chemicals



Source: Scope report on organic and Speciality sector in India, 2001

Areas of growth for Speciality chemicals

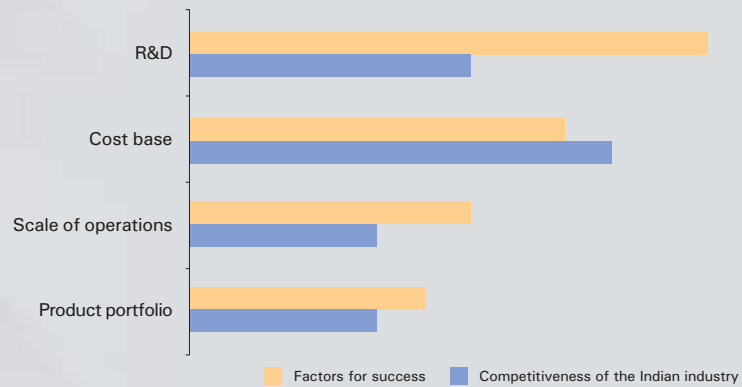


Source: KPMG survey of the Indian chemical industry, 2002

Figure 33: Market growth in the Indian Speciality chemicals segment

KPMG's survey reveals that a low cost base is viewed as the strongest factor for competitiveness in global markets (Figure 34). Improving R&D is seen as the most critical imperative for the Speciality chemicals industry. Scale of operations assumes importance as the product moves out of the laboratory to be developed and produced in large volumes.

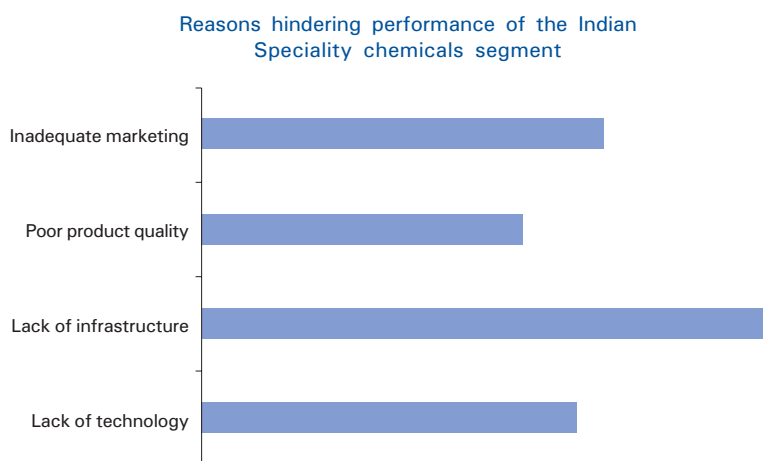
Factors for success and increased competitiveness of the Indian Speciality chemicals segment



Source: KPMG survey of the Indian chemical industry, 2002

Figure 34: Factors for success and increased competitiveness of the Indian Speciality chemicals segment

The lack of a logistics infrastructure and access to common R&D facilities are seen as hindrances to growth. An adequate marketing structure becomes important for the industry, given its highly fragmented and small-scale structure. Building and maintaining relations is critical. Hence the industry has often expressed the need for an 'aggregator' to accumulate products from the smaller players and market them to customers across the globe.



Source: KPMG survey of the Indian chemical industry, 2002

Figure 35: Reasons hindering performance of the Indian Speciality chemicals segment

Knowledge chemicals industry

At 12.3 per cent compounded annual growth rate (CAGR), the Knowledge segment is the fastest growing segment of the chemical industry. This segment comprises pharmaceuticals, agrochemicals and biotechnology companies.

Pharmaceuticals

The pharmaceutical sector in India is perceived to have a significant growth potential. It is ranked highest in being prepared to compete in global markets.

The pharmaceutical sub-segment was estimated to be around USD 4.75 billion for 2001; its growth is driven by exports of formulations, bulk drugs and generics. The industry is broadly divided into formulations (57 per cent), exports (28 per cent) and bulk drug sales (15 per cent). Anti-diabetics and cardiovascular medicines provide the highest growth rates across categories in India.

KPMG's survey reveals that the industry is aware that R&D is critical for success and a key for competitiveness in global markets. Product research in India is minimal due to lack of product patent recognition. Bulk of the research in India has been in the area of process development and reverse engineering.



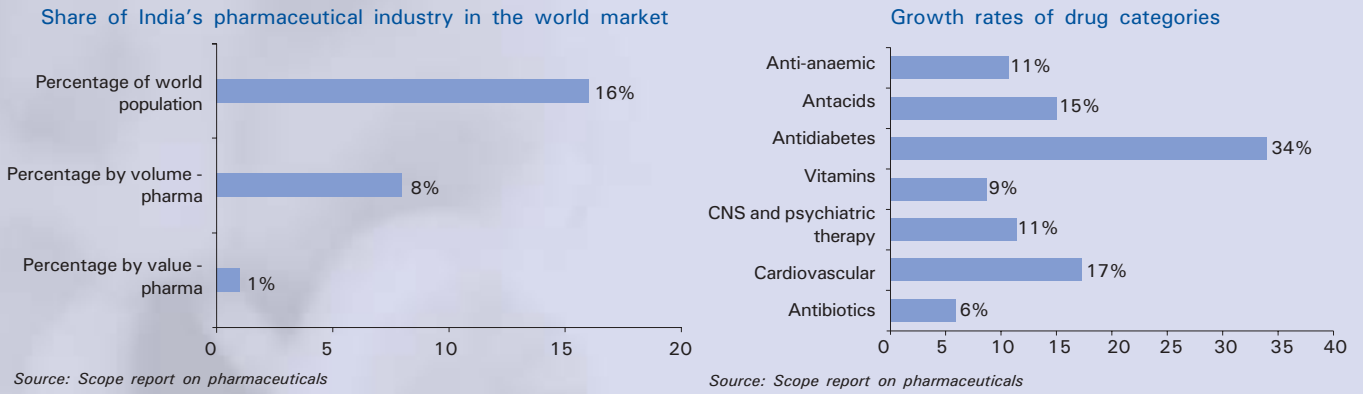
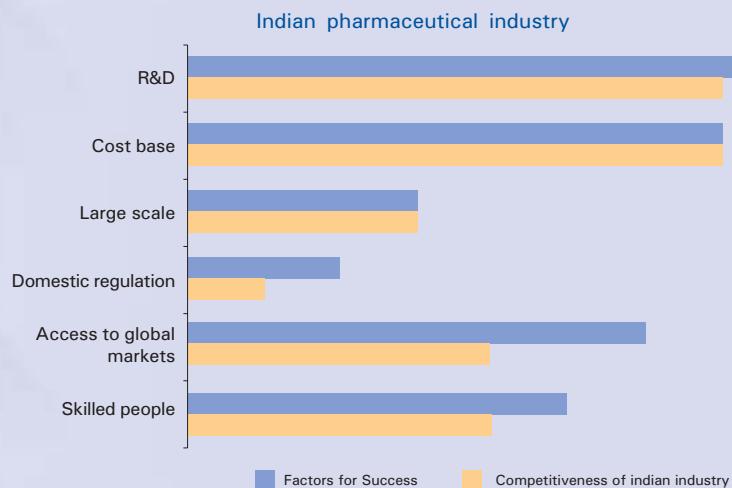


Figure 36: Indian pharmaceutical industry – global shares and growth rates by drug category

Patents are a serious concern for the sector. The patents regime in India allows product patents for non-chemical substances and process patents for chemical substances including pharmaceuticals, agro-chemicals and food products. The duration of the patent for pharmaceutical products is seven years from the filing date of the patent or five years from the patent sealing date, whichever is earlier. India, by virtue of being a signatory of the General Agreement on Tariffs and Trade (GATT) is bound to adopt product patents from 2005. While India has put in place a temporary mechanism till 2005 – exclusive marketing rights – it will need to develop patent laws in line with global practices, where it recognises the patents that have been filed in other member countries. The case of the pharmaceutical industry (Figure 38) highlights this difference between Indian and global companies.

The Indian pharmaceuticals industry is geared for competing in the generic drugs segment and hence costs are a critical factor. Access to global markets and availability of a skilled workforce is important for success and competitiveness in the industry.



Source: KPMG survey of the Indian chemical industry, 2002

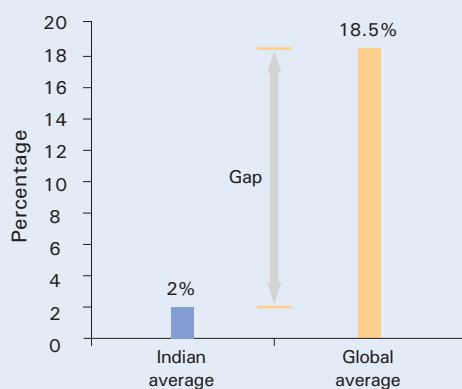
Figure 37: Factors for success and increased competitiveness of the Indian pharmaceutical industry

The need to increase R&D spend in the pharmaceutical industry

The Indian patent regime has encouraged research in the area of processes and reverse engineering. Moving forward, India will have to focus on new chemical entities (NCEs) and new drug delivery systems (NDDS). The R&D spend in Indian companies is expected to see a rise.

Globally, R&D is a fundamental driver of success for the pharmaceutical industry. Companies depend on developing premium therapies to open up entire new markets and sustain growth. Globally, R&D spend has been on the rise in the last few years and currently the average stands at 18.5 per cent of net sales. This is partly led by an increase in drug development costs. The average cost of introducing a new drug to the market has risen from USD 550 million to USD 820 million with most of the cost increases being in the testing phase.

India - R&D spends as a percentage of total sales 2001



Source: Scope report on pharmaceuticals

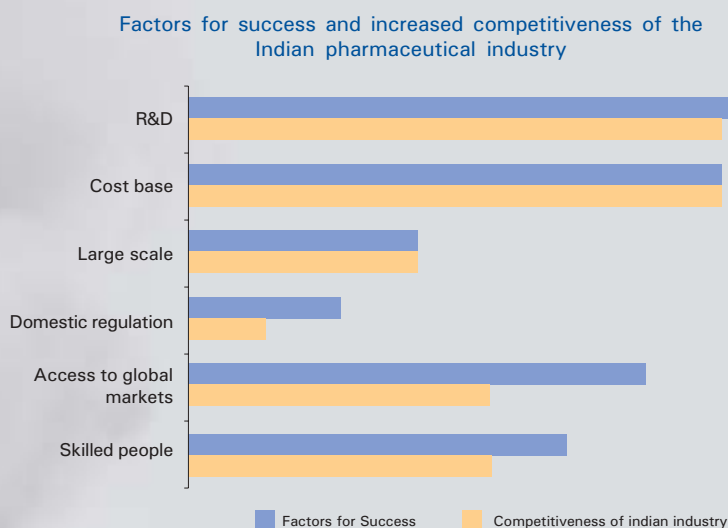
Figure 38: Indian pharmaceutical industry – global shares and growth rates by drug category

Source: KPMG research

Indian exports have grown at a CAGR of around 27 per cent over the last nine years. The Indian pharmaceutical industry is beginning to be recognised globally with 75 per cent of the Indian bulk drug production being exported. Formulation exports are mainly to developing countries while bulk drugs are exported to developed countries. About 90 per cent of the exports are in the 'off-patent' categories.

The Indian pharmaceutical industry is highly fragmented, with the top 10 players accounting for no more than 30 per cent of the market. There are over 23,000 licensed manufacturers in the pharmaceuticals business in India. This is in sharp contrast with the global situation where the industry is concentrated with the world's top 15 companies accounting for 67.5 per cent of industry revenues. A fragmented industry severely impairs its ability to make large investments in research or marketing.





Source: KPMG survey of the Indian chemical industry, 2002

Figure 39: Factors for success and increased competitiveness of the Indian pharmaceutical industry

The industry does not see itself as dependent on protectionist policies for competitiveness though patent related regulations are considered essential to boost research.

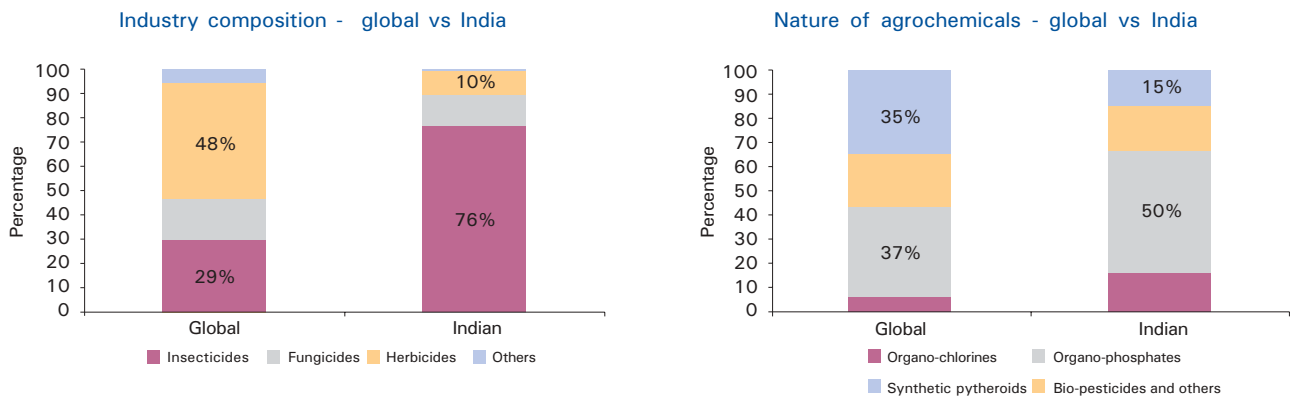
Agrochemicals

India is the second largest manufacturer of agrochemicals with 145 pesticides registered in the country. Stringent environmental norms in the West are causing production capacities in the agrochemical segment to shift to developing countries, such as India and China.

The agrochemical industry in India is different from the developed world for a number of reasons. Globally, herbicides constitute a larger proportion of the demand. On the other hand in India, insecticides comprise 76 per cent of the market while herbicides constitute only around 10 per cent of the market. The demand for herbicides is likely to grow with a growing shortage in agricultural labour due to increasing migration of labour to cities for manufacturing and services-based economic activities. This has already been witnessed in a couple of Indian states.

The Indian agrochemical industry is marked by a high degree of fragmentation compared to the global industry. Net profit margins in the industry are quite low at 4 per cent to 5 per cent due to the diseconomies of small scale operations and fierce competition amongst players.

India is a global sourcing base for generic agrochemicals. Most of the sales are to traders and not to end-users. This is because, barring a few, most Indian players have refrained from obtaining product registrations from relevant regulatory authorities permitting them to make direct sales. Most players also lack the necessary sales and distribution infrastructure to access consumers directly.



Source: KPMG research

Source: KPMG research

Figure 40: Industry composition and nature of agrochemicals

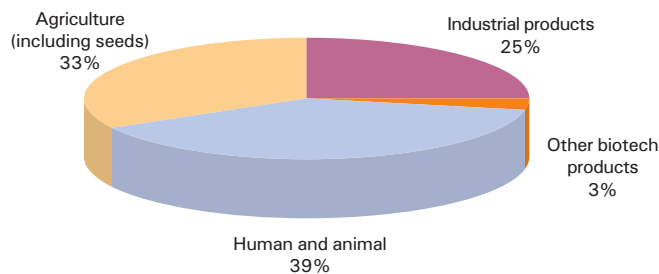
Players in the Indian industry have made limited investments in R&D due to prohibitive investment levels and long gestation periods. Global companies operating in India have merged with local companies and set up R&D laboratories to improve the process in formulation technology and assist in introducing selected products from their global portfolio.

Biotechnology

The industry expects biotechnology to be the second highest growth area in India in the long term. Following global trends, the biotechnology industry in India has seen a growing interest from entrepreneurs over the past decade.

Funding agencies have been quick to finance R&D within the sector. The World Bank granted USD 240 million to the Indian Council of Agricultural Research in order to foster agro-biotech. In addition, government policies have helped the industry come a long way, commencing with the setting up of the country's first biotech company, to approving engineered seeds like BT cotton for commercial agriculture. States such as Karnataka and Andhra Pradesh have also been promoting investments in this sector.

Estimated average biotech consumption - 2005



Source: Department of Biotechnology

Figure 41: Biotech consumption in India



India is well placed to make a big foray into biotechnology. Human and animal biotechnology as well as agro-biotech are expected to be emerging areas. Low cost clinical trials, increased R&D, molecule synthesis and fine chemical production are areas where significant initiatives have been made. India's large geographical spread offers abundant and diverse biological resources for genetic studies.

India has the potential to serve as an outsourcing destination for biotechnology including a large English speaking human capital base, which is required for such a knowledge based industry. There is a vast human resource pool comprising 3 million graduates, 700,000 post graduates and 1,500 Ph.D.s qualified in biosciences and engineering³. According to CII estimates, 10 per cent of researchers and 15 per cent of scientists in pharmaceuticals/ biotechnology R&D in USA are of Indian origin.

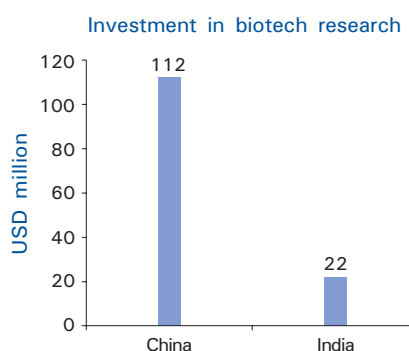
India lags behind some of its peers in exploiting new business opportunities, largely due to the lack of initiative, lengthy procedures and slow decision-making processes. A comparison with China illustrates the implications.

The need for speed in exploring new opportunity areas like biotechnology

India and China made a foray in biotechnology together in 1980. However, China has since made significant progress in the field and is today, far ahead of India both in terms of financial resources invested and the resources involved in biotechnology research. China is developing the world's largest biotech capacity outside North America and ranks second in plant biotech today.

	Genetically modified agricultural plants	Approval for field trials	Commercialisation
China	141	45	31
India	16	10	4

The implementation of biotechnology, especially in the field of agrochemicals (for instance, BT Cotton genetically altered to resist Bollworm), was delayed in India. China, on the other hand, planted 700,000 hectares of BT Cotton.



Source: The Hindustan Times, February 2002

Figure 42: Biotech research in India

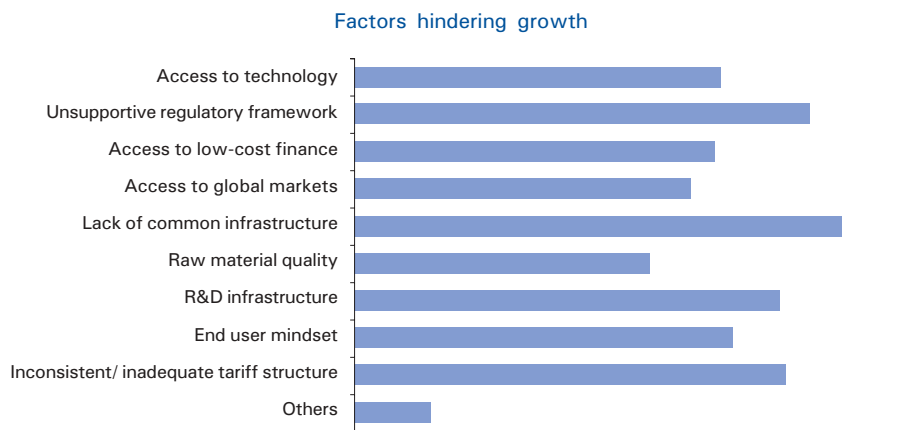
Source: KPMG research

³ www.biotech-india.com

Insights into the Indian chemical industry

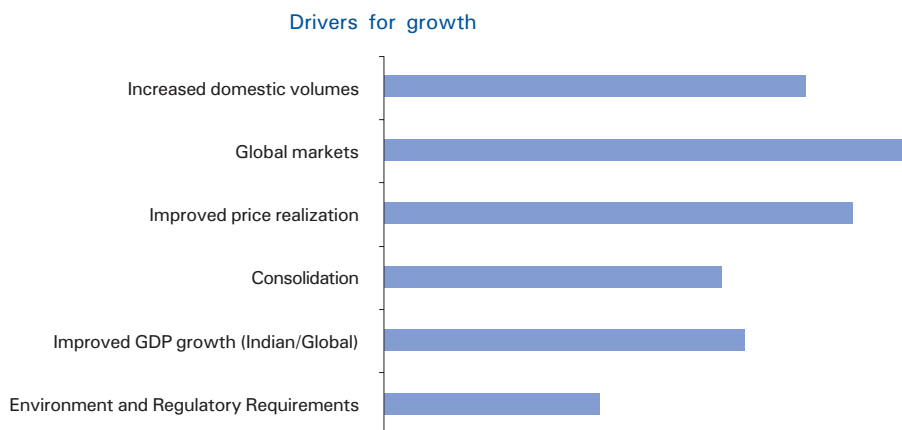
The KPMG survey of the Indian chemical industry, 2002 provides an interesting insight into how key players view the industry's present characteristics and structure.

The key inhibiting factor for the industry – as stated by key players – is its legacy from the old economy. These players hold external factors like lack of enabling infrastructure, an unsupportive regulatory framework and inconsistent tariff structures responsible for hindering long-term growth of the sector. On a relative scale, access to low cost finance and global markets is not a major deterrent to the industry. Players have identified the key growth drivers that are expected to propel the industry going forward (Figure 44).



Source: KPMG survey of the Indian chemical industry, 2002

Figure 43: Factors hindering growth



Source: KPMG survey of the Indian chemical industry, 2002

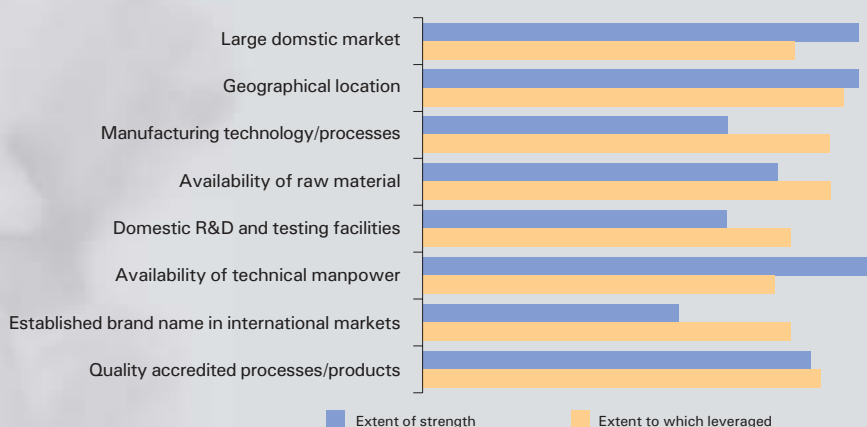
Figure 44: Drivers for growth



India's key strengths lie in quality manufacturing processes, availability of technical manpower and raw material and a latent domestic demand.

There are a number of strengths that can be leveraged to make India competitive in the global market (Figure 45). India's key strengths lie in quality manufacturing processes, availability of technical manpower and raw material and a latent domestic demand. India's geographical position and a long coastline are also seen as an advantage for the industry, especially in the Basic and Speciality segment. The Indian industry essentially needs to focus on developing a brand for itself in international markets, increase its focus on R&D and build global scale plants.

India's portfolio of strengths to leverage



Source: KPMG survey of the Indian chemical industry, 2002

Figure 45: India's portfolio of strengths to leverage

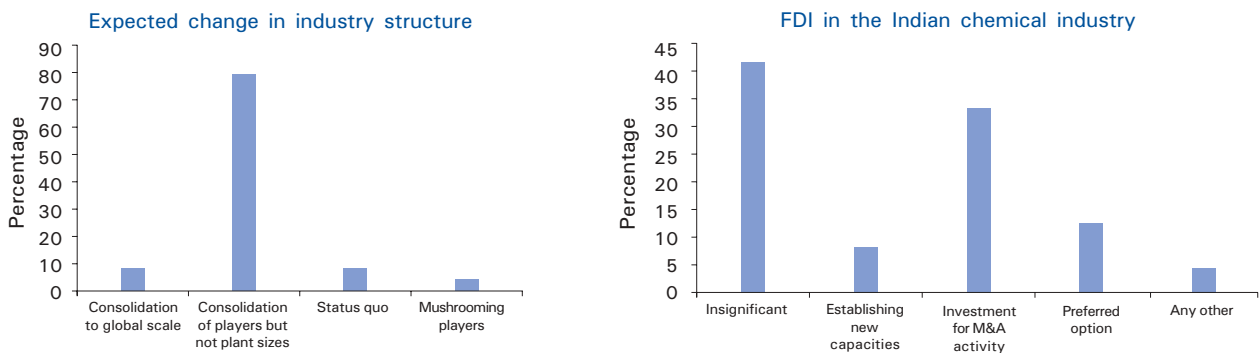
Growth in the Indian industry can be driven through a two-fold focus – targeting global markets and developing the domestic markets to tap the country's large potential. Improved price realisation through enhanced efficiencies and lower costs are key for driving growth.

Consolidation is seen as inevitable. Though it will reduce fragmentation, it will still not bring the Indian capacities close to global capacities.

Consolidation will ensure foreign direct investment (FDI) flowing into the Indian chemical industry through M&As. However, FDI for building fresh capacities is expected to be insignificant with very few respondents expecting investment in new capacities (Figure 46).

R&D needs to form an important basis for the competitiveness of chemical companies. A focus on close customer linkages and developing skilled manpower is imperative. However, the industry places a lower importance on duty structures and regulations as drivers for competitiveness. This can be perceived as a significant shift in the mindset of industry players, who have been used to competing in a protected environment.

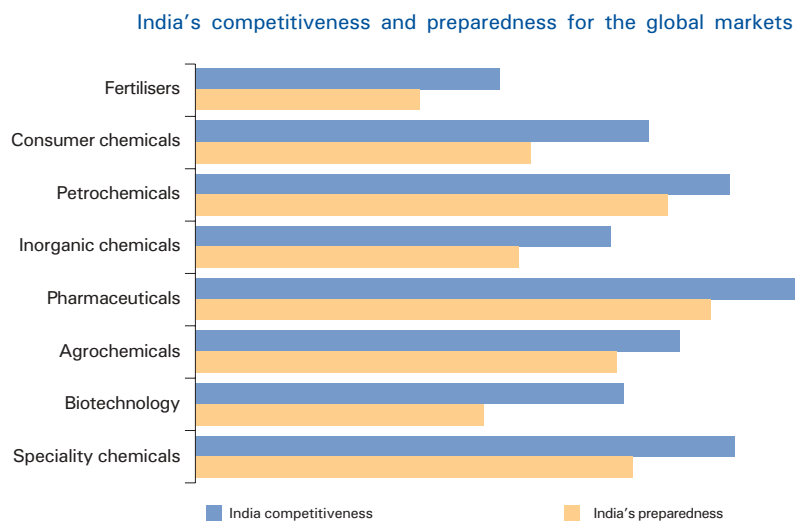
The scale of operations is considered to be critical by the industry for competitiveness. However, the importance of consolidation through mergers in this direction is underestimated.



Source: KPMG survey of the Indian chemical industry, 2002

Source: KPMG survey of the Indian chemical industry, 2002

Figure 46: Expected structure and FDI in the Indian chemical industry



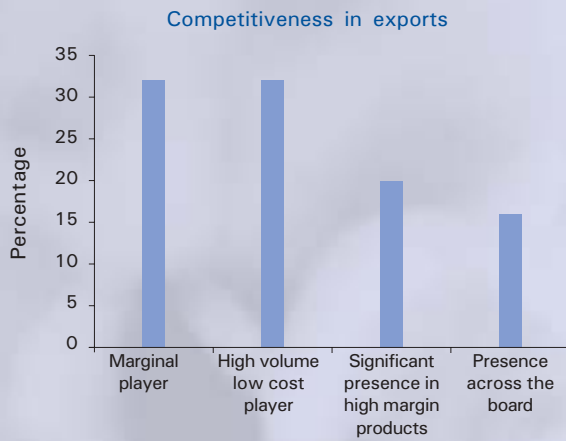
Source: KPMG survey of the Indian chemical industry, 2002

Figure 47: India's preparedness for global markets

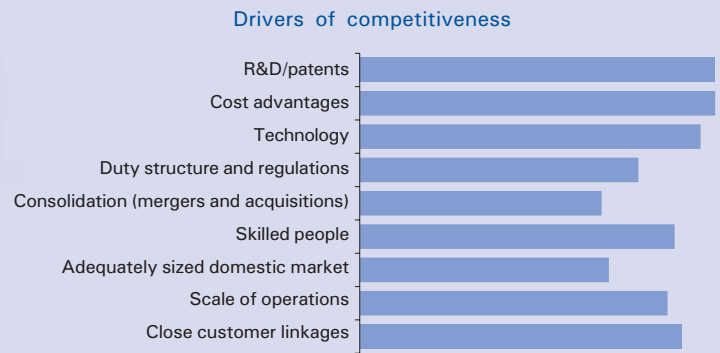
Achievements of the Indian industry

Notwithstanding these issues, some Indian companies have created sizeable international operations and have become significant players in the global market place. Some companies in the Speciality chemicals, pharmaceutical and paints sub-segments have already done so.





Source: KPMG survey of the Indian chemical industry, 2002



Source: KPMG survey of the Indian chemical industry, 2002

Figure 48: Competitiveness of the Indian chemical industry

The ability of chemical companies in India to perform better than global companies is also borne out by the performance of global chemical companies operating in India. Most large global chemical companies have established a strong presence in India. Agrochemicals, dyes and pigments, and Speciality chemicals are three areas where global companies have traditionally enjoyed leadership positions.

Indian subsidiaries of large global companies have performed better last year as compared to their parent companies, registering a higher Operating Profit Margin (OPM) in the range of 8 per cent to 13 per cent, while the parent companies have under-performed and have reported OPM in the range of less than 1 per cent to 6 per cent and hence comparatively lower Return on Equity (ROE).

Vision 2010

The road ahead

The Indian chemical industry is at the crossroads today. It could sustain its past performance and grow in line with the GDP growth (Base case scenario) as projected in the tenth plan and achieve a size of around USD 60 billion. However, KPMG's analysis indicates that the industry has the potential to grow at a significantly higher rate to a size of USD 100 billion by 2010 (Aspirational case scenario), provided certain imperatives are addressed (Figure 49).

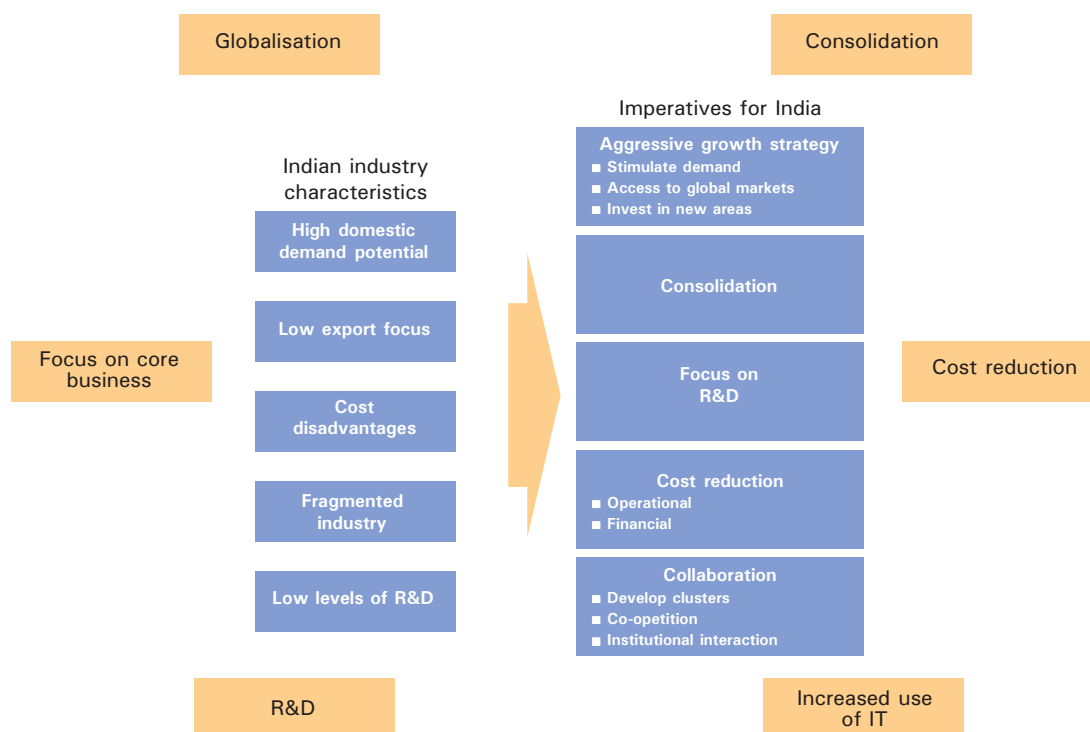
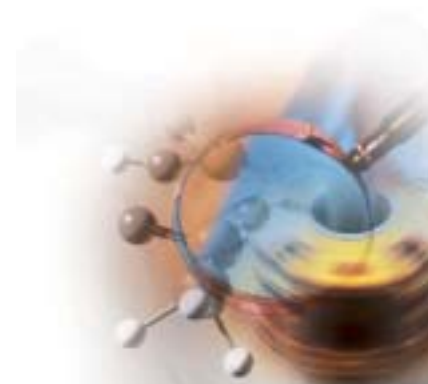


Figure 49: Vision 2010 - Imperatives for the Indian chemical industry

Base case scenario – 2010

The Base case scenario assumes that the industry continues to achieve historic growth rates in each of the three segments. The growth rate of each segment is estimated as a weighted average of the growth rates of the constituent sub-segments. The current growth expectations, obtained during the course of the KPMG survey of the Indian chemical industry, 2002 lead to an industry size of around USD 60 billion in 2010. Figure 50 provides a snapshot of the Indian chemical industry's composition and growth rates.

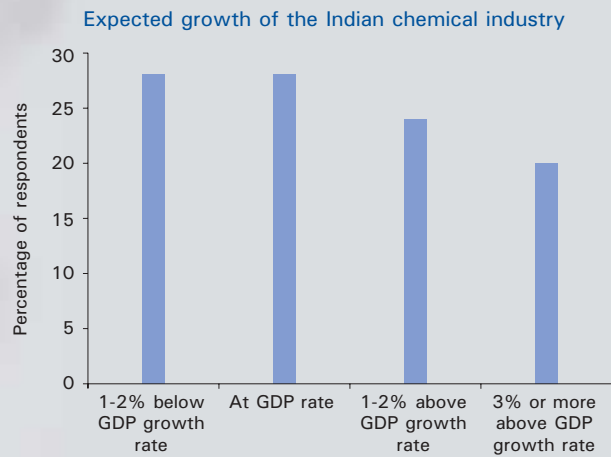
At USD 60 billion in 2010, the contribution of the chemical industry to India's GDP would grow from the current level of 6.7 per cent to 7.1 per cent, while its contribution to the global industry would increase from 1.9 per cent to 2.3 per cent.



Industry segment	Present size (USD billion)	2010 Base case industry size (USD billion)	Weighted average industry growth rates (per cent)
Basic chemicals	16	31	7.7
Speciality chemicals	7	14	7.9
Knowledge chemicals	5	15	12.3
Total	28	60	8.6

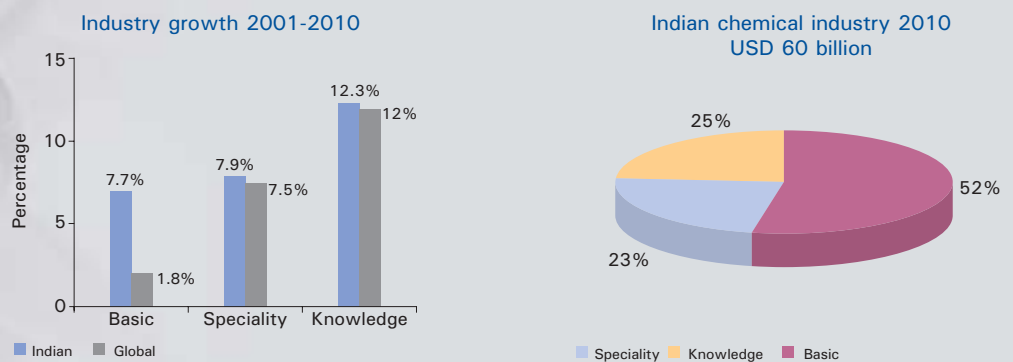
Figure 50: Indian chemical industry - 2010 Base case

The current growth expectations, obtained during the course of the KPMG survey of the Indian chemical industry, 2002 lead to an industry size of around USD 60 billion in 2010.



Source: KPMG survey of the Indian chemical industry, 2002

Figure 51: Indian chemical industry – expected growth



Base case scenario – overall growth 8.6 per cent

Source: KPMG analysis

Base case scenario

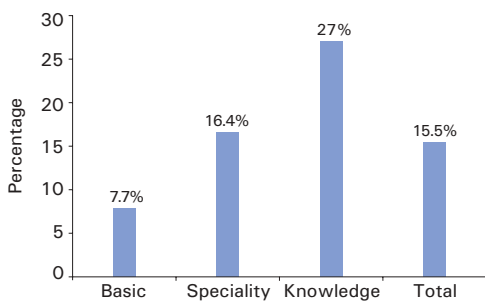
Source: KPMG analysis

Figure 52: Segmental growth rates of the Indian chemical industry - Base case

Aspirational scenario – Vision 2010

The Aspirational scenario places a greater emphasis on growth in the Speciality and Knowledge segments. In this scenario, the Indian chemical industry would have the same segmental composition as the global industry by 2010. With this increased emphasis on the Speciality and Knowledge segments, the Indian chemical industry is expected to grow to USD 100 billion by 2010.

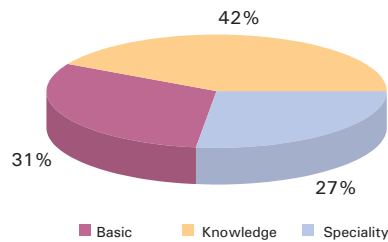
Implied industry growth (2001-2010)



Aspirational case scenario – overall growth 15.5%

Source: KPMG analysis

Indian chemical industry – 2010 USD 100 billion



Aspirational case scenario – overall growth 15.5%

Source: KPMG analysis

At USD 100 billion, the industry’s contribution to India’s GDP will increase from the current 6.7 per cent to 12.1 per cent.

Figure 53: Indian chemical industry - growth rates as a multiple of GDP growth

In this scenario, Basic chemicals are assumed to continue to grow at historical growth rates of 7.7 per cent while the Knowledge and Speciality chemicals industry segments are expected to register much higher growth rates. This scenario implies that Speciality and Knowledge segments will need to grow by an incremental 8.5 per cent and 14.7 per cent over the Base case growth rates in order to attain USD 100 billion by 2010. It would thus result in a derived growth rate of 15.5 per cent for the industry. At USD 100 billion, the industry’s contribution to India’s GDP will increase from the current 6.7 per cent to 12.1 per cent and its share of the global industry will increase from 1.9 per cent to 3.9 per cent.

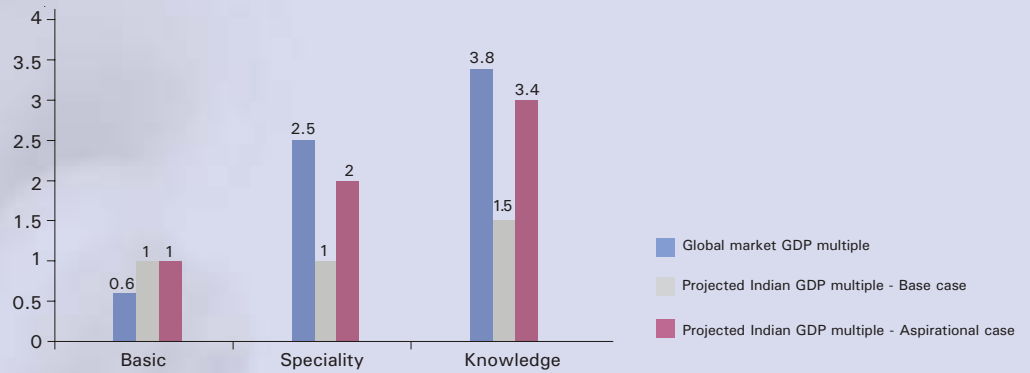
Industry segment	Present size (USD billion)	2010 Aspirational case industry size (USD billion)	Weighted average industry growth rates (per cent)
Basic chemicals	16	31	7.7
Speciality chemicals	7	27	16.4
Knowledge chemicals	5	42	27.0
Total	28	100	15.5

Figure 54: Indian chemical industry - 2010 Aspirational scenario

At the industry level, two comparisons support the aspirational target and the achievability of the same.



Multiple of Indian GDP growth of 8 per cent



Source: KPMG analysis

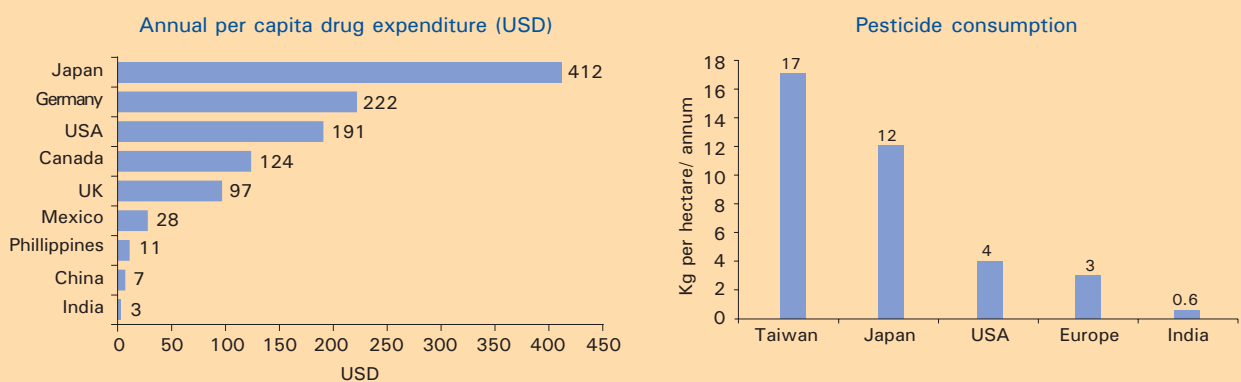
Figure 55: Indian chemical industry - growth rates as a multiple of GDP growth

Firstly, the GDP multiples (GDP as per the tenth plan) of the growth rates in Basic, Speciality and Knowledge segments for the aspirational case are illustrated in Figure 55. These multiples are in line with the growth multiples achieved in global markets.

Secondly, a comparison of Indian per capita drug expenditure and per hectare pesticide consumption shows that Indian demand is low when compared to certain other

High demand potential in the pharmaceutical and agrochemical industry

The Indian pharmaceutical sector shows considerable promise as awareness about drugs and health consciousness is rising and the Indian per capita drug expenditure is significantly below levels of other countries.



Source: India Infoline pharma sector report 2002

Source: SSKI securities

Figure 56: Demand potential - Knowledge segment

Consumption of agrochemicals is around 600 gm per hectare, compared to 10,000 gm per hectare in developed countries. In spite of ranking second in the area under cultivation (170 million hectares), India stands twelfth in the total pesticides consumption table.

Source: KPMG research

developing countries. For example, the Indian per capita drug expenditure is only around 10 per cent of Mexico and 30 per cent of Philippines, which are semi-regulated markets. This demand potential together with the export opportunities that are expected to arise, especially in the pharmaceutical and biotechnology industry, support the higher growth rates forecasted in this scenario.

At an industry level, companies operating in the Basic segment need to acquire low cost production facilities of global scales and achieve cost competitiveness. Speciality chemical companies, on the other hand, need to increase interactions with customers to facilitate application development and become lowest cost producers. Knowledge chemical companies need to use past experience in process R&D to become low cost global scale producers. In addition to these, there are several imperatives that need to be addressed by the Indian chemical industry to support the required growth.

Imperatives for the Indian chemical industry

The industry needs to address a number of imperatives to achieve the aspirational target of USD 100 billion by 2010. These imperatives apply to each segment albeit in different ways to bridge the USD 40 billion gap between the Base case and the Aspirational scenario, as illustrated in the table below. Some of the imperatives require a mindset change and new generation leaders to steer the industry through the times ahead.

Imperative	Basic	Speciality	Knowledge
Aggressive growth strategies <ul style="list-style-type: none"> ■ Stimulate demand ■ Access to global markets ■ Invest in new areas 	●	●	●
Consolidation	●	●	●
Research and Development (R&D)	●	●	●
Cost reduction <ul style="list-style-type: none"> ■ Operational ■ Financial 	●	●	●
Collaboration <ul style="list-style-type: none"> ■ Clusters ■ Co-opetition ■ Institutional interaction 	●	●	●

Degree of relevance

- High
- Medium
- Low

Figure 57: Imperatives for the Indian chemical industry



Pursue aggressive growth strategies

The chemical industry must look for opportunities aggressively in order to achieve the desired revenue growth. Some opportunities include:

- stimulation of domestic demand;
- access to global markets; and
- investment in new emerging growth areas.

Stimulate domestic demand

Achieving global consumption norms in the domestic markets is expected to ignite the prevailing latent demand. This could be achieved through application development and educating the end-consumer.

Application development to expand the market

The plastics industry in India has significantly lower penetration levels as compared to developed countries. One of the leading Indian Basic chemicals players has grown demand significantly by collaborating with small downstream manufacturers to design applications for usage of plastics and providing assistance in market estimation and other commercial areas. Providing technical assistance to procure machinery and stabilise manufacturing process, and promoting plastics as a clean and robust material have also helped the company achieve a significant increase in the per capita consumption of plastics.

Source: KPMG research

Working with customers

A large Indian agrochemicals company has been at the forefront of initiatives to stimulate demand within the sector. The company has followed a strategy of working with the end-consumer rather than intermediaries in the supply chain. For example, during the launch of a herbicide, the company's sales force spends time and effort meeting farmers and opinion leaders within villages in Northern India to demonstrate the benefits of the product. They also meet key buyers of the crop to update them of developments. While this has meant higher marketing spends, the company has benefited due to higher brand loyalty, better realisations and sustained growth in turnover.

Source: KPMG research

Enhanced lifestyle in India is expected to drive demand growth in the industry, while influencing associated factors such as farmer credit and irrigation levels will help increase agrochemicals consumption.

Access to global markets

This is applicable to the Knowledge and Speciality segments while some opportunities exist in Basic Chemicals as well. Indian companies need to move beyond the local markets. They need to compete in the global market place for selling as well as to evaluate sourcing options. Competing in overseas markets could be done in various ways. This includes exports, setting up offices in foreign countries or striking alliances/ joint ventures with overseas players to sell in their markets.

The strategies for globalisation should be based on the strengths of low cost manufacturing and low cost skilled resources for the Knowledge industry. For instance, for USD 10 million, US companies generate around five patents, while some Indian companies have generated three to four times the number of patents. These advantages could be leveraged to export to new markets or to build revenues through outsourcing. Companies should also take advantage of opportunities abroad to establish manufacturing locations either closer to end-markets or feedstock sources. The way forward is to build global scale capacities in the area of specialisation to compete effectively with other global players.

Serving global markets

One of the leading Indian Knowledge chemicals company used to export in order to leverage idle capacities on account of the cyclical nature of its core products. However, a couple of years back, the company decided to explore global markets. It acquired manufacturing as well as sales and distribution assets in Europe. This allowed it to enhance its market presence and leverage its low cost manufacturing base in India better. In 2002, close to 50 per cent of its business was obtained from global markets.

Source: KPMG research, SSKI

The global industry presents several opportunities for the pharmaceutical industry:

- developing and marketing products that have recently gone out of patent (drugs worth USD 80 billion are expected to go out of patent in the next 10 years);
- focussing on the high potential generics market in the US and other developed countries; and
- leveraging on cost advantages and skilled manpower base to undertake contract manufacturing and contract research.

Indian companies should also identify and acquire capacities available at competitive prices globally. In the Basic chemicals segment, given the dependence on feedstock prices, players should consider setting up capacities in countries where feedstock is available at competitive rates such as in the Middle East.

For India to be globally competitive, emphasis on quality is important. In the international markets, quality standards are becoming increasingly stringent. With improvements in



technology, purity levels are rising along with environment norms. Companies need to improve quality consciousness within their organisations to be able to maintain the cost of quality at competitive levels.

With the WTO removing tariff related trade barriers in 2005, Indian companies need to increase emphasis on safety, health and environmental (SHE) issues. This will help protect them against non-tariff barriers in the form of legislations that penalise companies without an adequate level of commitment to the environment and employees.

Doing business globally also requires Indian companies to be sensitive to regulatory requirements and cultural issues of the chosen markets.

Investing in emerging growth areas

Biotechnology holds tremendous potential for the Indian chemical industry in the long-run. Although the current development activity is centred on the Knowledge segment, the impact of biotechnology is much larger. Scientific and market research suggests that biotechnology could eventually take over as much as 50 per cent of the polymer markets and 15 per cent of the Basic chemicals market.

Biotechnology is expected to impact different sectors at varying times. Initially pesticides, fine chemicals and plastic additives would be impacted, followed by surfactants, coatings and dyes. Areas such as petrochemicals and inorganic chemicals are expected to be among the last to be affected. To pursue opportunities in biotech, a change in mindset is required in terms of greater risk appetite, higher funding for long-term projects and devoting greater resources to generating and developing new ideas.

Biotechnology in India – the changing landscape

The impact of biotechnology in India so far has been restricted to pharmaceuticals and agrochemicals. Several new entrepreneurs have entered the field and are actively growing the market. Leading institutions, such as Indian Institute of Sciences, National Council for Biological Sciences, Jawaharlal Nehru Centre for Advanced Scientific Research located at Bangalore, are supporting the industry in cutting edge research. The number of biotechnology companies has grown from 10 in 1993 to 210 in 2002 with about INR 300 million of venture capital funding available to the sector. Some companies have already started making a mark in the international biotech market with their vaccines.

Source: Department of Biotechnology, KPMG research

Consolidation

The Indian chemical industry needs to consolidate to upgrade the scale of operations required to compete effectively. This includes scale in manufacturing, logistics, marketing, R&D and raising finances. Fragmentation in the Indian industry is partly due to the fact that many capacities were set-up in the past without considering the imperatives of efficient cost of production and economies of scale, with self-sufficiency and assured margins as the primary objectives. With falling duties, the cost competitiveness of these industries will be under pressure.

Unlike the global Basic chemical industry, the capacities of larger players in India are small in comparison to global capacities. However, there are some sectors, such as man made fibres, that have already seen consolidation where the industry is practically dominated by two players.

The Knowledge segment has benefited from consolidation in terms of access to other companies' assets like FDA approved plants, product registrations, research initiatives as well as relatively easy availability of funds for R&D.

Consolidation in the Speciality industry will allow companies to leverage proprietary knowledge (of specific chemistry, for instance) and individual relationships with key customers to obtain scale benefits. Hence M&As or asset acquisition will drive the competitiveness of the Indian chemical industry going forward.

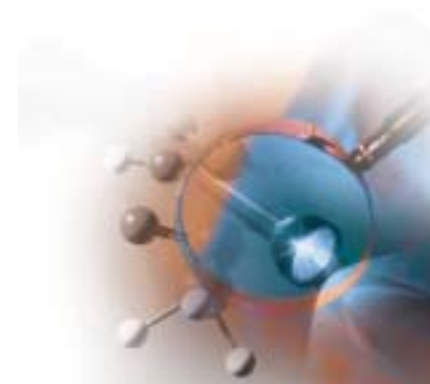
Another form of consolidation that is being actively considered in the industry is supply aggregation. Intermediaries can explore the option of aggregating products of small and medium scale manufacturers to provide them with marketing, financial and technical support. As an intermediary, a typical aggregator could provide the following services:

- develop manufacturers by providing financial and technological support to entrepreneurs and companies, where possible;
- identify the geographical areas for exports and appropriate distribution channels;
- study the pricing structure at various channels;
- study the products specifications and customer preferences and provide feedback to manufacturers;
- study the competing countries and suppliers therefrom and the marketing strategies deployed by them; and
- provide the small sized player with scale while continuing to retain nimbleness of operations.

Consolidation through intermediation

SINOCHEM (China National Chemicals Import and Export Company) is an organisation in China that also performs the role of an intermediary effectively, providing small players with the necessary scale. The core businesses of SINOCHEM include domestic and international trade of oil, fertiliser, rubber, plastics and chemicals. It has facilitated the development of the Chinese chemical industry and has worked in the areas of insurance, finance and logistics (transportation and warehousing) for the industry.

Source: KPMG research



Emphasis on R&D

While R&D remains a universal imperative, its purpose and nature varies across segments.

In the Basic segment, process R&D would drive greater efficiencies in manufacturing and hence reductions in product costs. A huge amount of effort is directed towards improving energy management since energy is a significant element of the conversion costs. In the petrochemical sector, application R&D is critical, as new applications have to be identified to increase use and application of polymers.

Developing new products

One of India's leading Speciality companies manufactures halogen-based chemicals. Realising that the revenue of one of its key products would be threatened, it reformulated its strategy. Identifying its strength in halide chemistry, the company leveraged it to develop new products based on it. These products are being sold to new customers. The company is now working towards developing some more products, using a similar approach to sell to these customers.

Another leading Speciality manufacturer undertakes 10 new exploratory projects every year in an effort to identify new product opportunities. On an average, five of these opportunities are finalised for production.

Source: KPMG research

Growth in the Speciality segment will be driven mainly through development of new products and applications. It is therefore critical for companies operating in this segment to develop capabilities for product and application R&D. Indian companies could ensure that every three years, at least one-third of their revenue is from new products, to ensure a healthy product pipeline in the long-run. Since the synthesis of Speciality chemicals often involves many stages, outsourcing could be used to shorten lead-times and leverage core skills of other players specialising in certain areas of chemistry.

Indian pharmaceutical companies need to innovate and design more effective drugs as the industry moves towards a product patent regime. Globally, new product development and R&D in new molecules drive growth within the sector. However, very few Indian Knowledge chemical companies have the size to invest in R&D to venture into molecule development. Generics offer a significant opportunity for Indian companies. The industry needs to develop further capabilities in process R&D to be able to manufacture generics cost effectively, as products that typically go off patent witness 80 to 85 per cent erosion in realisation within six months.

Pharmaceutical and agrochemical companies need to invest in biotechnology to participate in the growth opportunity presented by the sector.

Developing new products

A leading Indian biotechnology company has been involved extensively in cell research. The company has successfully developed cell lines and is in the process of approaching regulatory bodies in India and abroad to obtain clearance to start the clinical programme. It has also filed for US patents for therapy based on its new cell line. It is working on a number of other cell lines and hopes to repeat its performance.

Source: KPMG research

Cost reduction

Cost reduction is critical in the chemical industry for competing effectively in the domestic and global markets. With open trade and reducing tariffs, pruning costs is critical for survival in either case. The country is flooded with exports from countries with a range of advantages including low cost feedstock, scale and superior technology. Cost reduction could be achieved through two broad means:

- operational cost reduction; and
- financial cost reduction.

Operational cost reduction

With product differentiation being limited, the Basic chemical manufacturers need to focus on cost management for competitive advantage. Operational improvements could be effected through reduction in raw material costs, increase in process yields, reduced maintenance costs, streamlined material flow, improved energy management and increased process automation, among others. Raw material costs form a key component of the cost structure in a chemical company. It constitutes about 47 per cent of net sales in inorganic chemicals and about 60 per cent of net sales in fertilisers. The new natural gas finds in India are expected to improve the availability of feedstock to plants across the country, enhancing competitiveness. Several global companies have effectively used techniques such as Strategic Cost Reduction, Total Productive Maintenance, and Six Sigma to improve their competitiveness. Indian companies can apply these to their operations to obtain business benefits.

Reducing costs to improve profitability

One of India's leading Basic chemicals companies has undertaken a number of steps to reduce costs. Voluntary Retirement Scheme (VRS) was introduced to prune the workforce. The company enhanced its investment in power generation equipment to lower power cost and replaced some older high power consuming equipment with new more power efficient ones. The flow of raw material and finished products was analysed to improve material handling. The infrastructure for effluent treatment was enhanced and recycled water used for certain processes.

Source: KPMG research



Significant cost benefits and improved service can be realised in the area of logistics as well. The service levels, as measured by order fulfilment rates, are around 50-90 per cent for the Indian chemical industry, while the international statistic is around 99 per cent as identified in the KPMG Supply Chain Survey, 2001. Opportunities include improving forecasting accuracy, providing improved customer service, effective inventory level management, lowering response time and reducing manufacturing cycle time. Packaging and handling of finished goods offer significant improvement opportunities to reduce pilferage and material loss, ease in handling and transportation, containment of deterioration of material prior to use, etc. Returns on these investments have a payback period ranging from less than a year to two years. The high efficiencies in logistics can enable the industry to reap savings as high as 1 per cent return on sales.

Financial cost reduction

Financial cost reduction is an issue that is particularly relevant to Basic chemicals. Basic chemicals is a capital intensive and cyclical industry. Investors have been wary of investing on account of low returns and limited returns on investment. This has resulted in a majority of the sector's players having capital structures skewed towards debt. Most of these players are burdened with high cost debt. The ratio of PBDIT to Interest is less than one or is negative in some cases, showing an inability to service debt. This is true of private, public as well as joint sector companies.

For the companies to be cost competitive, reduction of the interest burden is essential. Debt restructuring is a solution used successfully by companies in this segment. The case profiled below illustrates the experiences of a Basic chemical company, which was able to restructure its debt to substantially reduce its costs.

Restructuring debt to improve profitability

One of India's leading Basic chemical companies has availed of fresh borrowings at lower rates and used these funds to repay high cost borrowing and negotiated with lenders for the rollover of borrowings for its fertiliser project. The interest rate of over 15 per cent on these borrowings has been rolled over at a lower rate. This has resulted in a significant improvement in the debt equity ratio and the debt servicing ability of the company.

Source: KPMG research

Collaboration among players

The chemical industry offers several opportunities for players to work together to improve competitiveness by collaborating. Players could come together and reap a range of benefits like reduced costs, increased knowledge transfer and greater marketing power. There are several forms of collaboration. Some common forms are:

- industry clusters;
- industry-institution partnership for knowledge development; and
- collaboration at company level.

Industry clusters

Industry clusters are establishments where several players set up plants around an area to reap the benefits of co-location. Some of the benefits of clusters include:

- sharing of resources to reduce costs;
- proximity to suppliers/ buyers, thereby improving coordination across the supply chain;
- sharing of industry knowledge, technology and skills across players; and
- availability of trained and industry specific skilled man power.

The government of India has developed an 'Industrial Cluster Upgradation Scheme' to facilitate the process. The proposed scheme primarily focuses on developing and upgrading industrial infrastructure at existing clusters. The overall objective of the scheme is to infuse efficiency and enhance competitiveness of industries located in such clusters. The scheme covers areas such as infrastructure support, market intelligence, technology transfer, human resources development, etc. Formation of Special Purpose Vehicles (SPVs), with participation of local industry associations and nodal agencies.

The emergence of industrial clusters has been by default rather than by design. Many of these clusters have subsequently set up common infrastructure (for instance, effluent treatment plants). Indian chemical clusters need to leverage individual capabilities and unique selling points to attract business. Clusters need to be projected as a single destination for potential buyers of chemicals catering to the needs of all buyers.

Cluster to improve competitiveness

Vapi, one of the country's largest chemical estates located in Gujarat, comprises largely small and medium players. It consists of about 1300 industrial units of which about 900 are involved in chemical and pharmaceutical processing.

The Vapi Industries Association is working on a number of strategies including:

- developing the estate to increase focus on export markets; including development of the common trade centre with commercial intelligence to assist in areas like marketing, finance, patents, etc.;
- using the government's Cluster Upgradation Scheme to upgrade existing infrastructure along with Gujarat Industrial Development Corporation that involves:
 - adopting a bottom-up approach for infrastructure development for local industries;
 - upgrading/ enhancing infrastructure instead of relocating.

Some industry players have also taken initiatives in forming clusters. A leading Basic and Speciality player has initiated discussions with the downstream customers to co-locate their plants to reap the above mentioned benefits.

Source: KPMG research



Clusters could work to obtain clearances from regulatory agencies in export markets for the entire cluster. Common services like power, transportation infrastructure, legal services for patent and intellectual property rights related queries, and a well-equipped laboratory for quality checks, as well as compliance-related issues, should be provided. Globally, there are also instances of companies that are pipeline distances away from their key raw material suppliers, giving them tremendous logistics benefits and operational flexibility. It is possible to achieve these benefits in clusters.

Industry-institution partnership for knowledge development

The Indian industry needs to leverage the potential of Indian research and educational institutions as a source of intellectual capital as well as future human capital. The industry needs to collaborate effectively to establish research programmes for application research with educational institutions. This is especially critical to the knowledge segment in the industry. The educational institutions could also partner with the chemical industry by offering courses and conducting research proactively.

While the larger Indian companies have been quick to realise the benefits of collaborating with institutions like NCL and UDCT (see illustrative case below), it is critical for smaller players to tie up with such institutions, to remain current with developments in the chemical field, without very large investments in R&D infrastructure. These institutes can also open local offices within clusters to facilitate such interactions. Such association will also help the smaller players with the preparation required to obtain clearances and registrations from regulatory agencies in export markets. The industry-institute collaboration will also be critical in emerging areas such as biotechnology. Another bold step could be the privatisation of some of the institutions in full or part or creation of private research companies that run laboratories or undertake contract research for companies.

Partnering with institutions

University Department of Chemical Technology (UDCT) is an autonomous unit specialising in chemical engineering. It has a history of strong linkages with the chemical industry in and around Mumbai to undertake state-of-the-art R&D in chemical technology. For instance, it has tied up with BPCL to institute a chair for chemical engineering to carry out research on environment related issues like bio de-sulphurisation of fuels, effluent treatment of chemicals and work on degradable fuels. UDCT has also instituted a programme focussing on flavours and fragrances in response to industry needs.

Source: KPMG research

Company level collaboration

Players in the industry could collaborate on a case-by-case basis as opportunities arise. This could be across several areas:

- Logistics involving infrastructure sharing (for instance, warehouses, channels, transportation facilities), pooling shipments and sharing distribution networks.

- Marketing involving presenting a common face to the end-customer in case of a fragmented market, tapping export related opportunities by getting together and aggregated branding rather than individual attempts to brand offerings.
- R&D involving joint investments in R&D facilities to develop new molecules and sharing of information and know-how.
- Purchasing benefiting from increased bargaining power and logistical efficiencies.
- Production involving strategic sharing of production capacities (leveraging scale benefits).
- Players could also work in tandem towards joint production planning and specialised manufacturing and exchanging products as necessary. Such arrangements generate cost benefits to both companies.

Such collaboration opportunities need to be identified within the sector and implemented.

Collaborating for growth

One of India's leading pharmaceutical companies is one of the largest manufacturers of a category of antibiotics in India. To enter the formulations market, the company has entered into co-marketing agreements with other players in the formulations category. This way, the other company prepares the drug and gets compensated for the preparation. Each of the players subsequently market it under different brand names. This co-marketing plan is part of the company's multi-pronged approach to increase its formulation sales.

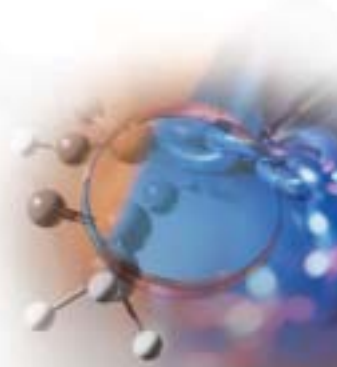
Source: KPMG research

Enabling environment

Apart from undertaking the imperatives discussed, the sector needs the support of the government and regulatory bodies to ensure the existence of an appropriate legal and regulatory framework in addition to adequate physical infrastructure. Some initiatives to be undertaken by the government bodies are listed below:

- formulating progressive regulatory policies and legal structure (labour laws, Intellectual Property Rights, environmental regulations, exit policies, capital markets);
- providing easy and transparent procedures for setting up a business within the country; and
- projecting India as a quality supplier of chemicals and as a destination for setting-up chemical industries.

The state of infrastructure in the country needs significant improvement. This directly impacts the cost structure of the chemical industry. These inefficiencies lead to increased costs and loss in service provided to customers. Figure 58 highlights how



some of our ports compare to global standards. Focussing on infrastructure projects including ports, road and rail will benefit the chemical industry by improving efficiencies and the ability to provide prompt service to domestic and global customers.

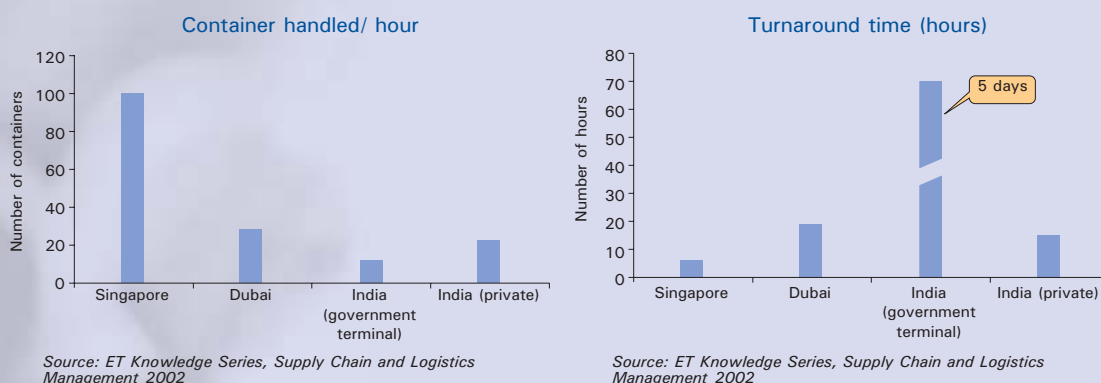


Figure 58: Indian ports: a comparison with overseas ports

Vision 2010: ripple effects

With adequate efforts and the development of supporting structures, as explained in the previous sections of this report, the Indian chemical industry is envisaged to grow from USD 28 billion to USD 100 billion by 2010. It would position India on the global map as a supplier of Speciality and Knowledge chemicals and as a destination for investment in these sectors. This would also help strengthen the Indian economy.

A facilitative environment and progressive regulatory framework would encourage entrepreneurs to step into the emerging sectors of the Indian chemical industry. Strengthening of IP regulations in India would boost research and innovation. Scientists with entrepreneurial spirit are expected to play larger roles in their organisations or create new enterprises. Increased consolidation and the emergence of a new breed of visionary entrepreneurs will help infuse new thinking into the industry.

Scientists and entrepreneurs are likely to try and extract greater value out of R&D programmes. This will lead to enhanced R&D programme efficacy measurement and management. A logical outcome of this change will be the propensity to register intellectual property (IP) as and when it is created; and seek non-strategic markets for it.

As Indian chemical companies expand into global markets, they will need to evaluate various infrastructure creation options through buying out existing players or setting up greenfield ventures. The players will need to focus on establishing either sales, marketing and distribution assets; or manufacturing plants.

Growth in the industry would create significant employment opportunities. The chemical industry today provides direct employment to around 0.9 million people. This number is expected to grow to around 1.1 million in the Base case scenario and 1.3 million in the

Aspirational scenario. This would require academia and other related research institutions to provide the infrastructure for training adequate manpower to meet this surge in demand. The indirect employment generated is expected to be a multiple of about 4-6 times this number.

Growth in the chemical industry would result in growth of associated industries (for instance, the fabrication and engineering goods industry). Upgrading the existing capacities and creating new ones would require fabricated and manufactured chemical process equipment. There is likely to be higher growth in the demand for plant and machinery, particularly in the Speciality and Knowledge segments. The process automation industry too would see an increase in demand. Automated processes will allow Indian players to match global manufacturers on process and labour efficiencies.

Some of the closed plants, having outlived their natural lives, will have to be built afresh to keep pace with technology and environmental considerations. Others will be closed because of considerations of economic viability assessment and consolidation. Yet another driver will be the relocation of capacities to places closer to markets or raw material sources or clusters providing cost and strategic advantages.

Another important area that would see derived growth would be the environmental equipment and consulting industry. Chemical industries would require better waste management and effluent treatment processes and equipment to meet stringent global requirements. The chemical industry itself would have to improve processes to minimise waste and adopt processes that are environment friendly.

The role of IT will increase in the business domain as well as technical domain like design, CAD/ CAM, simulation, bio informatics, etc. It will also play a key role to support the growth and expansion of the Indian chemical industry.

The sector is likely to witness the emergence of Indian trading organisations in the role of aggregators – selling Indian products and bringing raw materials from overseas to meet the industry's growing need for select chemicals. Some will make investments in distribution infrastructure and manufacturing capacities as a natural extension to their business strategy.

The business environment is expected to be more conducive. A number of proposed initiatives in the economic and regulatory regime like VAT, intellectual property rights, corporate governance, M&A, etc. and infrastructure development projects are likely to be implemented.

The Indian chemical industry has the expertise, knowledge, people, and technology to aspire towards USD 100 billion in 2010.

As highlighted in the report, there are several opportunities that provide new directions and new hopes for the Indian chemical industry. The industry needs to capitalise on these opportunities to gear up for the challenges ahead.



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About CHEMTECH Foundation

CHEMTECH Foundation, an apex industry association, was established in 1974 to promote technology upgradation and technology transfer in chemicals, chemical engineering and allied industries. One of the main objectives of the organisation is to promote economic development of the country through sustainable and speedy growth of different sectors of the chemical industry. To fulfill this, CHEMTECH has been involved in key initiatives within the industry including organising seminars and conferences.

The organisation is hosting a series of events as part of its CHEMTECH 2003 International Conferences in order to discuss and deliberate on issues that need to be addressed within emerging areas like innovation, biotechnology, pharmaceuticals and information technology in the chemical process industries.

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