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# India: The next chemicals manufacturing hub

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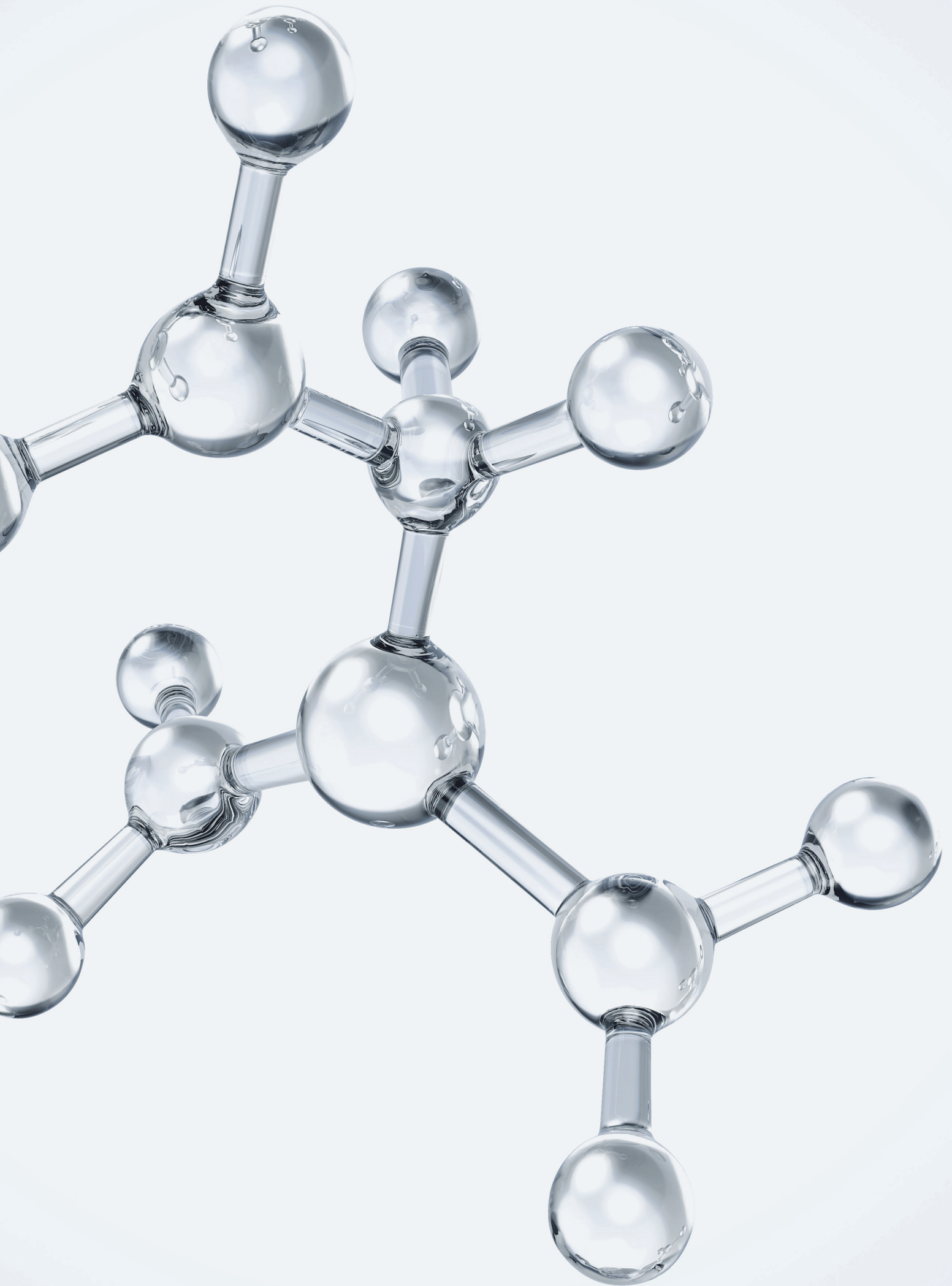




# India: The next chemicals manufacturing hub

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# Executive summary

India's chemical industry has been a global outperformer in demand growth and shareholder wealth creation over the last decade. It now stands poised to play an increasingly dominant role across both consumption and manufacturing in the global arena. Over recent years, changing geopolitical scenarios have led to many countries focusing on domestic self-sufficiency and localized supply chains. However, benchmarking India's manufacturing competitiveness reveals that India has a strong starting point vs other key global chemical clusters that could translate into India becoming the next chemicals manufacturing hub.

## India: The fastest growing global demand center for chemicals

Domestic consumption in India is set to grow at a 9-10 percent CAGR in the coming years as illustrated in Exhibit 2, on the back of rising disposable incomes, a favorable demographic dividend, increasing global preference for biofriendly alternatives, and growing diversification of global chemical supply chains<sup>1</sup>.

With this growth, India's share in the global chemicals sector could triple to 10-12 percent by 2040, creating an additional USD 700 billion market value, over and above the current contribution of USD 170-180 billion (as of 2021). The Specialty Chemicals segment is likely to be a key driver of this growth. It has the potential to contribute more than USD 20 billion to India's net exports by 2040, a 10x jump from the current total of USD 2 billion as shown in Exhibit 3.

## Benchmarking India's manufacturing competitiveness in chemicals

Benchmarking against six global chemical clusters surfaces both India's strengths and areas of improvement as a global destination for manufacturing chemicals. Indian chemical companies often face obstacles in feedstock availability due to lagging cracker capacity and low access to building blocks and key minerals. Additionally, India faces dearth of skilled R&D talent and challenges in timely EC & land approvals.

Despite this, India is cost competitive in several chemical segments due to low capital and operating expenses such as labour, utility and overhead expenses etc. Coupled with promoters' focus on high profitability and a culture of process innovation, Indian chemical companies generate one of the highest EBITDA per unit of investment in fixed assets. This is evident from global leadership of multiple Indian firms across segments like Agrochemicals, Pharma Intermediates, Dyes & Pigments, Carbon Black etc.

## Potential winning opportunities in India's chemical sector

Many sub-segments in India's chemicals sector offer opportunities for building at-scale businesses. Winning plays exist across Specialty Chemicals (agrochemicals, flavors & fragrances, cosmetic chemicals, etc.), Inorganic Chemicals (caustic, fluorine, etc.) and petrochemicals (C4, C6 and C8 derivatives). These sub-segments score high on both cost competitiveness—a function of domestic feedstock availability, trade balance, capacity utilization, scope of process and tech innovation, etc.—and market attractiveness, an indicator of market size, demand growth, export potential, etc.

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The future of Indian chemical sector looks promising, and the country could potentially become the driving force of the demand & supply of the world chemical market. Having said this, it becomes imperative for the global companies to understand the implications and reflect upon the resource allocation mix, the business model and the overall business strategy, before commencing or scaling up their operations in the country.

Further, Indian companies need to ponder upon questions around right type of business, the right mode of entry, the feasibility variables, the global footprint from the go-to-market & asset perspective, leveraging the existing supply chain, if possible, among others.

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<sup>1</sup> Including value created by the pharmaceuticals sector



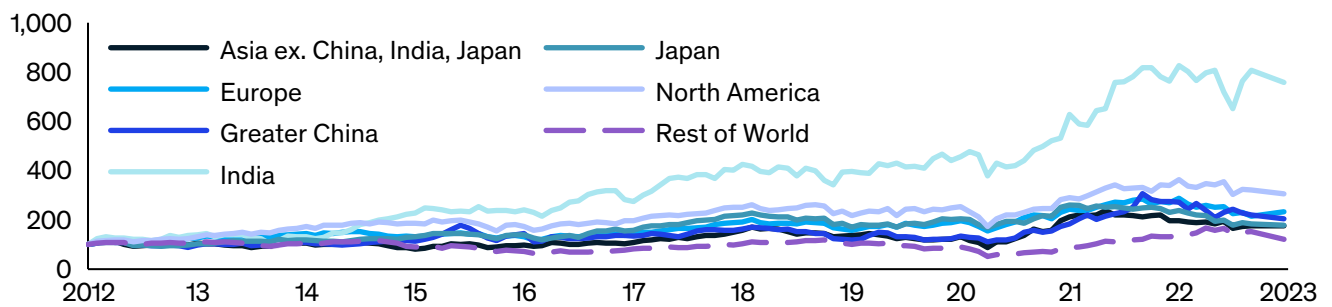
# 1. An era of sustained robust growth: The 2040 outlook

Over the last few years, the Indian chemicals sector has exceeded all shareholder expectations, outperforming not just the overall equity market (Exhibit 1) but also the majority of its upstream and downstream industries. This exceptional growth has been fueled by consistent revenue expansion, increasing margins, and rise in multiples.

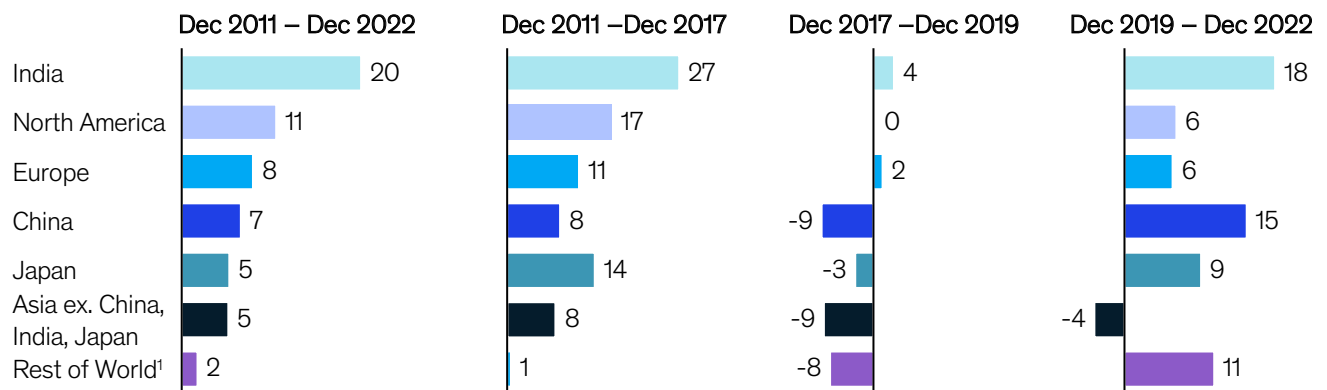
Exhibit 1

## TRS performance trends of top chemical companies across geographies

**Indexed Total Shareholders Return (TSR),**  
Dec '11=100, USD



## Cumulative TSR, CAGR, Percent



<sup>1</sup> Rest of World includes companies across Middle East, Africa, Latin America, Australia & New Zealand

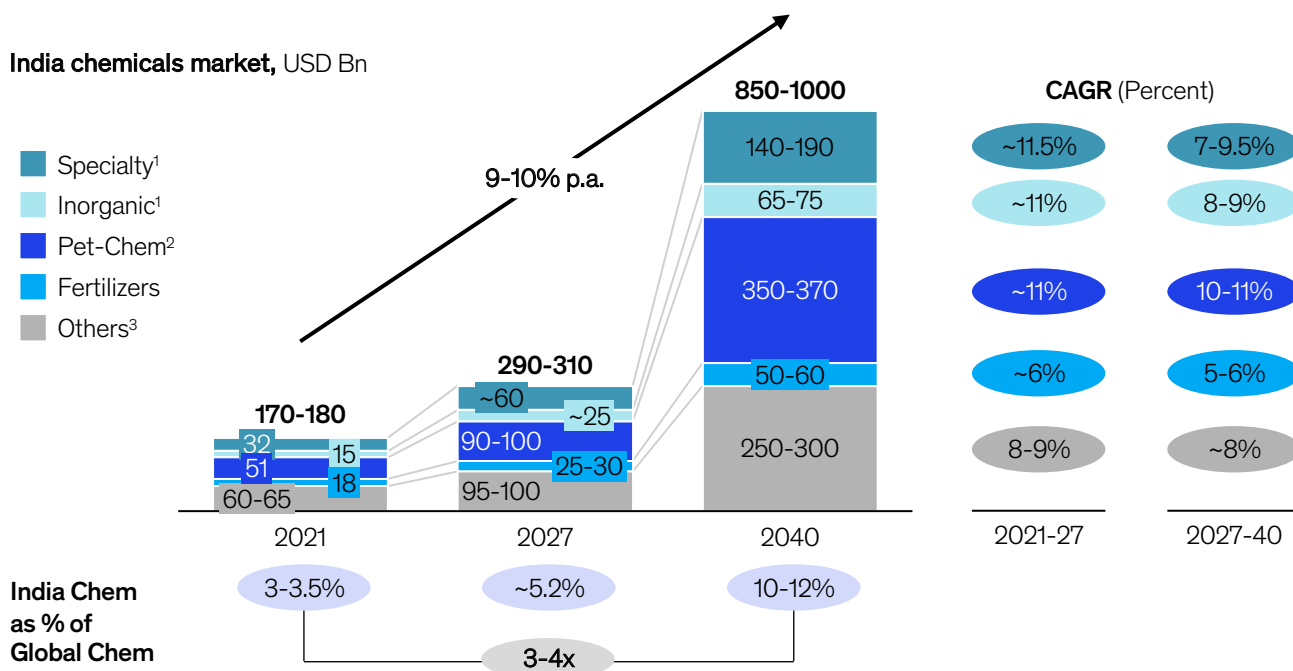
Source: Capital IQ

Note: Top 500 global companies considered for the analysis

The sector is projected to grow at 11-12 percent during 2021-27 and 7-10 percent during 2027-40—tripling its global market share by 2040. This growth is expected to be driven by a range of factors:

- **Rising domestic consumption:** India is expected to account for more than 20 percent of incremental global consumption for chemicals over the next two decades. Domestic consumption and demand is expected to rise from USD 170-180 billion in 2021 to USD 850-1000 billion by 2040 (Exhibit 2).
- **Changing consumer preferences:** The growing demand for biofriendly products globally could benefit India, as it is among the leading producers of many chemicals that are used in such products.
- **Shifting supply-chains:** Triggered by the evolving geopolitical scenario and the trend to diversify from the existing core manufacturing markets; firms are seeking to make their supply-chains more resilient. With its strong value proposition, India could be a preferred destination.

## India is expected to become a \$850-1000 Bn chemicals market by 2040, taking 10-12% share of the global chemicals market



<sup>1</sup> 2027 estimations basis sub-sector level CAGRs from IHS Markit; 2040 projections basis end-use sector nominal GVA CAGR (weighted)

<sup>2</sup> Estimated basis EIL 2020 and 2040 projections; 5% price CAGR assumed for 2021, 2027 and 2040 projections

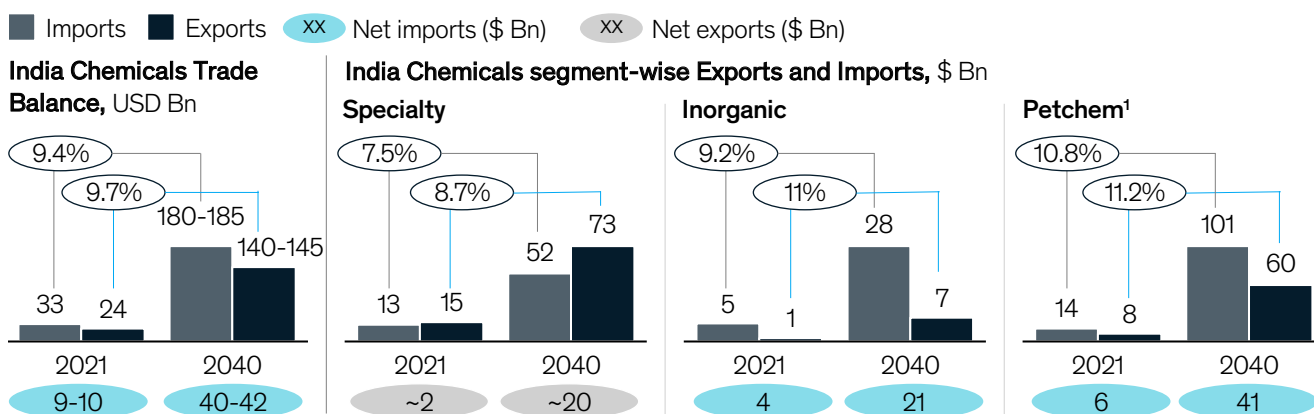
<sup>3</sup> Includes pharma products (vaccines, injectables, OSDs, medical devices etc.) as per NIC's industry division 21. Also includes some personal care consumer products (e.g. Shampoo, hair oil, toothpastes, soaps etc.) as NIC's industry division 20

Source: MoCPC 2021 report: "Chemical & Petrochemical Statistics at a Glance", Invest India, "India Petrochemicals Scenario 2040" by EIL and IOCL, IHS Markit, UN Comtrade, McKinsey Global Institute, Press search

### Widening trade deficit

India's current trade deficit, at USD 9-10 billion<sup>2</sup>, is expected to balloon to USD 40-42 billion by 2040. While exports are projected to grow at a CAGR of 9.5-10 percent to USD 140-145 billion by 2040, imports are likely to match growth at a CAGR of 9-9.5 percent to USD 180-185 billion (Exhibit 3).

## India's chemicals sector is expected to have a trade deficit of \$40-42 Bn by 2040; Specialty Chemicals has the potential to contribute ~\$20 Bn to net exports



<sup>1</sup> 2040 projections assume that the ratio of imports/consumption and exports/consumption at sub-segment level remain the same in 2020 and 2040

Note: Excludes fertilizers, pharma end-products and consumer products; includes pharma intermediate chemicals

Source: MoCPC report (Chemical & Petrochemical Statistics at a Glance – 2021), Invest India, "India Petrochemicals Scenario 2040" by EIL and IOCL, IHS Markit, UN Comtrade, McKinsey Global Institute, McKinsey Fertilizer Demand Model, Press search

<sup>2</sup> Basis Ex-Im data by UN Comtrade and McKinsey mapping of 6 digit HS Codes to chemical segments (inorganic, specialty and chemical)

Note: 2040 projections assume that the ratio of imports/consumption and exports/consumption at sub-segment level remain the same in 2020 and 2040. Govt. policies could change this mix over time.

Out of the three main segments of the sector—Inorganic<sup>3</sup>, Petrochemicals<sup>4</sup> and Specialty<sup>5</sup>—only Specialty is expected to be a net exporter. By 2040, its net exports are expected to rise by around ten times, from about USD 2 billion in 2021 to USD 21 billion. Almost 80 percent of the exports in the segment would come from four sub-segments: agrochemicals, dyes and pigments, cosmetics and personal care, and food ingredient chemicals (Exhibit 4).

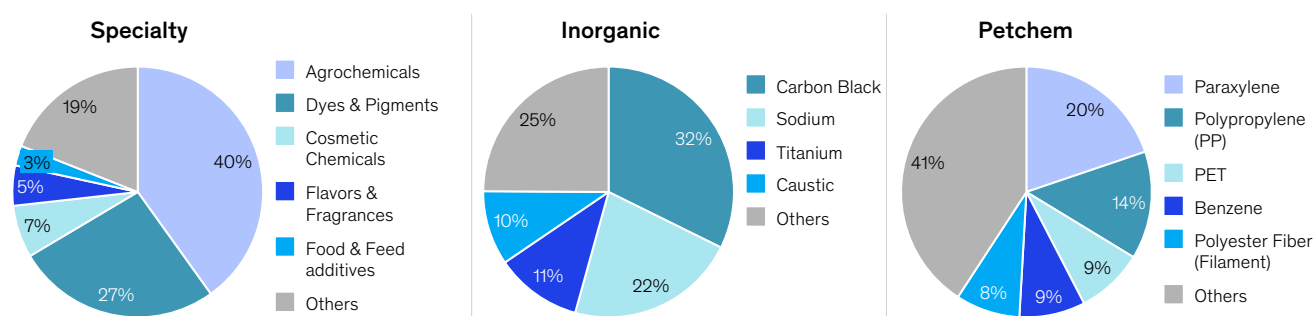
Due to limited cracker infrastructure and scarcity of key feedstock and minerals, both Petchem and Inorganic segments will have a trade deficit. At USD 41 billion, Petchem's deficit will be almost twice as large as Inorganic's USD 21 billion (Exhibit 3). Imports in Petchem would likely be fragmented across products, with the two largest imported products, PVC and Polypropylene accounting for just 13 and 8 percent of imports, respectively. Exports in the segment, meanwhile, will be driven by the C8 (Paraxylene) and C6 (Benzene) building blocks and bulk polymers PP, LLDPE and HDPE. In the Inorganic segment, imports will be driven by Phosphorus, Potassium and Titanium (together accounting for 70% of total imports) and exports by Carbon Black, Sodium and Titanium (together accounting 65% of total exports) as can be seen in Exhibit 4

Exhibit 4

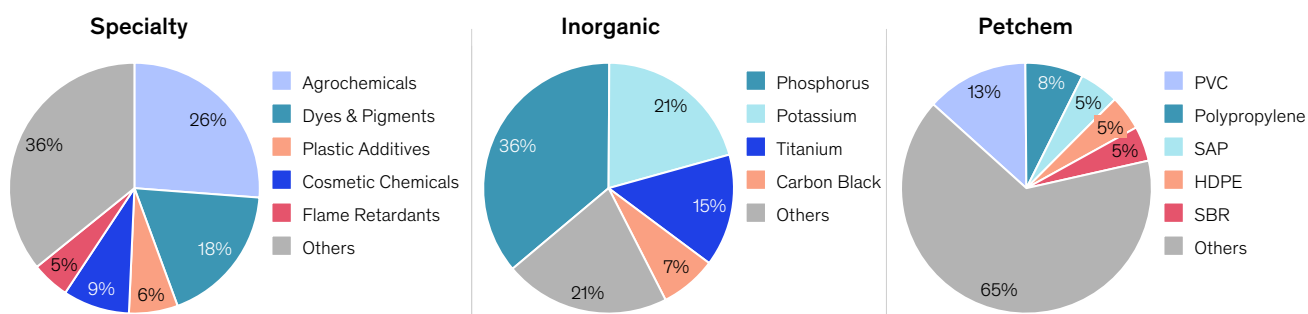
### 4-5 key segments could drive 50%+ of trade balance across Specialty, Inorganic and Petchem

#### Major contributors to export/import, 2040, USD Bn

##### Sub-segment export, %



##### Sub-segment import, %



Note: Excludes fertilizers, pharma end-products and consumer products; includes pharma intermediate chemicals

Source: MoCPC report (Chemical & Petrochemical Statistics at a Glance – 2021), Invest India, "India Petrochemicals Scenario 2040" by EIL and IOCL, IHS Markit, UN Comtrade, McKinsey Global Institute, McKinsey Fertilizer Demand Model, Press search

<sup>3</sup> Includes Potassium, Bromine, Caustic, Carbon Black, Fluorine, Sodium, Phosphorus, Titanium, Calcium, Silicon and Sulphur

<sup>4</sup> Includes building blocks (C1-C8), intermediates and end-products

<sup>5</sup> Specialty chemicals include: Dyes & Pigments, Agrochemicals, Electronic chemicals, Flavors and Fragrances, Cosmetic chemicals, Nutraceutical ingredients, Food & Feed additives, Plastics additives, Rubber-processing chemicals, Adhesives and sealants, Construction chemicals, Specialty polymers, Cleaners, industrial and institutional, Surfactants, Textile chemicals, Water management chemicals, Paper chemicals, Flame retardants, Lubricating oil additives, Antioxidants, Petroleum refining and chemical process catalysts, Biocides, and Corrosion inhibitors




























# 2. Benchmarking India's manufacturing competitiveness in chemicals

While it is clear that the Indian chemicals sector is geared for robust growth, its manufacturing competitiveness is less clear. Benchmarking the sector against six global chemicals clusters—China, Germany, Indonesia, Saudi Arabia, South Korea, and Vietnam—across 24 variables shows that though India is more or equally competitive on most counts, other countries have a competitive edge over India in a few crucial respects. (Exhibit 5)

Exhibit 5

## Macro Benchmarking

Category	Variables		Remarks
 <b>A. Feedstock availability</b>	1. Domestic availability of petchem building blocks	 	Sufficient: C4, C6, C8 Insufficient: C1, C2, C3, C7
	<hr/>		
 <b>B. Labour &amp; utilities</b>	2. Average Hourly Wage (USD/hr)		One of the lowest manufacturing labor wages in the world <sup>1</sup> .
	3. Total Labour Force (Mn)		Highest workforce availability, next to China
	4. Industrial water usage costs (USD/m <sup>3</sup> )		Comparable to peers
	5. Electricity costs (USD/kwh)		Comparable to peers
	6. Availability of R&D talent		Limited availability of R&D talent for chemicals companies
	<hr/>		
 <b>C. Capital costs</b>	7. Construction costs (USD/sq. m)		One of the lowest infrastructure costs – up to 70% lower than some of the other chemicals manufacturing hubs around the world
	8. Material costs (\$/unit)		
	9. Machinery costs (USD)		
	10. EBITDA per unit of investment in fixed assets (%)		Top Indian companies have the highest EBITDA to Gross PPE ratio
	11. Real interest rates (%)		Stable policy rate environment, comparable to leading economies
	12. Corporate tax rates (%)		Comparable to leading economies
	<hr/>		
 <b>D. Policy environment</b>	13-23. Ease of doing business metrics	 	Top quintile in protecting minority investors, getting electricity/ credit and dealing with construction permits Competitive in resolving insolvency and trading across borders
			Scope of improvement in registering property/land, paying taxes, starting a business and enforcing contracts
	24. Environmental Clearance		Approval challenges often lead to production delays

Comparable to peers  
Leading    Laggard/needs improvement

## Global chemicals manufacturing hubs selected for benchmarking against India



<sup>1</sup> While average hourly cost is low, due to lower productivity there is an advantage but not always as significant unless productivity is high

## An analysis of India's competitiveness

This section analyzes India's competitiveness in chemicals across four categories— feedstock availability, labour and utilities, capital costs, and policy environment:

### Petchem feedstock availability: India is self-sufficient C4, C6, C8, but is deficient in C1, C2, C3, C7

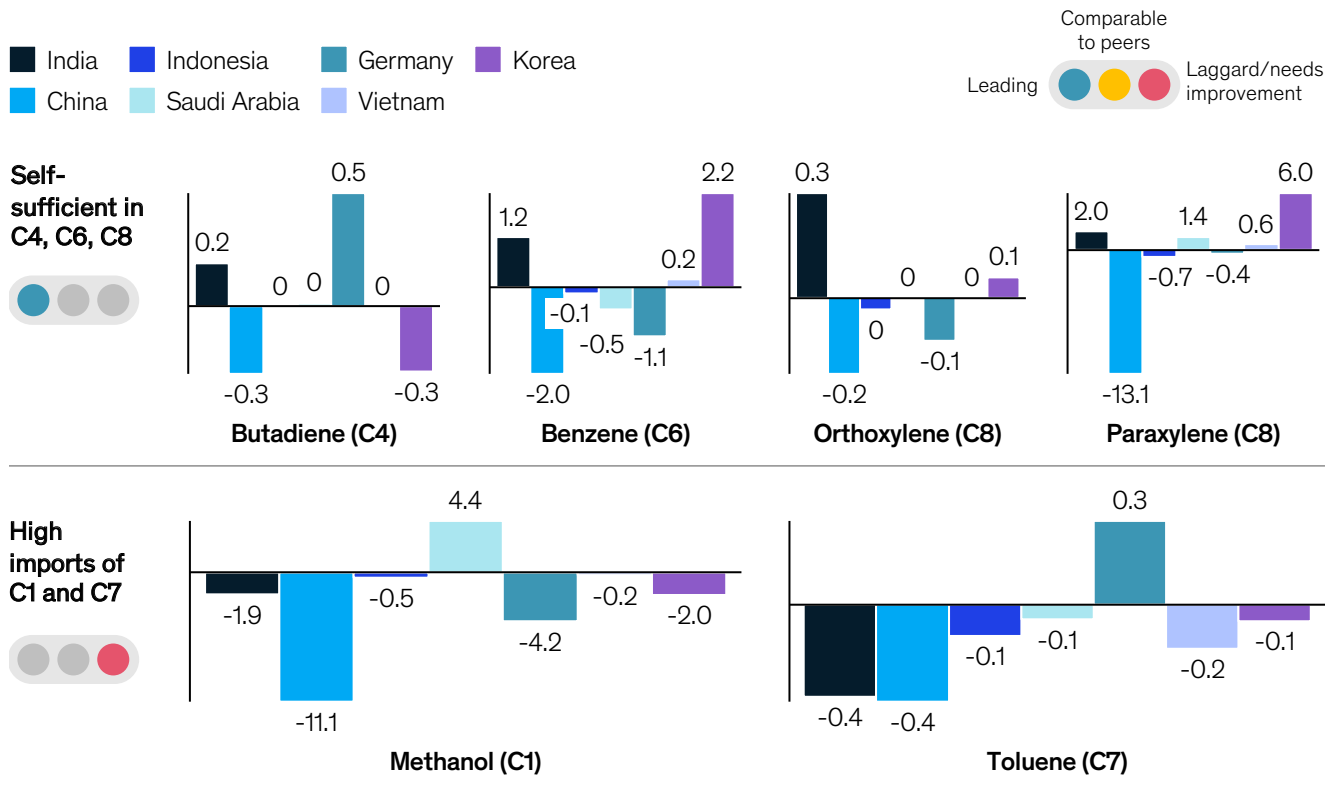
In the Petchem segment, India possesses abundant feedstock for higher carbon building blocks (C4, C6, and C8). Consequently, its combined surplus production of Butadiene (C4), Benzene (C6), Paraxylene (C8) and Orthoxylene (C8) is significantly higher than that of its peers.

However, for building blocks C1, C2, C3, and C7, India does not have sufficient feedstock to meet its downstream requirements. There is limited availability of Ethylene and Propylene in the merchant market as Indian refineries use these for captive consumption for producing bulk polymers. As a result, India is dependent on imports for intermediates and end-products derived from Ethylene and Propylene. Similarly, India imports large quantities of Methanol and Toluene for domestic consumption (Exhibit 6).

Exhibit 6

## A. Feedstock availability: India is self-sufficient in C4, C6, C8 but has supply deficit of remaining building blocks

### 1. Excess production of Petchem building blocks (2020, '000 kTA)



### Limited feedstock availability in C2, C3

India doesn't have enough Ethylene and Propylene domestically for downstream requirements. Intermediates & end-products derived from Ethylene and Propylene generally have high imports

#### Ethylene (C2)

- Imports meet 100% demand for**
- Ethylene Propylene Diene Monomer
- Imports meet 50%+ demand for**
- Ethylene Dichloride
  - TEG, Polyethylene Glycol

#### Propylene (C3)

- Imports meet 100% demand for**
- Acrylic Acid
  - Acrylonitrile
- Imports meet 50%+ demand for**
- Propylene Glycol
  - N-butanol

Source: "India Petrochemicals Scenario 2040" by EIL and IOCL, IHS Markit, UN Comtrade, Press Search



**Labor and utilities: India has abundant low-cost labor and competitive water & electricity costs, but faces a shortage of R&D talent**

India has the world's highest labor availability, more than 470 million, after China. Among the six peers, its labor costs are also one of the lowest, at less than USD 2 per hour. India's industrial grid electricity and water costs are also globally competitive, at USD 0.1 per kWh and USD 0.6-0.8 per m<sup>3</sup>, respectively.

However, India's chemical sector faces a shortage of skilled R&D talent. Only about 1,400 chemical engineers graduate from India's top 25-30 universities every year. Even from this limited pool, the majority either opt for higher studies or switch streams. This has led to low availability of specialized PhDs. India, therefore, is dependent on foreign talent for its chemical R&D needs<sup>6</sup>.

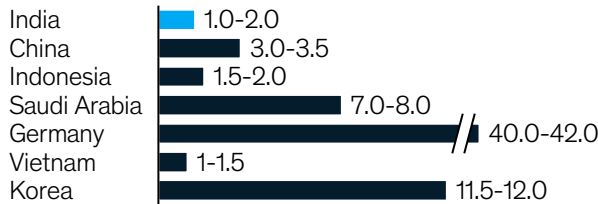
Exhibit 7

**B. India has one of the lowest labour costs in the world and competitive utility costs**

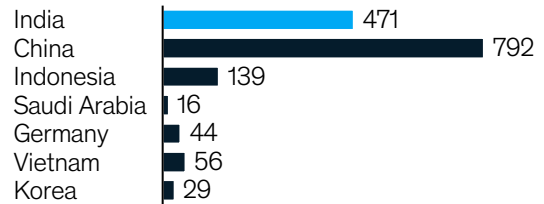


**Easy access to cheap labor**

**2. General labour costs**  
(2020, USD/hr)

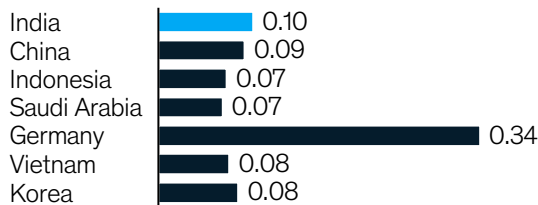


**3. Total Manpower**  
(2021, Mn)

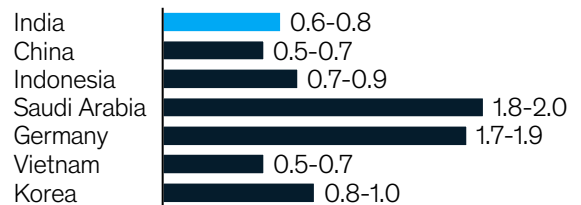


**Competitive utility costs**

**4. Industrial grid electricity**  
(2022, USD/kWh)



**5. Industrial water usage cost**  
(2022, USD/m<sup>3</sup>)



Source: General labor costs from Turner & Townsend and local press search; Total manpower from World Bank; Industrial electricity costs from World Bank, globalpetrolprices.com, and local press search; Industrial water usage costs from CEIC Data, DE Statis, IBNET tariff data, and local water department websites

**Capital costs: India is competitive across the board**

India's infrastructure costs, across construction, material, and machinery<sup>7</sup>, are up to 70 percent lower than other global chemical manufacturing hubs. For instance, construction costs in India are 5x lower vs Germany. Similarly, India's material costs are 4.5x lower vs Germany and 3x lower vs Saudi Arabia (Exhibit 8).

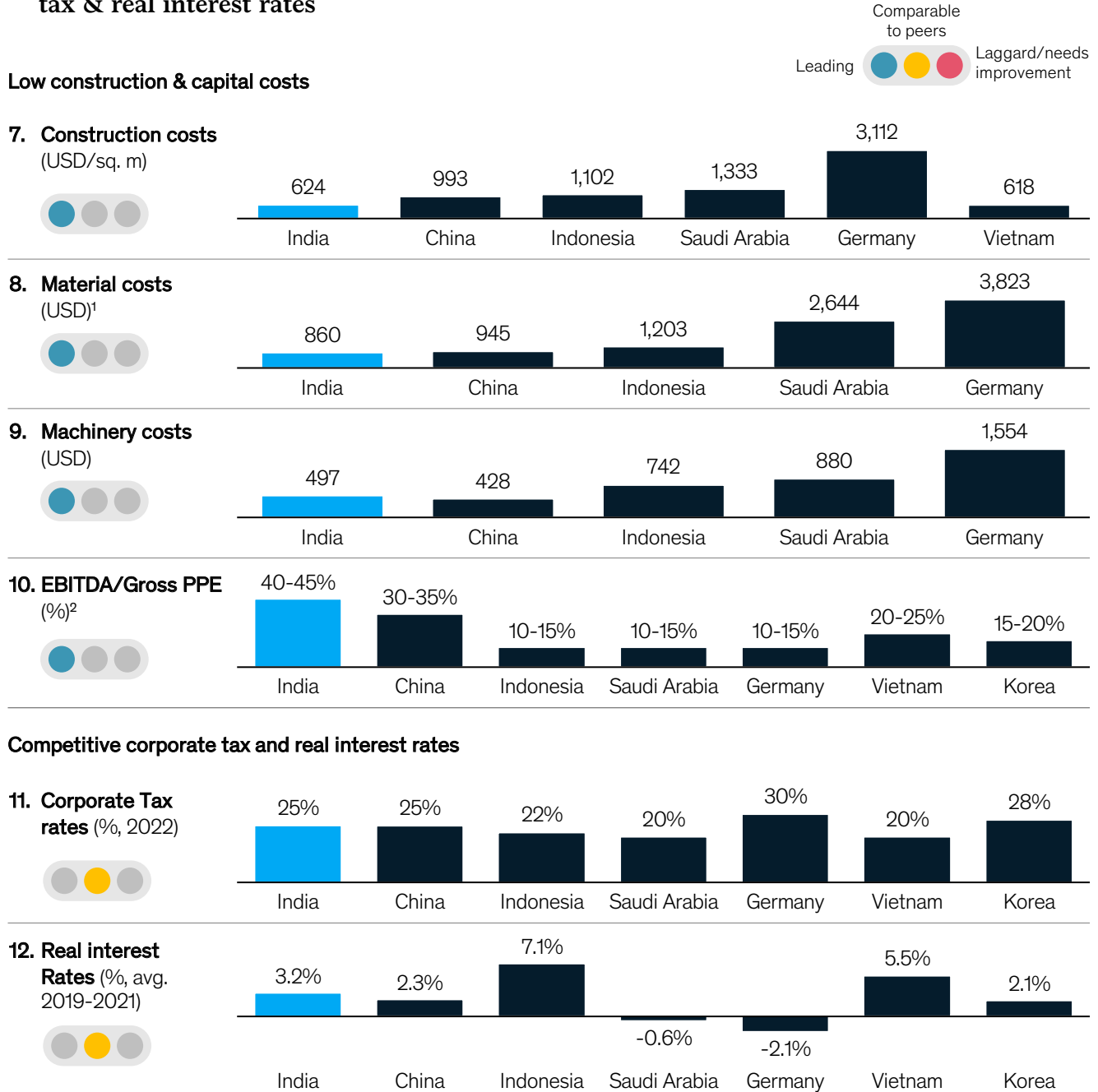
At 25 percent, India's corporate tax rate is comparable among peers. Indonesia has slightly lower tax rate at 22%, while Vietnam and Saudi Arabia have a tax rate of 20 percent<sup>8</sup>. Germany's tax rate, meanwhile, is the highest, at 30 percent. India's average real interest rate, is also competitive<sup>9</sup>. While it is lower than the average rate in Indonesia and Vietnam, it is higher than South Korea's and China's (Exhibit 8).

<sup>6</sup> Basis ICT, industry interviews  
<sup>7</sup> Turner & Townsend Construction Index; press search  
<sup>8</sup> Trading Economics and World bank Data  
<sup>9</sup> Based on data from the World Bank

On the back of these low rates and a razor-sharp focus on profitability, Indian firms outperform their global peers on the measure of EBITDA-to-gross-PPE ratio. The top 15-20 Indian companies generate an EBITDA of more than 40 percent per unit of investment in gross PPE<sup>10</sup>—significantly higher than the 10-30 percent reported by their counterparts across the world.

Exhibit 8

### C. India has the lowest construction & infrastructure costs in the world and competitive tax & real interest rates



<sup>1</sup> Average cost of one unit of each - Concrete, Standard brick per 1000, 13mm plasterboard, and Structural steel beams (tonne) (100 tonne+ job)

<sup>2</sup> Considered data of top 20 listed chemical companies of each country for Dec' 22 TTM

Source: Turner & Townsend Construction Index, Capital IQ, EIU, World Bank; Press Search

<sup>10</sup> Calculated using data from annual reports and Capital IQ

## Regulatory environment: India has made good progress over the years, but more needs to be done

Over the last 5 to 7 years, India has made substantial improvements in its policy and regulatory environment, making it much easier for enterprises to establish themselves and flourish. These improvements have included the introduction of the Insolvency and Bankruptcy Code (IBC) in 2016; a revamped universal tax regime in the form of the Goods and Services Tax (GST); and simplification, digitization, or discontinuation of large number of compliance requirements. Among other things, these changes have made it easier for businesses to receive credit, apply for construction permits, and manage insolvencies.

As a result of these developments, India's Ease of Doing Business Ranking jumped from 143 in 2015 to 63 in 2020, and its manufacturing FDI during FY16-20 exceeded the figure for the preceding five-year period by three times (Exhibit 9).

Exhibit 9

### Policy reforms since 2015 have led to improvements in ease of doing business rank along with \$ 240+ Bn of FDI inflows

#### Rankings across Ease of Doing Business parameters (2015-20)

	India	China	Indonesia	Korea	Germany	Vietnam	Comparable to peers	
							2020	Δ (since '15)
13. Protecting minority investors	13	6	28	37	25	61	97	Leading
14. Getting electricity	22	-115	12	33	2	5	27	Leading
15. Getting credit	25	-11	92	48	67	48	25	Leading
16. Dealing with const. permits	27	-157	33	110	12	30	25	Leading
17. Resolving insolvency	52	-85	51	38	11	4	122	Comparable to peers
18. Trading across borders	68	-58	56	116	36	42	104	Comparable to peers
19. Paying taxes	115	-41	105	81	21	46	109	Laggard/needs improvement
20. Starting a business	135	-23	45	140	32	125	115	Laggard/needs improvement
21. Registering property	154	33	28	100	40	76	64	Laggard/needs improvement
22. Enforcing contracts	163	-23	5	139	2	14	68	Laggard/needs improvement
<b>23. Overall ranking</b>	<b>63</b>	<b>-80</b>	<b>32</b>	<b>73</b>	<b>5</b>	<b>22</b>	<b>70</b>	

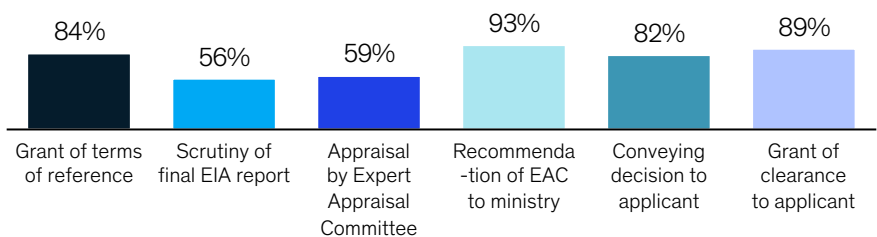
Source: Ease of Doing Business Reports, World Bank

Exhibit 10

### Most Indian chemicals manufacturers face production delays due to EC hurdles

#### 24. Share of projects that faced delays at different steps of EC

(%, CAG Report 2016 – latest available)



#### Key milestones in EC filing process

Source: CAG Report, 2016

On some parameters, however, India lags behind its peers. These include the ease of starting a business, registering property, paying taxes, and enforcing contracts. Getting timely environmental clearances (ECs) is also a major challenge in India. According to a report by the Comptroller and Auditor General of India, ECs in India are delayed nearly 9 out of 10 times, with the average period of delay being about 6.5 months. This becomes a source of significant capital drain for Indian chemicals manufacturers, who are often forced to wait for months, sometimes even years, to get clearance to initiate production in a finished facility.

## Cost competitiveness across sub- segments

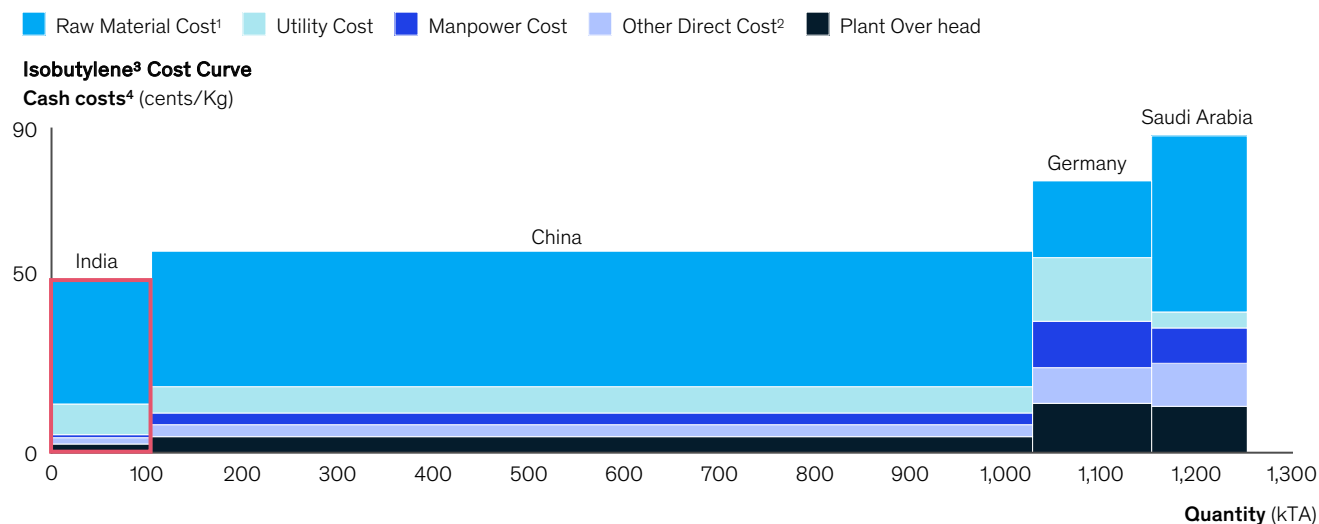
Macro trends play a pivotal role in developing a broad-based picture of India's strengths and improvement areas in chemical manufacturing. However, at the sub-segment level, cost-curve benchmarking serves as a better guide to cost competitiveness. This approach shows that competitiveness is a function of a variety of factors that can differ greatly from product to product. For instance, it shows that while feedstock availability is the main determinant of competitiveness in some segments, innovation and capabilities developed by Indian companies can sharpen the country's competitive edge in others. The following three cost curves illustrate this clearly.

### C6 Derivative- Isobutylene

In producing isobutylene (a derivative of butadiene), Indian firms might have up to 15 percent lower costs than in China (despite only a little difference in raw material costs), up to 35 percent lower than in Germany (even though raw material costs are lower in Germany), and up to 45 percent lower than in Saudi Arabia. With this clear cost advantage, India commands two-third of the market for Iso-Butyl Benzene (IBB), an isobutylene derivative used in pharma APIs and perfumes (Exhibit 11).

Exhibit 11

## Pet-chem competitiveness: India is highly cost competitive in C4, C6 and C8 derivatives due to domestic feedstock availability E.g. Isobutylene



<sup>1</sup> Includes raw material cost and by-product credits

<sup>2</sup> Other direct cost includes maintenance materials, operating supplies and control laboratory related costs

<sup>3</sup> Isobutylene from Isobutane by the Oleflex Dehydrogenation process

<sup>4</sup> Considered for average plant size: India (105 kTA), China (30 kTA), Saudi Arabia (33 kTA), Germany (42 kTA)

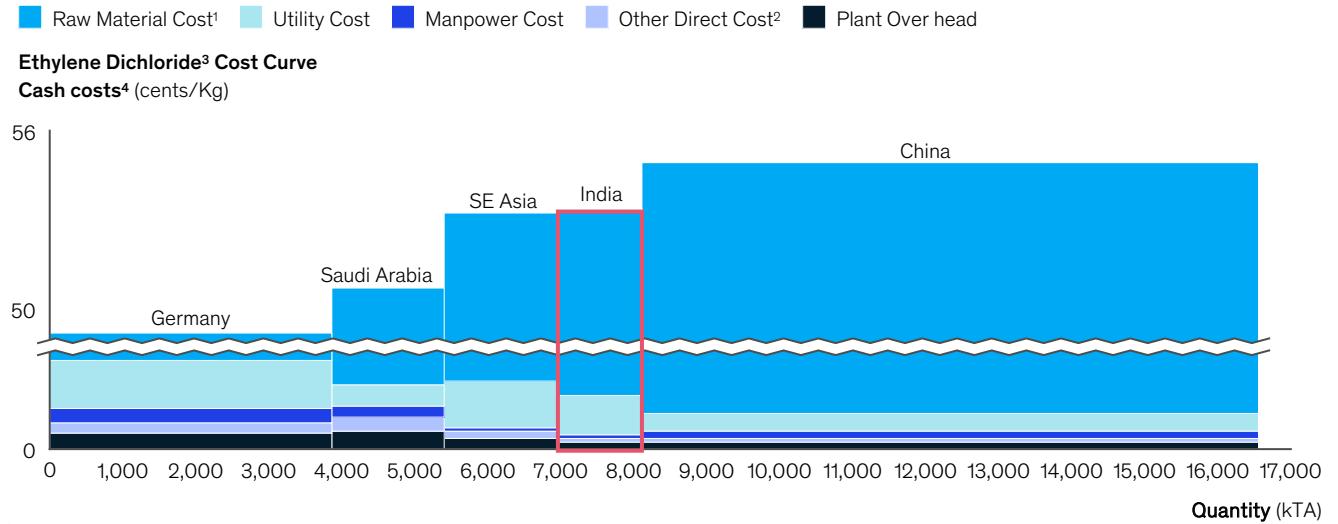
Source: IHS, ITC Trade Map, IndiaPetrochem, Press Search

### C2 Derivative - Ethylene Dichloride

Production costs of ethylene dichloride in India are typically higher than in Germany and Saudi Arabia, despite advantages in labor costs and plant overhead expenses. This is because of limited availability of ethylene for merchant sales in India. As a result, India imports more than half of its EDC requirements, primarily from the Middle East, Europe, and North America (Exhibit 12).

Exhibit 12

## Pet-chem competitiveness: India has low cost-competitiveness and high import dependency for C1, C2, C3 E.g. Ethylene Dichloride (EDC)



<sup>1</sup> Includes raw material cost and by-product credits

<sup>2</sup> Other direct cost includes maintenance materials, operating supplies and control laboratory related costs

<sup>3</sup> Ethylene Dichloride by Direct Chlorination: Liquid-phase HTC process (Oxy Vinyls)

<sup>4</sup> Considered for average plant size: India (383 kTA), China (384 kTA), SE Asia (390 kTA), Saudi Arabia (385 kTA), Germany (552 kTA)

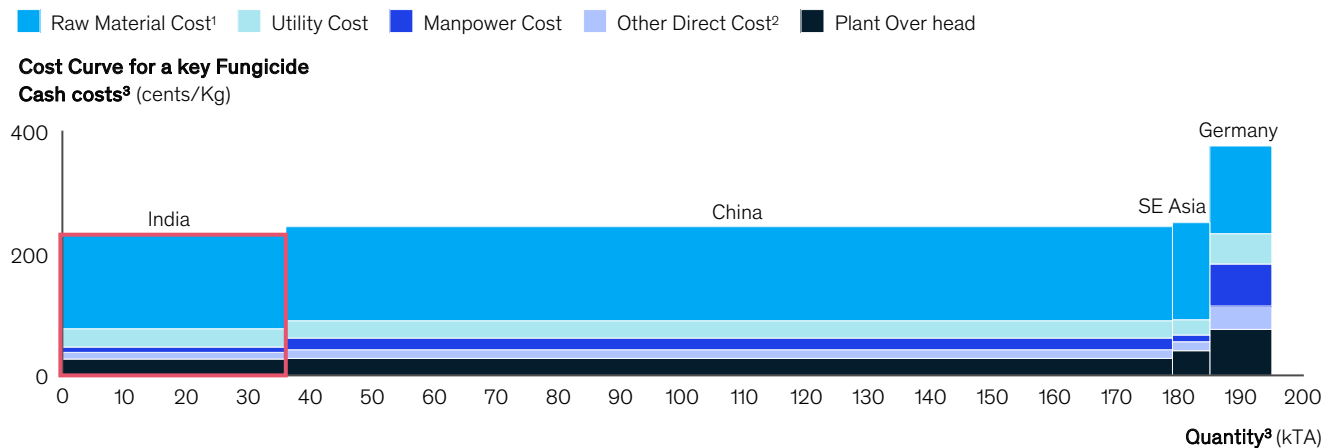
Source: IHS, ITC Trade Map, IndiaPetrochem, Press Search

### Agrochemicals

Indian agrochemical companies have a compelling cost advantage over their global counterparts, predominantly because of low raw material costs and labor costs (India's labor costs are less than half of China's) as illustrated in Exhibit 13.

Exhibit 13

## Specialty Chemicals competitiveness: India is highly competitive globally E.g. Cost leadership in Agrochemicals



<sup>1</sup> Includes raw material cost and by-product credits

<sup>2</sup> Other direct cost includes maintenance materials, operating supplies and control laboratory related costs

<sup>3</sup> Considered average capacity of 5 kTA

Source: IHS, ITC Trade Map, IndiaPetrochem, Press Search



# 3. Potential winning opportunities in India's chemical sector

Today, the Indian chemical industry offers several opportunities to build at-scale businesses across several Specialty, Inorganic and Petrochemical segments. Identifying these opportunities calls for the right balance between market attractiveness and cost competitiveness. While cost competitiveness is generally a function of feedstock availability, trade balance, and scope of value addition via process or tech innovation, market attractiveness is a composite of current market size, expected CAGR and macro trends.

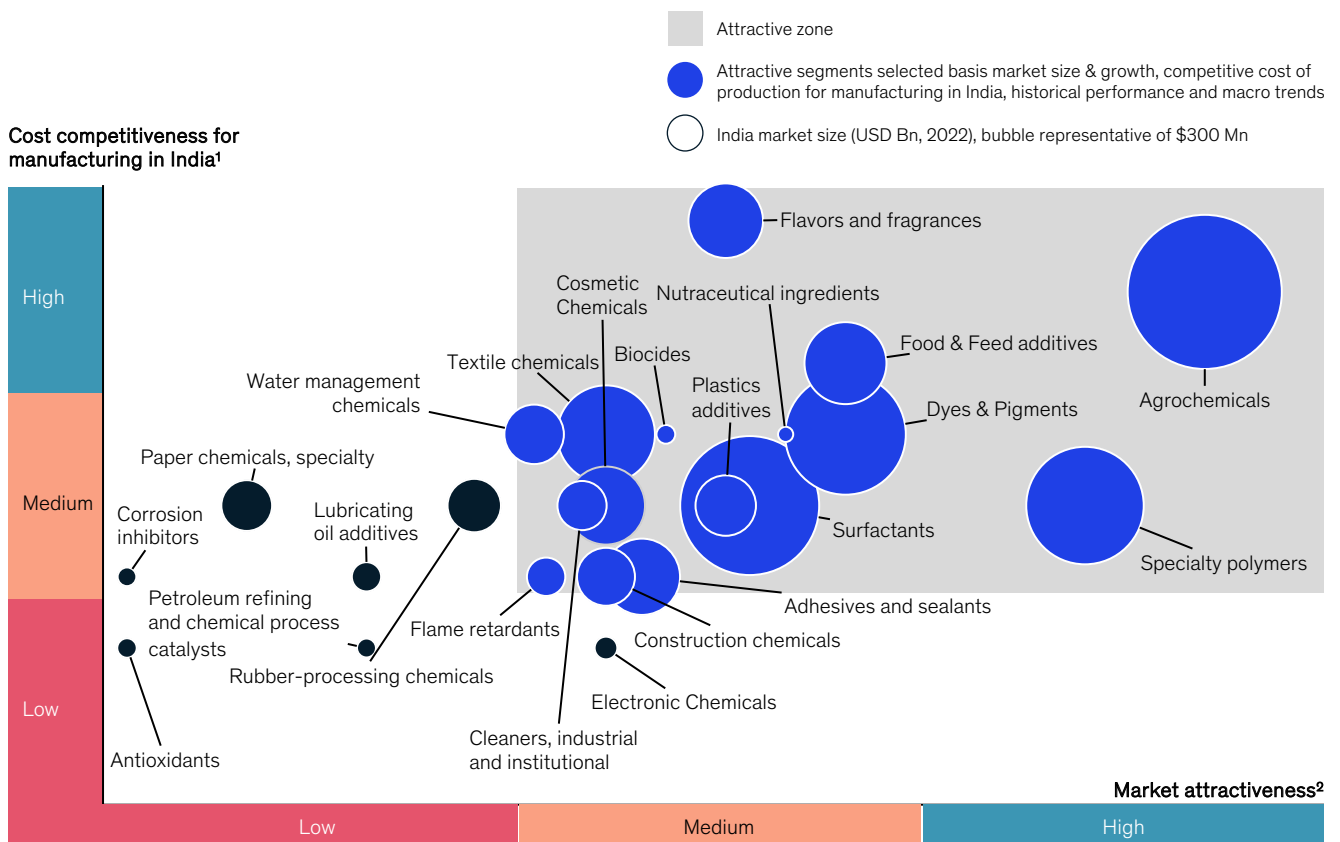
## Specialty chemicals

With a net trade surplus, the Specialty segment is the strongest pillar of India's chemicals sector. In all, 16 specialty chemicals sub-segments perform well on both cost competitiveness and market attractiveness. Two of these sub-segments (as illustrated in Exhibit 14) are:

- **Agrochemicals:** Agrochemicals in India is currently a USD 5.5 billion market<sup>11</sup>, growing at a CAGR of 8.3 percent. By 2040, it is expected to account for almost 40 percent of India's overall chemicals exports and nearly 13 percent of the global ag-chem market.
- **Food and Feed Ingredient Chemicals:** Constituting flavors and fragrances, food and feed additives, and nutraceuticals, this sub-segment is a USD 3 billion market in India, growing at a CAGR of 7-9 percent.

Exhibit 14

## Ranking of top 25 Specialty Chemicals segments on cost competitiveness and market attractiveness



<sup>1</sup> Basis domestic feedstock availability, 2022 imports and exports by India, scope of value addition via tech or process innovation

<sup>2</sup> Basis India market size (2022), India consumption CAGR (2022-2040), global market size (2022), and macro trends

Source: IHS Markit, UN Comtrade, Press search

<sup>11</sup> Includes local and exports market

## Inorganic chemicals

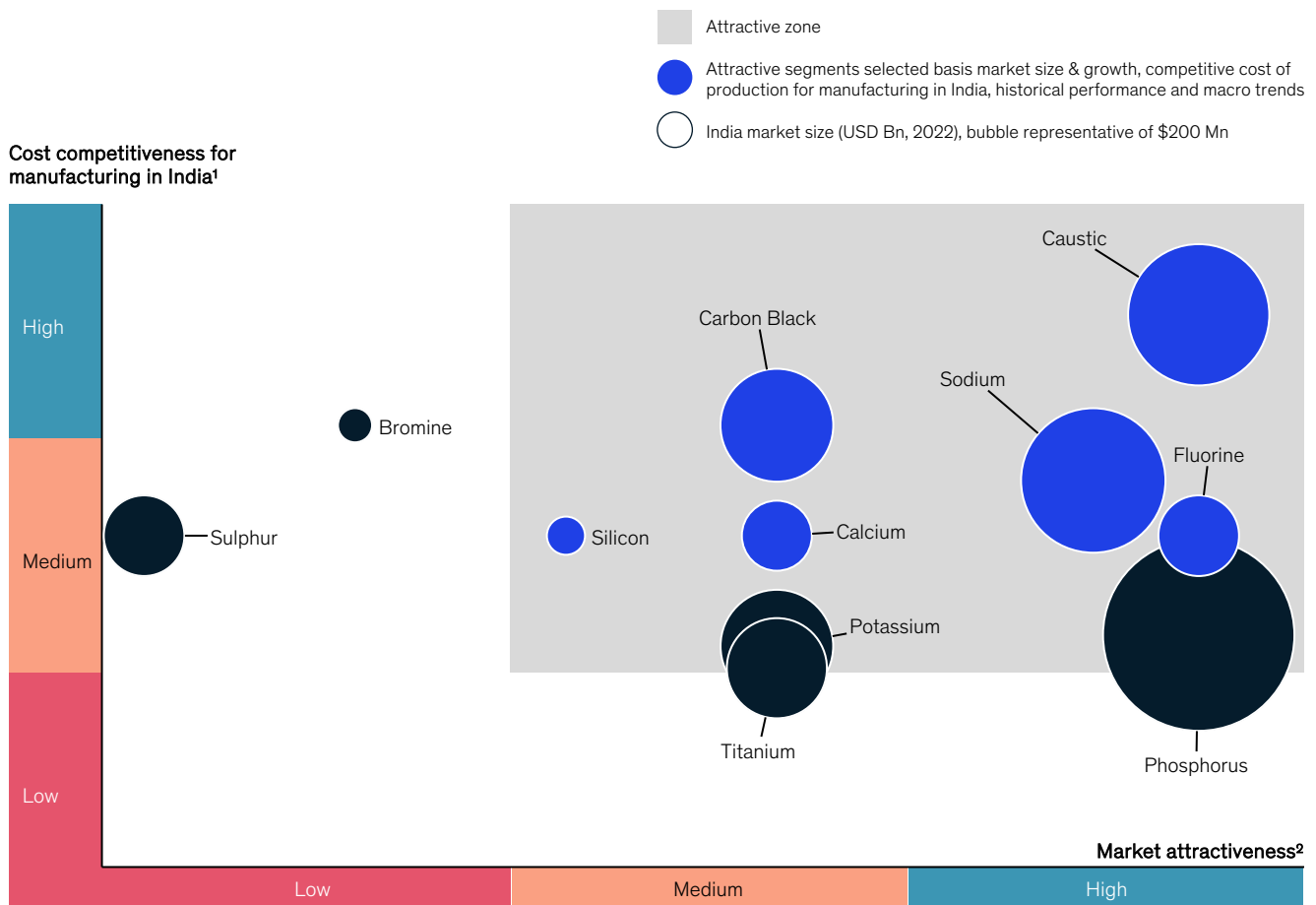
As inorganic chemicals require little processing as compared with other segments, the Inorganic chemicals segment is predominantly dependent on feedstock availability. India, unfortunately, has a scarcity of raw material for most chemicals in this segment. However, it has a high demand for many inorganic chemicals, making it an attractive market.

Six sub-segments emerge as an opportunity for building an at-scale business in the segment, backed by high growth rate of end-use industries and natural feedstock advantages. Two of these (as illustrated in Exhibit 15) are:

- **Fluorine:** Growing at a CAGR of more than 10 percent, fluorine is expected to become a USD 4.2 billion market by 2040. Its growth will be driven by rising demand from two of its main end-use industries: pharma and ag-chem.
- **Sodium and Caustic:** This sub-segment is expected to register CAGR of nearly 10 percent. By 2040, sodium and caustic could become a USD 13 billion and USD 11.5 billion market respectively.

Exhibit 15

### Ranking of Inorganic Chemicals segments on cost competitiveness and market attractiveness



<sup>1</sup> Basis domestic feedstock availability, 2022 imports and exports by India, scope of value addition via tech or process innovation

<sup>2</sup> Basis India market size (2022), India consumption CAGR (2022-2040), global market size (2022), and macro trends

Source: IHS Markit, UN Comtrade, EIL and IOCL Petrochemicals Perspective Plan, Press search

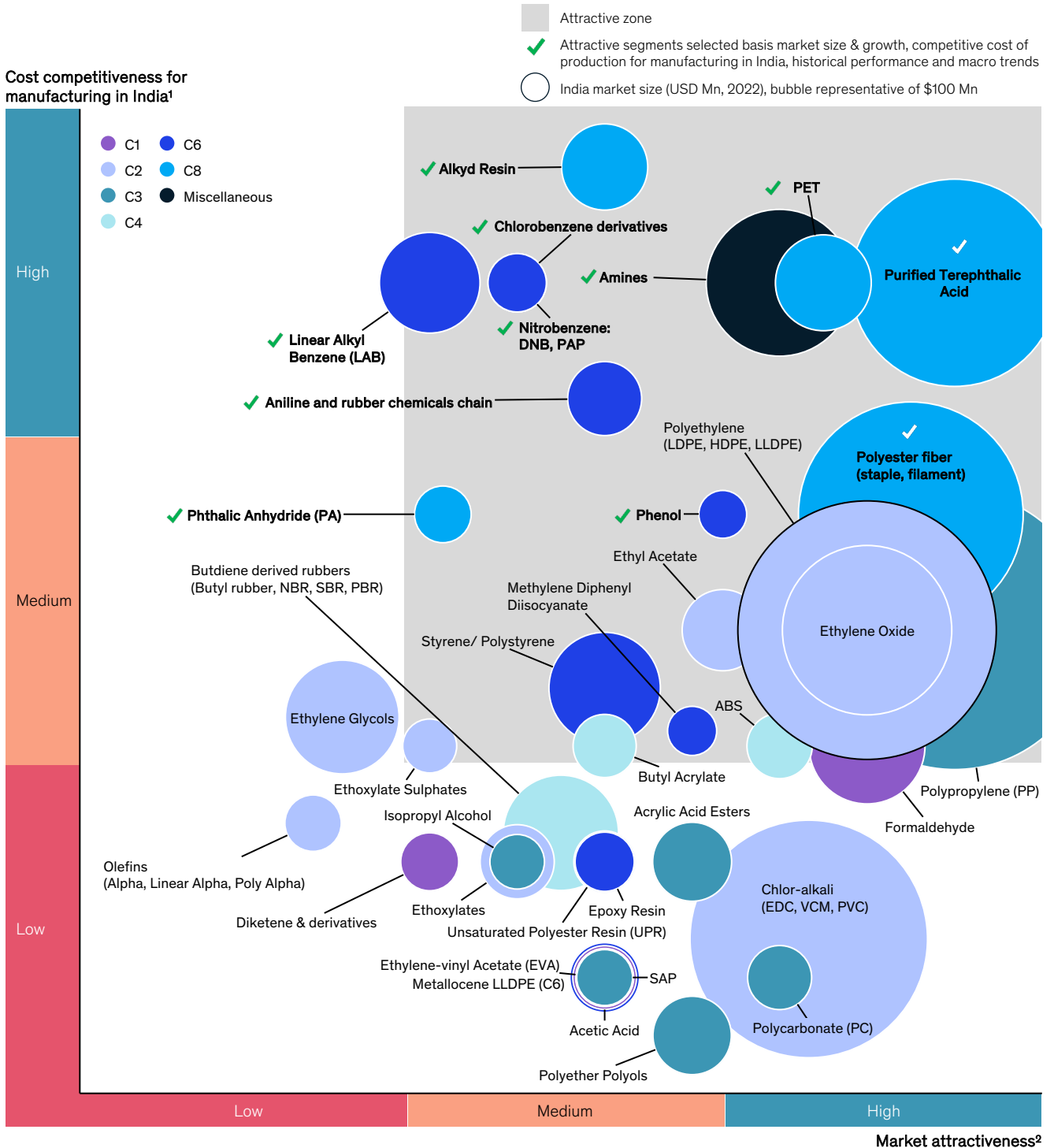


## Petchem

In petrochemicals, opportunities are highly dependent on scale and vertical integration capabilities of chemical companies. For example, backward integration at the cracker level makes bulk polymers (Polyethylene, Polypropylene, PVC etc.) score high on market attractiveness and cost competitiveness. However, other companies are better suited to focus on products where feedstock are easily available in the merchant market (e.g., C4, C6 and C8 derivatives) as illustrated in Exhibit 16.

Exhibit 16

### Ranking of top petchem segments (>\$200 Mn market size) on cost competitiveness and market attractiveness - for companies with low or moderate backward integration



<sup>1</sup> Basis domestic feedstock availability, 2022 imports and exports by India, scope of value addition via tech or process innovation and capacity utilization levels

<sup>2</sup> Basis India market size (2022), India consumption CAGR (2022-2040), global market size (2022), and macro trends

Note: Only primary chain/building block considered for products where multiple C1-C8 feedstocks are required

Source: IHS Markit, UN Comtrade, EIL and IOCL Petrochemicals Perspective Plan, Press search



# 4. Implications and questions for Indian and global companies to reflect on

India has the potential to become the consumption and manufacturing engine of the global chemical industry. It is witnessing rapid economic growth, is home to a rising middle class and requires lower capital and operating expenses. However, numerous challenges still persist including limited domestic feedstock availability, delayed regulatory approvals and scarcity of skilled R&D talent. These enablers and obstacles have influenced the spectrum of chemical sub-segments falling in the consideration pool, in terms of both market attractiveness and cost competitiveness.

Global chemical companies interested in entering or scaling up their businesses in India should, however, strategically ponder upon several questions, such as: Should we cater to India's demand via exports or a local manufacturing base? What should be our resource allocation strategy for Indian operations? What could be the right business model to overcome India's structural challenges?

Similarly, Indian chemical companies need to reflect upon numerous questions, such as: What type of business is suitable to enter and what is the best mode of entry? Where are we truly advantaged from the geographic stand-point? Where does the business stand across the feasibility variables (technical, economic and social) to enter a sub-segment? What would it take to be a real global player across assets, talent and go-to-market? Can we leverage the existing supply chain, if possible?

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