McKinsey&Company

Living in a Volatile World—Challenges and Opportunities for the Chemical Industry

Chemicals Practice March 2016

Authored by:
Avinash Goyal
Neelesh Mundra
Sheng Hong
Suyog Kotecha
Ulrich Weihe

Living in a Volatile World—Challenges and Opportunities for the Chemical Industry

Chemicals Practice March 2016

Acknowledgments

The authors would like to thank the Indian Chemical Council (ICC) and in particular Rakesh Bhartia (President, ICC), Yogesh Kothari (Past President, ICC), Kamal Nanavaty (Executive Committee, ICC) and H.S. Karangle (Director General, ICC) without whom this research would not have been possible.

The authors also thank Sanjoy Bhattacharya for his guidance.

The project team consisted of Amala Gupta, Pinak Dattaray. Rajat Upadhyaya and Saagar Sinha. Other McKinsey colleagues who have supported this effort are: Ankit Rawat and Ankita Sali (research), Anamika Mukharji and Parameshwari Sircar (editorial support), Manali Raul and Vineet Thakur (graphics design), Fatema Nulwala and Natasha Wig (external relations), and Sanaiya Photographer (administrative support).

Contents

Executive Summary

A word that adequately sums up today's business environment is "volatility". The volatility of markets, changing economic realities, more demanding consumers, and disruptions transforming conventional ways of doing business are all reasons that companies need to be on high alert in the face of challenges as well as opportunities.

The chemical industry is no different. Global changes have significant repercussions for chemical players, who may need to design a strategic approach for success in the face of current volatility. The presentations by McKinsey & Company on the occasion of the **9th Annual India Chemical Industry Outlook Conference** approach this theme from various angles, across five topics. We capture the essence of these presentations in the five sections that follow.

As Indian chemical players gear up to prepare their unique response to volatility, they need to understand the exact nature of the disruptions that confront them. **"No Ordinary Disruptions—Implications for the Chemical Industry"** discusses the implication of these disruptions for the chemical industry and how players can triumph over the challenges. This section outlines four macro level disruptive trends the chemical industry may need to grapple with—the shifting centre of economic gravity due to rapid industrialization and urbanization; the pace of adoption of new technologies that endangers older companies; the aging populations of "advanced" economies and China; and increasingly complex trade routes with new hubs emerging in Asia and the Middle East. The section also outlines how chemical companies could react to volatility, which includes:

- Baseline the current situation and capture learnings from other players (e.g., Chinese players)
- Develop strategic guidance for management and frontline to hit the next S-curve for growth (e.g., leveraging M&A/JV, adopting customer-specific tactics, capitalizing on innovation)
- Drive tactical actions to improve ROIC (e.g., functional excellence, frontline capabilities)

The remaining sections detail some of these learnings from China as well as some strategic and tactical options for chemical companies, such as M&A/JV, innovation, supply-chain excellence.

We describe how chemical companies have dealt with volatility in **"The Evolution of China's Chemical Industry"**. Why China? The Chinese industry takes centrestage in discussions not only because of its sheer size, but also because it can inspire other chemical companies that seek growth. China's economy has grown 20 times in the last 20 years—from USD 0.5 trillion to USD 9.1 trillion between 1994 and 2014, and is expected to grow further to reach USD 22 trillion by 2024. The Chinese chemical industry has grown alongside, and now accounts for 36 percent of the world chemical market size. Multinational companies (MNCs) dominated the China market in multiple specialties in the past, but local players are rapidly catching up, finding ways to upgrade their knowhow and using their local market advantages to quickly gain market share.

So what can the world (and India) learn from China?

- Build business on your core competencies.
- Identify where MNCs are winning and go all out to build those capabilities to edge out competition.
- Leverage all resources to establish an R&D ecosystem.
- Invest in developing talent and functional excellence.
- Encourage entrepreneurship to get transformative products.

With increasing external volatility, survival is certain only through growth. A core driver of growth, profitability and long-term value creation is M&A/JV activity. **"Outbound M&A/JVs–An Opportunity and Path Forward"**, discusses the advantages of outbound M&A/JV, starting with access to strategic resources, and moves forward to natural resources, new markets and finally to production assets that could enhance efficiency. Once again, the Chinese have shown the way, extensively using M&A/JV to upgrade their business capabilities and reach. Typical challenges faced in integration and how a set of best practices followed before, during and after the deal can maximize value from merger activities are covered in this section. The section highlights the need for clarity on the role of these deals in strategy, and for management discipline at each stage of the deal.

Besides M&A/JVs, innovation is another avenue for growth and survival. **"Can the Next Chemical Based Unicorn Come from India?"** discusses how the chemical sector can equip itself for disruptive innovation and the likelihood of the next chemical unicorn emerging from India. While India lags behind in the innovation index (ranked beyond 140), the scenario is slowly changing. Recent measures by the Government of India could create a conducive environment for innovation. Companies have to identify an attractive opportunity and then capture it by being at the right place with the right product/technology and at the right time.

In the era of disruptive technologies and increasingly demanding customers, supply chains, too, will need a deep rethink. **"Supply Chain 4.0–Digital Solution for the Chemical Industry"** refers to the sudden demand spikes, growing wealth in underserved rural areas, rising service expectations of customers, constant changes in stock keeping unit (SKU) range, the growth of online ordering platforms and a multitude of options available to customers—just some of the factors that could create a need for faster, more granular, and more precise supply chains. The section introduces and outlines Supply Chain 4.0—a transformative approach to supply chains that uses digital technology for improved performance and customer satisfaction.

Change is a constant in today's world. The best response to the changing world is to move with the times—learning from others' successes and proactively transforming ways of doing business. The five sections that follow look objectively at the way the chemical industry is evolving in the face of (no ordinary) disruptions, and puts forth several ideas—ranging from outbound M&A/JV, nurturing innovation and digitizing supply chains—to cope with the volatility of our business environment.

No Ordinary Disruptions—Implications for the Chemical Industry

Introduction

A multitude of disruptive forces are transforming our world. The economic centre of gravity is shifting due to rapid urbanization and industrialization in the emerging economies. Even the demographics of advanced economies are expected to change significantly. The world is adopting new technologies at an incredible pace. The emergence of Asia and the Middle East as prominent trade hubs is altering trade routes. These changes could impact the chemical industry. Organizations need to rethink their strategies to successfully ride the wave of volatility.

Four disruptive forces affecting the world

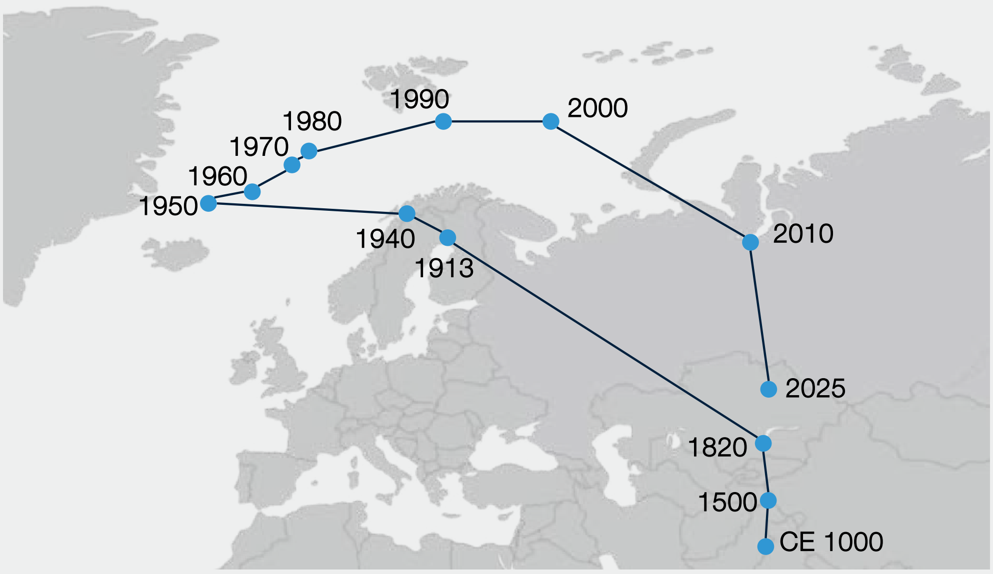
Macro level disruptive forces are changing the conventional ways of doing business. The four prominent disruptions are:

Shift in the economic "centre of gravity"

The world's economic centre is shifting east and south at an unprecedented speed, driven by fast-paced industrialization and urbanization in emerging economies (Exhibit 1.1). Middleweight cities in emerging markets are going to be the future engines of growth. These cities are expected to contribute to 50 percent of GDP growth from 2012 to 2025, as compared to a 28 percent contribution from advanced economies in the same period[1].

Exhibit 1.1: The economic centre of gravity is shifting east and south at an unprecedented speed

Earth's economic centre of gravity



SOURCE: McKinsey Global Institute "No Ordinary Disruption: The four global forces breaking all the trends"

1 Press reports and McKinsey Global Institute "No Ordinary Disruption: The four global forces breaking all the trends" By Richard Dobbs, James Manyika, and Jonathan Woetzel; 2015

Rampant adoption of new technologies

An analysis of the time taken by different technologies to reach 50 million users shows that while the telephone and radio (when invented) took several decades to hit this mark, today platforms like Facebook and Twitter have hit 50 million users in a year or less[2]. Given the speed at which organizations can and are adopting technologies, old companies which are less responsive to change may quickly become obsolete.

Aging population in advanced economies

It is expected that by 2040, around one in every four people in advanced economies and China will be over 65 years old[3]. The greying workforce will directly impact the overall rate of participation in the global labour market and lead to increased healthcare spends of economies.

Greater global interconnections

Trade routes are growing more complex in today's world due to the increased south-south and south-north trade. In 1990, the US and Western Europe were the main hubs for trade flows. By 2013, trade flows became an elaborate web involving Asia and the Middle East as significant stops on the trade route[4].

Companies may need to equip themselves for constant innovation to tide over the flux and volatility presented by today's macro level disruptions.

Chemical firms are challenged by a changing industry, a more demanding market, and a dynamic economic environment

Chemical companies are dealing with intense volatility and challenges today due to a more demanding market, a dynamic economic environment and a changing industry owing to global disruptions.

- The market today is more demanding, given significant oil price fluctuations and a slowdown in consumer and construction spending across economies worldwide, especially in China. Oil prices have been volatile since 1990 with price shocks being largely driven by supply disruptions or demand shocks. There was a period of exception from 2011 to mid-2014 with prices fluctuating within 15 percent of about USD 100 per barrel[5]. Oil prices have dropped steeply post 2014 due to weak demand and high supply, intensified by OPEC. Lower than expected GDP growth in developing countries, especially China, and slow economic recovery in Europe have weakened global oil demand growth.

- The battle for talent has shifted away from chemicals and towards technology, consulting and finance.

- Chemical companies are also dealing with a dynamic economic environment with activist investors pushing aggressively for higher returns, putting more pressure on industry executives. Mergers and acquisitions (M&A) are becoming more and more important for companies to grow and such activity has risen in recent years as firms move to reposition themselves along the value chain.

2,3,4 Press reports and MGI "No Ordinary Disruption" 2015

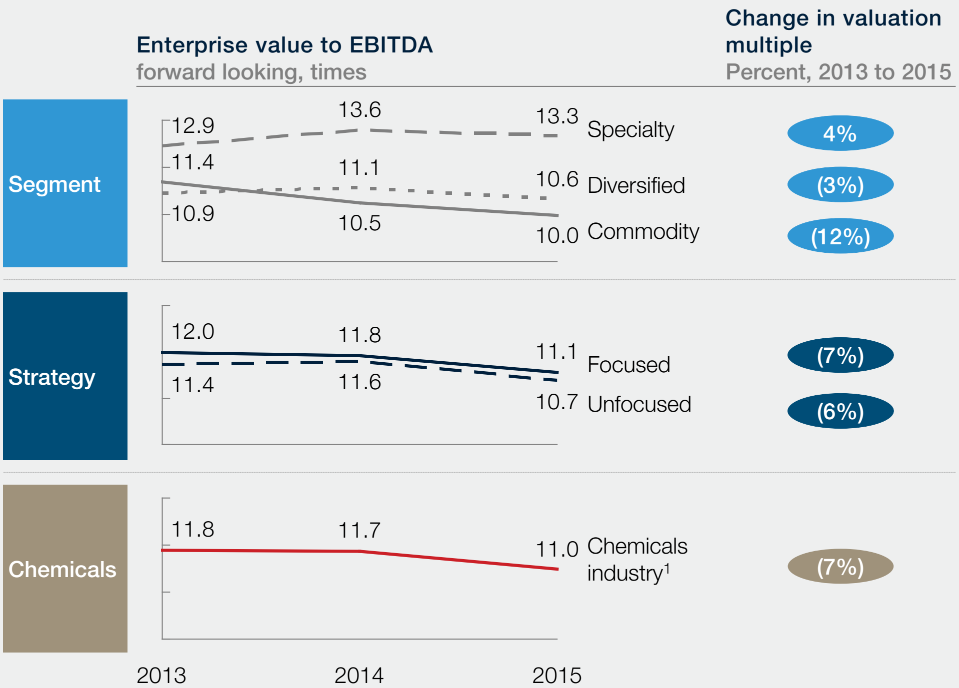
5 U.S. Energy Information Agency

- Industry-specific developments have added volatility in an environment which is already witnessing the disruptions described here. The industry is becoming more commoditized due to tougher competition, Chinese capacity additions, and more sophisticated customers.

Increase in Chinese capacity has led to global overcapacity and price pressure

The global chemical market is dealing with overcapacity and price pressures because China has increased its chemical production over the last 15 years across categories[6]. Chemical prices have reversed the long-term positive trend and dropped steadily over the last five years. This volatility in basic chemical prices is also causing uncertainty in markets, resulting in lower valuations across most sectors in the industry (Exhibit 1.2).

Exhibit 1.2: Lower valuation across sectors due to uncertainty



1 Excludes 10 companies (of 212) that could not be categorized as focused or unfocused

SOURCE: Capital IQ; CPAT

A three-step approach could help chemical companies during volatile times:

1. Baseline the current situation and provide immediate guidance on the way forward

   It is important for chemical companies to reduce missteps and set expectations internally while identifying the value at risk and the degrees of freedom to protect it. They could baseline the situation along internal and external metrics. The internal baseline could include levers such as value at stake, customer baseline and contractual obligations. External levers could assess the current situation for all stakeholders including customers

6 ICIS Supply and Demand; ICIS Pricing; IHS Connect

and the market. Based on the internal and external baseline, a toolbox of available levers to address the volatile situation could be created. Companies could also guide the frontline on importance, change in policy and expected behaviour.

2. Develop strategic guidance for management and frontline
   Strategic guidance for management and frontline along each customer segment, using a matrix of "value at stake" vs. "risk" could be developed. This could be supplemented with robust internal and external communications to all the concerned stakeholders.

3. Work on changing mindsets and behaviour to capture value and protect it
   Companies can capture value and protect it by driving on-ground tactical actions. It may help to change from an autopilot to a manual mode by setting up a war room for performance management. The war room behaves as an engine to drive change, take advantage of time-sensitive opportunities and make the most of the situation. Besides the war room, six additional measures that could change management and frontline mindset and behaviour are:

   — Create a set of consistent messages (through memos, townhalls, etc.) that offer a burning platform and a common goal to help personnel understand why change is needed.

   — Develop a playbook with actionable guidance, rules of engagement, negotiation tactics and simple talking points to provide employees with the tools to do things differently. This can be communicated through a mobile app, intranet page, etc.

   — Build capabilities to behave differently by providing a platform for experimental learning through role-plays, games, etc.

   — Set guardrails to prevent value destruction by changing pricing policies, e.g., on contract vs. spot, discount authorizations, approvals thresholds, etc.

   — Ensure the sales frontline has sufficient "skin in the game" and is rewarded for its extra workload by changing or introducing incentives to link sales with impact.

   — Drive functional excellence across operations, supply chain, procurement, working capital, etc. to release cash and improve profitability by four to five percent.

These actions will enable a seamless transformation to deal with the disruptions confronting the chemical industry.

Conclusion

Chemical companies need to proactively respond to the ever-evolving complex and volatile world. A systematic three-step approach can help in growth and protect margins despite current challenges.

The Evolution of China's Chemical Industry

Introduction

China's economy has grown between 1994 and 2014 from USD 0.5 trillion to USD 9.1 trillion, and is expected to grow further to reach USD 22 trillion by 2024[1]. The Chinese chemical industry has grown alongside, and now accounts for 36 percent of the world chemical market size[2]. Multinational companies (MNCs) have dominated in multiple specialties in the past but local players are catching up and gaining market share. This incredible growth of the Chinese chemical industry serves as an inspiration for Indian chemical players to scale up and dominate the market.

Chinese economy takes a great leap forward

The Chinese industry is at a critical juncture of transformation. A shift is visible across the main pillars of supply, with a focus on increasing skilled labour, production that gives centrestage to innovation, demand that moves from labour-intensive products to a seamless integration into the world market and, lastly, regulatory focus, with the government making an effort to be more service oriented.

The GDP growth of over 10 percent over the last two decades (1994 to 2014) is expected to be followed by a comparatively muted growth of around 6 to 7 percent over the coming decade[3]. This range will be the “new normal” and has three characteristics: slower but stable growth, quality and not just quantity, and economic and political structural changes towards more sustainability. Each of these characteristics ties in well with the Chinese economy taking a great leap forward.

The chemical industry in China

The macroeconomic trend of the Chinese industry resembles the trajectory of the chemical sector. The chemical industry grew from 1990 to 2014 at a CAGR of 11 percent and is expected to grow at 10 percent in the next decade. China is expected to account for 62 percent of the incremental growth of the global chemical industry in the period from 2014 to 2020[4]. The steady growth of China is reflected in the planned and in-progress capacity expansions for key commodities. For example, the need for new crackers in China far surpasses any other country in Asia—for every 20 crackers needed in China, India may require around four and Vietnam and Indonesia may only require around one each[5].

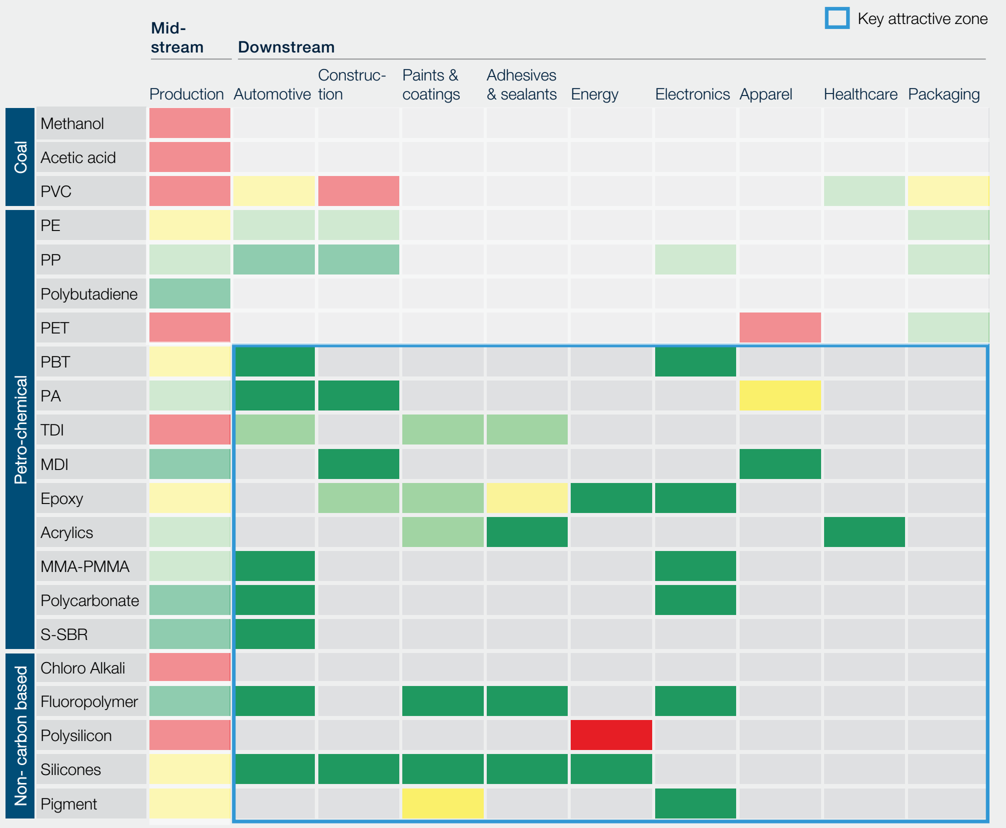
The growth in the chemical space, however, will not be uniform across categories. For example, increased investments have led to an excess supply of PET, PVC, and acrylic acid. Specialties in downstream market segments are very attractive in China (Exhibit 2.1) and so finding the right pocket of opportunity will be important for companies to be successful.

International firms dominate the specialties segment—MNCs hold 95 percent of the polycarbonates and 85 percent of the carbon fibre share[6]. However, as seen in the vitamins space, once local players crack the formula, they leverage their local market knowledge and lower overheads to rapidly overtake MNCs in market share.

1,3 CEBR; World Bank; The Economist; Global Insight
2,4 IHS Global Insight
5 ICIS supply and demand
6 China Customs; Literature Search; IHS

Exhibit 2.1: Specialties in downstream market segments are highly attractive in China

CASE EXAMPLE



Although not openly protectionist, investment barriers are rising for MNCs, both in environmental and technology areas. For example, in the Chongqing MDI project, the State Administration of Work Safety challenged BASF for environmental risks. The project also faced massive press exposure and approvals took four years (2007 to 2011). Similarly, the DuPont Shandong TiO_2 project has been suspended citing environmental concerns. Even the Sasol–Shenhua indirect coal liquefaction project has been suspended[7].

Learning from the success of Chinese chemical players

Chinese chemical players faced many challenges around two decades ago that Indian players are grappling with today. The success of the Chinese carries important lessons for Indian chemical companies that we can classify into five broad themes:

1. Take bold actions to build business on core competencies

   Chinese companies have done exceptionally well to integrate along the value chain which is their core competence. We detail the case example of how Hengyi, a private company set up in 1994, pioneered backward integration in the polyester value chain. Today, Hengyi has firmly established itself as the number one fabric raw material producer in China. It has seen a revenue CAGR of 19 percent since 2001. Only 32 percent of its revenue comes from PTA while 51 percent comes from PET fibre and the balance from others. It also began with

7 Expert interviews; Web search

the spin-off of textile and dyeing businesses in 2000, and then it became the first public operated enterprise (POE) as melt-direct-spinning producer in 2001, the first POE for Para-terephthalic acid (PTA) production in 2005 and the first POE for Co-Prolactam (CPL) production in 2012 (in cooperation with SinoPec). In 2013, it did a backward integration to make Paraxylene (PX) in Brunei. Even now, faced with low crude oil prices, Hengyi is exploring opportunities for high value-added businesses[8].

2. Find where MNCs are making exceptional returns, and focus R&D and market resources in those areas

   In multiple chemicals segments, Chinese players occupy a significant share of the global market once they overcome the technology hurdle.

   Chinese players own 95 percent of the global manufacturing capacity for Vitamin C[9]. They have developed a leading two-step fermentation technology and also have an edge over MNCs in capex and local labour. In Xanthan gum, 80 percent of the global production capacity is owned by Chinese players who have developed the leading fermentation technology with low production cost and also enjoy low capex (only around 25 to 30 percent of Western players). In Glyphosate, 55 percent of the global production capacity is owned by Chinese players with competitive technology (Dimethyl phosphite route), only second to Monsanto. In Aspartame, 50 percent of the global capacity is with Chinese players who have overcome the technology hurdle in one core intermediate step (L-phenylalanine) in 2006[10].

   Chinese players have picked up technologies and market access through international mergers and acquisitions (M&A). In the last 10 years, ChemChina has done at least seven outbound JVs with a focus on gaining access to specialized technology. It acquired Quenos in 2005, Adisseo in 2006 for methionine, Rhodia Silicones in 2007 for silicone technology, Elkem in 2009 for silicone, MAI for agro-chemical, REC Solar and, more recently, Pirelli for tyres. Wang Hua acquired Borsod Chem for TDI technology and Brancher SAS for feedstock technology[11].

3. Leverage all resources to establish an R&D ecosystem

   Collaborating with research institutes has also helped Chinese local players to quickly climb up the technology ladder. Many successful examples exist, such as Shanxi Sanwei and Henan Tiansheng, where local players have collaborated with local research institutes, such as Tsing Hua University, Peking University, South China University of Technology, to reverse-engineer MNC products[12]. Driven by better capex efficiency and low-cost labour, local players can enjoy a significant cost advantage over MNCs.

   Chinese educational institutions are also developing indigenous technologies which the Chinese firms are leveraging to the fullest. The story of how Professor Yao's research and development helped the indigenous development of Phytase in China is quite inspiring.

---

8 Hengyi annual report

9,10 IHS Global Insight

11 Web searches

12 Expert interviews; Web search.

Local firms saved on cost, made considerable production improvement and drove out nearly all MNCs of this market using Prof. Yao's patents. The price of Phytase dropped from ¥200–300/kg to ¥5–6/kg as production increased from 0 to 20,000 tons per annum. Meanwhile, leveraging the accumulated tech know-how, Prof. Yao is also developing other enzymes such as pectinase (textile and juice) and glucose oxidase (baking and food)[13].

4. Invest in developing talent and functional excellence
   Most businesses are facing overcapacity in their markets. Other hurdles, such as the lack of coal resources for methanol, the volatile price of natural rubber and no integration to feedstock, also exist for many products. Functional excellence enables companies to differentiate themselves and achieve high profitability.

   We have seen across multiple companies improvements of 2.4 to 3.5 percent through energy efficiency (EE), yield and operational equipment efficiency (OEE), and 0.5 to 3 percent potential through pricing excellence. Additionally, 15 percent potential improvement in procurement cost has been seen, leading to 5 - 7 percent improvement in EBITDA through functional excellence.

5. Maintain entrepreneurial spirit in the organization
   Companies in China have had a sharp focus on encouraging innovation in the Chinese chemical industry. The organizational culture at Tencent—the company behind the WeChat platform—is based on two pillars: (a) establish advancement, collaboration and innovation as corporate culture and (b) encourage internal competition. Some interesting practices at Tencent include the concept of no strict rules as to what can or cannot be done by the teams. Therefore, it is possible for Tencent to find itself in a scenario where multiple teams are working on similar products. Only the project(s) that win market recognition and eventually survive the competition get significant resource backing[14].

   No story in China can be complete without the mention of Taobao—a shopping website, where millions of students, housewives, white collar workers, mothers and small merchants go online to sell. Several books, articles and blogs have been written on how to make a fortune on Taobao. Countless stories exist, of transformation from a hundred-dollar to a million-dollar business, and new ones appear every day[15].

Conclusion

The Chinese economy has grown 20 times in the last 20 years and is today the second-largest economy in the world. The future is going to see a more "normal" 6 to 7 percent rate of growth and is going to be marked by several structural changes. The Chinese chemical industry is expected to account for 40 percent of the incremental global demand in the next decade[16]. Although high investments have created a surplus in many areas, particularly in commodities, pockets of opportunities still exist. Protectionist barriers for international firms are, however, on the rise. The Chinese industry takes centrestage in all discussions because of its size. The growth of China's chemical companies offers many lessons for other chemical players.

---

13 Expert interviews; Web search

14,15 Web searches

16 Global Insights; EIU; World Bank; ADB; Goldman Sachs; Merrill Lynch; UBS; Citi; Deutsche Bank; J.P.Morgan; IHS


200 ml
APPROX.
150
100
50

Outbound M&A/JVs–An Opportunity and Path Forward

Introduction

In an age of increasing external volatility, mergers and acquisitions (M&A) and joint ventures (JV) are central to the growth, profitability and long-term value creation of chemical companies. Outbound M&A/JVs offer four distinct advantages — access to strategic resources, access to new markets, natural resources and enhanced productivity.

While companies think about proactively expanding their M&A/JV activity, they should also recognize the typical challenges faced in integration across different phases of the deal—before the deal, during deal execution and post-merger. Companies could follow certain best-in-class principles along the deal value chain to maximize benefits from merger activities.

M&A/JV activity is central to growth and long-term value creation

With the increasing volatility in today's world, companies need to grow to survive. An analysis of the 100 largest US companies (as of 1984) that tracked their progress over three subsequent business cycles shows a strong correlation between growth and survival. Its key observations were that high-growth (greater than average US GDP growth) companies had a five times higher survival rate and also gave higher returns to shareholders (greater than fifteen percent) than low-growth companies.

M&A/JVs are one of the key drivers of growth and long-term value. Average revenue growth disaggregation of 100 companies in the US, from 1999 to 2005, shows that three levers drive growth: portfolio momentum (65 percent), M&A (31 percent) and share gain (4 percent), thereby establishing the relevance of M&A activity to long-term sustainable growth for companies[1].

Within the chemical industry sub-segments, companies where the degree of consolidation (share of the top three players) is high have witnessed higher profitability in comparison to sub-segments where the degree of consolidation is low.

Companies could proactively think about possible acquisitions that can create long-term value and propel fast-paced growth.

Access to strategic resources is one of the four main advantages of outbound JVs and acquisitions

Access to strategic resources has been a primary consideration for outbound M&A/JV activity in emerging markets. An analysis of global acquisitions between 2000 and 2013 highlights four advantages of cross-border deals:

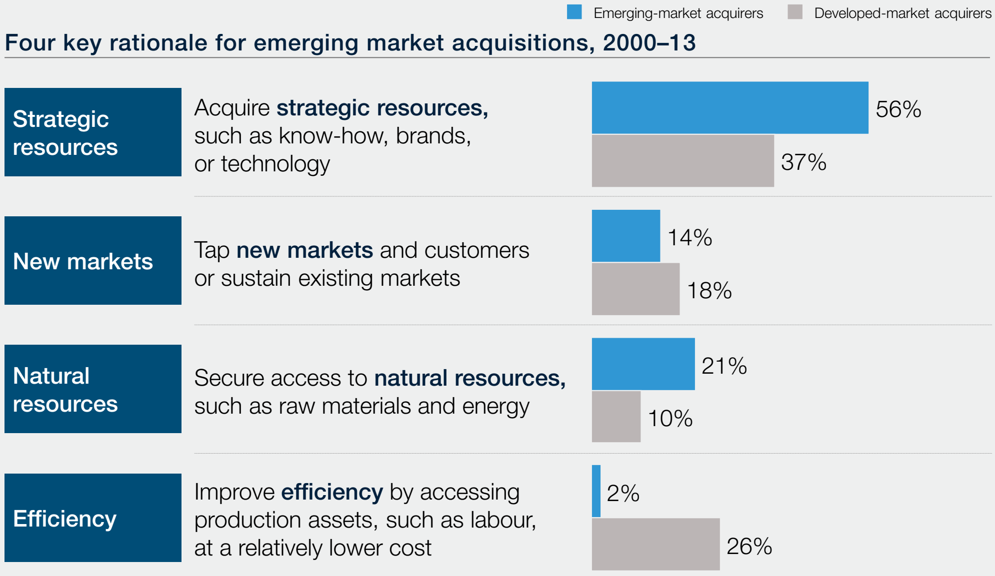
1. Cross-border deals allow access to strategic resources such as knowhow, brands and technology. Around 56 percent of outbound M&A/JV deals in emerging markets have been driven by consideration of access to strategic resources. As an example, Dow Chemical Company and Saudi Aramco formed a JV in July 2011 to build and operate a world-scale, fully integrated chemicals complex. Saudi Aramco benefitted from Dow's technology expertise, technology licensing and international marketing expertise[2].

---

1 McKinsey Granularity of Growth database

2 Press search; Expert interviews

Exhibit 3.1: For companies in emerging market, access to strategic sources has been major rationale for outbound JV/M&A



SOURCE: McKinsey perspectives- “Why Emerging Market companies acquire abroad” by David Cogman, Patrick Jaslowitzer, Marc Steffen Rapp

2. Outbound M&A/JV enables tapping into new markets and customers or sustaining existing markets. Nearly 14 percent of M&A/JV activity in emerging markets has allowed companies to access new markets.

3. M&A/JV deals can help companies secure access to natural resources, such as energy and raw materials. Around 21 percent of cross-border M&A/JV in emerging markets have opened up access to natural resources.

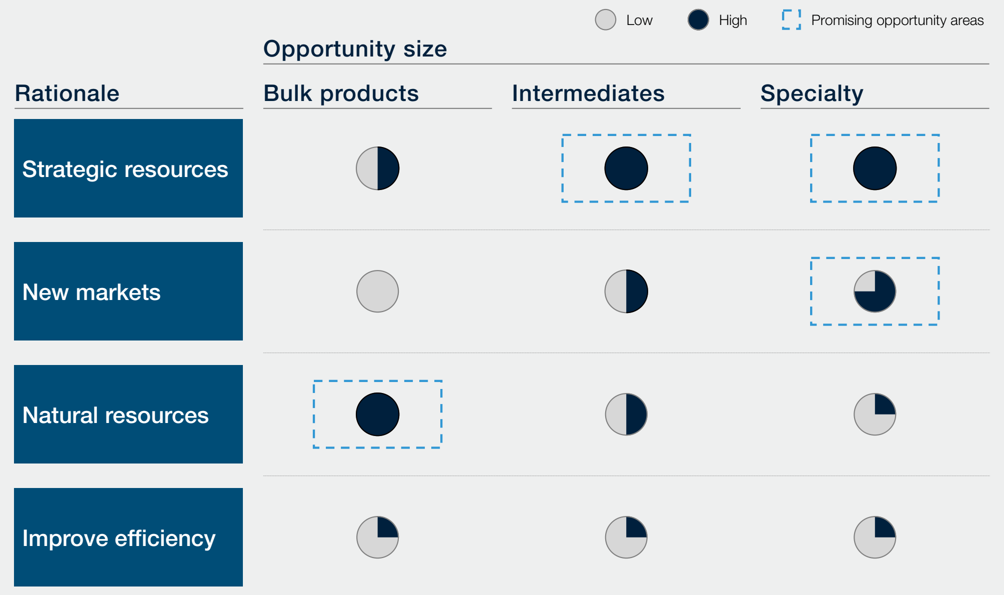
4. Access to production assets, such as relatively low-cost labour, can enhance efficiency. This has been more prominent for developed market acquirers (26 percent) in comparison to emerging market acquirers (2 percent).

China has led the wave of outbound M&A/JV. Chinese companies are increasingly going global to augment access to strategic resources. ChemChina has aggressively pursued outbound acquisitions—Pirelli to get access to the technology to manufacture premium tyres and Krauss Maffei, a German manufacturer of plastics and rubber-processing machinery. ChemChina is also in the process of acquiring Syngenta to get access to leading genetically modified food crop technology[3].

Indian companies may need to gauge the opportunity to invest in M&A/JVs by analyzing these advantages. The opportunity seems most lucrative for players in specialty chemicals and petrochemical derivatives because of superior access to strategic resources (Exhibit 3.2)

3 Press search; Expert interviews

Exhibit 3.2: Outbound JVs and M&A – different opportunities across value chain for Indian chemical players



Value creation in M&A/JVs is challenging and needs cautious execution

Despite its advantages, value creation in M&A/JV deals is a significant challenge with a 15 to 25 percent drop in return on invested capital (ROIC) due to goodwill from acquisitions[4].

Companies face multiple challenges and pitfalls during the entire cycle of the M&A/JV process

Phase 1: M&A/JV strategy and sourcing

The lack of a sound M&A/JV strategy is a common challenge in the pre-merger phase. Companies fail to develop a rigorous process for identifying, screening and prioritizing their target companies. The management and the board of directors of target companies often have different expectations. Limited competence in thorough due diligence leads to disproportionately high prices.

Phase 2: Due diligence and deal execution

Limited transaction experience typically results in underestimation of political hindrance and labour unions. Secondly, lack of transparent communication with external/public stakeholders sometimes results in issues in deal execution.

Phase 3: Integration planning and execution

Limited experience of the management in cross-border integration leads to improper management of possible cultural conflicts, especially among senior executives and middle-level managers. Governance issues are also prevalent with existing staff being appointed to key positions.

4 McKinsey Corporate Performance Center; ValueLine; Bloomberg

Best practices at different stages of the deal process can help avoid and overcome these pitfalls

Overcoming the challenges associated with a typical M&A/JV deal calls for companies to systematically follow a set of best practices at each step.

Phase 1: M&A/JV strategy and sourcing

An M&A/JV strategy and theme could be developed consistent with the company strategy, with value creation being the core target of M&A/JV. Five types of M&A/JV strategies that a company could consider are:

1. Programmatic M&A/JV refers to many small and medium-sized deals that account for a minimum of 30 percent of market cap acquired cumulatively[5]. Such M&A/JV is prevalent in high-growth industries to leapfrog product innovation and industries transforming to access adjacent spaces.

2. Tactical M&A/JV refers to many small and medium-sized deals constituting less than 30 percent of market cap acquired cumulatively[6]. This is prevalent when a company is looking to acquire select capabilities, when there is no need for further transformation.

3. Selective M&A/JV refers to opportunistic acquisitions including very few deals and a wide variety of market cap acquired. This is prevalent in consolidated industries with few candidates available.

4. Large deals refer to at least one transformational deal (at least 30 percent of market cap)[7]. These are suitable for slow-moving consolidating industries where scale is important.

5. Organic M&A/JV refers to a strategy with less than one deal every three years[8]. This is typically observed in slow-moving industries or industries with lots of tail wind through geographic expansion.

It has been observed that the programmatic archetype has proved to be most successful in the past (Exhibit 3.3).

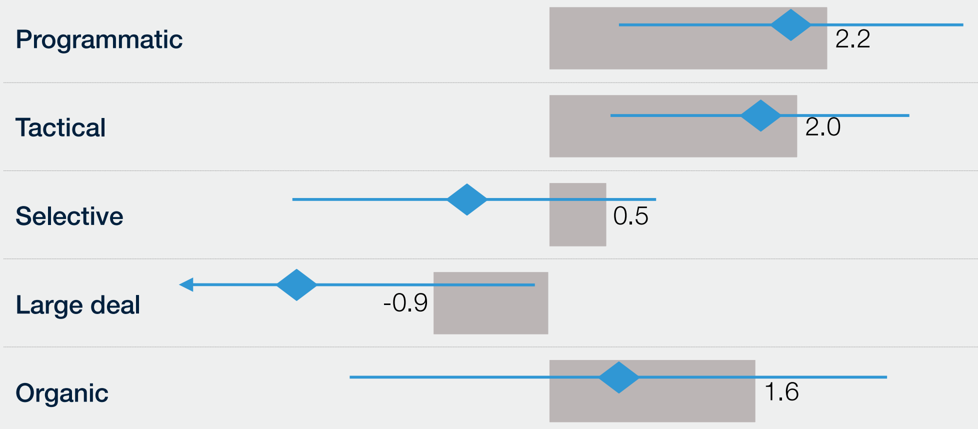
5,6,7,8 McKinsey perspectives, "Unlocking M&A value at every step, from strategy through integration" by Moni Miyashita, Rob Rosiello, Andy West

Exhibit 3.3: The programmatic archetype has proved to be the most successful in the past

Average and 95 confidence interval

Global 1,000[1] median excess TRS[2], December 1999 – December 2012

Percent



1 Includes companies among the top 1000 companies by market cap on December 31, 1999 (>USD4.9bn) and were still trading as on Dec 31, 2012; excludes companies headquartered in Latin America and Africa
2 Total Return to Shareholders

SOURCE: CPAT, Dealogic, TPSI database v26

Phase 2: Due diligence and deal execution

Companies could conduct an effective due diligence around the business in this phase and design a set of M&A/JV guidelines. It is more important to find the source of the enterprise's value creation, rather than trying to calculate everything backed by a deep understanding of the market.

Phase 3: Integration planning and execution

There needs to be a clear strategy with a focus on value creation and proactive seeking of opportunities to create synergies. The company needs to be prepared to develop a comprehensive integration program and the corresponding organizational structure post-merger. Focusing on key areas such as personnel retention and compliance and control can relatively simplify the acquisition and integration of local players.

Conclusion

Chemical companies may need to proactively scout for new opportunities in M&A/JV to attain sustainable, long-term, value-added growth. M&A/JV is a capability and a muscle that organizations may need to build, which typically requires M&A strategy and building a set of practices that allows for efficient sourcing, diligence, execution and integration.

Can the Next Chemical Based Unicorn Come from India?

Introduction

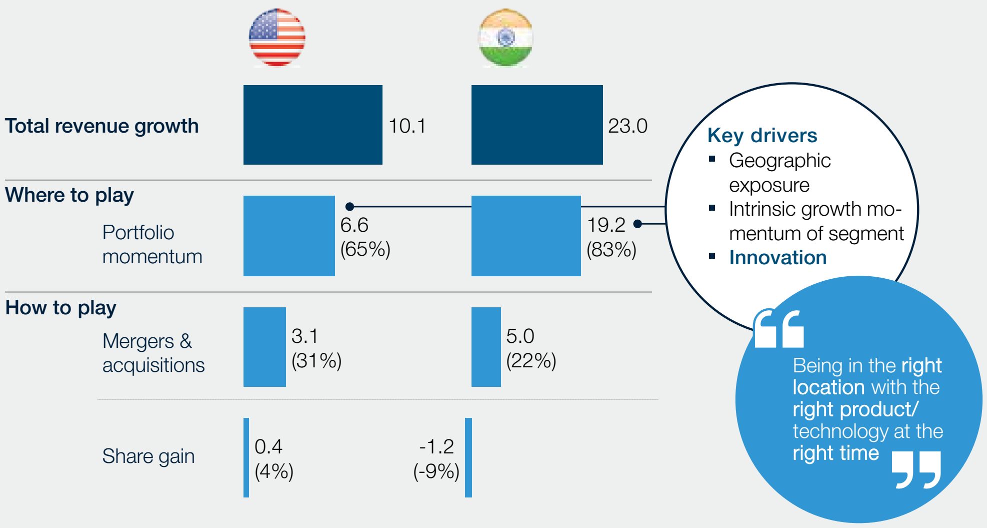
While a unicorn by definition is a privately held company with a valuation of more than USD 1 billion, the term is also used to mean an immensely successful company in the nascent stage. Flipkart, Paytm, Snapdeal, Ola cabs are the names that emerge when one thinks of unicorns from India. Not surprisingly, each of these is in the internet/e-commerce space. Can a true chemical based unicorn emerge from India? The first step to creating a unicorn is to innovate. This article explores whether India's environment fosters innovation.

Why innovate?

Innovation is important for all companies—big or small. It drives portfolio momentum, which increases revenues. Research conducted by the McKinsey Strategy Practice has shown that across markets, a bulk of the revenue growth of companies has come from portfolio momentum which is driven by innovation. Undoubtedly, innovation is a key priority for all high-performing companies. A survey of over 400 companies across the globe revealed that the organizations with higher revenue growth and profitability had innovation at the core of the management agenda (Exhibit 4.1).

Exhibit 4.1: Intrinsic portfolio momentum is a key lever for growth; innovation an important driver of this momentum

Average revenue growth disaggregation[1], percent



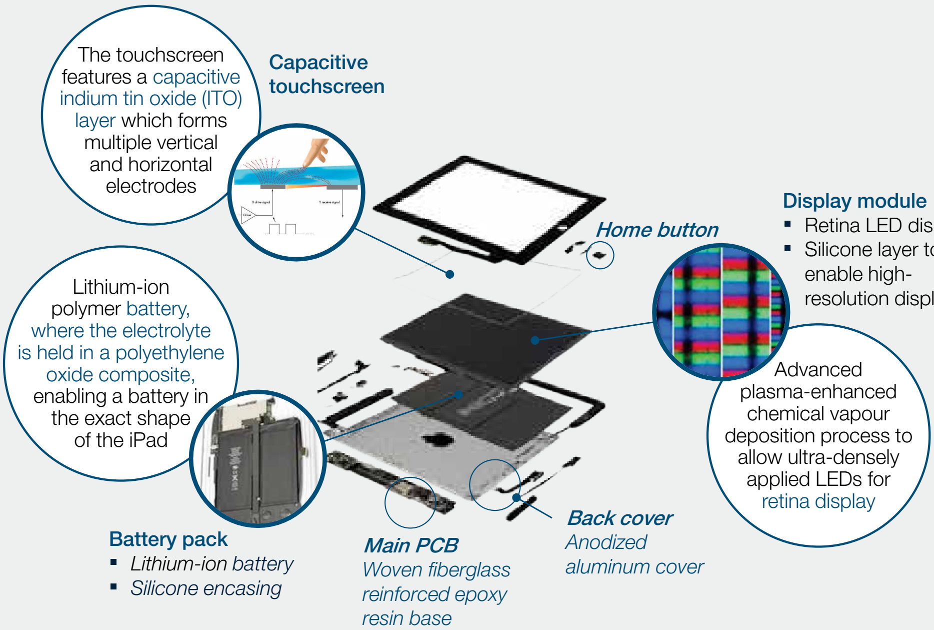
1 Sample of 53 companies in India with growth CAGR decomposition; 100 companies in the US

Do chemicals offer scope for innovation?

Yes, without chemicals, an iPad will be just an abacus. Within an iPad, chemicals form the basis of the capacitive touch screen, display module and battery pack (Exhibit 4.2).

Ample opportunities for innovation in the chemical space exist across various domains, such as advanced materials, advanced robotics, energy storage and next generation genomics. Many sizeable businesses have been built in the chemical space, especially in domains such as new product/technologies, alternate feedstock, resource efficient processes, and solutions co-developed with customers.

Exhibit 4.2: Chemicals enable technology: Electronics is an example



SOURCE: IHS iSuppli; Corning; howstuffworks.com

How to get innovation right

Only around 60 percent of chemical businesses create value from their innovation activities[1]. More interestingly, top innovators get around four to seven times more value out of each dollar spent on innovation. It is important, therefore, to get innovation "right" in companies[2].

This starts with identifying an attractive opportunity—which lies at the intersection of technology, customer and business. Within **technology,** it is imperative to answer questions such as what are the emergent disruptive technologies and how can existing technologies push innovation beyond current offerings. Within **customer,** questions such as what trends are shaping consumers and customer behaviour, what are their unmet needs and which segments offer the best opportunities need to be answered. Within **business,** it is important to ask questions such as which categories are most attractive, which are emerging, and what is the company's position relative to where value is being created.

There are several archetypes of achieving innovation in companies, each with its key success factors. The Visionary archetype is marked by a reliance on charismatic leaders to pre-empt opportunities. The Strategist archetype is based on a deep understanding of the strategic choices. Discoverers are led by having superior customer insight. Executioners have a clear industry roadmap and excel in execution. Experimenters rely on talent.

Innovation could be fostered in organizations through eight key practices:

- Ensure resource allocation is in line with strategy and highest returns.
- Balance project portfolio (timeline and risk profile) and ensure "start-up-ability".

1,2 McKinsey Innomatics™ Innovation Diagnostic

- Drive R&D by longer-term market needs (insights-driven) rather than only short-term customer needs (reactive).
- Identify true headroom and translate it into technology needs.
- Do not underestimate the complexity of commercialization/launch.
- Partner with other companies, as the complexity of (some of) today's chemical challenges is too large for a single company to solve.
- Set up new, innovative businesses in a dedicated unit with corresponding talent and funding.
- Holistically address productivity potential in R&D.

Where does India stand on innovation?

India stands at number 81 in the 2015 Innovation index by the World Intellectual Property Organization (WIPO), behind countries like Seychelles and Tunisia. Despite being a large economy of around USD 2 trillion and a country of over a billion people, India does not have the necessary infrastructure across the seven key factors outlined by WIPO to drive innovation[3].

Forty-five percent of India's manufacturing output is contributed by micro, small and medium enterprises (MSMEs) which do not have access to sufficient capital[4]. Other factors shackling innovation are a weak intellectual property rights (IPR) regime and therefore lower incentives to drive path-breaking research, lack of sufficient facilities for higher education, lack of physical infrastructure (roads, power, etc.) and a debilitating regulatory regime (India is ranked beyond 140 in ease of business category in the last five or more years)[5].

Fortunately, there are some green shoots. R&D spend by all companies in India has doubled since 2007 to USD 28 billion in 2015[6]. Highly competitive entrance processes to the higher educational institutions have created islands of academic excellence. The mobile subscriber base has surpassed 1 billion, enabling easier dissemination of the fruits of innovation to all[7].

Recent measures announced by the Government of India at the launch of the Startup India Movement could foster a conducive environment for innovation[8]. Policies such as self-certification of startups for environmental compliance, payment of gratuity, labour contract, clear taxation guidelines, and no retrospective tax/labour laws could help budding entrepreneurs. Apart from the legislative actions, investments in the infrastructure space could also facilitate business. Special attention to MSME may help. In 2013, The National Innovation Council had launched an MSME cluster development programme out of which only five clusters have been piloted.

3 These seven are: institutions, human capital and research, infrastructure, market sophistication,v businesss ophistication, knowledge, and technology inputs and creative inputs

4,6,7,8 Press search; Expert interviews

5 World Intellectual Property Organisation (WIPO) Global Innovation Index (GII)

Conclusion

As a country, India lags behind in the innovation index. While the scenario is changing, there is a long way to go. An Indian “unicorn” can certainly arise from the chemical industry, but it depends on a company identifying an attractive opportunity, and then capturing it—by being at the right place with the right product/technology and at the right time.

Supply Chain 4.0–Digital Solution for the Chemical Industry

Introduction

In the era of disruptive technologies and demanding customers, the supply chain needs an overhaul. Spurts in demand, online ordering and constantly changing stock-keeping unit (SKU) ranges make necessary a more granular, precise supply chain. Supply Chain 4.0 offers the digital solution to this challenge.

Our changing world prompts the need for Supply Chain 4.0

Mega trends and ever-increasing customer demands are influencing the way companies run chemical supply chains. These trends include:

- More wealth in previously underserved rural areas
- Increasingly volatile demand, with frequent spikes necessitating an agile supply chain
- Dramatically higher service expectations among customers, especially when combined with the granularity of orders through the online trend
- Greater individualization and customization prompting strong growth and constant changes in the SKU range
- A multitude of customer options for where and what to buy

These trends mean that supply chains have to become faster, more granular and precise. **"Supply Chain 4.0"**— the application of the Internet of Things (IoT), advanced robotics, and advanced analytics of big data in supply chain management is the need of the hour. For improved performance and customer satisfaction, it is important to automate and analyze the data through sensors.

SC 4.0 encompasses all opportunities across the supply chain

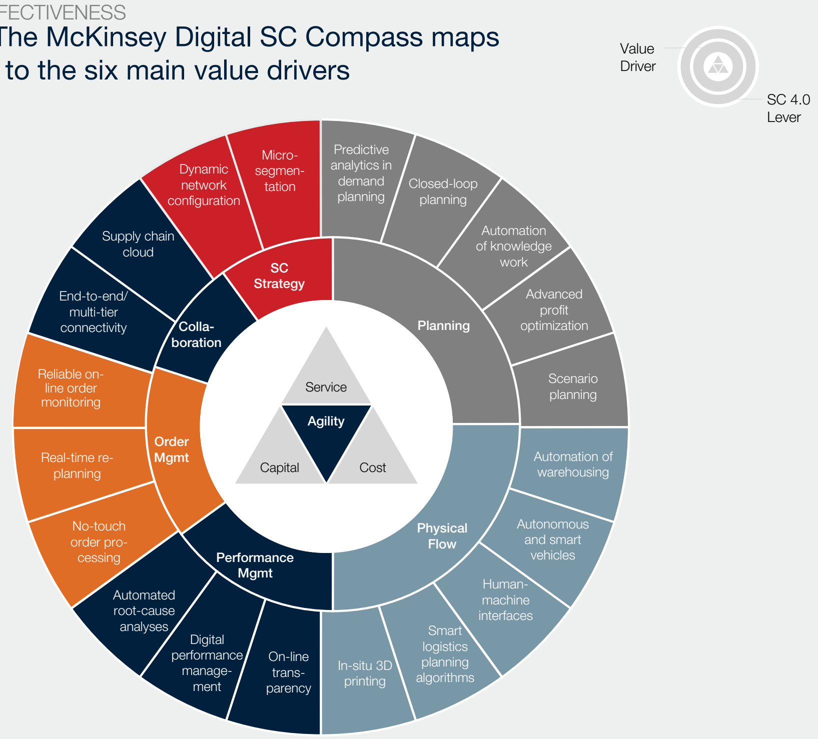
SC 4.0 addresses six major value drivers: a) planning b) physical flow, c) supply chain strategy, d) collaboration, e) order management and f) performance management. The world has seen multiple breakthrough innovations across these drivers. Each driver offers multiple opportunities for digitization as illustrated in Exhibit 5.1.

a. Planning

Predictive analytics in demand planning: These can be used to analyze a multitude of internal and external demand influencing variables, Bayesian networks and machine-learning algorithms for uncovering and modeling the complex relationships. The output of the analyses is a probability distribution of different sales volumes. Blue Yonder (a leading provider of predictive analytics and Big Data) has successfully employed this model.

OPERATIONAL EFFECTIVENESS

Exhibit 5.1: The McKinsey Digital SC Compass maps SC 4.0 levers to the six main value drivers



Closed loop planning: Fully integrated and widely automated closed-loop demand and supply planning can be used, along with integrated pricing and inventory decision making, depending on demand probability distribution and cost involved.

Other opportunities for digitization include automation of the knowledge network, advanced profit optimization and scenario planning.

b. Physical flow

Automation of warehousing: Advanced robotics solutions can ensure improved picking, self-guiding shelf-to-picker robots and automated case-replenishment through on-line monitoring of usage behaviour.

Autonomous and smart vehicles: Use of self-guided vehicles in controlled environments such as mines or on-premise solutions (e.g., trains), autonomous trucks currently being piloted and automated guided vehicles (AGVs) in warehouse environments.

c. Supply chain strategy

Micro segmentation: Granularization of the supply chain into hundreds of individual segments based on customer requirements and own capabilities, designed with a dynamic, big data approach. Micro segments are fully supported by IT systems with automated differentiated execution.

d. Collaboration

Supply-chain cloud: Joint supply chain platforms between customers, company, and suppliers, shared logistics infrastructure (vertical/horizontal deployment) and joint planning solutions.

e. Order management

Real-time planning: Instantaneous, in-memory re-planning of production schedule and replenishment, considering all constraints, to provide a timely and reliable order confirmation.

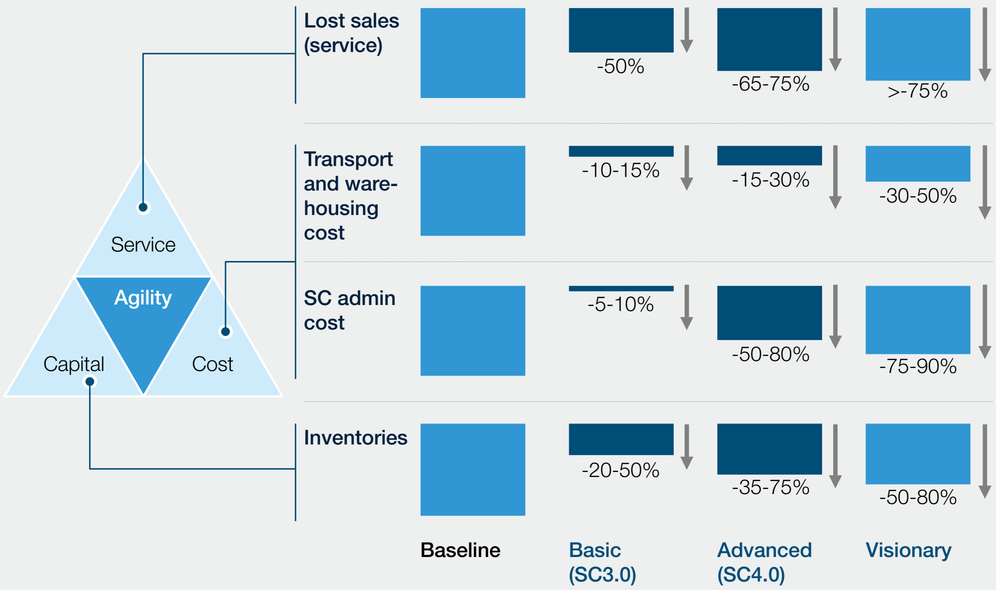
f. Performance management

Automated root-cause analysis: SC control tower analyzing KPIs and internal/external information to automatically detect root causes and trigger countermeasures.

SC 4.0 can unlock value of around USD 8 billion in the Indian chemical industry

Supply Chain 4.0 enables efficiency on three fronts: Service, Capital and Cost. This improvement can create huge savings potential for companies. For India, the overall opportunity estimates are USD 1 billion in logistics costs, USD 2 billion in lost sales and USD 5 billion in inventory reduction—an overall potential of USD 8 billion for the Indian chemical industry.

Exhibit 5.2: Applying SC 4.0 levers can unlock huge potential in all supply chain categories



A sound digital foundation can potentially help to implement SC 4.0 in Indian companies

On their journey towards SC 4.0, Indian organizations could focus across five dimensions:

1. Enable collaboration in the ecosystem

2. Manage data as a valuable asset

3. Implement two-speed systems/data architecture

4. Manage cybersecurity

5. Build digital SC capabilities

This transformation could take place through a three-phase journey with improved digital capability in each and every phase.

Phase 1—Quick turnaround: Run a targeted program to establish supply-chain fundamentals.

Phase 2—First steps into digital: Define digital strategy and a blueprint for future-state supply-chain design, organization and capability-building requirements and high-level data, software and hardware requirements.

Phase 3—Digital mastery: With a sound digital strategy and a roadmap in place, conduct assessment of available technologies/tools (e.g., automated warehousing, dynamic routing). Based on the organization's needs, select specific technologies, run a pilot and define a roll-out.

Conclusion

With the application of the Internet of Things (IoT), use of advanced robotics, and advanced analytics of big data in supply chain management, Supply Chain 4.0 can help companies move with the times. It can also contribute to unlocking savings (service, cost and capital) of around USD 8 billion in the Indian chemical industry. Enabling SC 4.0 involves building solid digital foundations across five dimensions, and is a transformative journey along three phases over a period of time.

India and overseas chemicals practice leaders

Abhiram Ramprasad
Associate
Mumbai

Amala Gupta
Associate
Mumbai

Ashok Kumar
Senior Expert
Delhi

Avinash Goyal
Partner
Mumbai

Chandrika Rajagopalan
Associate Partner
Mumbai

Florian Budde
Director
Frankfurt

Jakob Fischer
Director
Munich

Jens-Christian Blad
Senior Expert
Hamburg

John Warner
Director
Cleveland

Katsuhiro Sato
Partner
Tokyo

Neelesh Mundra
Associate Partner
Mumbai

Nitika Nathani
Associate
Delhi

Noshir Kaka
Director
Mumbai

Pinak Dattaray
Associate
Delhi

Rajat Upadhyaya
Engagement Manager
Delhi

Ramesh Mangaleswaran
Director
Chennai

Saagar Sinha
Engagement Manager
Delhi

Sheng Hong
Partner
Shanghai

Shirish Sankhe
Director
Mumbai

Suyog Kotecha
Associate Partner
Mumbai

Theo Jan Simmons
Partner
Cologne

Ulrich Weihe
Partner
Frankfurt

Chemicals Practice
March 2016

Design contact: Visual Aids India
www.mckinsey.com