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Confederation of Indian Industry



CII 12TH MANUFACTURING SUMMIT 2013

POWERING PAST HEADWINDS

INDIAN MANUFACTURING: WINNING IN AN ERA
OF SHOCKS, SWINGS, AND SHORTAGES

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PREFACE

“Toto, I’ve a feeling we’re not in Kansas anymore.”

— Dorothy, ‘The Wizard of Oz’

OUR REALITIES HAVE CHANGED; OUR EXPECTATIONS ARE CHANGING;
AND OUR REACTIONS NEED TO.

A lot has happened in the manufacturing space globally. Global growth rates are more muted, albeit temporarily. Global GDP growth was still 2.1 percent in 2012, and has not yet recovered to its pre-2008 levels of 4 percent.

Various measures of volatility indicate that we are living in one of the most turbulent eras in history. The balance of economic power is being fundamentally altered — not just by the BRIC nations, but also increasingly by the emergence of new centers (for example Africa, Indonesia, Mexico and other smaller countries). U.S. manufacturing is reviving, with far-reaching implications across the globe, especially for export oriented economies. New technologies and ‘Big Data’ are likely to fundamentally alter manufacturing economics and ways of doing business.

In India too, the context has changed, especially for the manufacturing sector. Demand has slowed down considerably across several sectors. Infra-structural bottlenecks and factor constraints have become even more acute. Import dependent sectors are reeling under the pressure of a weakening Rupee — adding to margin pressures. Growth rates in industrial production have declined significantly.

However, multiple opportunities still exist and newer avenues are opening up. The long term potential for Indian manufacturing continues to be robust, with a strong local demand base and a young, growing workforce. The currency depreciation in 2013 has created optimism among Indian manufacturers in terms of export opportunities. Some sectors like textiles and petrochemicals are already starting to do well. International markets are seen as essential components of Indian companies’ business aspirations. A good monsoon has raised hopes of strong rural demand. Different companies may have fundamentally different views about the power of smaller cities. Nevertheless, it is clear that future growth will happen in an era shaped by a set of forces that are different from what companies are used to.

In many ways therefore, the context of running a manufacturing company now has changed. Some companies have adapted well, while some are still trying to come to grips with the new context. How have the winners managed to adapt? What are the lessons for manufacturing companies in such an environment?

The report hopes to present a perspective on these questions and contains three sections:

1. The first section lays out the current performance of Indian manufacturing industry. This section also contains feedback from a broad-based industry survey conducted to gauge the sentiments and priorities of today's industry leaders.
2. The second section synthesizes the key trends sweeping the manufacturing landscape, draws out implications for Indian industry and makes the case for change.
3. The final section lays down the imperatives for companies to adapt and win in today's environment.

SECTION I: STATE OF THE INDUSTRY

THE STORY OF MANUFACTURING in India has always been one of unfulfilled potential. In many ways, that trend continues. The potential is still robust, with a large domestic demand base and a large and growing workforce.

However, it is in the actualization of this potential that there is a huge challenge. A clear manifestation of this challenge is the near stagnation of the manufacturing sector over the last two to three years, with ambitious growth programs giving way to day-to-day fire fighting, and hiring freezes (For example, firms across the automotive sector have imposed hiring freezes in 2013, in the wake of a prolonged slump in demand, as per SIAM reports).

While the ‘mood of the day’ is to talk about slowdowns and challenges, the reality is that the opportunity has not diminished. India has surplus raw material for many important manufacturing sectors, like steel, cotton and coal. It also has a surplus of trainable workers and its domestic demand potential can greatly improve.

There are indications that a revival is around the corner. Some sectors are starting to recover. Many sectors like the FMCG and pharmaceutical sectors have been relatively untouched. Thus while the current performance of the industry has been mixed at best, we, along with industry leaders, believe that the trajectory will point upwards very soon.

In this context, the following chapters lay out the elements of our current industrial performance; outline the views of industry leaders on the key elements characterizing the same; and identify some of the emerging opportunities and silver linings.

STAGNANT PERFORMANCE OF INDIAN MANUFACTURING

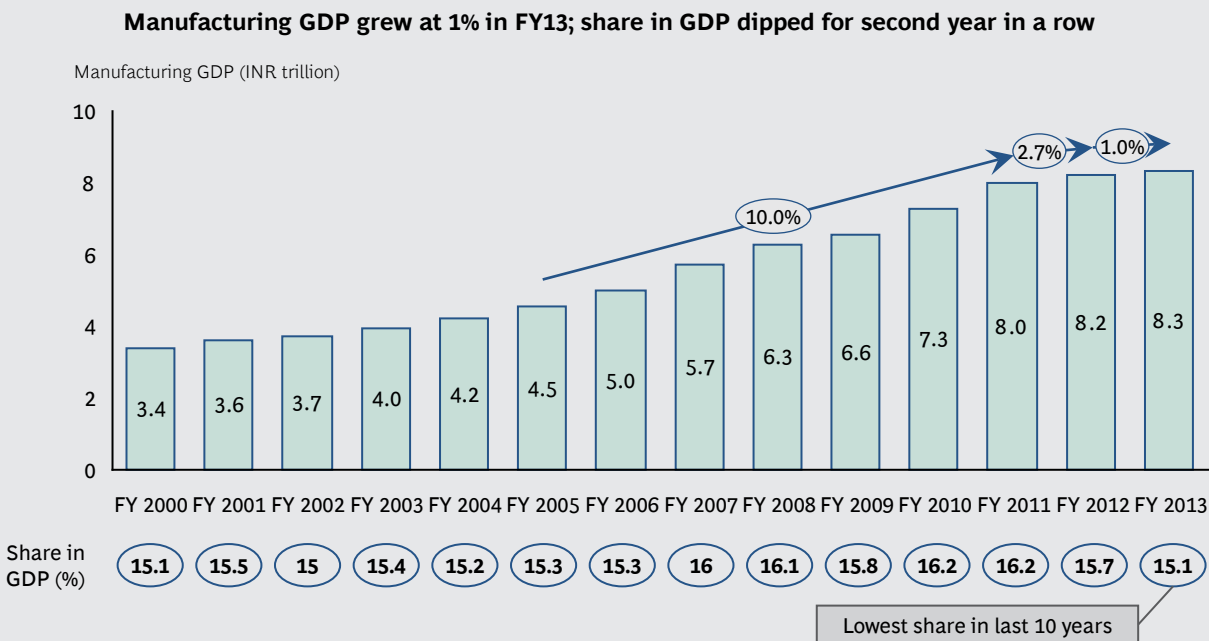
“Problems are not stop signs, they are guidelines.”
— Robert Schuller

THE MANUFACTURING SECTOR HAD played a robust role in driving GDP growth in the 2005–11 period, when it was growing at around 10 percent CAGR. How-

ever, since then, industry has posted an overall slump, with manufacturing GDP growth at around 3 percent in FY2011–12 and at around 1 percent in 2012–13 (as shown in Exhibit 1.1).

This is in sharp contrast to the over 10 percent average annual growth that the sector needs

EXHIBIT 1.1 | Clear Slowdown in Manufacturing Growth



Source: Reserve Bank of India Database on Indian Economy; Central Statistics Office; BCG Analysis.
Note: Manufacturing GDP at factor cost, constant (2004–2005) prices; Data for 2010–11 are based on Second Revised Estimates, 2011–12 are based on First Revised Estimates and 2012–13 are based on Provisional Estimates.

in order to reach its aspiration of 25 percent share in India’s GDP by 2022, as envisaged by the National Manufacturing Policy. At 15 percent currently, the share of the manufacturing sector in India’s GDP indicates significant potential, compared to corresponding figures of over 30 percent share for China and 25 to 30 percent share for several emerging economies.

Sectoral View — A De-Averaged Perspective

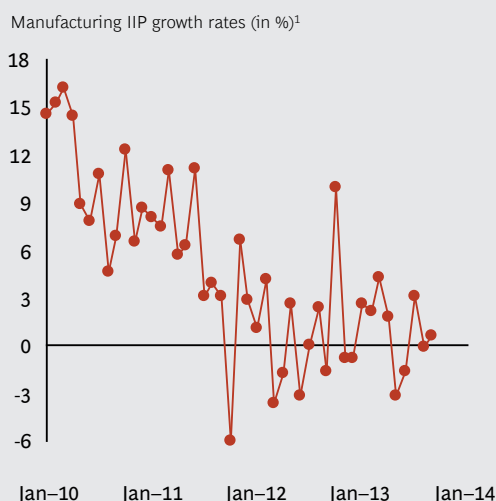
The monthly IIP has also been showing a consistent downward trend. Manufacturing IIP has stayed unchanged during the first six months over the last two financial years. A de-averaged look at the manufacturing IIP shows modest growth in a few sectors, only to be offset by contraction in others. However, three sectors in particular — textiles / apparels, chemicals and coke / refined petroleum products — have maintained a robust growth over the past two years (as shown in Exhibit 1.2).

The sustained slowdown has impacted growth across manufacturing sectors as well as across many Indian manufacturing companies, as is clear from the CII–BCG Manufacturing Leadership Survey 2013 (as shown in Exhibit 1.3).

Market sentiments corroborate the slowdown across sectors. Performance of several key manufacturing sector indices has significantly trailed even the flat benchmark indices (as shown in Exhibit 1.4). Two notable exceptions have been the FMCG sector, due to strong rural demand and falling commodity prices, and the pharmaceutical sector, boosted by strong domestic business as well as growth in international markets, particularly the U.S.

EXHIBIT 1.2 | Though Manufacturing has Slowed Down, some Sectors have Outperformed

Manufacturing IIP growth continues to remain sluggish



Textiles, petroleum products and chemicals outperforming other sectors for the past 2 years

Sub-sectors	FY 2012-13 ²	FY2013-14 ²
Textiles & Apparel ³	7.3	13.4
Coke, refined petro products & nuclear fuel	8.5	9.3
Chemicals	3.8	8.9
Machinery, equipment ⁴	-2.7	4.3
Food & beverages	2.9	-0.3
Basic metals	1.9	-2.3
Motor vehicles	-5.3	-6.0
Manufacturing (Overall)	1.3	0.1

Source: Ministry of Statistics and Program Implementation; BCG Analysis.

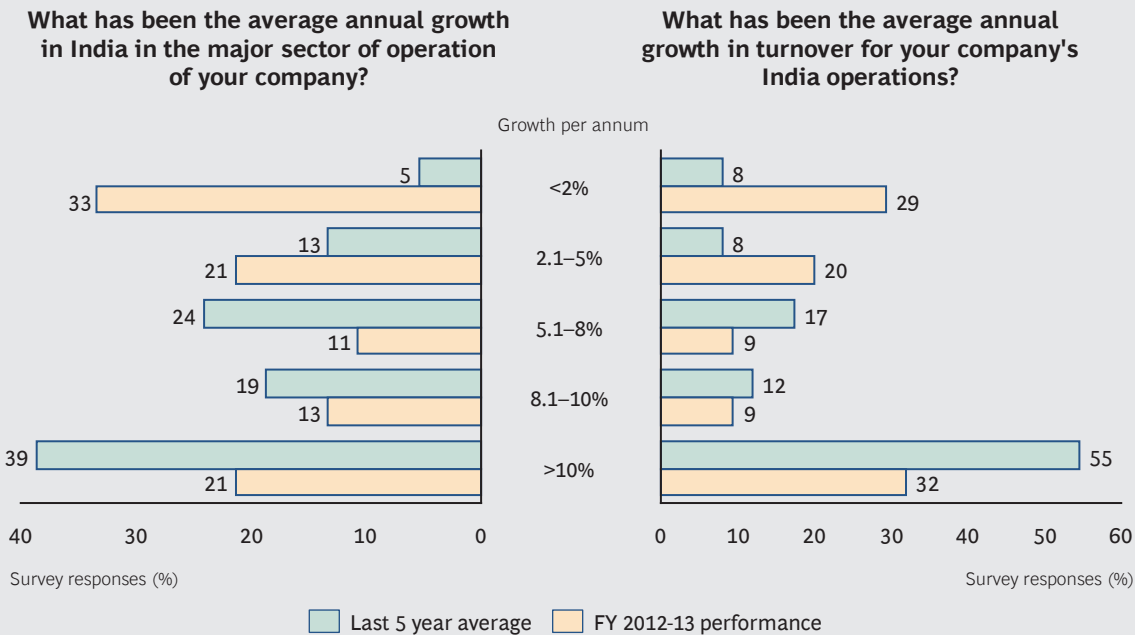
¹IIP growth rate defined as growth over same month in previous year.

²Indicates growth over same period last year; data for FY2012–13 is for full year; data for FY2013–14 is for 6 months from April to September.

³Includes two sub-sectors namely Textiles & Wearing apparel and Dressing & Dyeing of Fur.

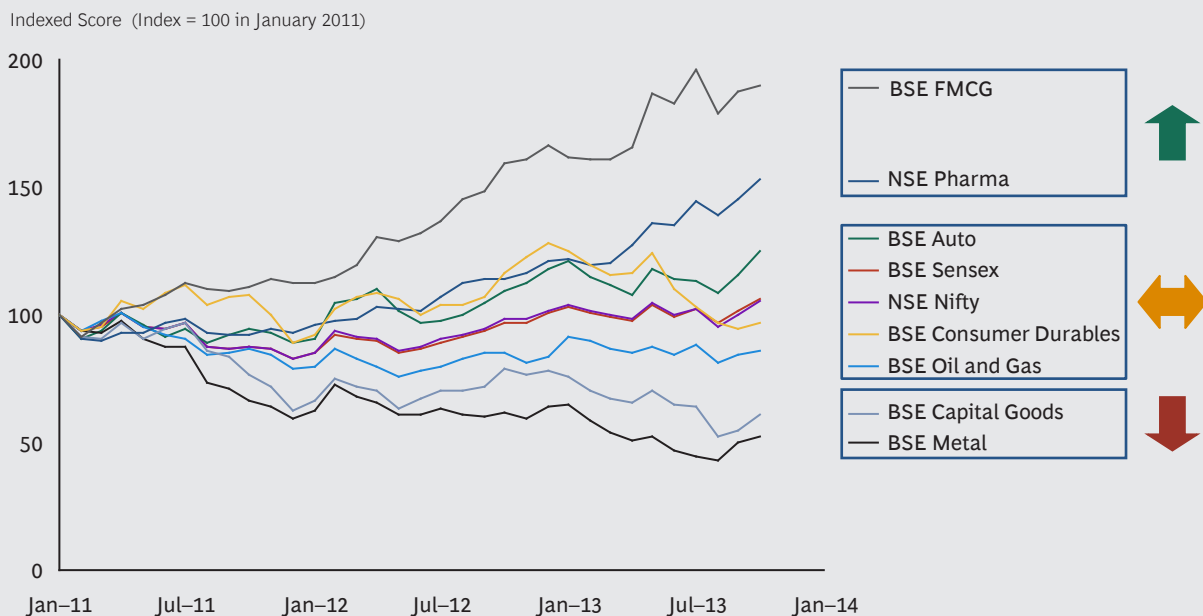
⁴Includes three sub-sectors namely Machinery & equipment n.e.c, Electrical machinery & apparatus n.e.c, and Office, accounting & computing machinery.

EXHIBIT 1.3 | Signs of Sectoral and Company Level Slowdown Visible



Source: CII-BCG Manufacturing Leadership Survey 2013; BCG Analysis.

EXHIBIT 1.4 | Manufacturing Indices Underperforming Against the Benchmark Index



Source: National Stock Exchange Archive; Bombay Stock Exchange Archive; BCG Analysis.

Note: Prices indexed to January 2011. Monthly value of index calculated based on simple average of daily closing prices over the month.

SILVER LININGS FOR INDIAN MANUFACTURING

“Keep your face always toward the sunshine — and shadows will fall behind you.”

— Walt Whitman

MULTIPLE OPPORTUNITIES EXIST EVEN in this environment; new avenues are still opening up. The depreciation of the currency in 2013 has lent optimism to Indian manufacturers as regards exports. Some sectors like textiles and petrochemicals are already starting to do well. International markets are seen as essential components of Indian companies’ business aspirations. A good monsoon has raised hopes of strong rural demand. Overall, industry is more confident of achieving higher growth going forward as compared to previous years (as shown in Exhibit 2.1). In this section, we touch upon some of the main opportunities to be tapped by companies.

Export Growth

Manufacturing companies have increased focus on exports, in comparison to previous year, as highlighted in the CII-BCG Manufacturing Leadership Survey 2013. After modest growth in April 2013 followed by two consecutive months of decline, Indian exports posted double digit growth in the next three months, growing at 11.6 percent in July, 13 percent in August, and 11.2 percent in September. The growth was driven primarily by textiles, chemicals and petroleum exports (as shown in Exhibit 2.2).

For instance, textile exports have maintained a strong growth trajectory in the current financial year. While a depreciated Rupee has helped, resurgence in demand from key developed markets has also been instrumental in driving exports growth for textiles. The recent increase in the rate of interest subvention from 2 percent to 3 percent is expected to further boost exports across several sectors, including textiles.

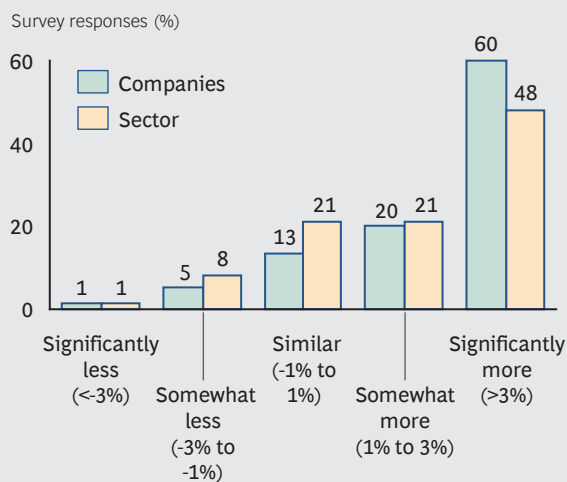
Rural Growth

This year, India has experienced one of the best monsoon seasons in recent history, with the southwest monsoon rainfall averaging at 106 percent of normal. As observed in the past, favorable monsoons have a positive impact on agricultural as well as overall GDP growth in the same and the subsequent year.

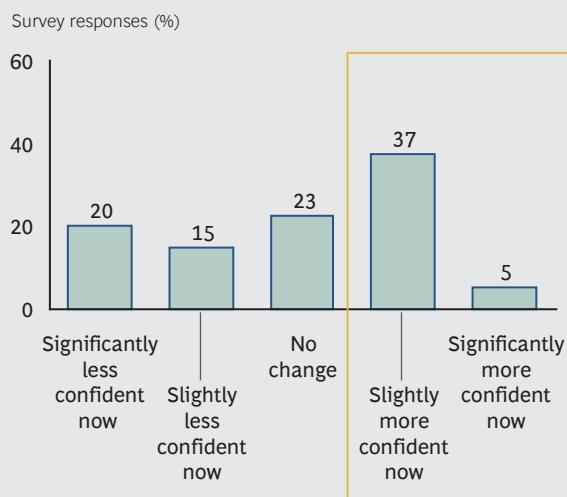
Hence, favorable monsoons this year are expected to spur rural demand. This is already evident in the robust growth of several industries in last few months, driven primarily by rural demand. For example, domestic tractor sales of Mahindra & Mahindra grew by 37 percent in September 2013 over previous year. At the same time, two wheeler sales, which fell during April–July 2013 over the previous year, bounced back in August and September, with the first half of FY 2013–14 registering a 3.5 percent growth over the previous year, likely backed by

EXHIBIT 2.1 | Manufacturing Companies Confident of Better Times Ahead

How do you see growth in your company / sector over the next 5 years compared to last 5 years?



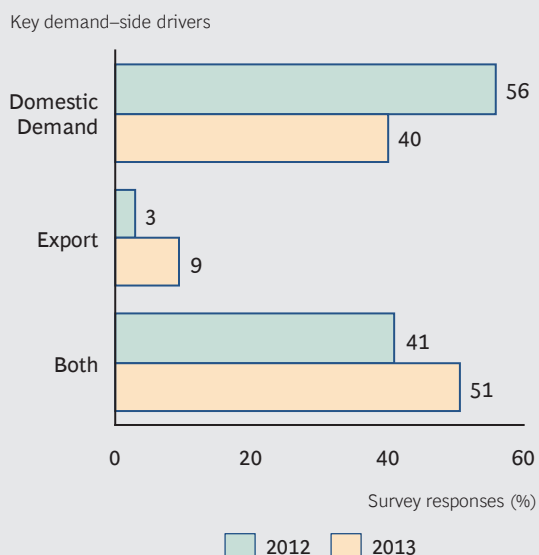
When compared to 12 months ago, how confident are you now about the rebound in India's manufacturing growth in the next 2 years to pre FY 2010-11 averages?



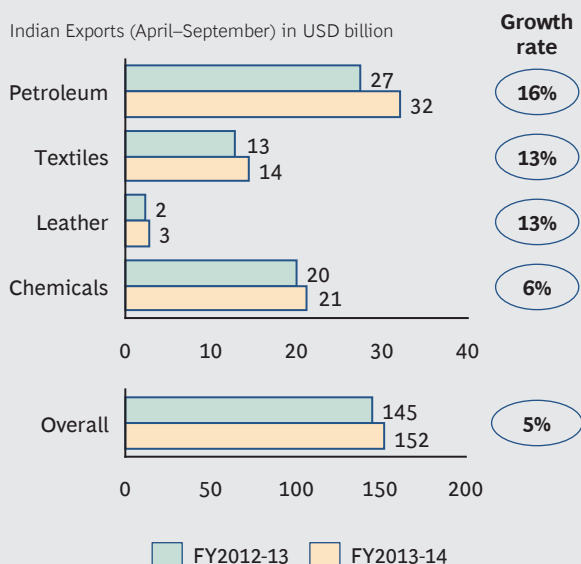
Source: CII-BCG Manufacturing Leadership Survey 2013; BCG analysis.

EXHIBIT 2.2 | Manufacturing Companies Increasingly More Confident of Exports

What would be the key demand-side driver for manufacturing growth for the next 5 years?



Signs of export improvement visible already



Source: CII-BCG Manufacturing Leadership Survey 2013; Directorate General of Commercial Intelligence and Statistics; IndiaStat; BCG Analysis.

strong rural demand. Similarly, FMCG companies like Dabur and ITC have posted strong growth in sales and profit margins, driven by rural demand.

Investment Boost

The Cabinet Committee on Investments, constituted in January 2013, is an important step by the government towards restoring confidence in the country's investment environment. The Committee is tasked with monitoring large as well as critical investment projects facing issues, in order to expedite resolution of any implementation bottlenecks and ensure timely completion.

The initiative has started yielding results, having initiated the resolution of bureaucratic hurdles for nearly 40 major projects, accounting for INR 1.5 lakh crore of investments. This positive move by the government has been welcomed across industry sectors.

MANY of the aspects mentioned above on the Indian manufacturing sector (IIP growth, the sector's contribution to GDP and export growth) are 'surface metrics' or 'symptoms' of deeper, underlying structural causes that are fundamentally reshaping business today. These causes offer unique opportunities and challenges to companies, providing substantial reward to those who adapt well. Thus, it is important to unravel the complicated intertwining of day-to-day challenges and deeper structural trends. The next section of the report aims to unravel the threads of change and identify the factors that will define the texture of the new environment.

SECTION II: UNDERSTANDING THE NEW ERA

GIVEN THE CURRENT CONTEXT of slowing manufacturing growth and its consequent operational stresses, it is critical for industry to step back and ensure that the sweeping structural trends that it is witnessing are not dismissed as ‘short term blips’. Most likely, these trends will be the driving factors that will determine the operating environment in the days to come.

This report attempts to filter out such trends from the ‘noise’ of day-to-day fire-fighting and synthesize implications for firms to win in the changing environment. In our view, the future is going to be characterized by three fundamental forces:

- **Shocks:** changes in our operating environment that are likely to stay.
- **Swings:** slow shifts over time that have become too significant to ignore.
- **Shortages:** fundamental challenges in the manufacturing support system that threaten to hamper growth.

SHOCKS: HERE TO STAY

“In a crisis, be aware of the danger — but recognize the opportunity.”

— John F. Kennedy

INDIAN MANUFACTURING COMPANIES NEED to take into account two key changes which distinguish current operating environment from the yesteryears, particularly considering that these are expected to continue going forward:

- **Increased volatility**, on two dimensions, namely firm performance and firm inputs
- **Currency shock**, which is in some form a double-edged sword for Indian manufacturing

Era of Increased Volatility

We have entered what seems to be a prolonged period of unprecedented volatility and rapid change, both globally and in India. Volatility is fundamentally at two levels: firm performance (for example, revenues, margins, market positions), and firm inputs (for example, commodities, interest rates).

Firm performance volatility has been on the increase globally over the last few decades, and continues to be a strong trend (as shown in Exhibit 3.1). In India too, the composition of the BSE reflects this volatility. Every four

years; about half the top 30 companies in the BSE are replaced by new firms.

Firm input volatility has also risen over the years. Volatility peaked in the years immediately following the crisis, and seems to be abating mildly in the last two years. Nevertheless, current volatility across inputs is at a higher level than seen historically.

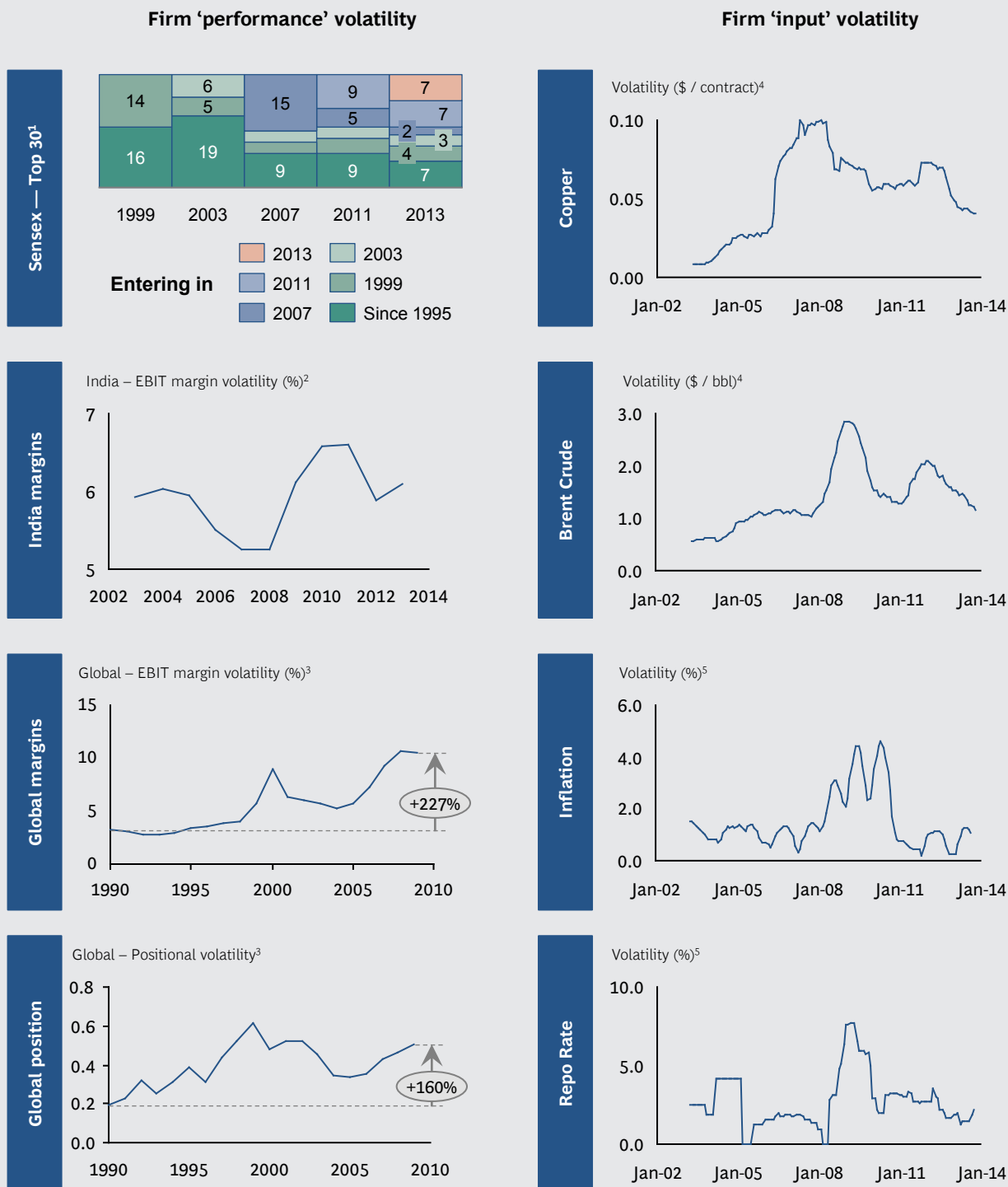
The new era of volatility will require manufacturers to be far more nimble and resilient in the way they operate.

Currency Shock

The Indian Rupee was largely stable for most part of the 2000s, ranging between 44 and 49 per USD during 2000–2007. However, the 2008 financial crisis saw a reversal in this trend, triggering a steady depreciation in the Rupee, reaching about 50–55 per USD by 2012. Additionally in 2013, the Rupee has seen sharper fluctuations and devaluation compared to most developing economies (as shown in Exhibit 3.2).

The high recent volatility and depreciation of the Rupee has been driven by a weak domestic demand outlook coupled with a widening current account deficit, and several international concerns related to the U.S. ‘tapering’ and political tensions in Syria. While RBI’s interventions like opening of a

EXHIBIT 3.1 | Volatility is Increasing across Multiple Dimensions



Source: Bombay Stock Exchange Data Archive; Capitaline; COMEX archives; Quandl; Reserve Bank of India; BCG Analysis.

¹Sensex volatility traces the changes in composition of the top 30 Bombay Stock Exchange companies based on market capitalization.

²Trailing twelve quarter standard deviation of operating margins (in %) averaged across 150 BSE firms that represent 80% of the total market as on 31 Dec 2010.

³Weighted average across all firms, based on revenue, based on 9,960 public US companies.

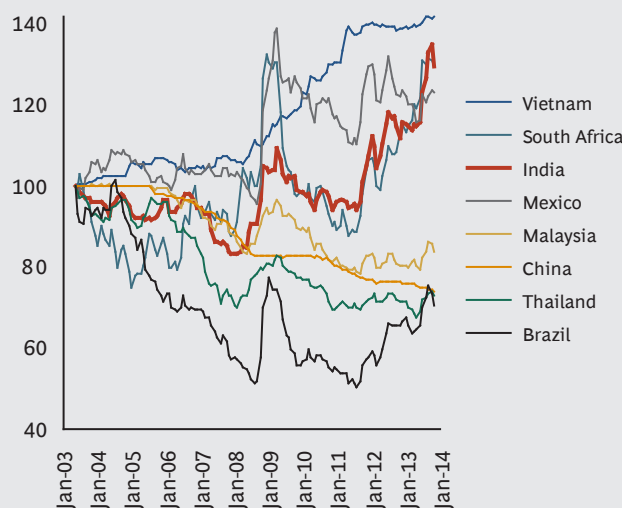
⁴Volatility calculated as a standard deviation of trailing 12 month daily actual changes in underlying index.

⁵Volatility calculated as a standard deviation of trailing 12 months monthly returns.

EXHIBIT 3.2 | Significant Depreciation in the Rupee Coupled with Increased Volatility

Rupee has depreciated more than most other competing export nations' currencies...

Indexed exchange rates¹
(Local currency per USD)



...and has become more volatile as well

Daily volatility (%)²



Sources: Oanda.com; BCG analysis.

¹Exchange rates indexed at 100 in April 2003.

²Volatility calculated as a standard deviation of trailing 3 month daily returns in USD-INR exchange rate.

swap window to attract NRI funds have been welcomed, speculations around the imminent tapering by the U.S. and withdrawal of specific moves by the RBI — instance the oil swap window — will continue to test the Rupee in the near term. The Rupee is therefore expected to remain volatile as some of these global and local cues unfold.

The implications of the depreciated, more volatile Rupee for Indian companies are three-fold:

1. Exports will become increasingly attractive for sectors that have a high local value-added component, for example, textiles.
2. For sectors with a high proportion of dollar linked input costs, localization and alternate material development will be the key to enhance competitive advantage. For instance, Rupee devaluation is not likely to benefit auto components / appliances significantly, as their cost base

is 70–90 percent commodity, and linked or priced at parity to international prices. Hence emphasis on localization and / or alternative material assumes importance.

3. Contracting philosophies need to change. Wherever possible, firms may need to enter into back-to-back currency based contracts with suppliers and customers, to shield themselves against the adverse impact of the fluctuations. If such contracts are not possible, shorter contracting windows and price adjustments, for example, monthly instead of quarterly contracts, could help minimize exposure and should be explored.

SWINGS: DISRUPTION UNDER WAY

“Opportunities are like sunrises. If you wait for too long, you miss them.”

— William Arthur Ward

THE MANUFACTURING LANDSCAPE, GLOBALLY as well as in India, has seen several slow, yet steady shifts which have now become too significant for any manufacturer to disregard. We highlight four key trends which are particularly relevant for Indian manufacturing sector — resurgence of U.S. manufacturing, rise of Africa, increasing significance of Big Data, and growth of rural India.

America Swinging Back

American exports are starting to revive. U.S. manufacturing exports as a share of the U.S. economy are at their highest in 50 years. A decade ago, exports contributed 9.4 percent of the U.S. GDP; currently that figure is 13.9 percent. Further, BCG research indicates that by 2020, the U.S. could capture USD 70–115 billion from the share of annual exports of other nations.

This resurgence of exports from the U.S. is driven by fundamental advantages in labor costs (adjusted for productivity) and energy, as compared to other developed countries (as shown in Exhibit 4.1). For example, U.S. labor costs (productivity-adjusted) are now 37 percent and 24 percent cheaper than cor-

responding costs in Germany and Japan respectively.

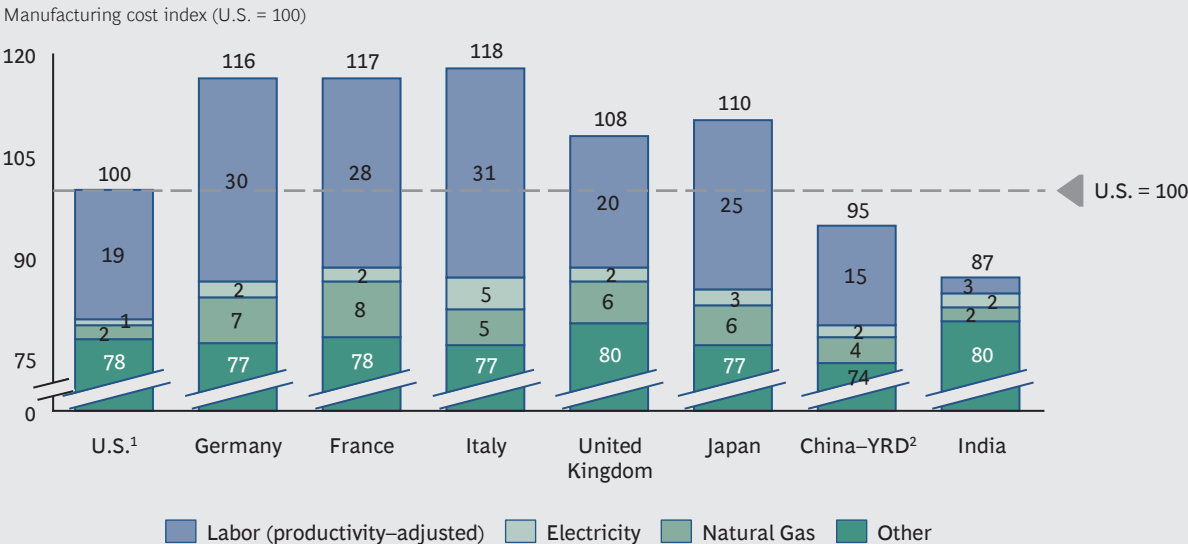
While this may suggest that the biggest threat from this surge is to the high-cost European countries, there are two implications for Indian companies:

1. The U.S. resurgence has proven in many ways that a low cost advantage is not the only stage for successful exports; rather, there is always an opportunity for countries with a balanced mix of cost, quality and service to find their target markets.
2. The sectors where the U.S. advantage is likely to be felt the most are: transportation equipment, chemicals, petroleum and coal products, computer and electronic products, machinery, electrical equipment, and primary metals¹. Of these, chemicals, petroleum and coal products account for almost 50 percent of all exports from India. The threat to Indian manufacturers therefore is significant and imminent.

In this context, Indian exporters need to consider moving from a ‘cost’ target to a more balanced mix of quality, cost and service. A low cost position alone will not be sufficient to win in the market. (This was also pointed out in our previous CII-BCG re-

EXHIBIT 4.1 | U.S. Expected to be Among the Lowest Cost Developed Nations in the World by 2015

Average manufacturing cost structures of major exporting nations relative to U.S. (2015 projections)



Source: US Economic Census; Bureau of Labour Statistics; Bureau of Economic Analysis; International Labour Organization.; BCG Analysis.
Note: No difference assumed in “other” costs (for example, raw materials inputs, machine and tool depreciation, etc.). Differences in values a function of the industry mix of each export country. Cost structures calculated as a weighted average across all industries.

¹US figures represent costs in a set of select lower-cost states.

²Chinese figures represent Yangtze River Delta region.

port in 2012, titled “Reigniting the Quest for India’s Manufacturing Leadership”).

Africa Rising

Africa as a continent has been growing consistently over the last two decades. Africa’s share of global GDP has risen from 2.1 percent to 2.4 percent over the last five years. Today, Africa has a consuming class of around 260 million people which is expected to grow to almost 400 million by 2020, higher than the corresponding figures for Brazil and Russia and lower only to China and India. The opportunities that this consuming class presents are enormous. Today, Africa is one of the world’s fastest growing markets for mobile phones and FMCG products. Companies all over the world have begun to give Africa its due credit. During the last decade, over 50 Indian companies have invested in Africa.

However, the challenges of serving the African market are numerous and substantial. Exporters / manufacturers are often overwhelmed by the diversity of the African

market: 55 diverse countries; over 2,100 languages and poor infrastructure — only 4 countries have a paved road density of greater than 250 kilometers per 1,000 kilometers of roads (250 kilometers being the cutoff for the bottom quintile of countries in terms of paved road density). Additionally, consumption of many product classes is almost non-existent, with a glaring need for significant education of both consumers and distributors in order to gain market share.

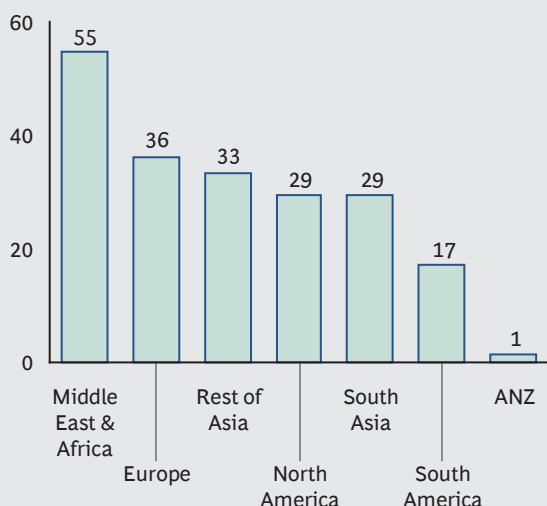
The implications of the African opportunity for Indian manufacturers are two-fold:

1. Africa is too significant to ignore when formulating growth plans. Top global companies see Africa either as a key market and / or as a key source.
2. Adopting a de-averaged view pays rich dividends when addressing Africa. Five key clusters account for over 80 percent of GDP and 83 percent of the consuming class in Africa (as shown in Exhibit 4.2). The challenges of diversity and infrastruc-

EXHIBIT 4.2 | Africa Clearly a High Potential and High Priority Market, but Needs to be De-averaged

Middle East and Africa considered priority export destinations by Indian manufacturers¹

Survey Responses (in %)



African market concentrated in 5 clusters



- 80% of GDP
- 83% of "consuming class"²
- 37 of the 50 top cities in Africa

Sources: CII-BCG Manufacturing Leadership Survey 2013; World Bank; United Nations Development Program; Middle of the Pyramid: Dynamics of the Middle Class in Africa; African Development Bank; BCG analysis.

¹Survey response to What are the key geographies to drive exports in, over the next 5 years (top 2)?

²Upper, middle and 50% of floating class (consumption per capita above US\$ 2).

ture reduce substantially when companies take such a cluster-based view.

of connected devices is projected to increase four-fold between 2010 and 2015.

Rise of Big Data

Big Data is changing the way the world works. Annual digital transaction data worldwide has grown almost 500 times over the last two decades, reaching transaction volumes of $2,600 \times 10^5$ terabytes in 2012. Research indicates that digital data volumes are likely to continue growing by about 50 percent year on year, reaching volumes of $7,910 \times 10^6$ terabytes by 2020.

The emergence of Big Data has been driven by four key enablers:

- **The social media boom:** Generating increasing content from and regarding users through social media such as Facebook, Twitter, etc. Facebook has 1.19 billion active users monthly.
- **The Internet of devices:** A proliferation of sensors and smart systems; the number

- **Online data transactions:** This is driven by cloud and e-commerce transaction data. Cloud data is expected to account for about 60 percent of all server workload by 2015.
- **Digital services and media:** Increasing digitalization of text, music, and video content.

The explosion of Big Data has profound implications for Indian manufacturers:

1. Big Data can provide faster and more accurate consumer feedback, create instant marketing opportunities and enable predictive analytics. For example, Ford uses Big Data collected through the cloud and run via Google's predictive analytics platform to refine its next generation of electric vehicles globally.
2. Mining Big Data can effectively provide substantially improved customer service.

For example, GE is leveraging Big Data to provide better predictive analytics for its aircraft engines and drive appropriate maintenance routines.

Rural Rumble

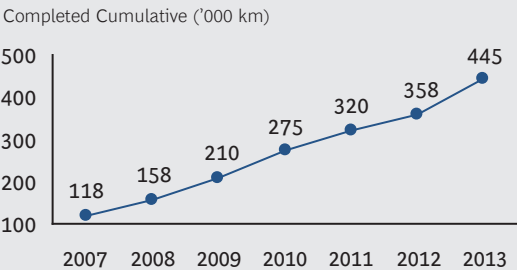
Rural India has been enjoying an era of increasing prosperity over the last several years. The aspirations of rural Indians for a better quality of life and employment opportunities have long been met by migrating to the nearest economic centers. However, of late, and especially in the last decade, a significant part of these aspirations has been addressed by improved prosperity in rural India. Rural consumption per person grew by 19 percent between 2009–10 and 2011–12 — a full 2 percentage points faster than the growth in urban centers. What has driven this new found prosperity and how fundamental are its drivers? What are its implications for the manufacturing sector?

Four factors have been important in driving the prosperity of rural India (as shown in Exhibit 4.3):

- **Improved road connectivity:** In 2000, 40 percent of all rural habitations in India (342,000) were unconnected by all-weather roads. The *Pradhan Mantri Gram Sadak Yojana* was launched in that year to connect all such habitations. Since the launch of the program, over 400,000 kilometers of roads have been constructed, connecting 80,000 new habitats (25 percent of all erstwhile unconnected villages). Plans are afoot for connecting another 80,000 over the next five years.
- **Improved electrification:** The percentage of electrified rural households increased from 44 percent in 2001 to 55 percent in 2011. Electrification helps improve rural output by enabling produc-

EXHIBIT 4.3 | ‘Bharat’ is Growing — Factors Driving Improved Prosperity in Rural India

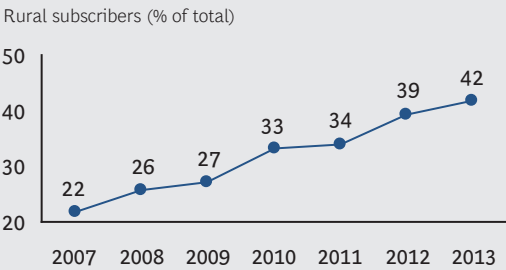
Improved road connectivity



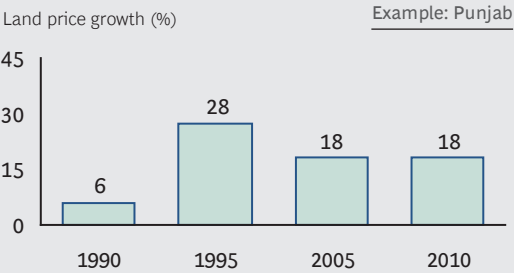
Improved electrification



Improving telephone connectivity



Increasing land prices



Source: Pradhan Mantri Gram Sadak Yojana for road connectivity; IndiaStat for electrification data; Hirashima (1978 & 2008) for land prices data; TRAI for telephone connectivity data; Credit Suisse.

tive use of evening / low-light hours in small industries, enabling use of labor saving tools / appliances and electronic gadgets like computers.

- **Improved cell phone connectivity:**

There has been a steep increase in mobile phone penetration in rural India over the last five years, from around 20 percent to around 42 percent. Cell phones improve productivity by helping people find jobs speedily, providing prompt information about market prices, and enabling better information flow that helps minimize waiting time.

- **Improving land prices:** Land prices are driven by four factors: improved connectivity; clear land titles; availability of “excess liquidity”; and alternative uses of land. There has been substantial improvement in each of these fundamental drivers.

The implications of this rural rumble for companies are straightforward:

1. Rural markets are now too big and too fast growing an opportunity to be ignored. Many Indian companies (from FMCGs to automotive) invested in villages in anticipation of rural demand and are now reaping the benefits of their investment.

2. Rural businesses still suffer from several fundamental challenges like poor logistics, low local scale and price sensitivity. Companies need to find different ways to address these problems.

NOTE:

1. For more details, please refer to the BCG report titled “Behind the American Export Surge”.

SHORTAGES: TAKING GROWTH AWAY

“The spirit is willing but the flesh is weak”
— ‘The Bible’

THE IMPORTANCE OF A robust support system in order to aid strong growth of the manufacturing sector has been emphasized time and again. However, several fundamental challenges in the manufacturing support system for India still threaten to inhibit the country’s manufacturing growth. We highlight two key shortages in this section.

Supply Chain Fragility

Indian manufacturing continues to rely heavily on Micro, Small and Medium Enterprises (MSMEs). As per government estimates, the MSME sector employs over 100 million people in around 45 million units across the country, contributes 45 percent to the manufacturing output, and accounts for 40 percent of the country’s exports.

However, MSMEs are also the most vulnerable to the current trends of sustained volatility and growth slowdown. Overall, MSME health has declined in the last two to three years. Credit defaults are the highest for MSMEs amongst all credit classes, standing at around 5.3 percent of advances as of 2012–13 (as shown in Exhibit 5.1). NPA rates have grown by over 1 percentage point in the last two years. This creates a vicious cycle: on one hand, MSMEs need access to finance to overcome the slowdown; on the other,

banks / financial institutions become wary of extending loans to this sector. This, in turn, creates significant supply challenges for larger manufacturers. A dipstick survey of the risk arising due to exposure of a large automotive manufacturer to MSMEs for supplies revealed that over 30 percent of its MSME suppliers are exposed to significant financial or performance risks, largely due to their inability to handle the current volatility and growth slowdown.

The implications of this situation on Indian companies are two-fold:

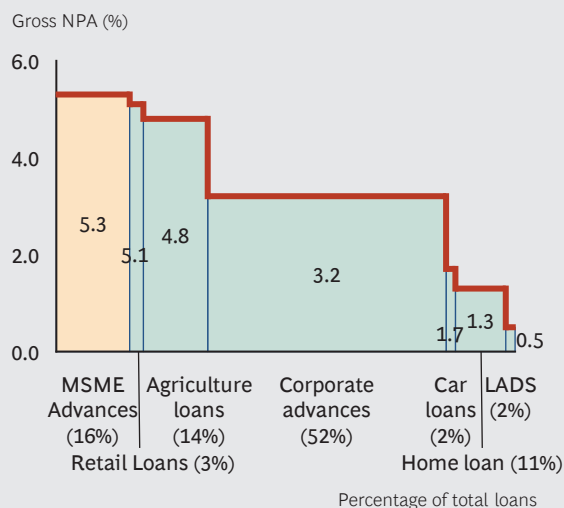
1. Manufacturers need to be proactive in identifying areas of fragility in their supply chain — especially fragility arising out of MSMEs being exposed to volatility.
2. Supplier capability development activities need to shift from mere technical support to commercial / management skills infusion.

Infrastructure and Regulatory Challenges

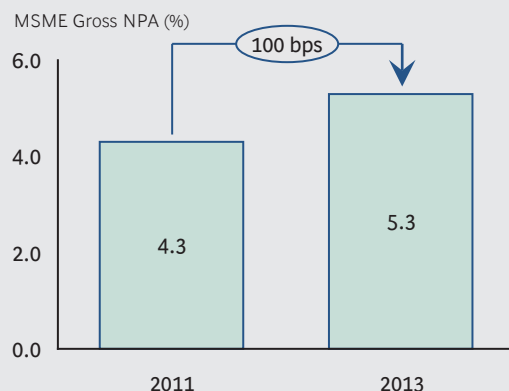
Indian infrastructure continues to trail global standards in terms of both soft (policy action) as well as hard (physical) infrastructure. The CII–BCG Manufacturing Leadership Survey 2013 once again highlighted restrictive regulations and infrastructural constraints as among the topmost challenges for the growth of Indian manufacturing (as shown in Exhibit 5.2).

EXHIBIT 5.1 | Ancillary Manufacturing Sector Under Significant Stress

MSME defaults are highest amongst all credit classes...



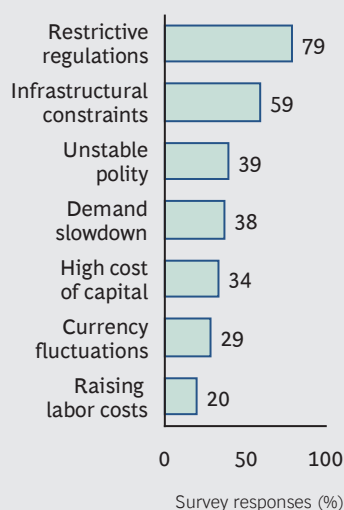
...and have risen progressively in the past two years



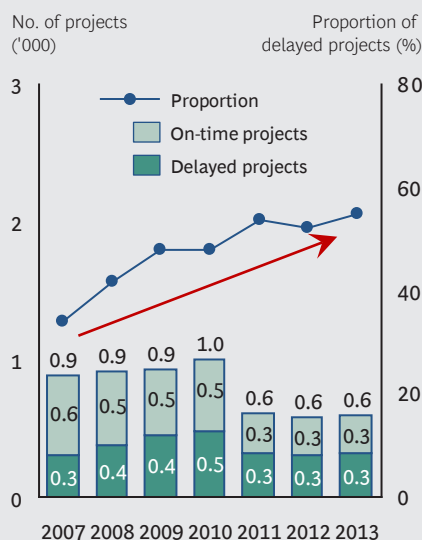
Source: FIBAC Productivity Survey 2011; FIBAC Productivity Survey 2013; BCG analysis.

EXHIBIT 5.2 | Infrastructural Challenges Impeding Manufacturing Growth

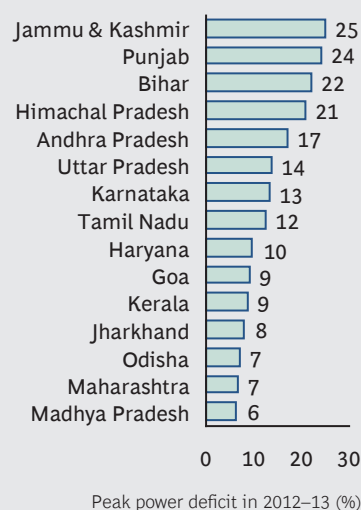
Biggest challenges for manufacturing growth in India¹



Proportion of delayed projects has been on the rise since 2007²



Power deficit high across most states in India



Source: Ministry of Statistics and Program Implementation; CII-BCG Manufacturing Leadership Survey 2013; Central Electricity Authority; BCG Analysis.

¹Survey response to What do you foresee as the biggest challenge for manufacturing growth in India over the next 5 years (top 3)?

²Central projects costing INR 150 Crore and above are considered.

For example, power deficits in India are as high as 25 percent in states like Jammu and Kashmir and 21 percent in even relatively more industrialized states like Himachal Pradesh.

The proportion of delayed projects has been on an upward trend owing to policy bottlenecks. Two global steel makers recently shelved plans for setting up plants in India, chiefly due to delays arising out of regulatory hurdles. Delays in getting regulatory approvals and the larger issue of project delays have also impacted cash flows for Indian infrastructure companies, leading to mounting debt burdens for these companies. This is an inherent structural flaw that needs to be addressed.

Implications of this situation on companies are two-fold:

1. Companies need to factor in higher costs due to infrastructure constraints.
2. Companies may need to invest in captive infrastructure in the short to medium term, especially in areas such as power generation.

As we have seen above, shocks, swings and shortages define the new era for manufacturers and will continue to shape businesses in new and unforeseen ways. How should companies react? What do they need to do to succeed in this new environment? In our view, ingraining 'Adaptiveness' into organizational DNA will be critical. In the next section, we lay out some thoughts and practice on how companies can increase their Adaptiveness Quotient (AQ).

SECTION III: WINNING IN THE NEW ERA

HOW CAN INDIAN MANUFACTURING companies brace themselves for this era of shocks, swings and shortages and emerge successful? In our view, adaptiveness holds the key. A BCG study titled “The Most Adaptive Companies 2012” points to a strong positive relationship between a company’s ‘adaptiveness’ and growth of its market capitalization (as shown in Exhibit 6.1). From 2006 to 2011, companies in the top decile in the BCG Adaptive Advantage Index (where a higher value indicates a more adaptive company) grew their average market capitalization by 31 more percentage points per year as compared to those in the bottom decile. A similar contrast is observed in the long term growth of market capitalization.

Manufacturing companies, both large and small, are increasingly realizing the importance of adaptiveness. For instance, *maquiladoras*, Mexican manufacturing units in free trade zones, have lost most of their basic work such as fabric stitching to upcoming, low-cost hubs like Bangladesh. This has required the *maquiladoras* to move to the next level of sophistication. For instance, some of them have taken up stitching of medical devices such as stents out of fine pig tissue.

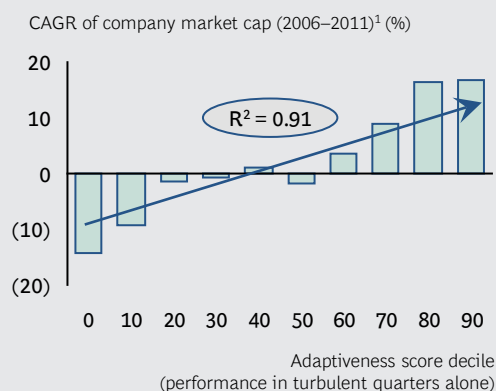
What is this adaptiveness about? Adaptiveness is about minimizing and managing risks while still exploring opportunities for growth. Adaptiveness needs to be incorporated in the company’s business models, strategies, plans, people, systems and processes. Highly adaptive companies, in our view, need to score on three elements: **Resilience, Responsiveness and Readiness (the three Rs)**:

- **Resilience** is about how ‘tough’ the business model is. We characterize resilience by the extent of diversification and the extent of collaboration.
- **Responsiveness** is about the speed with which an organization reacts to changes in the external environment.
- **Readiness** is about structurally building capabilities to both anticipate and manage events / scenarios.

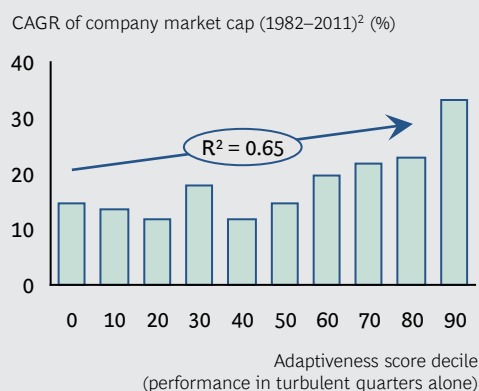
In the following chapters, we have explored how Indian manufacturing companies can inculcate the three Rs in their DNA to face this new turbulent era.

EXHIBIT 6.1 | Adaptiveness Pays Off in Both the Short and Long Term

Adaptability pays off in short term...



...and in the long term



Sources: Compustat; BCG ValueScience Center; BCG Analysis.

Note: The CAGRs were weighted to reflect the average adaptiveness scores of each decile of companies in the index.

The BCG Adaptive Advantage Index score for each company (a total of 2,500 companies across a range of industries) is calculated by measuring the weighted-average outperformance of a company's market-cap growth rates versus the weighted-average market-cap growth rates in its industry during that industry's seven most turbulent business quarters from October 2005 through September 2011.

¹Adaptiveness scores calculated from 2006 to 2011 for 2217 U.S. public companies.

²Adaptiveness scores calculated from 1982 to 2011 for 1209 U.S. public companies.

LESSON IN ADAPTIVENESS: THE JOURNEY TO THE SOUTH POLE

In December 1911, Norwegian explorer Roald Amundsen and his team became the first to conquer the uncharted South Pole. The trip to the South Pole was a journey to a 'different world' for the Scandinavian explorer. The success of the expedition rested on three pillars, namely Resilience, Readiness and Responsiveness.

Resilience — fortifying for difficult times

The expedition was undertaken in a ship called the Fram, built specially to withstand prolonged exposure to the harshest polar conditions. Several crucial aspects were addressed up-front: a rounded hull provided the ship better control over ice; and the use of hard timber, crossbeams and braces enhanced the strength of the vessel.

Readiness — elaborate preparations

Amundsen prepared rigorously for the voyage, building upon lessons from his past experience. Every aspect of the voyage was meticulously planned after factoring in critical risks that the voyage might encounter. Key areas where readiness was emphasized included people (handpicked and specially trained for the voyage), transport (North Greenland sledge dogs instead of ponies), equipment (extra long ski boots to dodge crevasses; stronger tents), and

supplies (special vegetables to guard against scurvy; libraries and musical instruments for leisure).

Responsiveness — quick adaptability

Amundsen's initial plan was to conquer the North Pole — it was for this endeavor that the Norwegian Parliament and the King of Norway had extended funds. However, in 1909, as soon as claims of North Pole conquest by two American explorers surfaced, Amundsen quickly revised his target as the South Pole, which he described as 'the last great problem that needed to be solved.' Even during the voyage, he guided his team to adapt as needed. For instance, during their first attempt to reach South Pole in late winter, Amundsen was quick to acknowledge the futility of his early start considering the extreme weather. After being on the ice just for four days, he directed the team back to base where they stayed put till the weather improved.

Success

The team finally set out on 19 October 1911 when the weather improved. Owing to rigorous planning, they conquered the South Pole on 14 December and returned to Framheim base on 25 January 1912 — the entire journey taking 99 days, 10 fewer than scheduled.

BUILDING RESILIENCE

“Ask not for a lighter burden, but for broader shoulders.”

— Jewish Proverb

ONE OF THE KEY imperatives for Indian manufacturing enterprises in this era of shocks, swings and shortages is to build resilient business models. In other words, business models that will not cave in to the pressures of volatility / turbulence, will have in built mechanisms for recovery and will be able to take advantage of the shift in demand and supply patterns.

Companies typically adopt two approaches to ensure resilience:

- **Diversification:** Companies diversify their markets of operation and their sources of supply in order to limit exposure to any specific set of situations.
- **Collaboration:** Another approach followed by companies is to partner / collaborate, not only with their suppliers / customers, but increasingly, with competitors. This reduces the risk, or at least the cost of failure.

Diversification

Companies have adopted different approaches for diversification. Many companies diversify at their ‘front ends’ (markets / customers / ge-

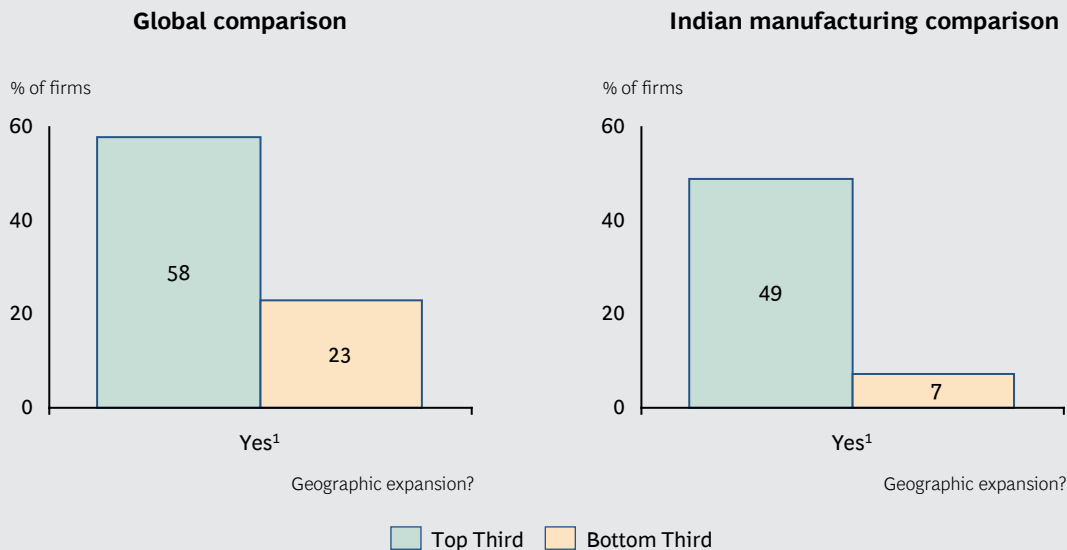
ographies). Other successful companies diversify at their ‘back ends’ (supply sources / manufacturing centers). This section discusses both these levers in detail.

DIVERSIFICATION OF MARKETS / CUSTOMERS

Diversifying into export markets is one of the key ways to gain resilience. As discussed in the first section on shocks, swings and shortages, not all markets are facing a downturn. Whilst U.S. manufacturing is reviving and posing a threat, eastern markets are maturing. The Africa potential is becoming a reality. Hence, exposure to international markets helps create resilient business models.

Historically, geographically diversified companies have performed better than their peers have. According to BCG’s Value Creators Report, 58 percent of global value creating companies (the top one-third as measured in terms of Total Shareholder Return (TSR) — from 1995 to 2008) had diversified geographically. A similar analysis of Indian manufacturing companies over the last five years shows that out of leading Indian value creators, 49 percent had diversified geographically with CAGR of over 15 percent for revenues coming from overseas during 2008 to 2013 (as shown in Exhibit 7.1). Further, companies having greater than 25 percent of their revenues from international business delivered two to four percent higher TSR per annum than peer companies having less than 25 percent of their revenues from international business.

EXHIBIT 7.1 | Top TSR Performers Expand Geographically



Source: Reuters; Capital IQ; BCG Analysis.

Note: Top third and bottom third defined based on TSR performance (from 1995 to 2008 for global companies and 2008 to 2013 for Indian manufacturing companies). Of these, companies with international sales comprising greater than 5% of total sales considered for further analysis (top third n=38 and bottom third n=13 for global, and top third n=41 and bottom third n=28 for Indian manufacturing).

¹Defined as 15% CAGR of international sales with international sales comprising greater than 5% of total sales.

In tune with global swings, Indian manufacturers are also rebalancing their overseas revenue portfolios. As a result, the share of India’s exports to non-U.S., non-EU companies over the last 10 years has increased from 57 percent to 70 percent. This trend is likely to continue as companies work towards exploring the rise of Africa and the shifting economic balance towards South East Asia and Latin America.

Apart from international diversification, companies are also diversifying within the country and across segments. Over the last few years, companies that have been able to buck the stagnant trend in manufacturing and perform better than their peers have focused on tapping into the large and growing rural customer base. For these companies, the rise in rural demand provides an effective counter to the slowdown in urban demand. They have invested heavily in adapting their business models and distribution networks to access rural markets and have in turn reaped better returns (as shown in Exhibit 7.2)

DIVERSIFICATION OF MANUFACTURING CENTERS

Historically, Indian companies have been wary of using a large labor force within the same

plant, for fear of handling large unions. They have more often than not gone for a distributed manufacturing setup within the same region for this precise reason. However, of late, companies have also consciously started creating a diversified base from the perspective of de-risking their supply chain.

Setting up capacity additions or new units in new geographies enables or even forces companies to focus on newer markets adjacent to the new unit. This improves their competitiveness in the new markets, gives them a logistical cost advantage and reduces response time. Several players with lower market share or penetration in specific geographies, or those with stagnant growth rates have used this strategy to diversify and grow (as shown in Exhibit 7.3)

DIVERSIFICATION OF SUPPLY SOURCES

Traditionally, manufacturing companies have focused on creating leaner supply chains. The key objective has been to create scale, efficiency and thereby reduce cost and complexity. However, with the increasing shocks and swings, companies have started diversifying their suppliers and prefer not to be dependent on a single supplier for one type of raw material or component.

EXHIBIT 7.2 | India Inc. Bullish on Rural Growth

“The rural market is still growing at 10–14% whereas the urban markets are either marginally de-growing or are flat. Our estimates of markets such as Punjab and Uttar Pradesh show consumers are ready to buy products”

— COO, *Videcon*, 2013

“Categories such as skin care and fairness creams are getting a good demand in rural markets since consumers there have more discretionary spending power”

— Director, *Emami*, 2013

“There is no deterioration of consumption cycle in rural India unlike the urban markets, despite high inflation. Dabur is expecting 30–40% higher growth in rural India over the urban markets”

— CEO, *Dabur India*, 2013

“We expect consumers in rural India will upgrade their purchases. Rural markets are growing 7–8% more than urban markets for LG India and account for 15–18% of overall sales”

— Chief Marketing Officer, *LG India*, 2013

“Going by the current trend of rising rural incomes with higher yields and minimum support prices, we are bullish on further growth from this critical market”

— VP (Marketing & Sales), *Honda Motorcycle & Scooter India*, 2013

“We have been focusing on these markets since the slowdown in 2008, and the initiative has helped us generate strong demand. Maruti Suzuki’s rural sales have jumped 19% this fiscal at a time the industry has contracted for nine months. The share of rural markets in Maruti’s sales has expanded to 28% from just 4% in 2008. The strong monsoon is expected to propel the demand further”

— COO (Marketing & Sales), *Maruti Suzuki India*, 2013

Source: Press Search.

EXHIBIT 7.3 | Manufacturers Broadening Production Footprint

Maruti Suzuki to start a plant in Gujarat...

“We are not moving away from Haryana. We have two plants in the state and going to Gujarat after utilising the capacity at Gurgaon and Manesar. We will do the same once we exhaust the capacity in Gujarat also”

— Chairman, *Maruti Suzuki India*

Dalmia Cements to start a plant in Belgaum...

“Three years ago, we were considered as predominantly south-based cement maker. But, we have added a plant in northeast and eastern India in the last couple of years. We are in the process of commissioning new plant in Belgaum, which will cater to markets in Maharashtra and Goa”

— CEO, *Dalmia Cements*

JCB India to start manufacturing unit in Jaipur apart from Pune & Faridabad...

“India is a very important market for JCB and our investment in Jaipur is a vital next step that we are taking to further strengthen our position in this growing market”

— CEO, *JCB Group*

Hero cycles to build 1mn capacity manufacturing unit in Bihar...

“Going forward we plan to dedicate this manufacturing plant to cater to the supply needs of the eastern Indian market. This plant is part of our strategy to not only expand production but also look for a manufacturing presence outside our traditional ground in Ludhiana”

— Chairman, *Hero Cycles*

Source: Press Search.

This diversification is by way of adding a new supplier or dispersing input requirements across multiple locations of the same supplier, thereby creating a natural hedge. This strategy may or may not improve bargaining power and has cost implications due to additional complexity; but it manages the risk of disruptions better. Hence, such diversification is applied selectively to critical inputs which have substantially high lead time for capacity creation in times of crisis. For instance, shoe maker Crocs expects 65 percent of its shoes to be made in China this year through third-party manufacturers, down from 80 percent last year, in the face of rising wage costs and supply shortages. Similarly, leather goods maker Coach will reduce its overall production in China to about 50 percent by 2015 from over 80 percent in 2011.

Collaboration

Collaboration with an external entity to tide over external challenges is a key driver of resilience, not just within the company, but also beyond. There are a couple of fundamental reasons why collaboration is an effective tool to combat external challenges. The first reason is that there is higher willingness to cooperate and explore new ideas during a downturn or an external challenge. Companies are typically more open to new ideas, including re-considering those that may have been shelved in the past, when they realize that their current plans alone will not be sufficient to reach their goals. The second is that resource allocation throughout the value-chain is more conducive for optimal results than that only within the company.

There are two types of collaboration that have proven effective in the past:

- Collaboration within the value chain (with suppliers or customers).
- Collaboration with a non-traditional partner (for instance, often with competitors).

COLLABORATION WITHIN THE VALUE CHAIN

Collaboration within the value chain typically occurs with suppliers and / or customers. While collaboration within the supply chain is an ongoing process in many companies, the winners see collaboration not as a one-off initiative, but as an ongoing program with their core suppliers.

They allocate specific resources in their procurement department towards supplier collaboration, devote senior management time, and ensure that promises about sharing of benefits arising out of a collaboration program are followed in letter and spirit.

Though collaboration in various forms has been existing formally across businesses globally for a few decades now (Toyota's famous JIT system being a good example), the current Indian context is forcing companies to take up collaboration initiatives more intensively than ever before. Collaboration today is being seen across three key dimensions:

Collaboration to increase customer value through better design and / or delivery. Often, sharing a customer challenge with suppliers can provide greater insights than ideating within the organization. Take the example of a manufacturer of consumer appliances that was trying to increase share in the North Indian rural market. Perennial low voltage in the North Indian villages was causing the company's refrigerators to malfunction. When this problem was shared with the supplier of compressor motors, they came up with a modified motor design that could continuously operate at lower voltages. This collaboration not only provided excellent consumer value, but boosted sales in North India as well.

Collaboration to reduce conversion costs due to better planning process. Collaboration across suppliers can not only increase customer value, it can also substantially reduce conversion costs. For example, in a recent collaboration exercise, a large steel-maker shared its throughput data by steel-type with its customer — an auto component maker. The two companies collaborated to identify the right steel-types to manufacture, that optimized throughput at the steel mill, along with the performance of the auto component. The companies agreed to share any benefits from this shift in an open manner. This approach was very different from the typical approach of 'list price for each spec, less discount' that the sales team of the steel maker and the procurement team of the auto-component maker were used to. It involved a change in mind set at both ends but resulted in outstanding impact.

Collaboration to reduce raw material and inventory costs due to better planning and visibility. Collaboration across the value chain can generate significant advantage in terms of inventory and raw material costs, both upstream and downstream. For example, a manufacturer of consumer appliances successfully collaborated across three different groups of suppliers to develop ‘composite’ printed doors instead of steel doors for its refrigerators and successfully managed to combat the inflation in steel prices.

COLLABORATION WITH NON-TRADITIONAL PARTNERS

In addition to collaborating with suppliers, companies are also exploring several innovative non-traditional collaborations, even with competitors, so as to leverage their individual strength, manage risks and explore new avenues of growth at the same time. Some of the non-traditional collaborations that companies are exploring are as follows:

Collaborating to share supply chain. This type of collaboration focuses on leveraging economies of scale by sharing logistics, components and suppliers. For example, Mars and Nestle combine deliveries to TESCO, potentially saving over 100,000 kilometres of duplicate truck journeys every year. Similarly, Unilever and Kimberly Clark share warehouse space in Amsterdam. As 93 percent of the combined volume is delivered to the same points, they have been able to reduce

inventory by 65 percent and stock-outs by 30 percent.

Collaboration to broaden product portfolio. Companies are collaborating with competitors to broaden their product offerings in the market. Again, the focus is on efficiency, scale and thereby competitive advantage for the partners. This is evolving as a critical form of collaboration in an environment of shortening product lifecycles. For instance, Reliance has entered into a JV with Russian petrochemicals giant Sibur to produce synthetic rubber to meet the demand from Indian auto makers. In another type of collaboration on similar lines, companies collaborate in innovation. For example, auto companies are more proactively collaborating on vehicle platforms; this helps them reduce costs as well as share the risks for failure. Similarly, Dupont and Chemchina have entered into a 50/50 joint venture in China, for the production and marketing of fluoroelastomer gums and precompounds.

Collaboration to explore new markets. In this type of collaboration, companies come together to share the risks and rewards of entering new markets. The objective is to complement each others’ strengths while charting new territory. For instance, Bajaj and Kawasaki have entered into a global alliance to market and brand their products jointly across developing countries, starting with Philippines and Indonesia.

CASE STUDY: BMW AND TOYOTA

BMW and Toyota have embarked on a collaborative journey to meet new challenges. Toyota owns the luxury brand Lexus, and is a direct competitor of BMW in the luxury car segment. The alliance started in 2011 along the following key dimensions:

- Electric car battery research: Electric cars are among the biggest growth trends in the automobile sector. The technology remains costly and difficult to implement. Both companies have come together to share costs and technology research.
- Engine supply: Toyota will reportedly use BMW’s 1.6 and 2-liter diesel engines in its cars that will be sold in Europe starting 2014. This is reportedly the first time that Toyota has procured an engine from a competitor. The collaboration will reduce BMW’s engine production costs per unit by increasing volumes.
- Developing new products: BMW and Toyota are teaming up to produce a midsize sports car that is set to underpin the replacements for the Z4, 6-series for BMW and GT86 for Toyota.

INCREASING RESPONSIVENESS

“You have to be fast on your feet and adaptive or else a strategy is useless.”

— Charles de Gaulle

THERE ARE TWO SUB-THEMES that we want to discuss under the topic of responsiveness:

- **Flexibility:** Companies need to inculcate the ability to change course with the market to leverage any swings beneficially.
- **Innovation revamp:** Companies need to step up their innovation agenda to be able to react to industry / customer needs in a shorter time-frame and with a more impactful value proposition.

Flexibility

Flexibility in winning companies can be found across all elements of planning and operations. One of the key areas that sets companies apart is a modular and flexible product strategy. A modular approach to products involves creation of highly flexible ‘platforms’ composed of a series of component sets or ‘modules’ which are re-usable across multiple models and segments.

The modular approach offers several unique advantages to companies:

- First, a modular approach helps in significant reduction of key costs — devel-

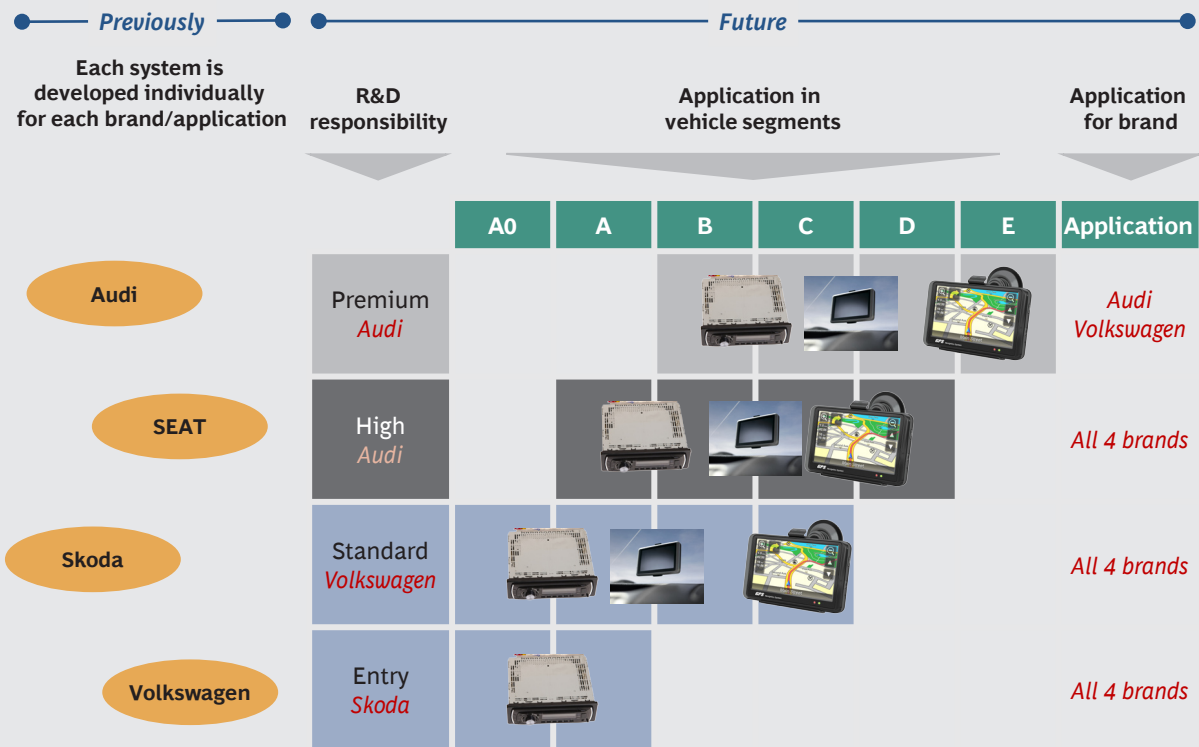
opment costs due to re-usability of available components, procurement costs due to higher per-module volumes, and production costs due to scale effects.

- Second, it improves speed-to-market due to reduced development time for newer variations by leveraging existing modules and faster production due to higher investment in automation and larger batches.
- Finally, it helps in improved quality management and control on account of increased up-front investment in high quality, optimized process design for each module which can be subsequently replicated across plants with relative ease.

Volkswagen has successfully embedded the modularity strategy firmly into its organization. Exhibit 8.1 shows one example of how infotainment is being modularized across brand and vehicle segments. In the long run, over 30 models, with lifecycles ranging across the next decade, are planned to be based upon modular toolkits translating into significant scale benefits.

Some of these benefits have already materialized. Material costs have reduced by 20 percent. Development costs, too, have reduced by similar extent, with a total of around 40 percent reduction expected in the future.

EXHIBIT 8.1 | Modularity at Volkswagen: Infotainment Example



As shown above, responsibilities are split between brands, even within a specific module, according to best-in-group competences and standard / premium / brand-specific elements

Source: Volkswagen; Press search; BCG analysis.

Innovation Revamp

Today’s fast evolving world necessitates companies to re-invent continuously, both in the way they operate, as well as in their offerings to their customers. Customers are choosier now, driving down the average life cycle of products to as much as half of their duration in the last century (as shown in Exhibit 8.2). The only way companies can manage this evolving and highly competitive environment is by changing the way they innovate.

We highlight two key imperatives for manufacturing companies looking at product innovation:

REVAMP THE NPD¹ PROCESS TO DRIVE SUPERIOR ECONOMICS OF INNOVATION

With product lifecycles shrinking, it is not only important for companies to ensure a steady flow of innovative product ideas, it is also equally critical to prioritize and rapidly move good ideas from concept to commercialization. Companies need to devise ways

for faster innovation. At the same time, it is essential to ensure reasonable return on innovation investments.

We share two case studies to illustrate how world leading companies approach this aspect:

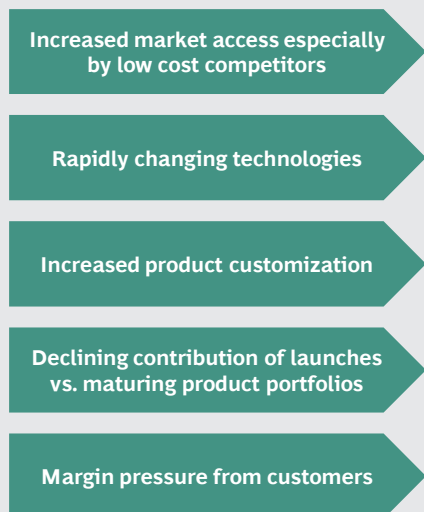
Case study 1: Iterative NPD process at P&G.

P&G follows an iterative, customer-centric NPD approach. This ensures that consumer needs and market uncertainties are continuously captured while frequently testing and refining prototypes with customers, using structured processes and tools. As an example, the company incorporated consumer insights in all product development phases when introducing a new dish-washing detergent in the European market:

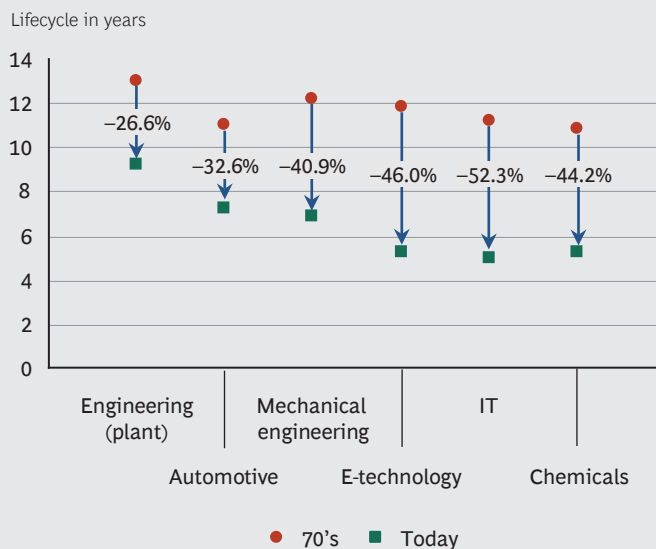
- First, product was designed and developed based on consumer insights (for example, a dish-washing detergent should leave dishes clean and shiny).

EXHIBIT 8.2 | Market Dynamics Shortening Product Lifecycles

Current market trends...



...leading to shorter product life cycles



Source: BCG Automotive / Procurement Practice; Droege / Backhaus / Weiber: Strategien für Investitionsgütermärkte – Antworten auf neue Herausforderungen; BCG analysis.

Note: Average length in each industry segment (empirical analysis)

- Second, product testing was carried out under customer-relevant conditions (for example, measuring how shiny the dishes become in terms of light reflectivity).
- Finally, evaluation results were also incorporated in product promotion (for example, leaves dishes up to 30 percent shinier).

Case study 2: Superior economics of innovation at 3M. 3M has been extremely successful at driving superior economics of experimentation. Three key aspects have been instrumental in this success:

- First, the firm promotes idea generation by allowing its employees to devote 15 percent of their schedules to “slack time” and by hosting technology forums to brainstorm and share ideas.
- Second, it increases the volume of ideas converted to experiments by providing multiple channels of seed capital, such as a “Genesis” grant to fund experiments.

- Finally, it accelerates the scale-up of successful experiments through its Pacing Plus program, which focuses on leapfrog technologies, and its Acceleration Initiative which addresses large opportunities and markets. The program helps allocate more corporate resources to experiments and speed up their commercialization.

In order to ensure that investments in innovation generate adequate returns, the company has also developed an internal measure called the New Product Vitality Index (NPVI), which measures the proportion of total revenue which is contributed by products that did not exist five years earlier. The NPVI has increased from 25 percent in 2008 to 34 percent in 2012, and the company aims to reach 40 percent by 2017.

Learning from global leaders in innovation, Indian companies also need to focus on adding speed as well as discipline to their innovation efforts by revamping the NPD process. This is critical to minimize innovation timelines from idea to commercialization and, at

the same time, maximize returns on innovation investments.

FOSTER RADICAL INNOVATION

Companies often shy away from radical innovation. Yet, the most rewarding ideas in the history of manufacturing have largely been radical in nature. Take for instance Corning's optical-fiber work which saw several failures along its course of development, including attempts at video telephony and broadcast local-area networks. The product achieved commercial success only about a decade later, following a highly opportunistic path that built on outside events and unrelated internal projects. Optical fibers are now a vital conduit of the world economy. But if Corning had been subject to today's productivity focused innovation regimes, the project would have been shelved much earlier in its development phase.

As radical innovation necessitates a reasonable amount of flexibility, companies need to ensure that radical ideas are not passed through the traditional, stringent stage-gated NPD process. Management needs to decide upfront whether a new project will follow the radical or conventional approach, necessarily devoting some portion of the innovation efforts towards radical projects.

Manufacturing leadership needs to understand that radical innovation calls for a different — yet systematic — management approach. Rather than focusing on predictability, companies need to focus on governance, especially around risk management, in their approach to radical projects. Management reviews for a radical idea should focus on how attractive the project looks on a risk-reward basis and whether the project is within acceptable limits of potential losses. Especially in the initial phases, it is important to recognize advances in understanding as acceptable outcomes rather than check-marking a set of predefined deliverables.

Apple stands out as one of the leaders in breakthrough innovation. While digital music players existed earlier, the iPod was distinguishably unique — its impressive looks and ease of use propelled product sales, touching

one million within 18 months since its launch in 2001. Not stopping merely at the product, Apple introduced the iTunes music store in 2003, which revolutionized the digital music industry. The file format promoted by Apple provided protection against rampant piracy, winning the support of the music industry. At the same time, end consumers benefitted from the ease of buying their favorite music from a single destination at reasonable prices. This fostered a new ecosystem for digital music, turning Apple into a media giant. iTunes sold one million songs in its first week itself. The revenues for iPod as well as iTunes have rapidly scaled since then and iPod holds over 70 percent share of the U.S. market today.

NOTE:

1. New Product Development

INSTITUTIONALIZING READINESS

“Action springs not from thought, but from a readiness for responsibility.”

— G. M. Trevelyan

THERE ARE TWO KEY elements that this chapter covers under the theme of readiness:

- **Talent management:** Ensuring the right talent for the organization.
- **Proactive risk management:** Building the right culture and systems to drive proactive risk management.

Talent Management

In the current environment, it has become ever more imperative for manufacturing companies to attract the right people and develop a bouquet of relevant skill sets. Unfortunately, given the relatively poor performance of the industry and widespread perception of manufacturing being ‘non-glamorous’, attracting and developing people is more difficult than ever before. Successful manufacturers are combating the situation through a variety of innovative means to deal with these challenges. In this part of the note, we focus on potential ways manufacturers can attract and develop people.

ATTRACTING TOP TALENT

There is massive competition for skilled labor. At the same time, fresh engineering grad-

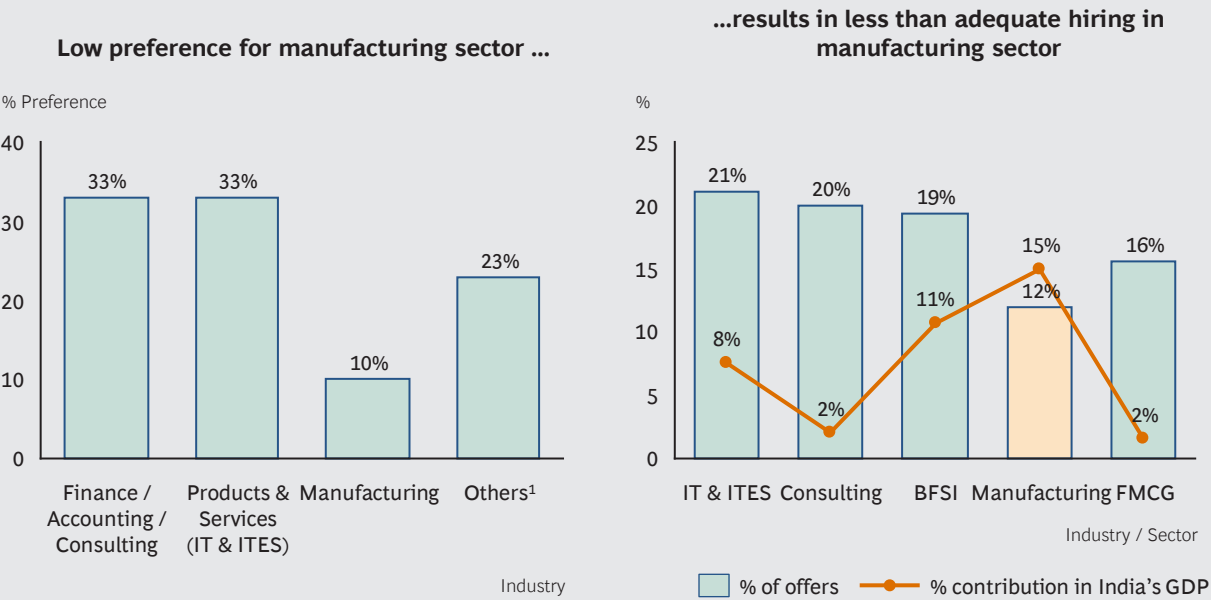
uates have lower preference for manufacturing as compared to other sectors (as shown in Exhibit 9.1).

Given the shortage of talent and the weak starting point that manufacturing has in the job market, manufacturing companies need to adopt a three pronged approach to attract talent (as shown in Exhibit 9.2):

1. Creating awareness about manufacturing jobs
2. Connecting with talent
3. Building a positive brand image

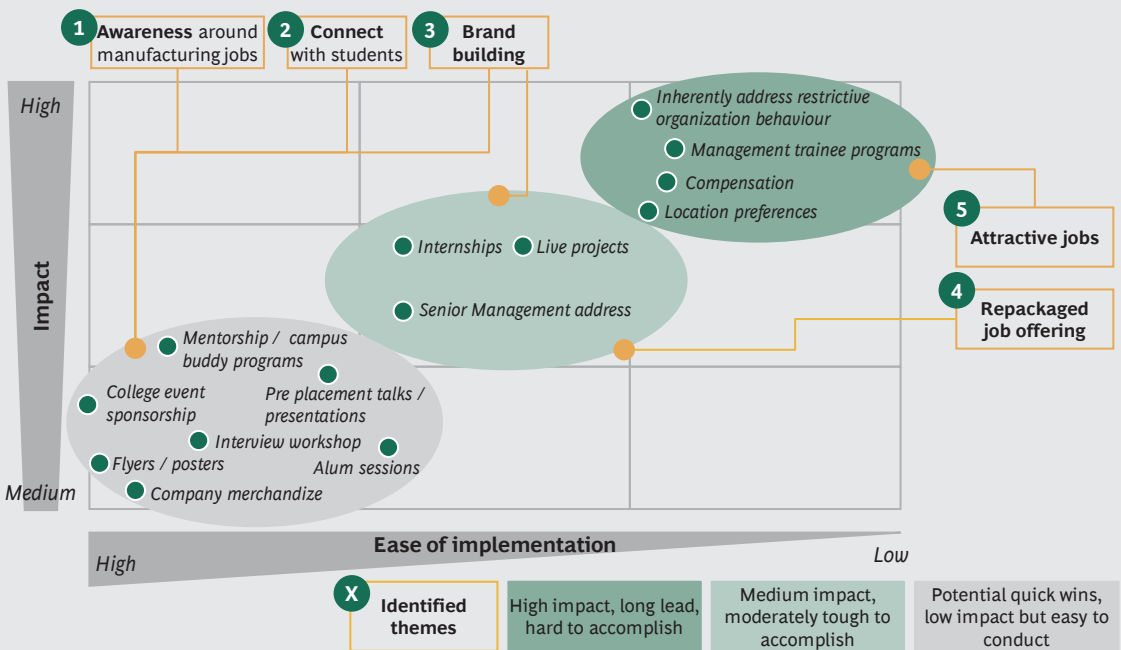
Additionally, there is urgent need for manufacturing companies to market their job offering to students better, by strongly emphasizing their key differentiators — like ESOPs, fringe benefits, job security and better work-life balance. As an example, a major manufacturing conglomerate in India has been successful in attracting and developing top manufacturing talent. At the campus level, the group has engaged students by conducting operations and strategy competitions, case studies and leadership talks. For the new hires, the group has a structured training program having focused stints spread across industries, functions and locations. It has also managed to attract new talent and retain top talent by providing them significant international exposure and cross-

EXHIBIT 9.1 | Manufacturing Sector Unable to Secure Right Share of Talent



Source: Graduate Management Admission Council Job Trends Outlook 2012; Placement Statistics of Sample Tier I & II B Schools in India; NASSCOM estimates; Economist Intelligence Unit Database; BCG–CII Campus Survey on Manufacturing Sector; BCG Analysis.
¹Others includes energy, pharmaceuticals , government profiles.

EXHIBIT 9.2 | Levers for Manufacturing Companies to Attract Top Talent



Source: BCG–CII Campus Survey on manufacturing sector; BCG analysis.

country mobility. Additionally it has launched multiple initiatives focused on continuous learning programs, world-class recreational facilities, subsidized education and scholarships for employees’ children, strengthening its proposition further.

DEVELOPING THE RIGHT SKILLS

With the increasing complexity of the new manufacturing environment, the skill requirement of employees has also gone up. Manufacturing jobs can no longer be considered linear, mechanical and isolated from other business functions. There has been an explosion in the role, scope, skill demands and expectations of manufacturing employees. As a result, manufacturing firms need to launch focused talent development programs. Let us look into a specific example of the procurement function.

Case study: the evolving role of procurement.

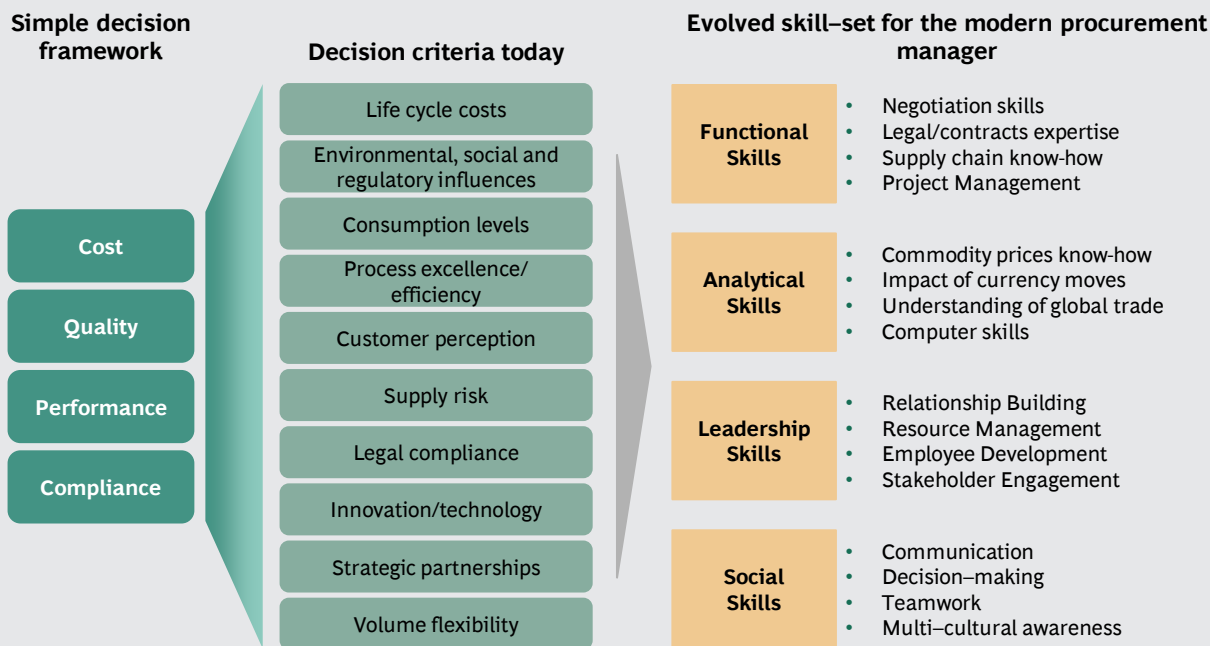
In the traditional business-as-usual environment, the decision making process for the procurement function involved fewer variables. The procurement mandate was to primarily ensure the timely supply of components at the best possible cost, with ‘pre-qualified’

quality and performance requirements that would be revisited once every few years. Managing supplier relationships was another tactical task at hand. However with the change in era, the role of procurement has also evolved. It is much more complex now, as explained in Exhibit 9.3.

A modern day procurement manager is expected to keep a tab of the market trends and how they affect the company’s supply chain. She / he has to be aware of the impact of global currency movement on supplies; she / he is expected to partner with suppliers actively in areas of innovation and product co-development. At the same time, technological penetration in procurement is continually increasing. As a result, today’s procurement managers are expected to develop advanced skills such as predictive modeling using Big Data and real-time monitoring of shipments.

In order to equip employees with the requisite skills for meeting these rising expectations, manufacturing companies need to develop multi-faceted programs focusing on a wide range of skills. For instance, a major steel company in India has been on a mission to

EXHIBIT 9.3 | Procurement Case Study: From Supply Management to Systems Management



Source: BCG analysis and case experience.

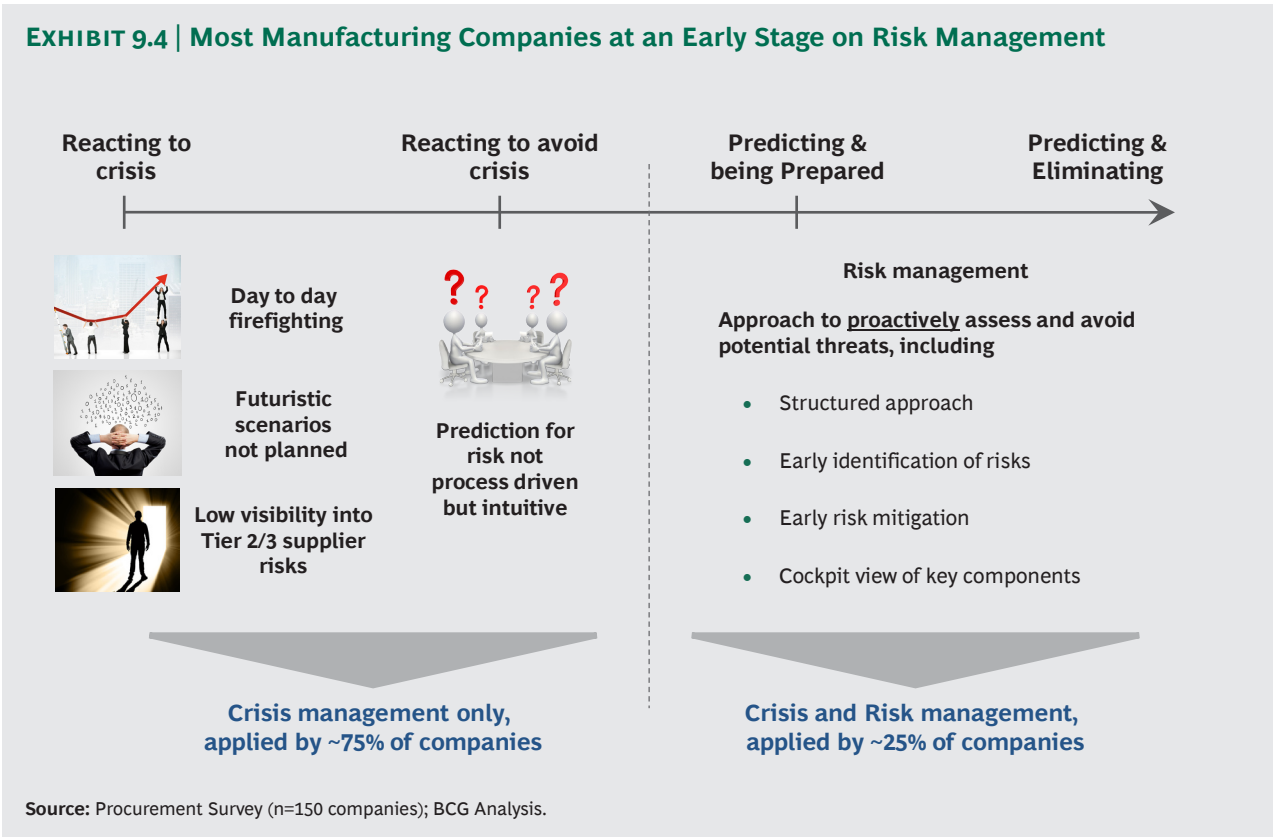
upgrade the skill set of its workforce. Recently, it conducted a capability building program for more than 70 employees in its procurement division. All aspects of modern procurement were covered with a carefully designed, state-of-the-art curriculum. The training focused on building employee capabilities across five dimensions — functional skills, strategic understanding, analytical skills, leadership roles and soft skills. A multi-pronged approach was adopted to deliver the training — classroom sessions, on-the-job training, virtual learning and expert lectures were all part of the diverse pedagogy. Group activities, role plays and assessment tests complemented the lectures and enriched the learning experience.

Proactive Risk Management

In the current volatile world, being proactive, anticipating risks and opportunities, and being the first on board can be a substantial source of competitive advantage. Further, even if a set of shocks cannot be predicted, having a well-tested event response plan can differentiate the winners from the losers. For example, during the recent tsunami in Japan, the world’s semiconductor supplies were se-

verely impacted. However, as other companies struggled to get their production up and running for months, Fujitsu was able to meet customer demands quicker than anyone else was. The reason they were able to do so was because they had put in place a proactive risk management system after having faced an earthquake three years ago. The moment the tsunami struck, Fujitsu shifted its front-end product manufacturing to unaffected plants in central Japan and its back-end product manufacturing to southern Japan and China. Their plant in Mie (Japan) was able to handle the processing of three different widths of silicon wafers efficiently, thanks to the redundancy they had built in their manufacturing capabilities. Fujitsu also had an effective plan to restore electricity, water and other utilities that enabled them to resume production quickly in their disaster-stricken plants.

Such proactive management needs to be part of the organizational DNA and embedded by the way of systems and processes. A recent survey conducted by BCG reveals that most companies are still in a reactive mode (as shown in Exhibit 9.4). Less than 25 percent of them have proactive risk management systems.



A proactive risk management system needs to have the following features:

- Standard, objective predictive metrics.
- A predefined option set of mitigation actions.
- Ways to measure / quantify risks, cost of mitigation actions, and their implications.

To illustrate, automotive companies are exposed to multiple tiers of suppliers — each of whom is exposed to market-specific, supplier-specific and geopolitical risks. A spike in any one of the risk parameters has the potential to cause severe disruption in the supply chain, resulting in several ramifications including production downtimes, loss of customers, product recall, and lower employee morale. As a result, many leading companies are devising a supplier risk management system which focuses on regularly capturing symptoms and signals from suppliers on various operational, financial and strategic pa-

rameters that can serve as an early warning for impending risks (as shown in Exhibit 9.5). These can be then used to take proactive action that will ensure that either the risk does not materialize or even if it does, it does not significantly impact the company's operations.

From the above section, it is clear that being adaptive not only has short term benefits but offers significant long term advantage to those companies that can get it right. However, ingraining adaptiveness into organizational DNA is difficult, especially in manufacturing, which has a relatively longer legacy of stable businesses. Nevertheless, the imperative is greater than ever before. In the next section, we share some concluding thoughts for industry leaders to act on.

EXHIBIT 9.5 | Key Risk Indicators to Assess Specific Supplier Risk

Geopolitical risks	Catastrophe risks	Market risks	Strategic risks	Financial risks	Operational risks
Sociopolitical risks - Country risk rating - Corruption index - Criminality index	Environmental disasters Past incidents of natural disasters	Macro-economic development - GDP (growth) - Employment rate - Inflation - Gini index	Supply chain structure - Number of alternative suppliers - Supply / demand situation	Profitability - EBIT - Net profit margin - Cash conversion cycle	Personnel risks - Employee age - Level of education - Number of labor unions
Legal risks - Tax rates - Frequency of regulation change	Man-made disasters - Accidents - Dry zones	Market price development Commodity indices for major used components	Industry concentration - Market share - Number of clients	Funding - Current ratio - Credit Rating - Debt / equity ratio - RoE, RoA	Technological risks - Age of machinery - Facility restoration
Infrastructural risks - Infrastructure coverage and quality rating - Infrastructure investments	Violent acts - Population satisfaction rating - Foreign relations		General strategy - Image ranking - Contract duration	Liquidity - Credit lines - Cash position - Refunding rates - Liabilities - Liquidity plan	Process / organization risks Infrastructure rating

to be assessed for countries in which supplier has production facilities

to be assessed for supplier itself

Source: BCG Automotive / Procurement Practice; BCG Analysis.

CONCLUDING THOUGHTS

“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change.”

— Charles Darwin

A LOT HAS CHANGED IN the Indian manufacturing sector. Turbulence has increased considerably. Product life cycles are shrinking as customers demand more. Shortages in terms of infrastructure have started to become a norm in some of the sectors. Exports have become radically more attractive for some sectors, marginally more in many others.

Our approach in this era of turbulence needs to change. Companies need to be more adaptive and build their strategy and operations around three pillars of adaptiveness — Resilience, Readiness and Responsiveness. Resilience to make their businesses withstand shocks, Readiness to ensure their companies know how to react to changes, and Responsiveness to ensure speed.

The adaptive companies have already started powering past the headwinds. Waiting in the hope that the sector will get back to the days of lesser turbulence and higher predictability may not be prudent. The time to change is now.

FOR FURTHER READING

The Boston Consulting Group publishes other reports and articles on related topics that may be of interest to senior executives. Recent examples include:

Managing the “Unmanageable”: Radical Innovation

A focus by The Boston Consulting Group, September 2013

The Most Innovative Companies 2013 — Lessons from Leaders

A report by The Boston Consulting Group, September 2013

Perspectives on Importance of Automotive Industry

A report by The Boston Consulting Group in association with Society of Indian Automobile Manufacturers (SIAM), August 2013

Green Manufacturing— Imperatives for Indian Industry

A report by The Boston Consulting Group in association with The Confederation of Indian Industry (CII), August 2013

Behind the American Export Surge — The U.S. as One of the Developed World’s Lowest-Cost Manufacturers

A focus by The Boston Consulting Group, August 2013

People Productivity — Key to Indian Manufacturing Competitiveness

A report by The Boston Consulting Group in association with The Confederation of Indian Industry (CII), March 2013

Allies and Adversaries: 2013 BCG Global Challengers

A report by The Boston Consulting Group, January 2013

Re-igniting India’s Quest for Manufacturing Leadership

A report by The Boston Consulting Group in association with The Confederation of Indian Industry (CII), December 2012

Capital Goods in India — A Call for Action

A report by The Boston Consulting Group in association with The Confederation of Indian Industry (CII), November 2012

The Most Adaptive Companies 2012 — Winning in an Age of Turbulence

A report by The Boston Consulting Group, August 2012

Adaptive Advantage — Winning Strategies For Uncertain Times

An e-book by the Boston Consulting Group, April 2012

Thriving in a Volatile World — Conversations with Leaders

A report by The Boston Consulting Group in association with The Confederation of Indian Industry (CII), March 2012

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