



GROWING RELATIONSHIPS THROUGH DATA

**MANUFACTURING INDIA**

**2025**





# Manufacturing India 2025

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Manufacturing India 2025



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GROWING RELATIONSHIPS THROUGH DATA



# Preface



**Kaushal Sampat**

President & Managing Director - India  
Dun & Bradstreet

There are distinct winds of change in the Indian manufacturing sector with the Government initiating the 'Make in India' program that seeks to give a comprehensive push to industrial development. While lack of an enabling infrastructure and historical governance issues have long challenged India's manufacturing growth, the initiative is expected to provide much required conducive environment for the manufacturing sector as it seeks to introduce business friendly regulatory environment, enhance the ease of doing business and improve manufacturing infrastructure, among others. These initiatives complement progress on broader investment reforms, allowing India to seize emerging export opportunities.

The stage has been set and the initiatives rolled out. Developing the manufacturing sector would thus enable India to accelerate its growth rate towards its high long-term potential by gainfully engaging its workforce. The initiatives taken to promote the manufacturing sector will benefit all the other segments of the economy. The Indian manufacturing sector will slowly but surely gain the foothold in the coming years.

However, the goal of increasing the share of manufacturing sector to 25% of GDP would involve various opportunities and challenges. In order to effectively catalogue this journey of growth, Dun & Bradstreet has instituted a research based publication: "Manufacturing India 2025" that analyses the prospects of the Indian manufacturing sector over the next decade. This report provides forecasts of overall economy and manufacturing sector by 2025, identifies critical parameters that will drive growth and propel the nation as a global manufacturing hub.

We believe that growth in manufacturing would be a sum of diverse growth paths of various industry sub-sectors identified in the "Make in India" programme.

I hope that you find this publication to be a useful research tool and an invaluable addition to your library. We look forward to receive your valuable feedback and suggestions.





# Corporate Publications



Dun & Bradstreet's Economic Analysis Group conducts high-end business research and analysis. Tracking the economic scenario and business landscape closely, it produces value-added publications such as

India's Top 500 Companies, India's Top Banks, India's Top PSU's, India's Leading Equity Broking Houses, India's Leading Infrastructure Companies and many more.

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# Foreword



**Pawan Bindal**

Director

Dun & Bradstreet India

There exist much potential to re-embark on the path of accelerated manufacturing growth supported with effective and strong manufacturing reforms. The “Make in India” programme initiative has raised hope for sustainable higher growth in the manufacturing sector. The vision of increasing manufacturing share in economy has boosted confidence among various stakeholders. By providing the critical enablers in place such as targeted infrastructure improvements and more open trade and investment regime, the manufacturing sector is expected to shift into the next gear of competitiveness during the next decade.

Along this path, India would also have to focus on building more complex capabilities that are required to make a shift structurally from low-value added sectors towards high-value added sectors. Indian manufacturing sector ought to become more responsive to changing global markets. The critical drivers for this structural change will involve imbibing technology at each level of the manufacturing segment that are aimed at efficiency seeking process innovations and new product developments. Along with spending on R&D, sectors would also require adopting new and advanced manufacturing technologies. Definite policy thrust is required for the development of technology intensive

sectors like aerospace, defence, high precision machinery, pharmaceuticals, etc. Channelizing and incentivizing the educated and skilled workforce towards understanding and absorbing the new-age technologies would only help in increasing the value addition to the manufacturing sector.

At Dun & Bradstreet, we believe that manufacturing in India would grow with “Make in India” initiative acting as a catalyst. The publication ‘Manufacturing India 2025’ is an attempt to identify key enablers of manufacturing growth and to track their progress over the next decade. Dun & Bradstreet’s global footprint and wider market reach will ensure that this publication serves as an authoritative source of information. Our endeavour is to meet your expectations and we look forward to your feedback and suggestions on this publication.



# Providing Solutions Across Segments

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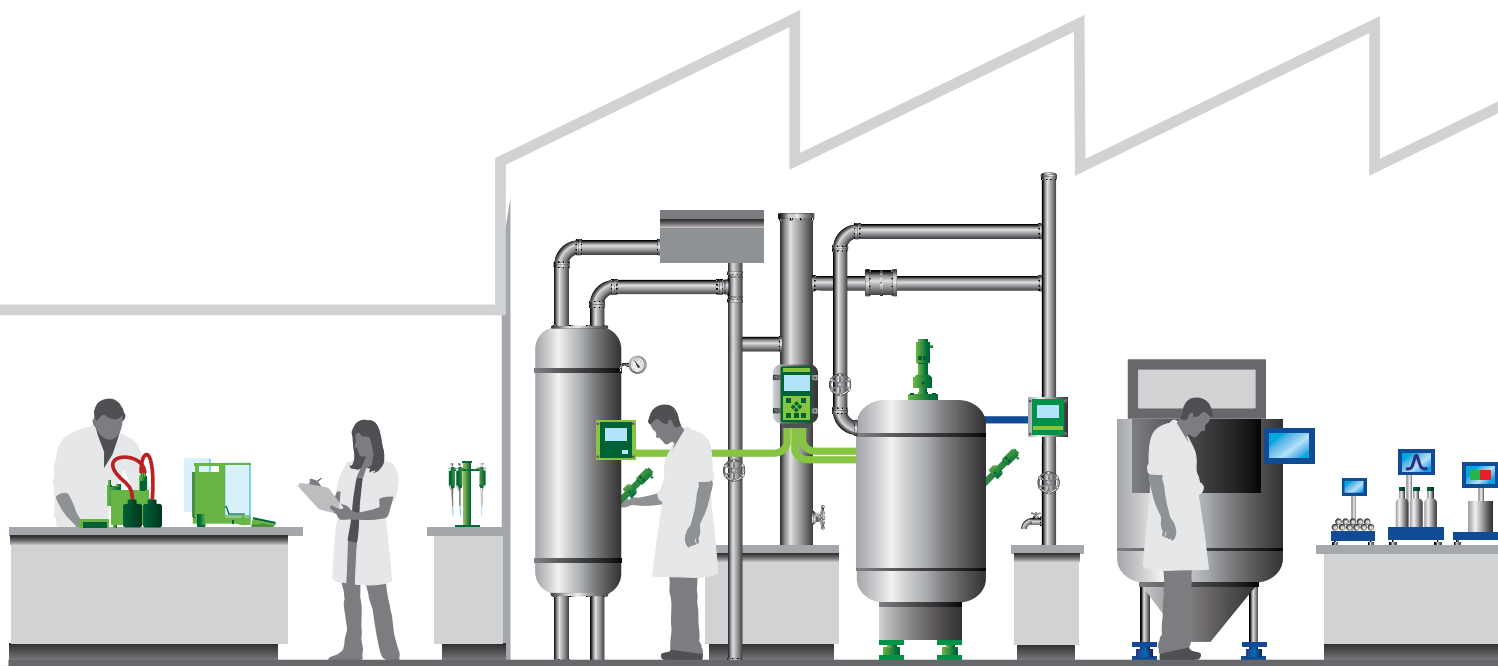
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# METTLER TOLEDO

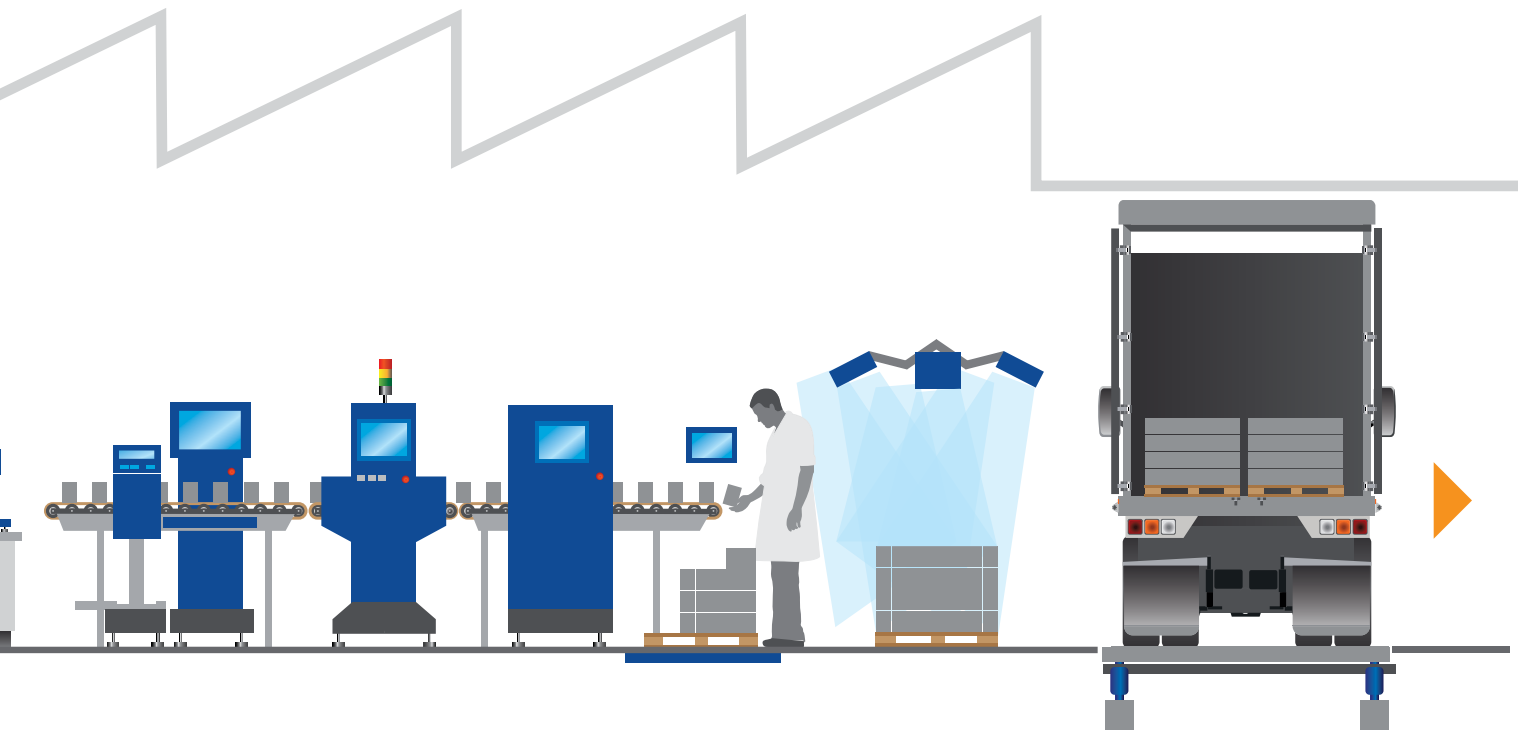
## Warehouse

Structure  
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Ports

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Chemical

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Parcel & Cargo



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# Sectoral Risk Outlook (SRO)

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## Comprehensive Sectoral Coverage

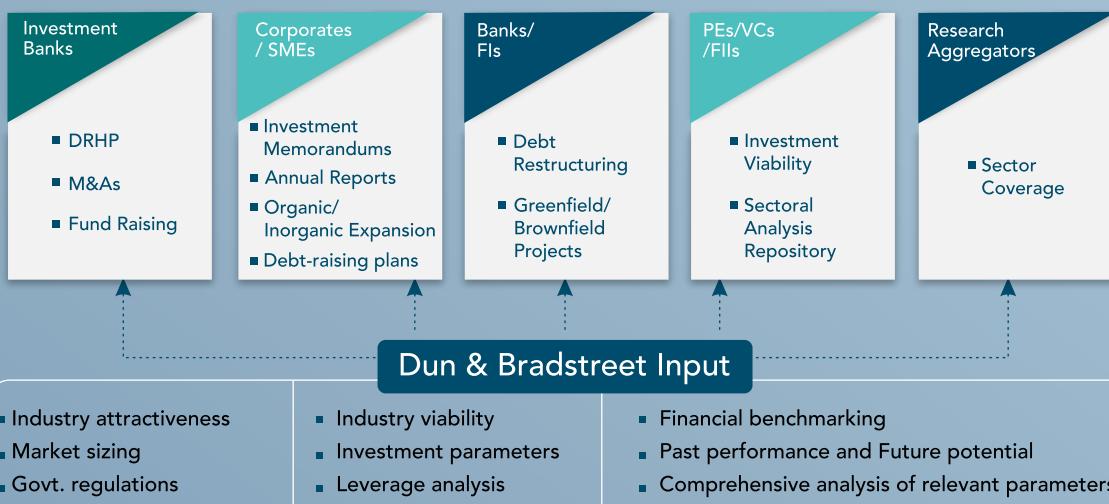
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# Executive summary



**Dr Arun Singh**  
Lead Economist  
Dun & Bradstreet India

While global growth remains subdued, the Indian economy is gradually gaining pace led by the inherent strong fundamentals of the economy. However, India has great potential to grow further. The series of small yet important reform measures announced by the new government at the centre, improved business environment through simplifying processes, thrust on infrastructure development, focus towards decentralized planning and greater empowerment of states would help India to reach its true growth potential. To achieve a manufacturing-led transformation, the Government has launched the 'Make in India' Programme to provide conducive environment for manufacturing sector in India and develop it as an attractive hub for manufacturing. Along with 'Make in India' Programme, other initiatives like Digital India, Skill India, Start-up India, developing Smart Cities and Rurbanisation if implemented conscientiously and accountably will change the dynamics of Indian economy in next decade.

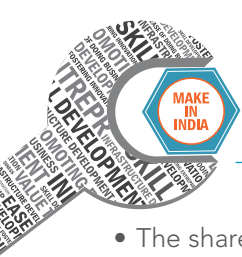
In this context, 'Manufacturing India 2025', a publication produced by Dun & Bradstreet, outlines India's growth journey during the next decade. In this publication, Dun & Bradstreet has evaluated

the growth prospects of the overall economy and identified key enablers of manufacturing growth. The report outlines the current macroeconomic scenario, provides insights about eight future manufacturing technologies, compares the enablers of Indian manufacturing with its global counterparts and also lists down key constraints that could pose downside risks to India's growth prospects.

The highlights of the finding has been provided below

- The Indian economy is expected to gather pace by FY17. India's GVA is expected to witness a healthy growth rate of an average of around 7.8% during FY17-FY20, beyond which its growth rate is expected to accelerate to around 8.2% during FY21-FY25. Given its strong domestic fundamentals, India is expected to realize its potential and achieve an average growth rate of around 7.9% during the next decade (FY16-FY25).
- Growth in the industrial sector is expected to revive in the coming decade. With recovery in the industrial activity, share of industrial sector in overall GVA is expected to increase from 31.2% in FY15 to 34.1% in FY25.





- The share of services sector in GVA is expected to be 56% by FY25, while the share of the agriculture sector in GVA is expected to decline from 16.3% in FY15 to 9.9% by FY25.
- India's manufacturing sector is expected to gain momentum in the coming years and grow at an average rate of 12.2% till FY25. With the revival in the manufacturing activity, the share of manufacturing sector in overall GVA is expected to increase from 17.1% in FY15 to 24.7% in FY25.
- The 'Make in India' initiative, improvement in business environment, implementation of critical reforms in the areas of land, labour and taxation, focus on skill development and macro-economic stability are expected to be the key factors that would provide fillip to the Indian manufacturing sector.
- In order to achieve the target of 25% share of manufacturing in GDP by 2025, D&B expects the manufacturing investment to grow from around US\$ 109 bn in FY14 to US\$ 490 bn in FY25.
- D&B evaluated the growth and status of 6 major industrial sectors by 2025; the share of 6 major industrial sectors in India's economy i.e. Mining, Metals, Machinery & Equipment, Chemical & Pharma, Textile & Leather and Food processing is expected to grow from around 17% in FY14 to approximately 23% by FY25.
- D&B covers broad advanced-technology-based processes manufacturing which are impacting the current manufacturing processes in India and are likely to be imbibed by the Indian manufacturers at large in the future. These future manufacturing technologies include Internet of Things, Additive Manufacturing, Robotics Manufacturing, Nanomanufacturing and Biomanufacturing.
- In view of various initiatives taken by the government, a significant pick-up in infrastructure investment can be expected in the coming years. According to D&B estimates, physical infrastructure investment is expected to surge to 10.2% of GDP by FY25 from around 7.5% (E) of GDP in FY15.

- While physical infrastructure is expected to play a vital role in India's journey towards higher growth in the coming few years, improvement in social infrastructure will help the country to move towards inclusive growth.

The goal of raising the share of manufacturing to 25% of GDP would require conducive business environment, efficient business processes, investment to support innovation, capital and labour efficiency, shift from low value added sectors towards high value added sectors, presence of supporting industries along with continued policy thrust amongst other measures. Besides improvement in physical infrastructure, strong supply chain and logistics, focus on health and skill development are required which will not only facilitate the growth of the manufacturing sector but will also push India on a high and sustainable growth trajectory in the coming years.



# EXPERT SPEAK





**Mr. Sanjeev Dhar**  
Managing Director  
Mettler-Toledo India Private Limited

## METTLER TOLEDO

### Q: Please give us an overview of your company

A: METTLER TOLEDO is a leading global manufacturer of precision and weighing instruments for use in laboratories, manufacturing, logistics and retail. The company offers weighing, analytical, measurement and inspection solutions along their customers' production or manufacturing value chain to help them streamline processes, enhance productivity, reach compliance with regulatory requirements or optimize cost.

### Q: What are your thoughts about 'Make in India' initiative?

A: This is one of the most progressive and aggressive initiative by the government. Changing lifestyle, global exposure and media are bringing about a change in the domestic consumption patterns. Disposable incomes are increasing in India where 95% of the population are at middle-income levels and below. This initiative combined with Skill Development initiative has very high potential for job creation. Under this initiative, the ease of doing business in India should improve significantly. We are optimistic that the government is stepping up the progress monitoring of these operational issues. With the right focus and execution on Make in India initiative, a fine balance can be achieved between services and manufacturing sectors helping the GDP to grow beyond 8% by 2025.

### Q: Could you elaborate on your contribution/support for the 'Make in India' initiative?

A: Our organization provides comprehensive range of Precision Weighing & Analytical solutions to most of the target sectors that are part of the Make in India initiative. Our products and solutions helps our clients to improve their efficiency and productivity, with reduced wastage of time, effort, cost effectiveness and manpower. Our solutions touch all the different

processes of any manufacturing organization. We conduct special educational programs at leading organizations on Good Weighing Practice (GWP), which is a global patented program of Mettler Toledo, helping manufacturing industries to adapt to the right weighing processes. We work closely with Legal Metrology and help all the industries to comply with the guidelines set by Legal Metrology from time to time. Our equipment's are the best in class with very high precision and accuracy; we assemble some of our products in Vasai, Mumbai and also have engaged many contract manufacturers to manufacture the platform scales and weighbridges. Since many Indian manufacturers are participating in Make in India initiative, we want to let them know that we are available to strengthen their various weighing processes which is very critical at every stage in the production line. We also cater to Courier, Cargo and Logistics Industry with our unique Dimensioning and Volumetric Weighing Solutions, which is not yet regulated in India, however used by this Industry to prevent revenue leakage. With the new SOLAS(safety of life at sea) regulation governed by International Maritime Organization, implemented by Directorate General of Shipping under the Ministry of Shipping GoI, we are fully prepared with the various solutions and can help all exporters to comply with this unique requirement of declaring the Verified Gross Mass of the products which are exported.

### Q: Can you please tell us about the R&D initiatives of your company?

A: METTLER TOLEDO has long been a leader in innovation and quality. Some of our unique innovations cut across various technologies to include gas analysers, micro balances, advanced loadcells technology, software solutions, etc,. Our global R&D expenditure is 5% of our company's turnover. In addition, we also have a dedicated R&D team in India. We have been customizing and also developing new solutions for our customers in



India to be competitive and help our customers with improved cost of operations.

## Q: What are the challenges faced by the manufacturing sector in India?

A: Challenges and hurdles are part of any new initiative. We have to admit that technologically we are lagging from the developed countries with high labor intensive processes; we are still a decade behind if not less than advanced countries, in usage of technology and in manufacturing excellence. It is important that all manufacturers make the right investment on quality products, without compromising on the safety, productivity and processes aspects in manufacturing. Productivity of the manufacturing sector is low, partly because the relatively small size of manufacturing firms makes it difficult to exploit economies of scale. Despite abundant, low-skilled and relatively low cost labour, Indian manufacturing is surprisingly capital and skill intensive. Furthermore, firms have less incentive to grow, since by staying small they can avoid taxes and complex labour regulations. Land acquisition is slow, companies face frequent power outages and transport infrastructure is below par. In particular, India should aim for more formal jobs, as these tend to be the most secure and of highest productivity.

## Q: Can you please elucidate the challenges faced by your company in the current scenario?

A: Once GST is implemented the business dynamics will change. We are also hopeful that GST will simplify the distribution process in the country and will save the manufacturing industry from the different and varied taxes or duties levied by different borders within the country. Today only Pharmaceutical manufacturing process for export is regulated by USFDA. For domestic production, the regulatory framework may not be watertight. We would expect the government to make the regulatory framework more stringent for all production in India. This would improve the branding and also the quality of the products made in India. Manufacturing processes of the second big manufacturing sector, Food, has not been regulated yet. This sector is highly unorganized with very little focus on quality of production processes which raises warning to health and safety. We expect the Food Ministry to bring in stringent manufacturing guidelines. FSSAI has a large role to play and we would request this organization to come

up with stringent manufacturing regulations enabling improved image of Make in India for the Food sector. Other area is the delay in stamping of weighing equipment's by Weights & Measures. The rates are varied across states and the time taken is huge. This can become a roadblock for manufacturers who have to periodically calibrate their weighing equipment's.

## Q: What is your company's growth strategy for FY17?

A: We at Mettler Toledo believe in spreading our solutions and product portfolio across all vertical and different work places or applications within these sectors. In line with our global strategies we are focusing on Pharma and Food. India is a large country demographically and the industrial belts are spread out far and wide, we have robust plans to increase our penetration geographically to cover the length and breadth. We are working on improving our services to our customers even in remote locations, enabling them to use the best technology products on weighing and measuring. We are also continuing to focus on customization and R&D to serve our local customers.

## Q: Can you please elaborate on your company's long term growth strategy and the key areas you plan to focus on?

A: We have been developing solutions across verticals like Infrastructure, Manufacturing, Textile, Automotive, Chemical etc., and have 24 Business Units with varied solution offerings for various verticals across their production processes. This makes us very unique to partner with our customers and offering them end to end weighing & process solutions including software. We are focusing on manufacturing segment and the companies which would be setting up manufacturing facilities in India. We have unique solutions in counting applications, dosing, batching, foreign particle detection, dimensioning, weighing of truckloads/container loads to precision weighing in Pharma formulations. We are also continuing to invest in our customer knowledge programs, improvement of Good Weighing Practice (GWP) by conducting weighing seminars, so that the manufacturers gets benefited. We are exploring how we can cater to SMEs and increase our presence. We are also focusing on cross selling and upselling within our existing customer portfolio, support and service our customers with our unique and advanced solution offerings.





**Mr. Ashok Chaturvedi**  
Chairman & Managing Director,  
Uflex Limited



## Q: Please give us an overview of your company

A: Uflex Limited is India's largest global flexible packaging solution company. We enjoy a formidable market presence in over 140 countries. Since its inception in 1983, Uflex has grown from strength to strength to evolve as a truly Indian Multinational. Today we have state-of-the-art packaging facilities at multiple locations in India with installed capacity of around 100,000 TPA (tonnes per annum) and packaging film manufacturing facilities in India, UAE, Mexico, Egypt, Poland and USA with cumulative installed capacity in excess of 337,000 TPA. Integrated within our core business profile are allied businesses like Engineering, Cylinders, Holography and Chemicals that qualify Uflex as a one stop shop for addressing end to end flexible packaging solutions globally.

Uflex has thus a vast production capacity for manufacturing products like Polyester chips, Bi-axially Oriented Polyethylene Terephthalate (BOPET), Bi-axially Oriented Polypropylene (BOPP) films, Cast Polypropylene (CPP) films Metalized and Speciality films, flexible packaging laminates (roll form), pre-fabricated pouches, flexi-tubes & big bags, flexible packaging converting machines & packaging machines, rotogravure printing cylinders, flexo polymer plates, elastomers & sleeves, anti-counterfeiting & brand protection solutions (to prevent look alikes from eroding our clients' brand equity) & inks, adhesives, coatings and polyols.

## Q: What are your thoughts about 'Make in India' initiative?

A: 'Make In India' initiative has placed the global spotlight on our nation. It beholds immense potential to boost our manufacturing sector's contribution

to the GDP from the existing 17% to the targeted 25%. The initiative is making great strides towards a congenial policy environment facilitating investment, fostering innovation, enhancing skill development and building world class manufacturing infrastructure.

## Q: Could you elaborate on your contribution/support for the 'Make in India' initiative?

A: Uflex has its roots in India and with humble beginnings back in the early eighties the organization has evolved to become a billion dollar organization (on consolidated basis). Being an Indian, I take immense pride in the 'Make In India' initiative and we have been contributing to the image of Brand India since our inception. We have state-of-the-art manufacturing facilities in Noida, Jammu and Malanpur. In 2005 we expanded our film manufacturing foot print in UAE and thereafter in phases we expanded it to Mexico, Egypt, Poland and USA up till 2013. Besides catering to the Indian market, we export packaging products, inks & adhesives, coatings polyols, rotogravure cylinders, flexo polymer plates, elastomers & sleeves, anti-counterfeiting & brand protection solutions across the globe. Every flexible packaging solution that we engineer indigenously adds incremental value to brand India. We enjoy a formidable market presence in over 140 countries where our brand commands respect in terms of quality and value for money. The upcoming aseptic packaging plant that is currently being commissioned at Sanand Gujarat reaffirms our commitment to 'Make in India'.

## Q: Could you let us know more about your upcoming aseptic packaging plant?

A: We are in the process of setting up first of its kind 'Aseptic Packaging Plant' at Sanand in Gujarat with



a Capex of INR 580 crores in the first phase. The plant is expected to be commissioned by October/ November 2016 and will be commercially operational by April 2017. This facility will employ around 250 people in the first phase. 90% of the output of 1st phase from this factory will cater to the domestic demand. This project is our latest contribution to the prestigious 'Make in India' scheme.

With the new Aseptic Packaging Plant for packing liquid products, Uflex will complete the entire bouquet of product offerings that at present spans across solids, semi solids, pastes, gels, viscous fluids, powders and granular materials.

This plant at Sanand, Gujarat will be spread across an area of more than three million square feet and will house printing machines from Gallus and Extrusion and Laminating Machines from Davis-Standard based in Germany among other state-of-the-art infrastructure. Since 72 acres of land has been procured at Sanand, the facility may also house expansion of manufacturing facilities of our existing businesses in India in future.

**Q: Can you please tell us about the R&D initiatives of your company? How they have contributed to the growth of your company?**

A: Innovation to create value added differentiation is the cornerstone of Uflex. Innovation is inalienable to research and development to which we stand strongly committed. All our business verticals have separate R&D departments. One of the most important facts that I would like to share over here is that quite often our clients coordinate and collaborate with our R&D team and utilize our laboratory and shop floor facilities to experiment and come up with bespoke flexible packaging solutions. R&D besides proximity to customers, speed to market reach, and our ability to process any quantum of order and ensuring just in time deliveries anywhere in the world have contributed to the growth of our company.

The list of our R&D initiatives is all too long for me to elaborate over here, but to name a few, we are focusing a lot on green packaging that uses the mono-ethylene glycol derived from green sources.

This film does not contain any MEG which is conventionally made through the crude oil route. We have waged a full blown war against counterfeiting and are helping our clients with unmatched brand protection solutions to keep the look-alikes and the fake at bay. Most contemporary unigrams, latentograms, fresnel lens embossed films are some of our very many important innovations towards anti-counterfeiting.

Uflex has developed world's first 8 micron plain/heat-sealable BOPP films, 6.5 micron BOPET films and heat-sealable 12 micron metallized BOPP films that are suitable for printing and lamination. We have also developed Industrial/ Bulk Liquid Packaging Film (F-LLP-M) UV – Resistant Metalized PET that enhances the laminate strength minimizing the risk of de-lamination.

We have also innovated to manufacture Cast n Cure Lens for beverage packaging, Nano perforation for rice packaging and high barrier laminates for packaging snacks.

We have tailor-made for our clients electro-beam curing stand up bags; single dose bio-degradable sachet; high barrier laminate for shampoo sachet; inno-lock pouch for foods and snacks. Uflex designed DuPont award winning Flex SafePack to keep moisture and water from entering into the bag, helping the cement withstand harsh environment and maintain its full functionality over an extended period of shelf life.

As I said before, the list is too long to be elicited here.

**Q: What is your company's growth strategy for FY17 and what will be the key areas of focus?**

A: Our growth strategy for FY 2016-17 is strongly interwoven with innovation driven manufacturing and some of our key focus areas would be liquid packaging, tubes for pastes & gels, robotic technology for manufacturing rotogravure cylinders; enhancing barrier properties of substrates and laminates simultaneously light-weighting for ecological sustainability; developing efficient machines for filling and packaging liquids.





**Mr. N. Jehangir**  
Vice Chairman and  
Managing Director,  
NeST Group of Companies



## Q: Please give us an overview of your company

A: SFO is the flagship company of the NeST Group, which specializes in Technology Services, with R&D, Software & Manufacturing Services. We are a 'one stop solution provider' for our global clientele.

## Q: Could you elaborate on your contribution/support for the 'Make in India' initiative?

A: We have been promoting India as an ideal manufacturing and have succeeded in persuading companies like GE, Toshiba, Philips, Siemens, Alstom, Thales, Hitachi, Diebold etc. to manufacture their technology products with SFO. We have also developed Nest Hi Tek Park in Kochi, the first private Park for Hardware Manufacturing. The first phase of 200,000 sq. feet, standard and customizable, ready to occupy SMART factory space is now available with all SEZ approvals in place. The Park being situated nearby to SFO so that customers have the choice to outsource services to SFO and avail the diverse competencies. We can add value in joint R&D & Re-engineering, Testing & Certifications, speed up statutory approvals, join hands in domestic selling or even offer a Joint Venture arrangement. This is what we @ SFO call Flexible Partnership.

## Q: Can you please tell us about the R&D initiatives of your company? How they have contributed to the growth of your company?

A: It is absolutely essential for us to invest in R&D if we have to be successful as a global manufacturing company. By investing in R&D, we are able to adapt customer technology and help them to improve and optimize their products & solutions. SFO's 'Vision 2020' envisages an investment of ₹ 176 crores in technology as varied as Design & Engineering,

Software Development, Electronic Manufacturing, Box Build, Bio Technology & development of our own SEZ. We won triple Awards from ELCINA towards R&D, Quality and Large Scale Exports in 2014-15. The first prize for R&D was awarded for the path breaking innovation and development of 'Intrusion Proof System for Fiber optic networks'. This system is now included in nation's strategic fiber optic networks at undisclosed sites. Honeywell awarded us the Most Innovative Supplier Award this year. We are also spearheading technology advancements in niche areas in Digital Services, including Cloud, Analytics & Mobility. SFO is involved in the design, manufacturing and BSNL QA approval of passive optical products in the Digital India Program. SFO covers 70% of the Fiber Optic Passive Accessories. SFO's products are used to connect 50,000 Villages in the first year of the program. Our products will soon connect another 200,000 villages across India in the near future.

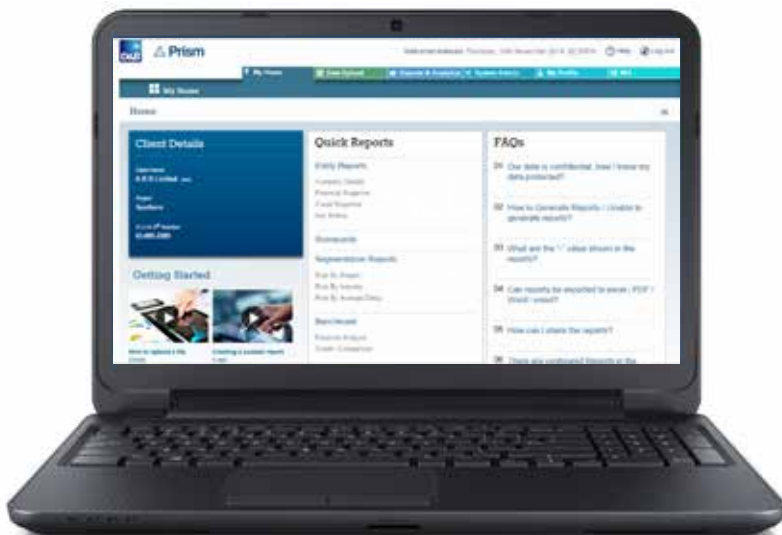
## Q: What are the challenges faced by the electronics manufacturing sector in India?

A: The greatest competition is from the Chinese & Taiwanese suppliers with our limitation on chip manufacturing. We need to import these components which constitute more than 70% of the cost break up and incur inventory, transportation & logistics cost. Infrastructure is another bottleneck for both domestic & international trade of goods. Further, sectors like defense does not provide a level playing field for an SME player like SFO. We have obtained highly stringent NADCAP Certification for Electronics, but it is difficult to compete the monopoly of the large Public & Private Sector Players. We need a policy change which should enable the SME sectors to be awarded Govt contracts.

## Q: Can you please elaborate on your company's long term growth strategy? What are the key areas you plan to focus on?

We are going to tread both organic & inorganic growth strategies in the coming years to ensure that we reach our goal to be a US\$ 1 bn company by 2020. Aerospace & Defense & R&D Services would be core areas of growth. We will also be expanding our geographic reach to Australia, Europe & some key States in USA. Another growth area would be through R&D services.





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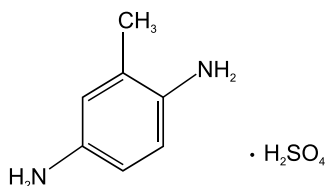
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## Toluene 2,5 Diamine Sulphate (2,5 TDS)

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Appearance : Off White to Light Pink

Use :In oxidative hair dye formulations

Synonyms: 2MePPDA sulphate; C.I. Oxidation Base 4; Para-Toluenediaminesulfate; 1, 4-Benzenediamine-2-methyl sulfate



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# Macroeconomic Outlook

## Introduction

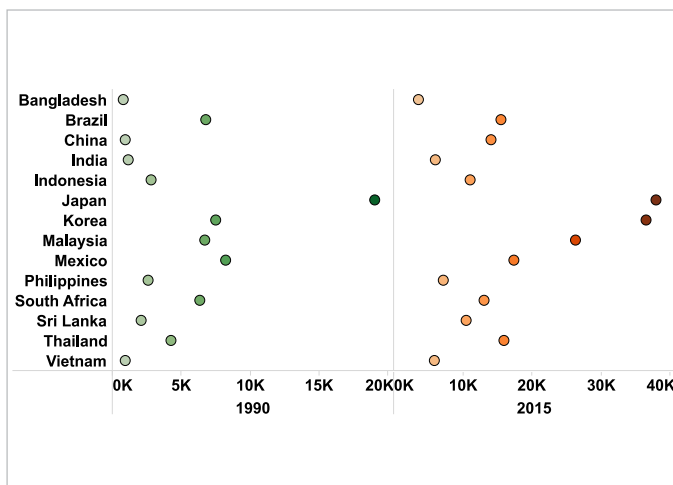
The resilience that India has demonstrated since the breakout of global economic slowdown in 2008 indicates the fundamental strength of the economy. However, India has great potential to grow further. India inherently has a large population that serves as a huge consumption demand, its demographic dividend presents a huge workforce which if productively employed is likely to contribute to its growth and moreover, India's investment potential has not been fully exploited to the extent as it has been in China or the other developed Asian economies. A vision that ensures productive employment of its workforce, provides for a well-planned infrastructure set-up, taps the untapped investment potential and uplifts the rural economy could help India reach its true growth potential.

The series of small yet important reform measures announced by the new government at the centre so far has put India on the right track for an improvement in its long-term potential output. Nonetheless, the future performance of the Indian economy will depend more heavily on reinforcing domestic drivers of growth.

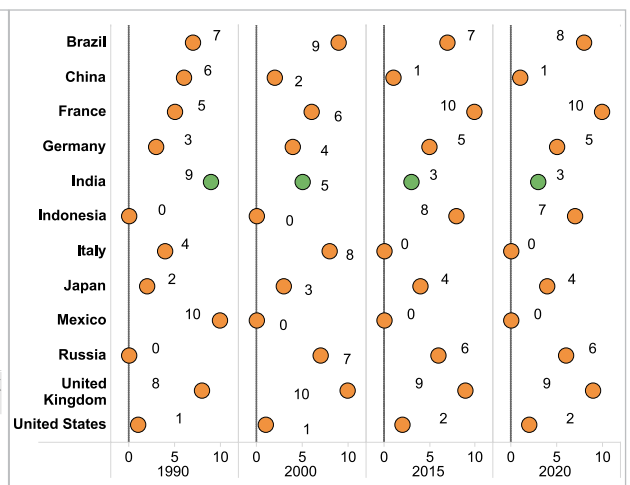
## Development indicators - Comparing India with some selected economies

India still has a long way to go. A comparison with some of the Asian, emerging and developed economies with respect to a number of development indicators shows that India is lagging behind these countries. However, it also points out the numerous

### GDP PPP (US\$)



### GDP per capita, PPP Ranking



Source: IMF

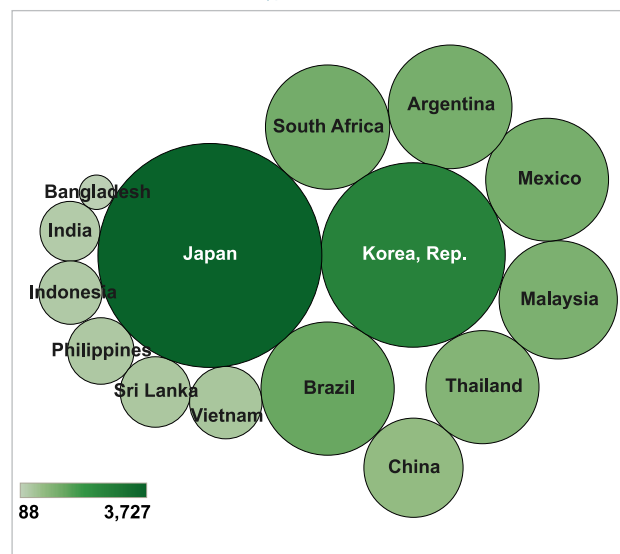
Note: 0 ranking means country is not in top 10 ranking



opportunities that India has and can achieve going ahead. We expect that with the increase in growth and the consequent rise in income, India would be able to improve its welfare indicators and achieve a more inclusive growth.

- India's rank shifted from 9<sup>th</sup> largest economy in terms of GDP (PPP terms) from 1990 to 5<sup>th</sup> in 2000 and 3<sup>rd</sup> largest economy in 2015 (E)
- While India ranks 3<sup>rd</sup> largest country in terms of GDP Purchasing Power Parity, per capita GDP in PPP terms has deteriorated over the years
- In the last two decades (since 1990), China demonstrated an exemplary performance; the per capita GDP of China grew by more than 14 times
- During the same time, the per capita GDP of Vietnam grew by 6 times compared to 5 times of India.

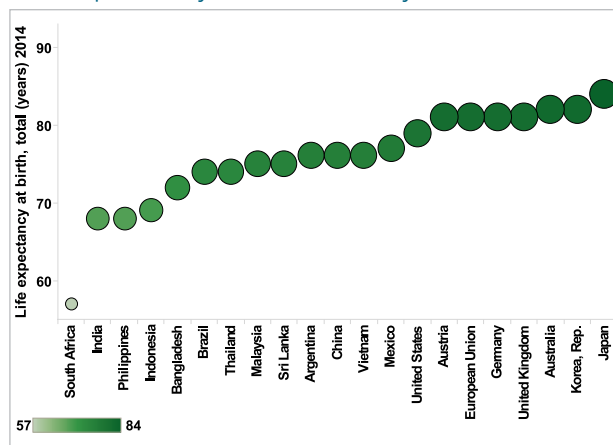
Health expenditure per capita, PPP (constant 2011 international \$), 2014



Source: World Bank

- In terms of per capita health expenditure, India not only remains far behind the Asian and emerging economies, the increase in per capita health expenditure during the last decade has not been adequate in comparison with the overall growth rate achieved.
- Countries like Sri Lanka, Vietnam, Philippines and Indonesia have high per capita health expenditure than India

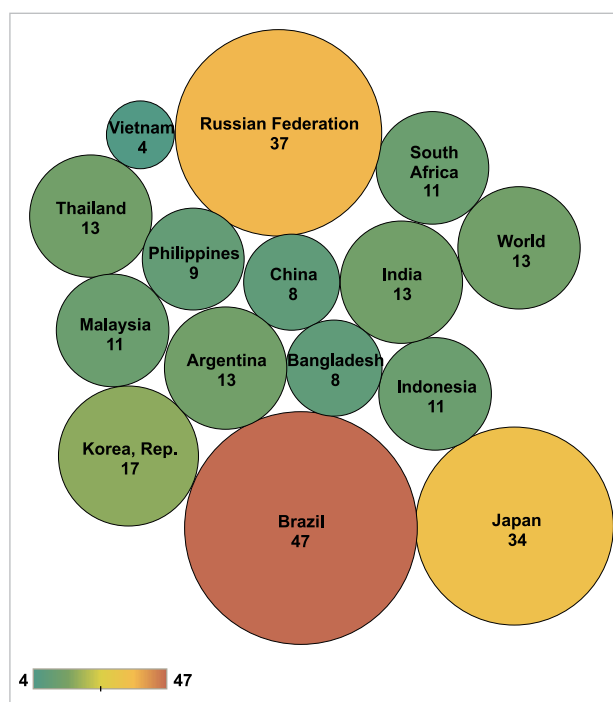
Life expectancy at birth, total (years), 2014



Source: World Bank

- India ranks far behind its peers and indeed behind even than the other developing countries. The life expectancy at birth is 68 years for India, lower than 72 for Bangladesh and 76 for Vietnam.

Commercial bank branches per 100,000 adults,  
2014



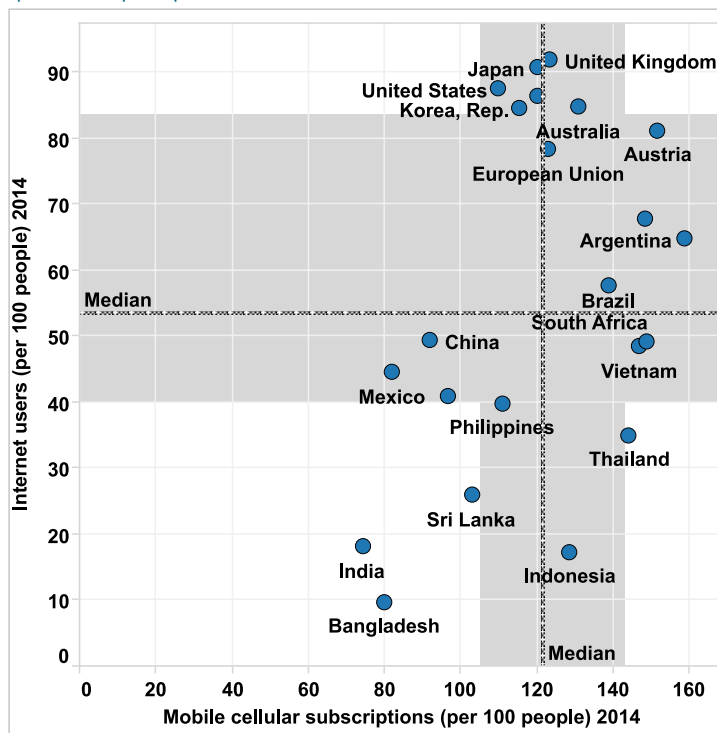
Note: Numbers are adjusted to the nearest decimal

Source: World Bank



- India has been trying to deepen the financial inclusion. However, it still has a long way to go. The presence of commercial bank branches per 100,000 adults was marginally lower than the world average in 2014. We expect access to financial services to increase in the coming years as there have been initiatives taken by the Reserve Bank of India and the government for the same.

### Internet users and mobile cellular subscriptions (per 100 people), 2014



Source: World Bank

- Although the number of internet users in India has more than doubled in the last five years, India is still far behind than other countries. There were only 18 per 100 users compared to 49 per 100 user persons in China.
- India has one of the lowest ratios with only 74 cellular mobile subscriptions per 100 people in 2014.
- India which was on par with China in 2010 in terms of cellular subscribers per 100 people fell back in 2012 and now is lagging by a difference of 18. While Nepal and Bangladesh have grown at a rapid pace and have 82 and 80 subscriptions per 100 people respectively.
- India along with Bangladesh is much lower than the lower bound of the quantile range for both the parameters.

## Indian economy – Growth trajectory

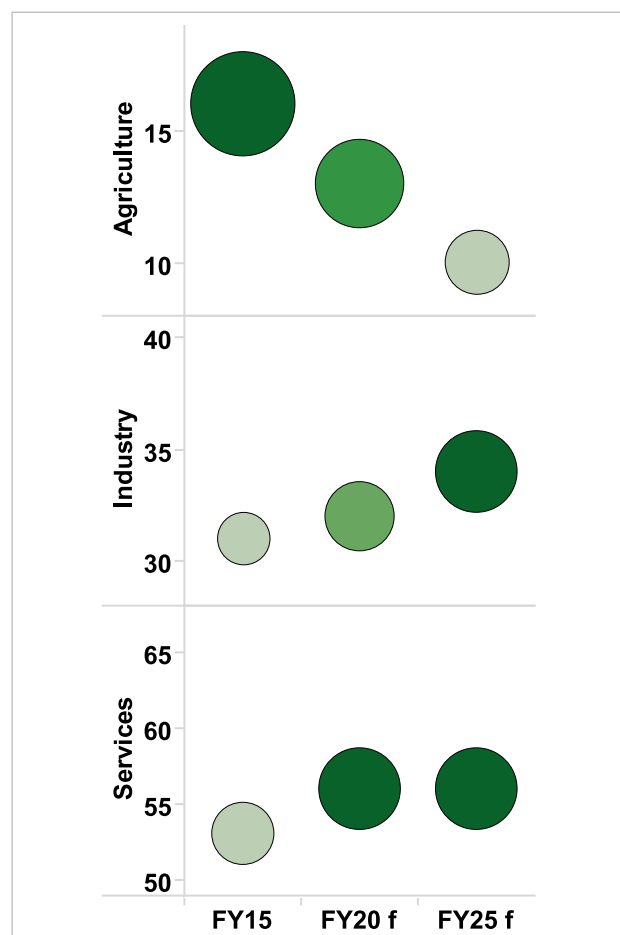
### Indian economy - Current scenario

India has achieved a high growth trajectory during the last decade propelled by the set of industrial and financial sector reforms and the consolidation of government finances. Moreover, high savings rate, acceleration in investment, moderate inflation and fiscal consolidation led India to achieve an average growth rate of 9.5% during the period FY06 to FY08. The growth trajectory of the Indian economy suffered a setback when the economy slowed down due to the impact of the global financial crisis and European debt crisis. India's growth weakened considerably and slumped down to an average growth of around 5.9% (Gross Value Added) during FY13 and FY14. The slowdown in growth was a result of global factors which was compounded by domestic structural issues. Global macroeconomic and financial uncertainty, weak external demand, elevated price levels, widening twin deficits and falling investment impacted growth. According to Dun & Bradstreet's estimate, the Indian economy is expected to gather pace by FY17. India's GVA (Gross Value Added) is expected to witness a healthy growth rate of an average of around 7.8% during FY17 to FY20, beyond

which its growth rate is expected to accelerate. India is likely to achieve a higher growth rate of around 8.2% during FY21-FY25. This increase in growth rate is expected to culminate into a realisation of high per capita income over the years. We believe India has the potential to achieve a higher growth rate, given its domestic fundamentals. We expect India to realise its potential and achieve an average growth rate of around 7.9% during the next decade (FY17 to FY25). With this growth rate, India's nominal GDP is expected to touch US\$ 3.4 trillion by FY20 and further to approximately US\$ 6.4 trillion by FY25.



## Services sector continues to account for higher share in India's Gross Value Added (GVA) (%)



All figures are at basic price; f: D&B forecasts

Source: CSO, D&B Research

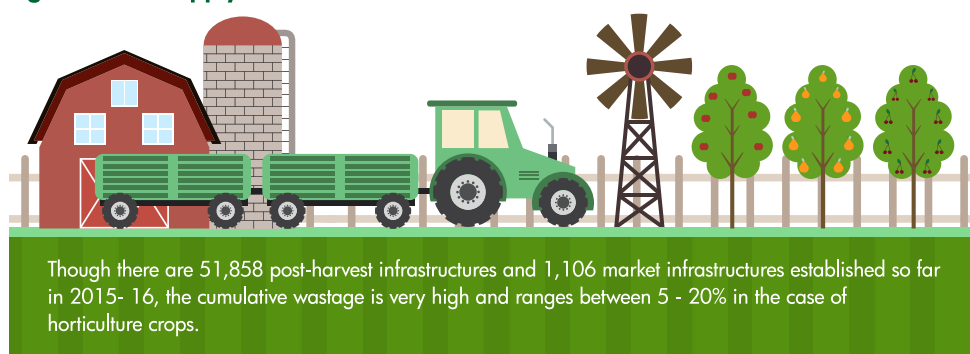
## Share of agriculture sector expected to come down

Agriculture sector is the backbone of the Indian economy with almost 58% of rural households depending on agriculture for their livelihood. Hence, it is crucial to achieve steady growth in agriculture sector in order to sustain growth momentum of the Indian economy.

Despite reduction in net sown area due to growing urbanisation and industrialisation, Dun & Bradstreet expects the agriculture sector to register an average growth of 2.9% during FY17-FY25. The growth in agriculture sector would come on the back of increased investment in infrastructure like irrigation facilities, warehousing and cold storage. In addition, the growing use of genetically modified crops would help in improving the crop yields. The analysis of sectoral GVA data reveals that, the share of agriculture sector in GVA is expected to decline from 16.3% in FY15 to 9.9% in FY25.

There is tremendous potential to increase availability of agricultural produce by reducing wastage in the post-harvest value chain. To ensure food security, investment in post-harvest and market infrastructure needs to be continued. Though there are 51,858 post-harvest infrastructure and 1,106 market infrastructure established so far in FY16, the cumulative wastage is very high and ranges between 5 to 20% in the case of horticulture crops.

## Agriculture – Supply chain Infrastructure



### Storage Capacity - Lakh MT

FY10 - 107.2

FY14 - 105.6

FY15 - 106.2

FY16 - 113.2



### No. of Warehouses - Number

FY10 - 487

FY14 - 471

FY15 - 464

FY16 - 470





Some recent key government initiatives that will accelerate growth in agriculture and allied sectors are:

- The Cabinet Committee on Economic Affairs (CCEA) has approved 'Blue Revolution', an umbrella scheme for integrated development and management of fisheries by Government of India, with total financial outlay of ₹ 30 billion for a period of five years.
- The new crop insurance scheme for farmers 'Bhartiya Krishi Bima Yojana' aims to cover 50% of the farmers under the scheme in the next two-three years.
- Plans to bring 2.85 million hectares of land under irrigation.
- The Department of Agriculture and Cooperation, the Department of Agriculture Research & Education (DARE) and the Department of Animal Husbandry, Dairying & Fisheries (DAHD&F) have signed MOUs with other countries including the US, collectively taking the number of partnerships with other countries to 63. These agreements would provide better agricultural facilities in areas such as research and development, capacity building, germ-plasm exchange, post-harvest management, value addition/food processing, plant protection, animal husbandry, dairy and fisheries. The agreements could also help enhance bilateral trade in agriculture sector.

Source: IBEF, PIB

### Services sector would continue to dominate the share in GVA

The services sector witnessed considerable moderation in growth in the last few years due to weak global growth prospects and sustained slowdown in the domestic industrial growth which in turn pulled down demand for services. Dun & Bradstreet expects growth in services sector to average at around 8.8% during FY17-FY20 which will plummet to 8.4% during FY21-FY25. During FY17-FY25, services sector would register an average growth of 8.6%. The rise in per capita income, increased focus on services exports, some improvement in the global economic and financial environment and resurgence in domestic industrial activity are expected to provide a boost to the services sector growth in the coming years.

Within services, transport and storage services are likely to witness healthy growth on account of increased manufacturing activity and the government's 'Make in India' initiative. The conscious efforts taken by the government to leverage IT in different varied segments of the economy via

initiatives such as 'Digital India' would provide a push to IT enabled services. Growth in financial, real estate and professional services is also likely to receive momentum in the coming years on the back of initiatives for financial inclusion as well as initiatives for accomplishing mission of 'Housing for All' by 2022 and plans to develop 100 smart cities.

The share of services sector in overall GVA is expected to increase from 52.5% in FY15 to 55.4% by FY20. Thereafter, given the moderation in services sector growth, the share of services is expected to remain almost same at around 56% by FY25.



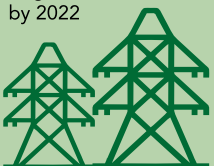

### Growth in the industrial sector to revive in the coming decade

Growth in the industrial sector remained muted during last few years owing to weak consumption and investment demand, slowdown in external demand as well as elevated interest rates. Moreover, slow pace of critical reforms, the bottlenecks in the clearances of projects and the lower rate of resolving issues in the project investments also adversely impacted growth in industrial activity.

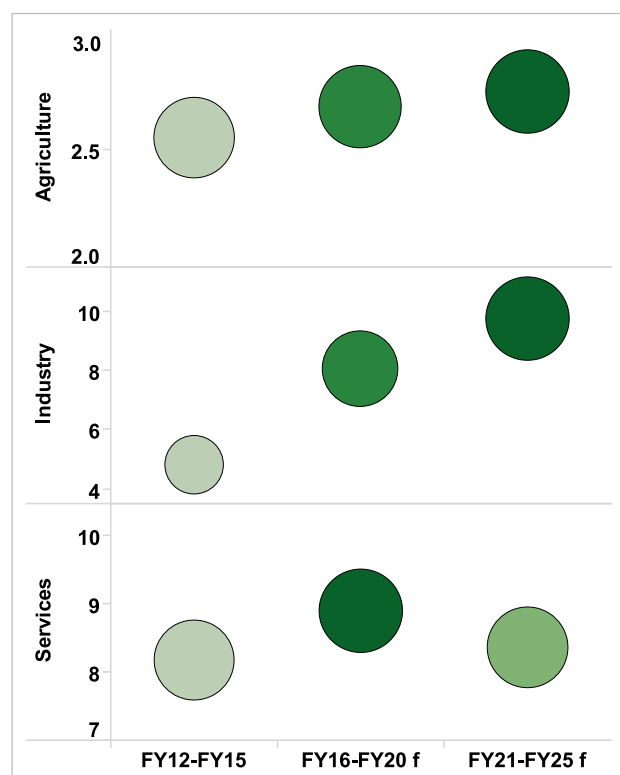
Growth in the industrial sector is expected to revive gradually in the next few years. The industrial activity is expected to gain momentum consequent to an overhaul in infrastructure, easing of supply-side bottlenecks (such as skilled labour and land), ease in doing business conditions as well as implementation of critical reforms in the areas of taxation, land, labour and exit of businesses, etc. Moreover, government initiatives like the development of smart cities, urbanisation and industrial corridors are also expected to contribute in accelerating the pace of industrial sector growth. As per D&B's estimates, growth in industrial sector is expected to average at around 8.2% during FY17-FY20, which will pick up further pace to average at around 9.8% during FY21-FY25. During FY17-FY25, growth in industrial sector is expected to average at around 9.1%. With recovery in the industrial activity, share of industrial sector in overall GVA is expected to increase from 31.2% in FY15 to 34.1% in FY25.



## Key government initiatives that would provide fillip to industrial sector in the coming years

MINING		ELECTRICITY	
<ul style="list-style-type: none"> <li>100% FDI under the automatic route</li> <li>Mining lease granted for long duration of minimum 20 years and maximum 30 years and could be renewed for a period not exceeding 20 years</li> <li>Approval of Mines and Minerals (Development and Regulation) (Amendment) Bill, 2016 (MMDR Bill, 2016)</li> </ul> 	 <ul style="list-style-type: none"> <li>Easing of doing business conditions</li> <li>Likely implementation of Goods &amp; Services Tax (GST)</li> <li>Labour &amp; land reforms</li> <li>Implementation of 'Skill India' a multi skill development programme</li> <li>Easing of FDI norms</li> </ul>	<ul style="list-style-type: none"> <li>Implementation of Ujwal DISCOM Assurance Yojana (UDAY) for financial turnaround and revival of power distribution companies (DISCOMs)</li> <li>Implementation of mission 24x7 'Power for All'</li> <li>Massive renewable energy production target of 175,000 MW by 2022</li> </ul> 	 <ul style="list-style-type: none"> <li>Development of 100 smart cities</li> <li>100% FDI under automatic route in the construction development sector</li> <li>Relaxation of FDI rules in construction sector by reducing minimum built-up area as well as capital requirement</li> <li>Major boost for the development of road &amp; highways</li> </ul>
	MANUFACTURING		CONSTRUCTION

## Industry expected to surpass service sector growth (%)



f: D&B forecasts

Source: CSO, D&B Research

## Manufacturing activity to pick up in the coming years

As per D&B's estimates, manufacturing sector would register an average growth of 12.2% during FY17-FY25. The 'Make in India' initiative, improvement in business environment, implementation of critical reforms in the areas of land, labour and taxation, focus on skill development and macro-economic stability are expected to be the key factors that would provide fillip to the Indian manufacturing sector. With the revival in the manufacturing activity, the share of manufacturing sector in overall GVA is expected to increase from 17.1% in FY15 to 24.7% in FY25.

## Consumption & investment outlook

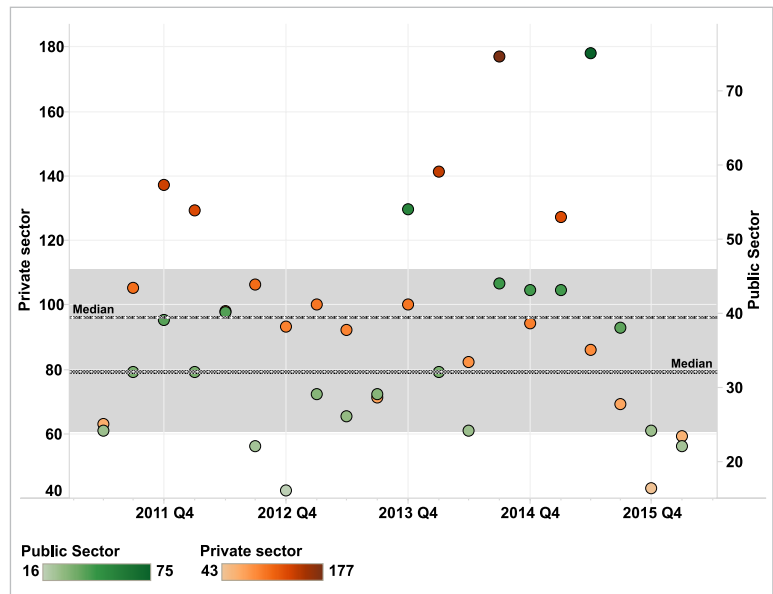
While elevated interest rates and weak rural demand due to fall in crop output capped growth in private consumption during FY15; high interest rates, high debt burden on corporate sector, shrinking profit margins, sluggish global demand and delayed regulatory approvals were some of the key reasons behind the weak private investment in the country.



Growth in private final consumption expenditure fell to 6.2% in FY15 (at 2011-12 base, basic prices) as compared to 6.8% in the previous year. On the other hand, growth in investment as measured by gross capital formation rose to 6.3% (at 2011-12 base, basic prices) in FY15 as against a decline of 1.9% in FY14 on the back of substantial support from public sector investment.

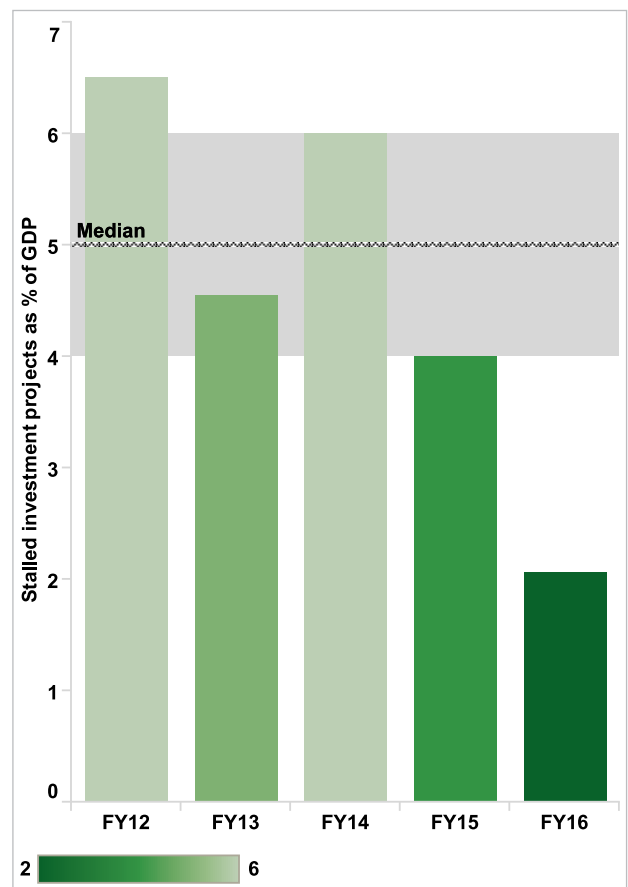
The substantial fall in private sector investment can largely be attributed to the stalling of projects. The stock of stalled projects started to pile up from FY12. Although, the number of stalled projects has witnessed some reduction from 6.1% of GDP in FY14 to 4.0% of GDP in FY15 and 2.3% of GDP in FY16 as per the CMIE data, they continue to affect investor's confidence in turn daunting fresh private sector investment. The fact that private sector dominates the share in total stalled projects as compared to public sector is another alarming concern. Subdued economic conditions, lack of promoter interest, and delays in regulatory/environmental clearances were the primary factors surrounding the large number of stalled projects in the public as well as private sector. The stalling of public sector projects had a ripple effect on the private sector as it gets substantial business from government contracts. The delayed projects resulted in cost overruns and repayment issues, thus adversely impacting the balance sheet of companies and led to rising level of NPAs in the banking system, which in turn constrained fresh investment and credit flow. This is reflected in the new project investments which have decelerated since FY12.

### Number of stalled projects – Public and private



Source: CMIE

### Stalled investment as % of GDP



Source: CMIE





## Investment to get support from traction in infrastructure activities

The investment and consumption scenario is likely to change gradually going forward. The slew of initiatives taken by the union government in the areas of infrastructure development mainly roads & railways, ease of doing business, simplified FDI norms, and e-governance, etc. are likely to pave way for higher investment growth in the long run. Easing the process of environmental clearance, amendment of certain archaic labour laws are reassuring signs and could manifest in raising the efficiency and the productivity levels of the invested capital in the coming years. Although, the full impact of these initiatives on investment will get reflected over a period of time, the foundation has been laid for investment demand to pick up. Though early signs of resumption in investment demand are visible, the significant revival in investment could happen only after FY17.

The 'Make in India' campaign which involves developing industrial corridors, new manufacturing cities, logistic hubs and residential townships along with the 'Dedicated Railway Freight Corridor' is also expected to provide boost to the investment demand in the coming years. Further, the increased government expenditure on infrastructure development would have multiplier effect on employment, consumption, output and also spur investment in the manufacturing space. Nonetheless, the government is required to further accelerate the pace of reforms particularly in land and labour related issues, as well as resolve other factors impacting stalled projects in order to provide major push to investment.

While the government is expected to play a major role in reviving investment at the initial phase, the private sector is expected to pitch in gradually as demand conditions improve and supply-side bottlenecks are eliminated. We believe that steps towards removing infrastructure barriers, constructing industrial corridors, industrial clusters, smart cities, urbanisation, nurturing innovation and skill development will accelerate the growth of the

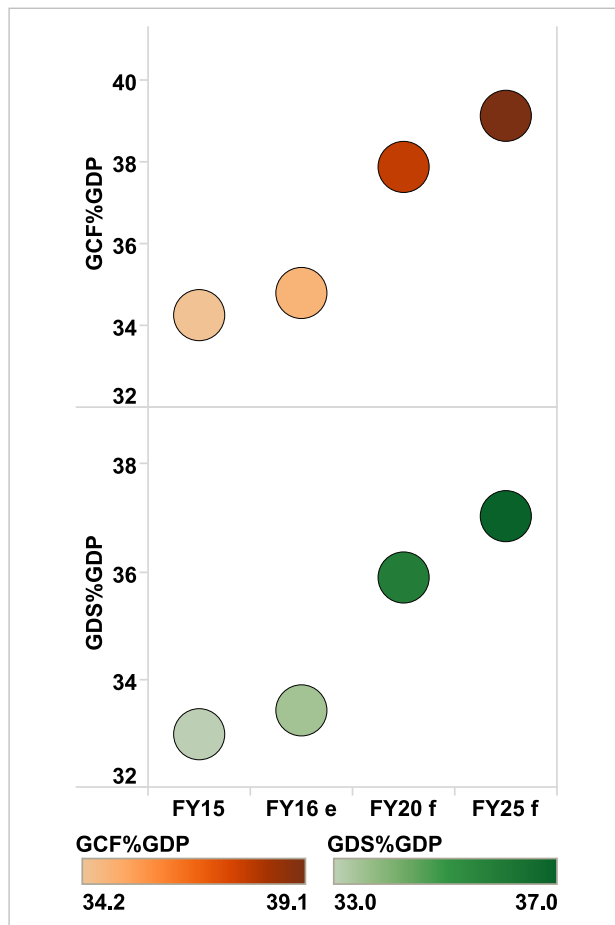
manufacturing sector in the coming decade. Dun & Bradstreet expects investment rate to increase to 39.1% by FY25 as against 34.2% in FY15.

One of the biggest concerns here is fall in the productivity of the investment. A reflection of the fall in the productivity has been seen in the rise in Incremental Capital Output Ratio (ICOR). The lack of continuance of economic reforms and likely loss of efficiency and productivity of key infrastructural sectors such as mining & quarrying, power, gas & water have led to a rise in the ICOR levels. Removing procedural bottlenecks is warranted to facilitate investment by domestic as well as foreign investors. In the coming decade, we expect increased policy focus to improve the ICOR from 4.8% in FY16 (E) to 4.6% in FY25.

A major proportion of investment would be funded by domestic savings. As per D&B's forecasts, aggregate savings as a % of GDP is expected to surge to 37.0% in FY25, as against 33.0% in FY15; domestic savings would primarily be driven by rising income levels. Moreover, a growing middle class population and changing demographics are expected to help increase the savings rate. Given the fall in savings propensity, the RBI and government has taken various measures to channelize household finances into financial savings.



### Savings to support investment in the coming decade (%)



Note: GDS (Gross domestic savings), GCF (Gross capital formation); GDS/GDP and GCF/GDP figures are at current market prices. Investment rate is defined as % share of investment in current GDP market price. Saving rate is defined as % share of saving in current GDP market price. e; D&B estimates, f: D&B forecasts

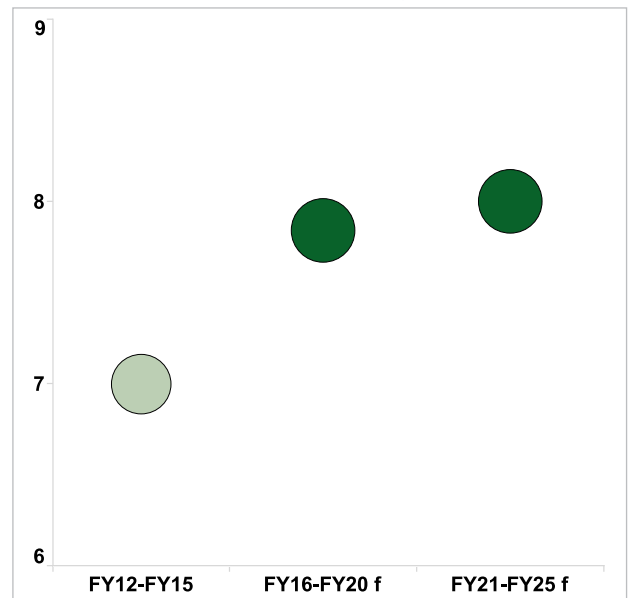
Source: CSO, D&B Research

### Young population will continue to provide the impetus to consumption-led growth

Rising income levels coupled with increase in the young working-age population will lead private final consumption expenditure to grow steadily over the coming years. As per D&B's projections, growth in private final consumption expenditure is expected to average at around 7.7% during FY17-FY25. Further, the analysis of consumption expenditure data reveals a changing pattern of private final consumption expenditure during the coming

decade. The share of spending in basic goods (food, beverages & tobacco and clothing & footwear) in private final consumption expenditure is expected to decline substantially to around 30.9% in FY25, versus around 38.8% in FY15. On the other hand, share of discretionary spending (rent, fuel & power, furniture, medical care, transport & communication, recreation & education) is projected to witness a sharp increase from 61.9% in FY17 (E) to around 69.1% in FY25. This shift in consumption pattern towards discretionary products indicates that the lifestyle of the consumers is expected to undergo a major change.

### Growth in private final consumption expenditure to pick up steadily (%)



Note: Growth in private final consumption expenditure is average % growth

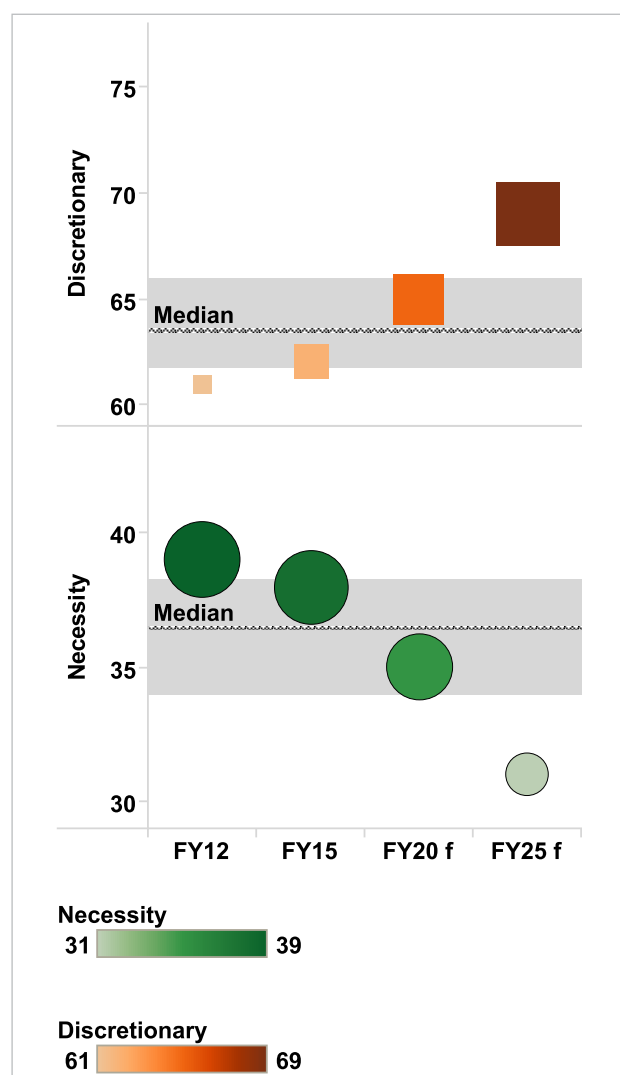
f: D&B forecasts

Source: CSO, D&B Research





## Rising share of discretionary spending in total private consumption expenditure (%)



f; D&B forecasts

Source: CSO, D&B Research

The growth projections for the macroeconomic variables that have been discussed so far have been done with certain underlying assumptions. The realization of the underlying assumptions that have been considered behind charting out the Scenario I is important for India to realize its potential and be a US\$ 6.4 trillion economy by FY25. However, given the current uncertainty which prevails not only in the domestic and global economy but also over the development in the reforms environment, we have outlined two other scenarios (Scenario II and Scenario III) which have been described in brief below.

## Scenario I: Incremental thrust on reforms to push India's GDP to reach US\$ 6.4 trillion by FY25

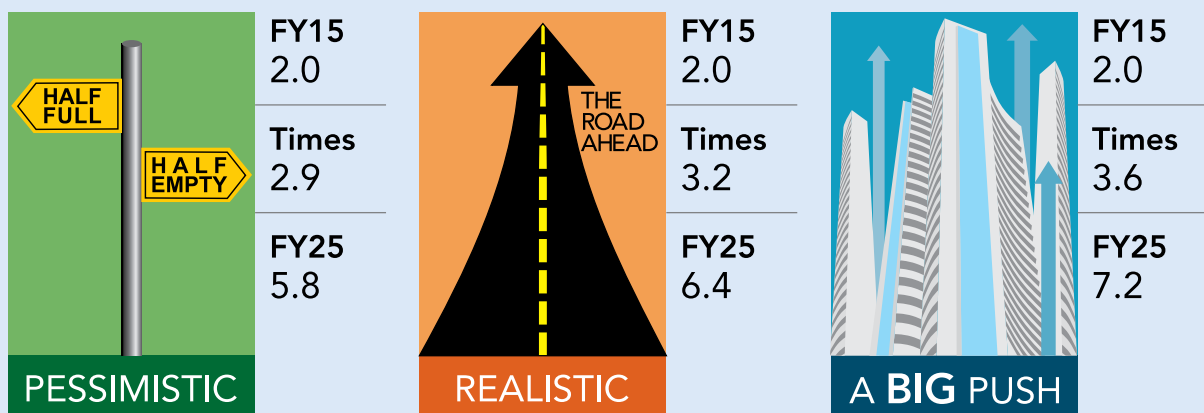
We have assumed that the new government at the centre undertakes incremental efforts to push through major reforms and successfully implements them in a time bound manner. The rise in productivity and efficiency levels is expected to yield a higher output for capital invested over the coming years. Government's effort is expected to boost the private sector and improve the overall demand scenario. The consumption as well as the investment demand is thus likely to remain healthy and support the overall growth momentum. We also expect stability in the external environment and recovery in global growth which will aid India's growth journey during the forthcoming year. In this scenario we expect GDP at current market price to reach US\$ 6.4 trillion by FY25.

## Scenario II - Failure to provide requisite thrust in reforms would lead India's GDP to reach around US\$ 5.8 trillion by FY25

Any derailment in the global recovery process or emergence of external shock can push back India's growth momentum. If the recovery in the global economy takes a longer time than expected it would pose a major difficulty for the recovery of the Indian economy from the current situation. In addition, if the government faces major impediments in implementing critical reforms and fails to boost investment activity, we expect that the recovery process would be further delayed. Without any major push to clear the obstacles and supply side constraints which has been so far hindering the investment activities resulting in lower productivity and rise in inefficiency levels i.e. rise in ICOR levels, the pace of growth of the Indian economy would slow down. The investment along with consumption demand in this scenario would remain weak failing to provide requisite support to growth. In this scenario we expect India's GDP at current market price to reach US\$ 5.8 trillion by FY25.



## Expected amount of GDP (US\$ Tn) to touch by 2025 under three scenarios



Figures are rounded to their nearest decimal

Source: MOSPI, Dun & Bradstreet research

### Scenario III- A big push to enable India to be close to around US\$ 7.2 trillion economy by FY25

In this scenario, we assume that the new Government at Centre is able to push through its ambitious reform program and successfully implements them within a much shorter time period than expected. The government takes extra initiatives to bring about a major overhaul in its reform agenda. A favourable policy environment, resurgence in investment activity, enhanced private sector contribution and huge consumption demand will provide the 'big push' to the Indian growth momentum. Increase in productivity and efficiency levels owing to technology gains and improvement in governance will improve the ICOR levels. Better traction in investment will be able to provide a much greater thrust to the growth momentum. Rise in income levels along with the growing population will boost the savings rate. We also expect that the government will be able to capitalise on the promise of the country's demographic dividend and exploit the untapped potential of some unexplored region. Stability in the external environment and recovery in global growth will also support India's growth momentum. Assuming that the exchange rate remains at an average around of ₹ 64 per US\$ during FY17-FY25, we expect India's GDP at current market price to reach US\$ 7.2 trillion by FY25 in this scenario.

### Determinants of sustaining growth

To achieve sustainable growth going forward, it is imperative to raise the growth potential of Indian economy by improving growth determinants. In our assessment of India's growth dynamics, we have identified certain key areas of transformation which will play a critical role in upholding India's growth story and help in raising the growth potential as well.

#### Areas of transformation

##### Enhancing infrastructure investments

Increasing investments in infrastructure and implementing the projects within a reasonable time frame would provide a much needed fillip to the economy and galvanize it for all round progress and development. Measures announced for physical infrastructure such as roads, railways, industrial corridors and rural infrastructure are likely to modernise and improve the connectivity within all parts of the country. Focus on expediting the completion of pending projects will modernise the infrastructure network and is likely to provide the necessary boost to manufacturing and agriculture sectors. The numbers of stalled infrastructure projects have been on a consistent decline. This is primarily because many bottlenecks facing infrastructure and





energy intensive industrial projects have been eased, particularly in the area of procedurally complex environmental rules. The process of applying for environment and forests clearances has been made online, state governments have been given greater powers to grant environmental clearances for certain industries while the requirements of public hearing for certain sectors or project categories have been diluted. The government has also given a lot of incentives and policy push to the roads and power sector because of its significant multiplier effects on output (steel, capital goods) as well as reviving investment in the manufacturing space. A slew of policy changes such as fast-tracked environment nod, raised limits on sand mining and provision of online filing for clearances to construct rail over-bridges and under-bridges has led to an unprecedented pick up in execution of road projects. Moreover, the shift in government policy from the Build, Operate, Transfer (BOT) model for Public- Private Partnership (PPP) projects to the government-funded Engineering, Procurement, Construction (EPC) model has given the much needed uplift required for road construction projects. In addition, the three-pronged approach to revive the PPP led project initiatives announced by the government during the Union Budget for 2016-17 i.e. Public Utility (Resolution of Disputes) Bill for resolution of disputes in infrastructure related construction contracts; PPP and public utility contracts, renegotiation of PPP Concession Agreements and new credit rating system for infrastructure projects – is expected to crowd in some private investments going ahead.

There has been a perceptible thrust by the Government towards upliftment of regions beyond the urban centres. Initiatives such as creation of Smart Cities and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) would provide the much needed fillip for all round progress and development. The rural areas are also expected to develop through the likely increase in focus of the government to provide for key infrastructure facilities through its ruralisation mission. The government in its Union Budget for 2016-17 declared creation of 300 Rural clusters which will be centres for infrastructure amenities and market access for

the farmers and will be a great push for the rural infrastructure going ahead.

Linking of rivers, development of industrial corridors with emphasis on smart cities to spur growth in manufacturing and urbanisation, work on select expressways in parallel to the industrial corridors, target of National Highway (NH) construction of 8,500 km, development of new airports in Tier I and Tier II cities, 500 urban habitations to be provided support for renewal of infrastructure and services in the next 10 years through PPPs are some of the concrete measures to uplift the infrastructure in all spheres. The government has also allowed 100% FDI in some areas of railway infrastructure and has eased FDI rules in construction. It has proposed to permit financial mobilization upto ₹ 313 billion by National Highway Authority of India (NHAI), Power Finance Corporation (PFC), Rural Electrification Corporation (REC), Indian Renewable Energy Development Agency Ltd (IREDA), National Bank for Agriculture and Rural Development (NABARD) and Inland Water Authority through raising of bonds during FY17.

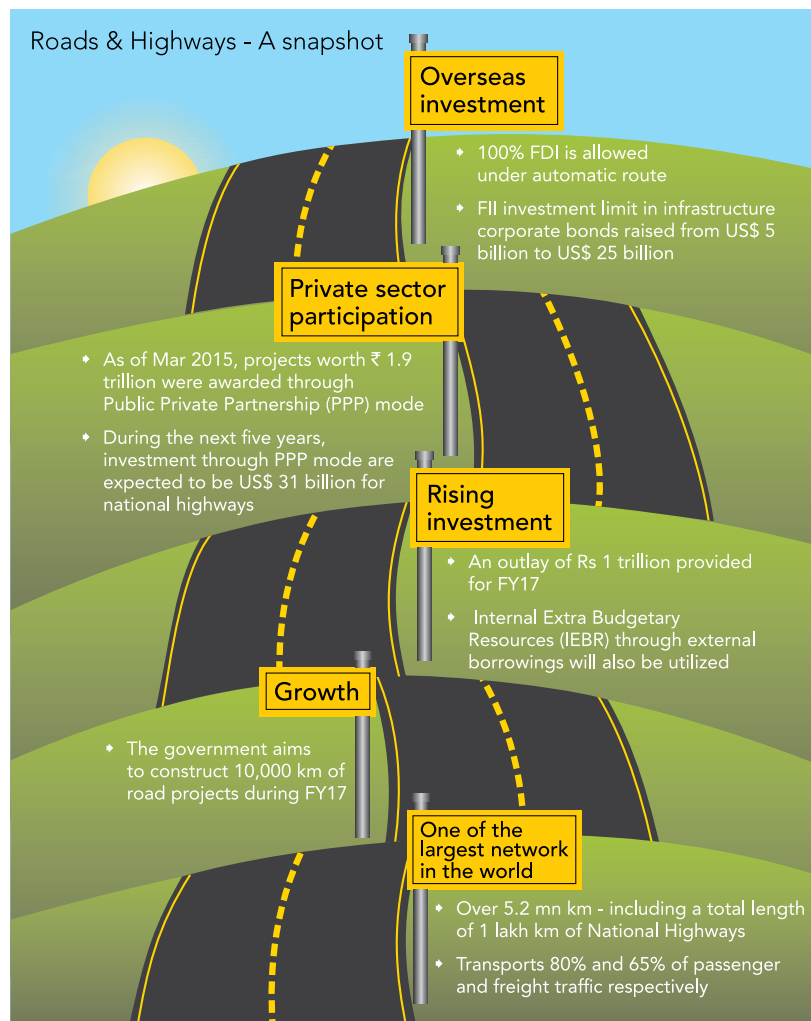
### Physical infrastructure

In view of various initiatives taken by the government, a significant pick-up in infrastructure investment can be expected in the coming years. According to Dun & Bradstreet's estimates, physical infrastructure investment is expected to surge to 10.2% of GDP by FY25 from around 7.5% (E) of GDP in FY15. Resolution of policy bottlenecks such as land acquisition and improvement in demand conditions would also stoke private infrastructure investment.

### Road & Highways

In order to revive the road and highway segment of the infrastructure sector, the government has taken various initiatives like increased threshold for project approval, enhanced inter-ministerial coordination, delegating the powers for grant of forest clearances to the regional offices, online filing for clearances to construct rail over bridges and under bridges and increasing limits on sand mining, etc. Apart from this, Ministry of Road Transport and Highways (MoRTH)





Source: MoRTH, PPP in India – Ministry of Finance

has introduced innovative project implementation model like Hybrid Annuity Model to encourage investment in highways.

The slew of measures taken by the government has resulted in unprecedented pick up in execution of road projects.

- Under the Rashtriya Rajmarg Zila Sanjyokta Yojana, the government intends to connect 100 of the 676 district headquarters in the country with highways. This scheme involves the development of 6,600 km of highways
- The government has also approved the Bharat Mala project aimed at developing 5,500 km of new roads in border areas
- Another 6,000 km of roads project is also planned to connect religious and tourism centres and to

enhance connectivity in backward areas.

- Under the Setu Bharatam Scheme, the government intends to construct 202 rail overbridges and 150 bridges on national highways
- Further, given that several PPP projects are languishing due to lack of additional equity, the National Highways Authority of India (NHAI) has been authorized to inject funds on a loan basis in projects that are at advanced stages of completion. As per the government estimates, around 16 such PPP projects stalled in various parts of the country will benefit from this initiative

The expected economic revival, proactive governance & faster approvals, the government thrust on infrastructure development, preference of road in freight traffic and measures to boost PPP mode would be key growth drivers in road projects going forward.

#### Government Policy initiatives for Attracting Private investment in Roads & Highways

- Government to carry out all preparatory work including land acquisition and utility removal. Right of Way (ROW) to be made available to concessionaires free from all encumbrances
- NHAI / GOI to provide capital grant up to 40% of project cost to enhance viability on a case to case basis
- 100% tax exemption for 5 years and 30% relief for next 5 years, which may be availed of in 20 years
- Concession period allowed up to 30 years
- In BOT projects entrepreneurs are allowed to collect and retain tolls
- Duty free import of specified modern high capacity equipment for highway construction
- Approval for permitting 100% equity divestment after two years of construction completion for all BOT projects

Source: National Highway Authority of India (NHAI), MoRTH

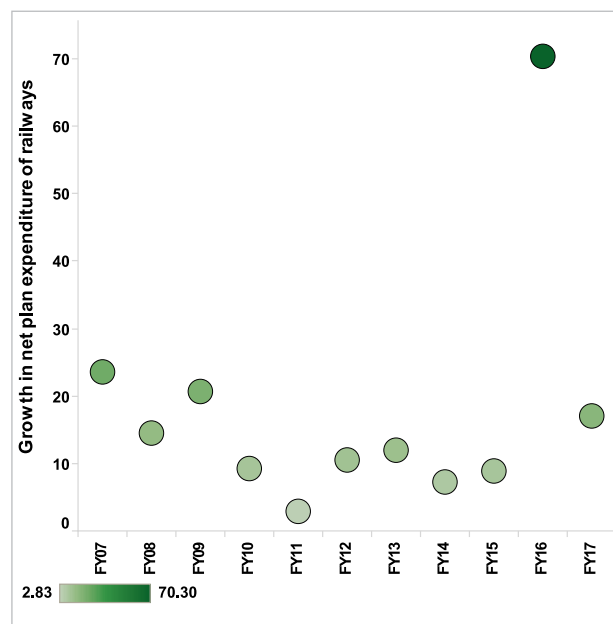


## Railways

The Indian railways is recognized as one of the largest railway systems in the world. However, for many years the railways was plagued with significant underinvestment as a result of which the network expansion and modernization has not happened at the requisite pace. Nonetheless, in recent years, the Ministry of Railways has come up with substantial investment plan for infrastructure development which would involve high-speed rail connectivity, station redevelopment and capacity expansion across the country. The Indian railway's capital expenditure has increased substantially from ₹ 587.2 billion in FY15 to ₹ 1 trillion in FY16 and, in the current fiscal; it has been pegged at ₹ 1.21 trillion. The government has also endeavored to provide the required fillip to the sector by attracting private investors.

The government has reached an agreement with Life Insurance Corporation of India (LIC) for long-term funding of ₹ 1.5 trillion over 5 years for rail infrastructure development, with first tranche of ₹20 billion being already received. In addition, it has signed Memorandum of Understanding (MoU) with Japan on the cooperation and assistance in Mumbai-Ahmedabad High Speed Rail Project. Japan has offered a loan of over ₹ 790 billion for a period of 50 years. The Ministry of Finance also approved issue of tax free bonds by Indian Railway Finance Corporation (IRFC) amounting to ₹ 60 billion during FY16, with the entire amount being raised from the market. A 100% FDI is also permitted in all rail infrastructure areas. Thus apart from the capital expenditure provided for in the railway budget, a major portion of funding is expected to be raised through PPP and multilateral funding.

## Growth in net plan expenditure of railways



Source: CMIE

In addition to enhanced funding, the ministry has taken a slew of other measures like speedy project execution by delegating full powers to General Managers for acceptance of tenders, and obtaining professional input from outside agencies, to name a few. In the Union Budget for FY17, excise duty was proposed to be reduced from 12.5% to 6% on parts of railway locomotives, or rolling stock, railway track fixtures and fittings, as well as railway safety or traffic control equipments, etc.

The railway sector is expected to make significant contribution in realization of 'Make in India' programme, given its strong backward linkages with the manufacturing sector. Besides, rapid urbanization, high demand for the effective transfer of goods along with expected increase in the industrial activities are expected to accelerate the growth of Indian railways, in turn enabling it to gradually generate its own resources for its development.





### Indian Railways

Largest rail network in Asia; world's second largest under one management.

- 122,000 km of track length; 12,817 trains; 23.5 million passengers every day; more than 7,500 stations.
- 7,421 freight trains carry 3 million tonnes (MT) of freight every day.

The Indian Railways entered a select club of railways that includes China, Russia and USA in carrying more than one billion tons of freight annually

### Investment

- Life Insurance Corporation of India (LIC) to fund Rs 1.5 trillion over 5 years for rail infrastructure development.
- Issue of tax free bonds by Indian Railway Finance Corporation (IRFC) amounting to Rs 60 billion during FY16.
- 100% FDI is permitted in all rail infrastructure areas.
- FY16 investment is close to double of the average of previous 5 years.
- Outlay for railway electrification increased by almost 50% in FY17; target to electrify 2,000 kms.



### 2015-16 Achievements

- Commissioning of 2,500 kms Broad Gauge lines & electrification of 1,600 kms, highest ever.
- The Dedicated Freight Corridor project, the largest infrastructure project in the country.
- ₹ 240 billion worth contracts awarded since November 2014 as against ₹ 130 billion worth contracts awarded in last 6 years.
- Make in India - Procurement of train sets to be increased by 30%.
- Recruitments made online in FY16. All procurement moved to the e-platform; electronic tender awarding to be rolled out on a Pan India basis in FY17.
- Compression of project sanctions time to 6-8 months from 2 years.
- Digital India - latest drone and Geo Spatial based satellite technology for remotely reviewing the physical progress across major projects. Application of Track Management System (TMS) launched.

### Customer Interface

- 65,000 additional berths generated; 2,500 water vending machines installed; 17,000 bio-toilets in trains; world's first Bio-Vacuum toilet developed.
- Enhanced capacity of e-ticketing system from 2,000 tickets per minute to 7,200 tickets per minute to support 1.2 lakh concurrent users as against 40,000 earlier.
- Wi-Fi provided in 100 stations, to be provided in 400 more.
- 'Clean my Coach' service through SMS.

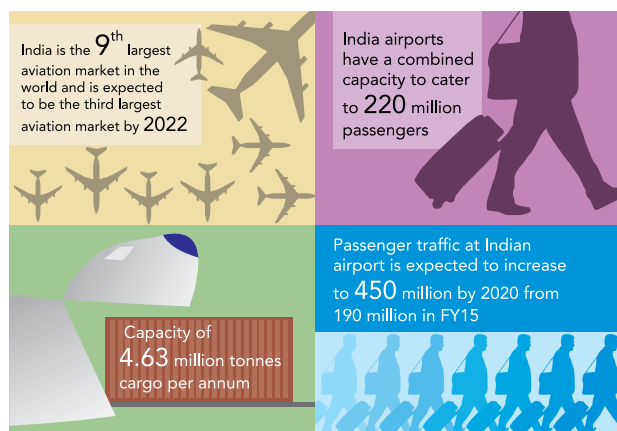


### The Road Ahead

- UDAY - overnight double-decker, Utkrisht Double-Decker Air-conditioned Yatri Express on the busiest routes, could improve carrying capacity by almost 40%.
- Proposed to develop Rail side logistics parks and warehousing in PPP mode. 10 goods sheds will be developed by Transport Logistics Company of India in FY17.
- To soon inaugurate India's first rail auto hub in Chennai.
- FY17 - targeted commissioning 2,800 kms of track; commissioning Broad Gauge lines at over 7 kms per day against an average of about 4.3 kms per day in the last 6 years.
- To generate employment of about 90 million man days in FY18 and 140 million man days in FY19.



## Airways



Source: Ministry of Civil Aviation

There are huge growth opportunities for the Indian aviation sector which calls for significant investment in infrastructure. There is a need for improvement and construction of new airports in Tier II and Tier III cities. As per the government estimates, around 500 brown-field and green-field airports would be required by 2020.

In order to boost infrastructure development in the sector:

- The government has permitted 100% FDI for green-field projects under the automatic route.
- In the Union Budget FY2016-17, the government introduced proposals for construction and revival of airports. It has proposed to revive 160 airports and air strips of state governments at an indicative cost of ₹ 500 million to ₹ 1,000 million each for enhancing regional connectivity.
- It also intends to develop 10 of the 25 non-functional air strips in collaboration with the Airports Authority of India (AAI).
- Further, the AAI plans to spend US\$ 1.3 billion on non-metro projects between 2013-2017, focusing on the modernization and up-gradation of airports.

Initiatives by the government to construct new airports and convert a handful of domestic airports into international ones are expected to boost the aviation infrastructure in India. In addition, the private sector is encouraged to get involved in the development of infrastructure for aviation sector through PPP mode.

## Civil Aviation Policy 2016

The key highlights of the policy are:

- India to become 3rd largest civil aviation market by 2022 from 9th
- Domestic ticketing to grow from 80 million in 2015 to 300 million by 2022
- Airports having scheduled commercial flights to increase from 77 in 2016 to 127 by 2019
- Cargo volumes to increase by 4 times to 10 million tonnes by 2027
- Taking flying to masses – Enabling Indians to fly at ₹ 2,500 per hour under Regional Connectivity Scheme at unserved airports
- Requirement of 5 years of domestic flying for starting international operations removed. All airlines can commence international operations provided they deploy 20 aircraft or 20% of total capacity (in term of average number of seats on all departures put together) whichever is higher, for domestic operations.
- Flexible and liberalized 'open skies' and 'code share' agreements
- Incentives to MRO sector to develop as hub for South Asia. For instance, Airport royalty and additional charges will not be levied on MRO service providers for a period of five years from the date of approval of the policy. Furthermore, state governments will be persuaded to make VAT zero-rated on MRO activities.
- Ensuring availability of quality certified 3.3 lakh skilled personnel by 2025
- Development of green-field airports and heliports
- Enhancing ease of doing business through deregulation, simplified procedures and e-governance
- Promoting 'Make In India' in Civil Aviation Sector

Source: PIB

## Ports

In the wake of 'Make in India' initiative, ports would need to serve the growing requirement of the overseas trade. This implies that the capacity of the ports in terms of their berths and cargo handling equipments needs to be improved which in turn would require significant investment in maritime transport infrastructure. The measures should not only build new capacity but also enhance port performance.

According to the National Transport Development Policy, cargo traffic to be handled by Indian ports is expected to be at around 1,695 Million Metric Tonnes (MMT) by FY22, an increase of 643 MMT from



## Future Projects – Ministry of Shipping

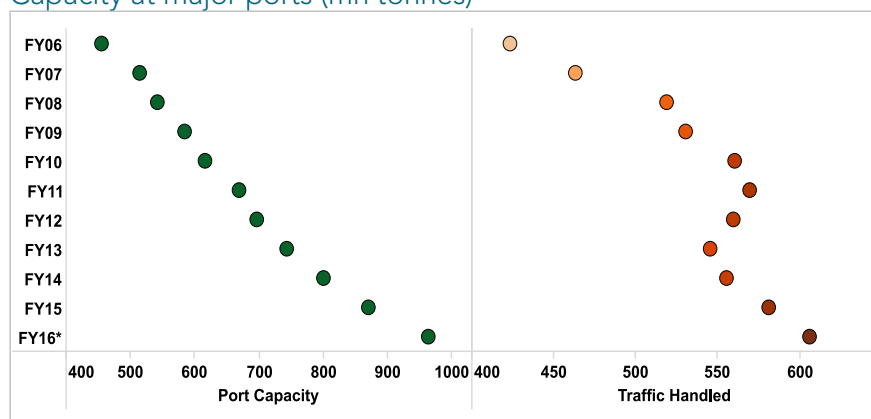


Category	No. of projects	Cost in US dollar billion
Shipbuilding, Ship Repair and Ship Breaking	13	1.47
Maritime Education, Training and Skill Development	4	0.18
Inland Water Transportation and Coastal Shipping	27	1.15
Investment Opportunities in Maritime States	46	5.81
Cruise Shipping and Light House Tourism	9	0.49
Hinterland Connectivity and Multi Modal Logistics	36	21.86
Green Port Initiatives	4	0.06
<b>Total</b>	<b>139</b>	<b>31.03</b>

FY15. That implies 2,422 MMT of cargo handling capacity is required in Indian ports by FY22 for which additional 901 MMT of cargo handling capacity is to be created in ports in the coming years. Hence, the government has identified port projects involving investment of over US\$ 10 billion for award during the next five years. The government has already approved 88 port projects involving investment of ₹ 380 billion in the last 3 years.

outlay of US\$ 11.8 billion. The programme provides guidelines for capacity augmentation and hinterland connectivity improvements at major ports. Further, the government introduced 'Sagar Mala Project' in Mar 2015, which focuses on modernization of existing ports, development of new ports, improving connectivity between the ports & the hinterland, port-led industrial development and coastal community development. In the Union Budget for FY17, the government proposed to develop new green-field ports both in the eastern and western coasts of the country. Besides, ₹ 8 billion is proposed to be allocated under the Union Budget for modernization and development of green-field ports including expedited work on national waterways. There is also 100% FDI under the automatic route permitted for construction and maintenance of ports. In FY15, Indian ports witnessed FDI inflows to the tune of US\$ 1.9 million as against US\$ 0.3 million in FY14. The private sector participation is encouraged as it would not only bring in investment for infrastructure development but would also bring efficiencies in ports through use of latest technology and better management practices.

### Capacity at major ports (mn tonnes)



\*Apr-Dec

Source: Ministry of Shipping

The government has also initiated National Maritime Development Programme (NMDP) with the planned

Further, the National Waterways Bill 2016 for declaration of 106 new waterways as National Waterways has been passed. Inland Waterways Authority of India has undertaken various projects for development and maintenance of National Waterways for providing/upgrading / maintaining inland water transport infrastructure as per the requirement. The development of inland waterways by connecting major rivers through a network of interlinking canals is expected to result in efficient low-cost inland water transport.



## Sagarmala



- **Sagarmala** - An initiative to promote port-led development by harnessing the 7,500 km long coastline, 14,500 km of potentially navigable waterways and strategic location on key international maritime trade routes
- A total of 150 projects with thrust on four areas - port modernization, connectivity, port-led industrialization and coastal community development

### Impact

- Creation of 1 million jobs, 0.4 million direct jobs over the next ten years
- Double the share of waterways – inland and coastline – in modal mix from 6 %
- Annual logistics cost savings of close to ₹ 350 billion; boost India's merchandise exports to \$110 billion by 2025
- A total of ₹ 12 trillion investment mobilization over the next ten years

### Port-led development (four areas of thrust)

- **Port modernization** - 6-8 new ports, 40+ capacity enhancement projects at major ports; investment of ₹ 650 billion
- **Port connectivity** - Coastal and inland waterway projects, 80+ connectivity projects, 7 dry ports; investment of ₹ 2.2 trillion
- **Port-led industrialization** - 14 Coastal Economic Zones to include 13 port-based discrete manufacturing clusters, for labor intensive sectors; 14 large coastal clusters for basic input industries
- **Investment mobilization** - 4 trillion in infrastructure; 8 trillion in industrial and manufacturing clusters over the next ten years
- **Coastal community development** - Skill development, island development; uplifting fisherman and other local communities

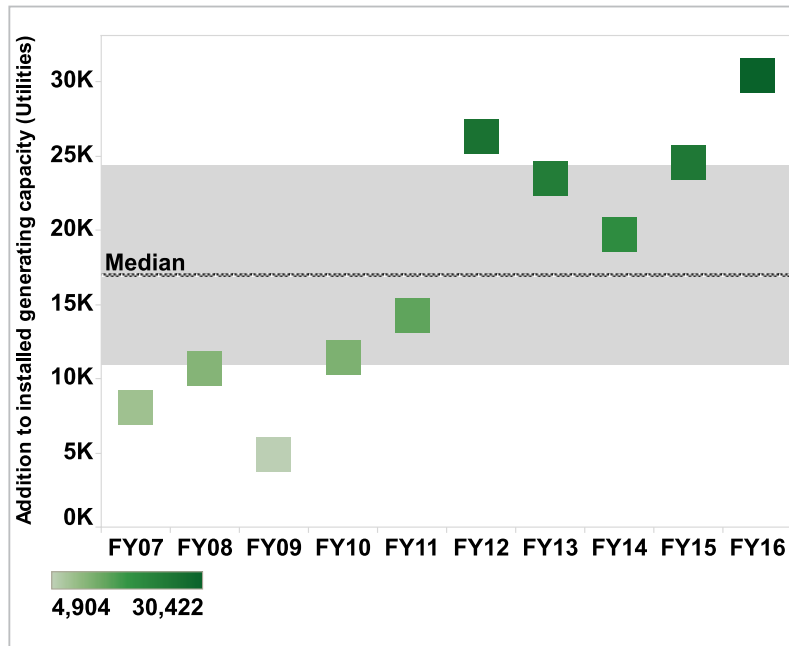
## Electricity

Despite India being one of the largest producer of electricity in the world, the per capita consumption of electricity is lower than the world's average. According to the census of 2011, around one third of the Indian households in the country do not have electricity. Hence, the government aims at providing affordable and 24x7 electricity for all households, industrial & commercial establishments and agriculture sector by 2019. As per the 18th Electric Power Survey (EPS) of Central Electricity Authority (CEA), the energy requirement for the year FY19 is expected to be 1,552 bn units (BU) and the peak demand is estimated to be about 229,465 MW. For meeting the projected demand in FY19, the generation capacity addition expected by FY19 is 372,140 MW, which if achieved will result in generation of 1,677 BU. The government is targeting a capacity addition of 86.4

GW during 2017-22. In order to achieve this target, the government has taken several policy measures in the areas of thermal power generation, hydel, solar, wind and other green energy. In addition, it has taken measures for strengthening of transmission & distribution, separation of feeder and metering of power to consumers.



### Addition to installed generating capacity\* (Utilities) MW



\* Note: includes Thermal, Nuclear, Hydro and Renewable energy sources

Source: CMIE

- A substantial investment of ₹ 430.33 billion has been planned to supply separate electricity through separate feeders for agricultural and rural domestic consumption.
- Apart from this, ₹ 326.12 billion Integrated Power Development Scheme has been launched for strengthening sub-transmission and distribution systems.
- Given that transmission losses account for almost 27%, there are plans to reduce it by 5%, which in turn will avail an additional 15,000 MW of power with no fresh investment required for power generation.
- Further, in order to ease the debt burden of ₹ 4.3 trillion of power distribution companies, the government introduced Ujwal Discom Assurance Yojana or UDAY. It is the financial revival package for electricity distribution companies of India (DISCOM). The scheme comprises four initiatives namely improving operational efficiencies of DISCOMs, reducing power costs, decreasing interest costs and enforcing financial discipline.

- Besides, National Smart Grid Mission has been initiated to make the power infrastructure cost effective, responsive and reliable.

- Under green energy initiatives, India's solar power capacity target under the Jawaharlal Nehru National Solar Mission (JNNSM) was increased by five times to 100,000 MW by 2022. The target will mainly comprise of 40 GW Rooftop and 60 GW through Large and Medium Scale Grid Connected Solar Power Projects. The total investment in setting up 100 GW will be around ₹ 6 trillion.

- In addition to this, solar power projects with investment of about ₹ 900 billion would be developed using Bundling mechanism with thermal power.

Measures taken by the government to achieve the goal of 24x7 power supply are as under:

- Capacity addition of 118,537 MW (including 88,537 MW conventional and 30,000 MW renewable) during the 12th Plan i.e. by FY17
- Construction of 107,440 ckm transmission lines and setting up of 282,740 MVA transformation capacity during the 12th Plan, i.e. by FY17
- Preparation of state specific action plans for providing 24X7 Power For All (PFA) in partnership with the states
- Strengthening of sub-transmission and distribution networks and segregation of agricultural feeders to give adequate and reliable supply and reduce line losses through new schemes of Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and Integrated Power Development Scheme (IPDS)
- Introduction of new Scheme Ujwal Discom Assurance Yojana (UDAY) for operational & financial turnaround of Discoms
- Promotion of energy conservation, energy efficiency and other demand side management measures
- Providing support from Power System Development Fund (PSDF) for stranded gas based generation



## Social Infrastructure

### Social infrastructure: An engine of growth

While physical infrastructure is expected to play a vital role in India's journey towards higher growth in the coming years, improvement in social infrastructure (especially health, sanitation and education) will help the country to move towards inclusive growth. Since investment in social infrastructure is a necessary condition for attaining higher economic growth, the government has over the years scaled up investment in social infrastructure.

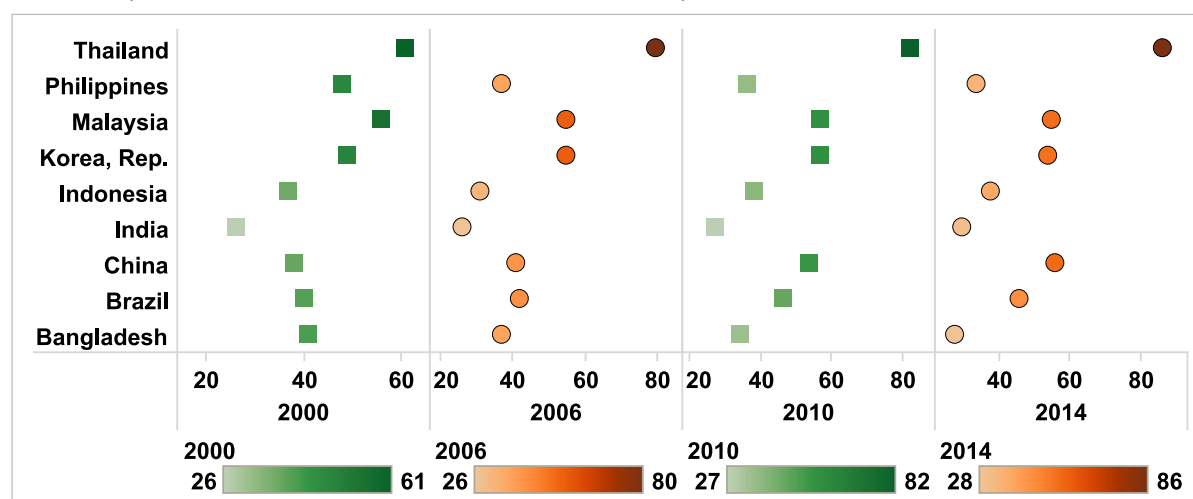
#### Health

Even though healthcare in India has improved over the years, it still lags behind Brazil, China, Russia and few other developing countries. Healthcare spending as a % of GDP in India is lowest among the BRICS nations. Further, the improvement in the health indicators has not been uniform; while states such as Kerala have performed well, Madhya Pradesh and Odisha continue to disappoint even though the states began on equal footing. The statistics for India's health infrastructure is not only below that of other large countries but also not sufficient to match the voluminous disease burden. Due to the paucity of skilled doctors and nurses in

both urban and rural areas, demand for healthcare is higher than the supply, leading to huge waiting times, queues, exploitation, bribery and corruption. The growing incidence of age- and life-style-related chronic diseases resulting from urbanization, sedentary lifestyles, changing diets, rising obesity levels necessitates increased funding on healthcare by the government.

The government has initiated various steps to enhance health care access and address the infrastructure deficit. The hike in the FDI limit in the insurance sector would be particularly beneficial to the sector. Moreover, the government has proposed some commendable initiatives in the Union Budget for FY17. For instance, the launch of new health protection scheme for poor households upto ₹ 0.1 million cost of hospitalization is expected to provide significant respite to poor and economically weak families. In view of growing incidence of life-style related disease like diabetes, the government has initiated National Dialysis Services Programme. The initiative like Sehat (Social Endeavour for Health and Telemedicine) has also been launched at Common Service Centres (CSC) for the benefit of rural population. Further, the government has set a target of 95% immunization cover against seven vaccine preventable diseases namely diphtheria, whooping cough, tetanus, polio, tuberculosis, measles and hepatitis B by end of 2016. The 'Digital India' mission of the government also covers healthcare sector

#### Public expenditure on health as % of total health expenditure



Source: World Bank



through E-health initiative. The E-health programme aims to make use of technology and portals to facilitate people maintain health records and book online appointments with various departments of different hospitals using eKYC data of Aadhaar number, thus providing effective healthcare services to all citizens.

However, in order to achieve the “Health for All” vision that was highlighted in the draft National Health Policy, stepping up Government’s spending on healthcare is of utmost importance. Government’s health expenditure as a % of GDP continues to be below 2.5% of GDP. The long awaited amendment for providing infrastructure status to the healthcare sector needs to be addressed. Innovative public-private partnerships would aid in improving healthcare availability in under-served areas and bridge the rural-urban disparity. These measures, if suitably implemented, can potentially have a lasting impact on India’s medium and long-term growth prospects. Given the government’s thrust to provide quality healthcare infrastructure and services, the government may increase public spending on healthcare going forward.

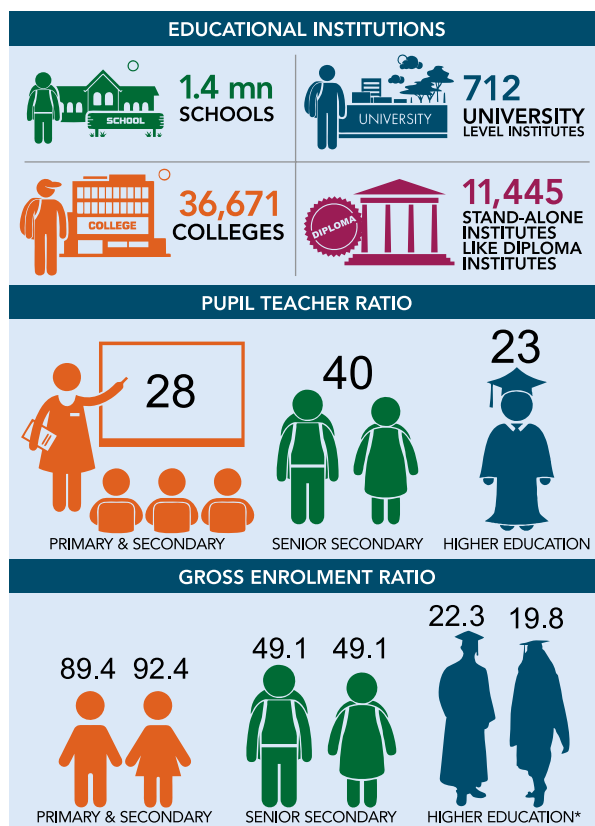
## Education

Although literacy rates in India have increased considerably, from 18.0% in 1951 to 65.0% in 2001 and 74.0% in 2011, they are far below the UMI (upper middle income) reference level of 95% and vary substantially among males and females as well as urban and rural regions. The Indian education sector is beset by issues of access, equity and quality. The education sector - public and private is in need of a major overhaul. The sector has witnessed a host of reforms and increased financial outlays in recent years that could potentially transform the country into a knowledge haven. The government has already allowed 100% FDI in the education sector. The Union Budget for FY17 has also provided significant push to the education sector by allocating ₹ 201.6 billion in FY17 as against ₹ 165.8 billion in FY16, an increase of almost 21.6%.

With human resource increasingly gaining significance in the overall development of the

country, development of education infrastructure is expected to remain the key focus in the coming decade. In this scenario, infrastructure investment in the education sector is likely to see a considerable increase in the current decade.

## Education: Key facts & figures (2014)



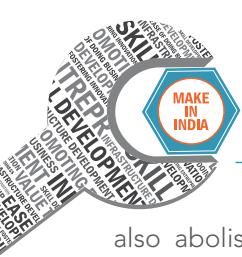
Note: \* Data pertains to FY13

Source: Ministry of Human Resource Development

## Governance and policy

Overall governance along with corporate governance needs to improve from the current levels. In fact, governance has to improve at every level – from hospital and educational institutions to polity, firms, nonprofit institutions, banking and finance, regulation, land records etc. The new government with its mantra of “minimum government and maximum governance” has dismantled a number of ministerial panels and started taking measures to streamline the administrative structure to improve governance and delivery. The government has





also abolished the practice of appointing groups of ministers (GoMs) and empowered groups of ministers (eGoMs).

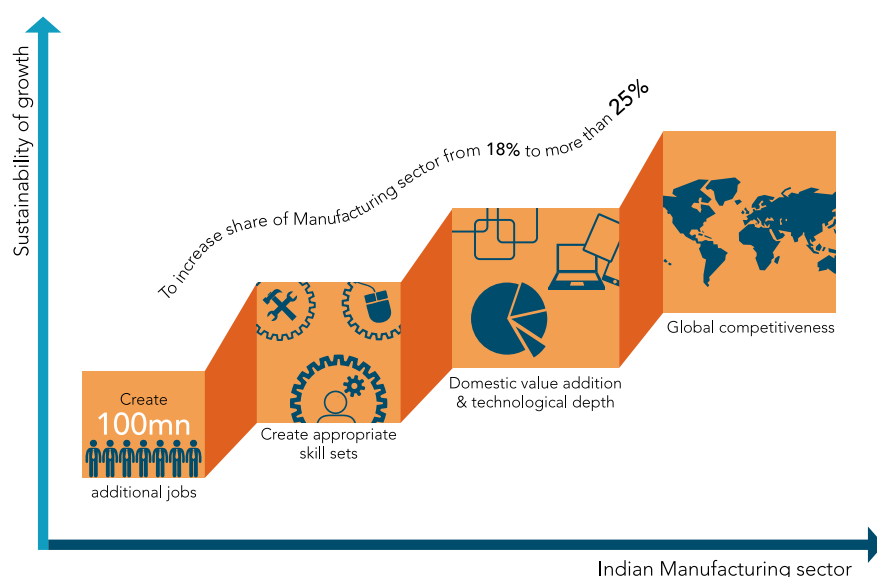
## Big Push Measures - The new paradigms in transforming growth

To emerge from the current slowdown and ascertain a sustainable high growth rate it will require the support of radical initiatives which will provide the 'big push' to the Indian growth momentum. The measures should explore the core competencies and create the enabling framework for India's economy to develop and prosper. We intend to explore some of the current measures taken by the government in this section and chart out its impact on India's growth prospects:

### Make in India

The performance of the Indian manufacturing sector over the past few years has been dismal; the sector has grown slower than the rest of the economy and its share has stagnated at around 18% of GVA, comparing poorly with peers such as Malaysia, Thailand and Indonesia. The sector as a whole has not seen much employment growth in the last decade. Reviving the manufacturing sector

assumes importance as it is needed to increase our GDP growth and provide jobs - both integral to achieve inclusive growth going forward. To achieve a manufacturing-led transformation, the Government has launched the 'Make in India' Programme to promote manufacturing in India and develop it as an attractive hub for manufacturing. The initiative seeks to raise manufacturing (formal and informal) to 25% of GDP and to create 100 million manufacturing jobs within a decade. The program includes major new initiatives designed to facilitate investment, foster innovation, protect intellectual property, and build best-in-class manufacturing infrastructure. The initiative is based on four pillars, which have been identified to give boost to entrepreneurship in India, not only in manufacturing but also in other sectors. The four pillars are: New Processes, New Infrastructure, New Sectors and New Mindset. The program represents an attitudinal shift in how India relates to investors; not as a permit-issuing authority, but as a true business partner. Under the initiative, 25 sectors including defense manufacturing have been identified to revive India's industrial growth and more importantly propel the nation as a global manufacturing hub. The plan includes a variety of measures from easing the regulatory burden to establishing special economic zones to awaken India's latent manufacturing power. It also includes actions to enhance skills and job creation in leading manufacturing sectors.



While the vision of "Make in India" is laudable, turning it into reality would be a tall task. It is possible that the manufacturing sector may well fall short of the set target. Yet the various measures taken by the government in terms of facilitation to industrial sector, creation of conducive environment for the manufacturing activities, focus on improving industrial policies, development of smart cities and FDI enhancement would, to a great extent, facilitate the growth of the manufacturing sector



and push India on a high and sustainable growth trajectory in the coming years. Supplementing these initiatives with overhauling some of the other fundamental factors such as labor and land laws, poor infrastructure and tax policies would further entice domestic and international investors to come and make in India.

## Digital India

The role of digitization in driving economic growth, competitiveness and innovation is well recognized. Though India is considered as the IT powerhouse of the world, there is a massive digital divide in the country based on income, education and geography. For a country with a population of 1.2 billion, the most efficient way to communicate with its citizens is by connecting with everyone on a digital platform. It has therefore become increasingly important for the government to respond and embrace digital technology as a tool to drive innovation, transform how they engage with citizens, foster the interaction of citizens with each other and explore how outcomes can be better secured, resulting in innovative and effective public services.

In order to transform the entire ecosystem of public services through the use of information technology, the government has launched the Digital India programme with the vision to transform India into a digitally empowered society and knowledge economy. The Digital India initiative is centered on three visions:

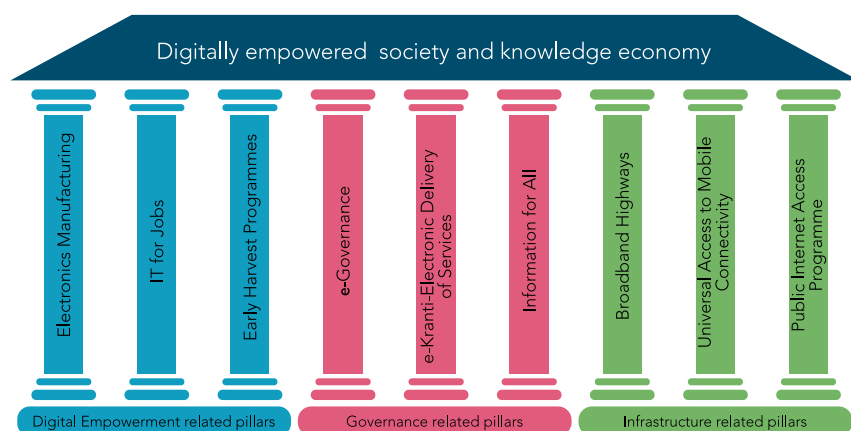
(a) *Digital Infrastructure as a Utility to Every Citizen:* The government is planning to provide high-speed internet connectivity to 250,000 Gram Panchayats, which will be a core utility for digital inclusion.

The citizens will be provided with a digital identity, which will be unique, lifelong, online, and valid. There will be easy access to Common Service Centers and a shareable private space for every citizen on a public cloud.

(b) *Governance and Services on Demand:* Under this vision, all the government departments will be seamlessly integrated with high-speed optical fiber, which will improve inter-operability of these organizations and will result in real-time service delivery from online or mobile platform. Apart from this, the government is planning to make all citizen entitlements portable through cloud for easy and country-wide access. The cloud platform can host online repositories for all possible entitlements thereby providing a single source of truth. This includes areas like Public Distribution System, BPL entitlements, social sector benefits, LPG and other subsidies, etc. Government services for businesses shall be digitally transformed for improving ease of doing business in India. The government also plans to use the power of Geospatial Information Systems (GIS) for decision support systems & development.

(c) *Digital Empowerment of Citizens:* This vision is to empower citizens through digital literacy and universal access to digital resources. All documents/certificates to be available on cloud and digital resources/services to be available in all Indian languages. The government also wants to provide collaborative digital platforms for participatory governance. e.g. MyGov website for crowd sourcing ideas.

The Digital India project in a way provides a concerted digital push to complement the 'Make in India' initiative, thereby enabling to propel forward economically. The creation of large-scale digital infrastructure and digitally enabled







government services would enable manufacturers to do business better and faster, in turn driving innovation and increasing competitiveness. Digitizing the government services will help in reaching more number of people irrespective of social-economic, geographical or regional diversity. Another major outcome of this initiative would be the entrepreneurial opportunities that would be created especially in areas such as m and e-commerce, design and manufacturing services in high tech manufacturing and products. The initiative can bring about significant improvement in labor productivity, in the delivery of government services and reduce revenue leakages (by minimizing corruption) for the government.

## Skill India

The growth rate of the labor force in India will continue to be higher than that of the population until 2021. According to an Indian Labor Report, 300 mn youth will enter the labor force by 2025, and 25% of the world's workers in the next two years will be Indians. India could benefit economically from this 'demographic dividend', if it is able to productively employ its people. However, huge numbers of Indian youth are not only unemployed but also unemployable. Based on the Census 2011 and NSSO (68th Round) data, it is estimated that, 104 mn fresh entrants to the workforce will require skill training by 2022 while 298 mn of the existing workforce will require additional skill training over

the same time period. The main issue to address then is not just providing employment but also increasing the employability of the labor force in India. Employability is contingent upon knowledge and skills developed through quality education and training.

While a number of initiatives have been taken in the skilling and vocational space in India, the launch of the Skill India Campaign is an important milestone towards achieving the objective of skilling with Speed, Scale and Standards across the country. The government has launched four landmark initiatives that aims to train over 40 crore people in India in different skills by 2022. The initiatives include National Skill Development Mission, National Policy for Skill Development and Entrepreneurship 2015, Pradhan Mantri Kaushal Vikas Yojana (PMKVY) scheme and the Skill Loan scheme.

The government's flagship scheme, PMKVY, will incentivize skill training by providing financial rewards to candidates who successfully complete approved skill training programmes. The scheme aims to recognize and provide skill to 2.4 million youth who lack formal certification, such as workers in vast unorganized sector. Under the Skill Loan scheme, loans ranging from ₹ 5,000-1.5 lakh will be made available to 3.4 million youth seeking to attend skill development programmes over the next five years. In the Union Budget for FY17, the government has allocated ₹ 17.7 billion for PMKVY scheme. Through an initiative known as 'Recognition of Prior Learning' (RPL), 10 lakh youth will be assessed and

certified for the skills that they already possess. The government has also proposed to set up 1,500 Multi Skill Training Institutes and to offer entrepreneurship education and training through massive open online courses to be provided in 2,200 colleges, 300 schools, 500 government ITIs and 50 Vocational Training Centres. It intends to launch a new Digital Literacy Mission Scheme for rural population

### Incremental Skill Gaps in Various Industries in India in 2022 (in mn)



Source: NSDC



to cover around 60 million additional households within the next three years.

The creation of a first ever separate Ministry of Skill Development and Entrepreneurship as well as launch of National Skill Development Mission, 2015 mark important steps towards backward integration with the Make in India campaign. Efforts in the skill landscape have been largely devoid of industry/ employer linkages until the last few years. By aligning the skilling efforts with the requirements of 25 key identified sectors of 'Make in India', Skill India would promote growth through improved productivity. The skill policy would bring about more private participation and public-private partnerships in skill development initiatives. The shift in focus from inputs to outcome of skill training that includes employability and placements of trainees would also bring about a positive change.

#### National Skill Development Mission, 2015

- The National Skill Development Mission was approved by the Union Cabinet on July 01, 2015.
- The mission aims at rapidly scaling up skill development efforts in India, by creating an end-to-end, outcome focused implementation framework, which aligns demands of the employers for a well-trained skilled workforce with aspirations of Indian citizens for sustainable livelihoods.
- Key institutional mechanisms for achieving the objectives of the mission have been divided into three tiers, which will consist of a Governing Council for policy guidance at apex level, a Steering Committee and a Mission Directorate (along with an Executive Committee) as the executive arm of the mission.
- Seven sub-missions that have been proposed initially to act as building blocks for achieving overall objectives of the mission are: (i) Institutional Training (ii) Infrastructure (iii) Convergence (iv) Trainers (v) Overseas Employment (vi) Sustainable Livelihoods (vii) Leveraging Public Infrastructure

Source: Ministry of Skill Development & Entrepreneurship

## Urbanisation

The World Urbanization Prospects by UN notes that the largest urban growth will take place in India, China and Nigeria, with India projected to add 404 mn urban dwellers by 2050. Effective management of growing urbanization will thus be

critical in shaping India's current and future growth path. Viewing urbanization as an opportunity and urban centers as growth engines, the Government launched three mega flagship schemes - Smart Cities Mission, the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Housing-For-All. The Smart Cities Mission will get an outlay of ₹ 480 bn, while the AMRUT mission will receive ₹ 500 bn over the next five years. The Housing-for-All by 2022 will see the Government spend about ₹ 3 trillion in the next seven years. While 500 cities and towns, each with a population of 100,000 and above, will be developed under the AMRUT scheme, there would be 100 smart cities built over five years and Housing for All aims at construction of 20 million houses in urban areas in the next seven years.

### Key features

- Under the Smart Cities Mission, each selected city would get central assistance of ₹ 1 billion per year for five years and the focus will be on core infrastructure services such as adequate and clean water supply, Sanitation and Solid Waste Management, Efficient Urban Mobility and Public Transportation, robust IT connectivity, Governance, especially e-governance and citizen participation.
- The AMRUT scheme, on the other hand, adopts a project approach to ensure basic infrastructure services which will be linked to promotion of urban reforms. These reforms as envisioned at present will include e-governance, constitution of municipal cadre, devolving functions and funds to urban local bodies, review of building bye-laws, improvement in assessment and collection of municipal taxes, credit rating, energy and water audit, and citizen centric urban plans. The implementation of AMRUT scheme will enable cities and towns to eventually graduate to 'Smart Cities'.

### Potential Impact

These schemes have the potential to bring about a transformation of urban India with the critical goal of making the country an economic hub besides ensuring that urban areas are livable, sustainable, smart and inclusive. The initiative to build 100 smart





a cluster of 'smart villages', the Government has launched the Shyama Prasad Mukherji Rurban Mission (SPMRM) with an outlay of ₹ 51.4 bn. The SPMRM, through the development of rural growth clusters, aims to transform rural areas into economically, socially and physically sustainable spaces, or 'smart villages' which would trigger overall development in the region. The mission aims to create 300 such Rurban growth clusters over the next 3 years, across the country.

## Progress so far

- First batch of 20 smart cities from 11 States and Delhi announced; 3 cities from Madhya Pradesh, two each from Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat, Maharashtra and Rajasthan and one each from the remaining five.
- Bhubaneswar ranked number one and Bhopal at number 20 in the first list of mission cities.
- 20 winning cities and towns have proposed a total investment of ₹ 508.02 billion over five years with all the cities proposing public-private-partnership as a major vehicle of resource mobilization.
- 10 of the 20 cities have proposed to mobilise ₹ 85.21 billion under PPP model while others have also indicated this option.
- A total area of 26,735 acres has been identified by these cities for making them smart through necessary interventions.
- 23 cities and towns from as many States and Union Territories, who could not make to the first list of winners, were given an opportunity to participate in the 'Fast Track Competition'. Revised Smart City Plans have been submitted

### Key features of National Rurban Mission (NRuM):

- The clusters would be developed by provisioning of economic activities, developing skills & local entrepreneurship and providing infrastructure amenities.
- Would meet twin objectives of (a) strengthening rural areas and de burdening the urban areas and (b) balanced regional development and growth of the country.
- The clusters would be well delineated areas with planned layouts prepared following the planning norms (as laid down in the State Town and Country Planning Acts/similar Central or State statutes as may be applicable), which would be duly notified by the State/UTs.
- The clusters will be geographically contiguous Gram Panchayats with a population of about 25,000 to 50,000 in plain and coastal areas and

## Rurbanisation

The word 'rurban' (rural+urban) refers to an area which possesses the economic characteristics and lifestyles of an urban area while retaining its essential rural area features. In an attempt to develop





a population of 5,000 to 15,000 in desert, hilly or tribal areas. There would be a separate approach for selection of clusters in Tribal and Non-Tribal District.

- The funding for Rurban Clusters will be through various schemes of the government converged into the cluster. The SPMRM will provide an additional funding support of upto 30% of the project cost per cluster as Critical Gap Funding (CGF) as central share to enable development of such Rurban clusters.
- The mission envisages institutional arrangements, both at the State and Centre to ensure smooth implementation of the mission. The mission also has an Innovation budget towards facilitating research, development and capacity building.
- 14 components have been suggested as desirable for the cluster; skill development training linked to economic activities, Agro Processing/Agri Services/Storage and Warehousing, Digital Literacy, Sanitation, Provision of piped water supply, Solid and liquid waste management, Village streets and drains, Street lights, Fully equipped mobile health unit, Upgrading school /higher education facilities, Inter-village road connectivity, Citizen Service Centres- for electronic delivery of citizen centric services/e-gram connectivity, Public transport, LPG gas connections.

## Ease of doing business

Business in India is onerous due to a lack of credit information, bureaucracy, corruption, poor enforcement of contract or intellectual property rights, poor records of land title, the slow legal system and relatively inefficient banking. Corporate reorganization and investor protection are held back by inadequate legal provision. Currently, India is ranked at the 130th position among 189 nations in World Bank's Ease of Doing Business 2016. In case of paying taxes, the only other country in the group that does worse than India (157) is Brazil (178).

The government has set itself the ambitious target of climbing on to 50th position in the World Bank's ease of doing business rankings by 2017 from the present 130th. To achieve this, the Government has initiated several steps. The Department of Industrial Policy and Promotion (DIPP) has already taken a number of initiatives to improve the environment for doing businesses. They include launching a single window eBiz portal for obtaining clearances from various governments and government agencies, exempting a large number of defense equipment from compulsory licensing, and extending the initial validity period of industrial licenses from two years to three so that there is enough time to obtain necessary clearances from authorities. In an effort to hasten decision making, a bureaucratic overhaul has been undertaken for better implementation of Government policies. Some of the steps taken in this

direction include limiting the decision-making process to four layers, setting a two-week deadline to answer queries et al.

### The steps taken by the government to provide ease of doing business

- To facilitate investors and to reply to their queries, Frequently Asked Questions (FAQs) by applicants for grant of industrial license have been developed and uploaded on DIPP website.



Source: World Bank





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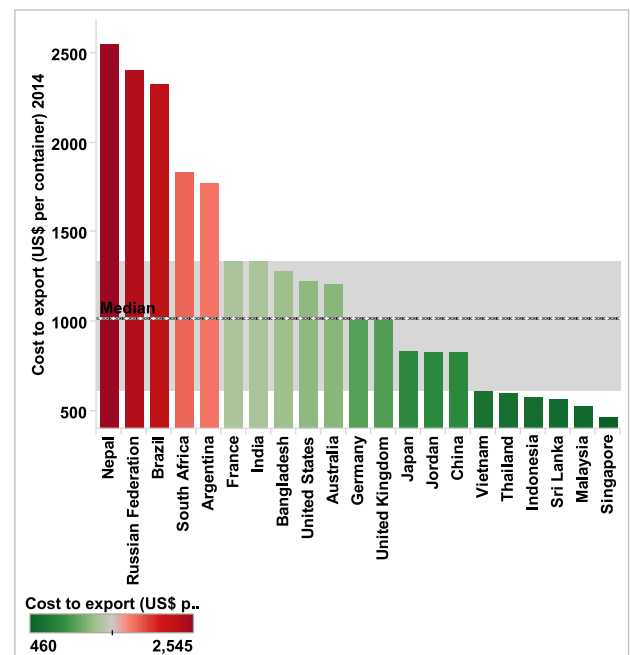
- Extended validity of consent under environmental provisions (Chhattisgarh)
- Unified process with single ID for VAT and Professional Tax registration (Maharashtra)
- Commercial benches established in Mumbai High Court (Maharashtra)
- Creation of Invest Punjab, as a one-stop clearance system for investment projects (Punjab)
- 131 industries exempted from consent requirement by Pollution Control Board (Punjab)
- Real-time allotment of TIN - Taxpayer Identification Number (Delhi)
- Registration for VAT in Delhi has been made online.
- Online application portal for residential and industrial building permits (Delhi)
- Commercial benches established in High Court (Delhi)
- Online portal for construction permits for institutional and commercial buildings (Delhi)
- Static check posts replaced by mobile squads (Uttarakhand)
- Green industries exempted from inspection by Pollution Control Committee (Puducherry)
- Checklist for 86 government services and delivery timelines across 23 departments/organizations made available on Karnataka Udyog Mitra, an online portal (Karnataka)
- The time required for giving a new electric connection in Mumbai has been reduced to 21 days from 67 days. The number of procedures involved has been cut down to 3 from existing 7.
- Online portal for the grant of construction permits (Mumbai)
- Joint inspection by all departments to grant NOCs for construction permits (Mumbai and Delhi)
- Simplified procedure to install electricity connection in 15 days (Delhi)

DIPP has requested all Secretaries of Government of India and Chief Secretaries of the States/UTs to simplify and rationalize the regulatory environment. In order to improve the regulatory business environment they have been requested to take the

following measures on priority:

- A check-list of required compliances should be placed on Department's (DIPP) web portal.
- All registers required to be maintained by the business should be replaced with a single electronic register.
- No inspection should be undertaken without the approval of the Head of the Department.
- For all non-risk, non-hazardous businesses a system of self-certification should be introduced.

### Cost to export (US\$ per container)



Source: World Bank

- The cost to export has been on the rise and its figures in 2014 was US\$ 1,332 in India compared to US\$ 832 in China, US\$ 572 in Indonesia, US\$ 610 in Vietnam and US\$ 1,281 in Bangladesh

## Boost to entrepreneurship

Developing and supporting a culture of entrepreneurship and innovation would enable India to make a mark for itself globally and be recognised as one of the leading destinations for entrepreneurial activity. In an effort to provide a more supportive environment to underpin entrepreneurial growth, "Start-up India, Stand up India" has been





## Start-Up India

## Key features

- ## Progress so far

- 

## Start-Up India

## Stand Up India



## Stand up India

The “Stand up India” scheme aims to promote entrepreneurship among Scheduled Caste/Schedule Tribe and Women for loans in the range of ₹ 1 million to ₹ 10 million. The initiative stresses on the need for each of the 1.25 lakh bank branches to encourage at least one Dalit or Adivasi entrepreneur, and at least one woman entrepreneur. The scheme is expected to benefit large number of such entrepreneurs, as it is intended to facilitate at least two such projects per bank branch (Scheduled Commercial Bank) on an average one for each category of entrepreneur.

The broad features of the scheme are as follows:

- Composite loan between ₹ 1 million and upto ₹ 10 million, inclusive of working capital component for setting up any new enterprise
- Debit Card (RuPay) for drawal of working capital
- Credit history of borrower to be developed
- Refinance window through Small Industries Development Bank of India (SIDBI) with an initial amount of ₹ 100 billion
- Creation of a corpus of ₹ 50 billion for credit guarantee through NCGTC
- Handholding support for borrowers with comprehensive support for pre-loan training needs, facilitating loan, factoring, marketing etc
- Web Portal for online registration and support services

## Policy initiatives

The major thrust of the reforms of the early 1990s related to removal of controls on industrial investment, a larger role for the private sector, easing foreign investment, prudential exchange rate management, greater reliance upon market forces and restructuring of the role of government. This systemic shift propelled the growth of the economy. However these accomplishments are dwarfed only by what remains to be done. The gradualist approach to reforms has taken a toll on the economy leaving behind several sectors on a lackadaisical growth trajectory. Major policy reforms coupled with

effective implementation is imperative to the growth of these sectors. In the following section, we look at bills that have been passed and those that are still pending across key sectors such as agriculture, HRD, industry, finance, energy etc.

## Bills passed/pending since May, 2014

61 bills (excluding amendments) introduced since May 2014 till budget session 2016. 50 bills have been passed while 16 are still pending during this period which includes the crucial GST bill.

Sector	Number of Bills passed	Number of Bills pending
Agriculture / Rural development	1	1
Constitutional Amendments	3	1
HRD / Labour / Health	8	2
Industry / Commerce / Finance	14	5
Science / Energy / Mines/ Environment	3	3
Security / Law / Strategic affairs	15	3
Transport / Tourism / Urban development	6	1

## Agriculture

Passed Bills	Introduction
The Rajendra Central Agricultural University Bill, 2015	23-Dec-15
Pending Bills	Introduction
The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (Second Amendment) Bill, 2015	11-May-15

## Constitutional Amendments

Passed Bills	Introduction
The Constitution (119th Amendment) Bill, 2013	18-Dec-13
The Constitution (121st Amendment) Bill, 2014	11-Aug-14
The Constitution (Scheduled Castes) Order (Amendment) Bill, 2016	1-Mar-16
Pending Bills	Introduction
The Constitution (122nd Amendment) (GST) Bill, 2014	19-Dec-14





## HRD / Labour / Health

Passed Bills	Introduction
The Labour Laws (Exemption from Furnishing Returns and Maintaining Registers by certain Establishments) Amendment Bill, 2011	23-Mar-11
The Telecom Regulatory Authority of India (Amendment) Bill, 2014	11-Jul-14
The Apprentices (Amendment) Bill, 2014	7-Aug-14
The Indian Institutes of Information Technology Bill, 2014	12-Aug-14
The Central Universities (Amendment) Bill, 2014	14-Aug-14
The School of Planning and Architecture Bill, 2014	2-Dec-14
The Bureau of Indian Standards Bill, 2015	7-Aug-15
The Payment of Bonus (Amendment) Bill, 2015	7-Dec-15
Pending Bills	Introduction
The Factories (Amendment) Bill, 2014	7-Aug-14
The Homoeopathy Central Council (Amendment) Bill, 2015	6-May-15

The Benami Transactions (Prohibition) (Amendment) Bill, 2015	13-May-15
The Consumer Protection Bill, 2015	10-Aug-15
The Companies (Amendment) Bill, 2016	16-Mar-16
The Enforcement of Security Interest and Recovery of Debts Laws and Miscellaneous Provisions (Amendment) Bill, 2016	11-May-16

## Science / Energy / Mines/ Environment

Passed Bills	Introduction
The Coal Mines (Special Provision) Bill, 2015	2-Mar-15
The Atomic Energy (Amendment) Bill, 2015	7-Dec-15
The Mines and Minerals (Development and Regulation) Amendment Bill, 2016	15-Mar-16
Pending Bills	Introduction
The Electricity (Amendment) Bill, 2014	19-Dec-14
The Compensatory Afforestation Fund Bill, 2015	8-May-15
The Regional Centre for Biotechnology Bill, 2016	15-Mar-16

## Industry / Commerce / Finance

Passed Bills	Introduction
The National Institute of Design Bill, 2013	11-Mar-13
The Securities Laws (Amendment) Bill, 2014	4-Aug-14
The Textile Undertakings (Nationalisation) Laws (Amendment and Validation) Bill, 2014	1-Dec-14
The Payment and Settlement Systems (Amendment) Bill, 2014	8-Dec-14
The Regional Rural Banks (Amendment) Bill, 2014	18-Dec-14
The Insurance Laws (Amendment) Bill, 2015	3-Mar-15
The Warehousing Corporations (Amendment) Bill, 2015	3-Mar-15
The Undisclosed Foreign Income and Assets (Imposition of Tax) Bill, 2015	20-Mar-15
The Negotiable Instruments (Amendment) Bill, 2015	27-Jul-15
The Indian Trusts (Amendment) Bill, 2015	13-Aug-15
The Industries (Development and Regulation) Amendment Bill, 2015	7-Dec-15
The Sugar Cess (Amendment) Bill, 2015	11-Dec-15
The Insolvency and Bankruptcy Code, 2015	21-Dec-15
The Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Bill, 2016	3-Mar-16
Pending Bills	Introduction
The Micro, Small and Medium Enterprises Development (Amendment) Bill, 2015	20-Apr-15

## Security / Law / Strategic affairs

Passed Bills	Introduction
The Delhi High Court (Amendment) Bill, 2014	17-Feb-14
The Scheduled Castes and the Scheduled Tribes (Prevention of Atrocities) Amendment Bill, 2014	16-Jul-14
The National Judicial Appointments Commission Bill, 2014	11-Aug-14
The Juvenile Justice (Care and Protection of Children) Bill, 2014	12-Aug-14
The Delhi Special Police Establishment (Amendment) Bill, 2014	25-Nov-14
The AntiHijacking Bill, 2014	17-Dec-14
The Citizenship (Amendment) Bill, 2015	27-Feb-15
The Andhra Pradesh Reorganisation (Amendment) Bill, 2015	2-Mar-15
The Appropriation Acts (Repeal) Bill, 2015	24-Apr-15
The Repealing and Amending (Fourth) Bill, 2015	27-Jul-15
The High Court and the Supreme Court Judges (Salaries and Conditions of Service) Amendment Bill, 2015	13-Aug-15
The Arbitration and Conciliation (Amendment) Bill, 2015	3-Dec-15
The Commercial Courts, Commercial Division and Commercial Appellate Division of High Courts Bill, 2015	7-Dec-15
The Election Laws (Amendment) Bill, 2016	24-Feb-16
The Sikh Gurdwaras (Amendment) Bill, 2016	15-Mar-16



Pending Bills	Introduction
The Lokpal and Lokayuktas and other related Law (Amendment) Bill, 2014	18-Dec-14
The Whistle Blowers Protection (Amendment) Bill, 2015	11-May-15
The Enemy Property (Amendment and Validation) Bill, 2016	8-Mar-16

## Transport / Tourism / Urban development

Passed Bills	Introduction
The Real Estate (Regulation and Development) Bill, 2015	14-Aug-13
The Public Premises (Eviction of Unauthorised Occupants) Amendment Bill, 2014	11-Dec-14
The National Capital Territory of Delhi Laws (Special Provisions) Amendment Bill, 2014	15-Dec-14
The Motor Vehicles (Amendment) Bill, 2015	2-Mar-15
The National Waterways Bill, 2015	5-May-15
The Carriage by Air (Amendment) Bill, 2015	7-Aug-15
Pending Bills	Introduction
The Merchant Shipping (Amendment) Bill, 2015	10-Aug-15

## Missions launched by the NDA government

Name of the mission	Announced/ Cabinet approval	Launch Date	Aim of the mission
SWACHH BHARAT MISSION	15/8/2014	2/10/2014	To clean India and make it free of open defecation by 2 October 2019
JAN DHAN YOJANA	10/7/2014	28/8/2015	To ensure every Indian household has access to a bank account
PM JAN SURAKSHA BIMA YOJANA	28/2/2015	9/5/2015	To provide an accidental-death-cum-disability cover of ₹ 0.2 million for Indians in the age group of 18-70 years
PM JEEVAN JYOTI BIMA YOJANA	28/2/2015	9/5/2015	To provide life Insurance cover of ₹ 0.2 million to Indian citizens in the age group of 18-50 years
ATAL PENSION YOJANA	28/2/2015	9/5/2015	To address old-age security needs, senior citizens guaranteed a fixed retirement income subject to their level of contribution
MUDRA	28/2/2015	8/4/2015	To provide capital to small micro units to encourage entrepreneurship
ATAL INNOVATION MISSION	24/2/2016	-	To promote a network of world-class innovation hubs and Grand Challenges for India
MAKE IN INDIA	-	25/9/2014	To promote India as an important investment destination and a global hub for manufacturing, design and innovation
START UP INDIA	15/8/2015	16/1/2016	A comprehensive policy to encourage start-ups in the country
STAND UP INDIA	15/8/2015	16/4/2016	Making it easy for backward caste and female entrepreneurs to access loans at a low interest rate
PM AWAS YOJANA (URBAN)	29/4/2015	25/6/2015	To ensure housing for all by 2022
NAMAMI GANGE MISSION	10/7/2014 (Cabinet approval on 13 May 2015)		To clean river Ganga and ensure uninterrupted flow of water







## State level policy initiatives

- The state government of Madhya Pradesh has made amendments to the labor laws and has expedited the process for registration and grant of licenses. The laws to which amendments were made include Industrial Disputes Act, Factories Act, and Shops and Establishments Act.
- The state government of Rajasthan has passed the Rajasthan Investment Region Bill, 2016; the Rajasthan Land Pooling Scheme Bill, 2016; and the Rajasthan Urban Land (Certification of Titles) Bill, 2016. Together all these laws will promote the ease of doing business and removes constraints to land acquisition.
- The state government of Rajasthan has also relaxed the provisions of the Industrial Disputes Act, Factories Act, Apprentices Act and Contract Labor Act amending several archaic central labor laws.
- The state government of Karnataka has passed the Karnataka Land Reforms and Certain Other Law (Amendment) Bill, 2014. The legislation makes it easier to divert agricultural land for commercial and industrial purposes by simplifying procedures.
- The state government of Andhra Pradesh has passed the Industrial Disputes (Andhra Pradesh Amendment) Act, 2015 and Andhra Pradesh Integrated Registration Act, 2015. The legislation puts an end to the License Raj by bringing registration of shops and establishments under one portal.
- The state government of Gujarat has relaxed labor laws to give an impetus to industrialization by passing the Labor Law (Gujarat Amendment) Bill, 2015.
- The state government of Maharashtra has passed The Factories (Maharashtra Amendment) Act, 2015. The legislation would provide a fillip to the small and micro enterprises as it allows women to work in night shifts.

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# Manufacturing Outlook

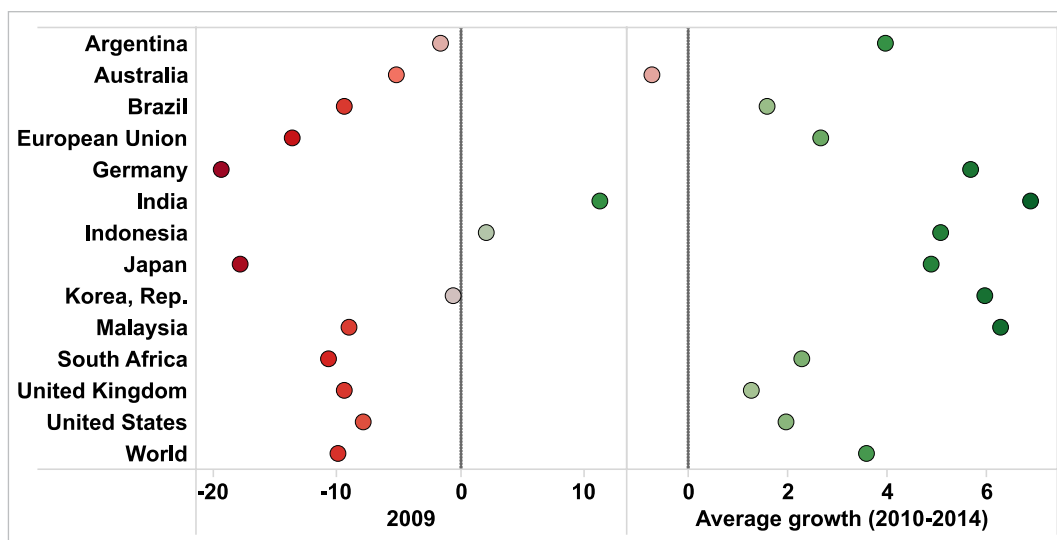
## Manufacturing scenario globally

Globally, the manufacturing sector is still struggling to reach the levels prevalent before the 2008 global financial crisis. The growth momentum remains subdued as the global economy still suffers from currency volatility, a sharp decline in commodity prices, slowdown in the largest manufacturing zone, i.e. China and geopolitical instabilities. While industrialised economies continue to face slow growth, the emerging or developing countries, which have been the main engine of global manufacturing growth, are finding it difficult to sustain growth as they are facing low demand in the global market and in their domestic economies. China continues to slow down and the major Latin American economies are also struggling with severe economic challenges. The implications of the slowdown in China, the

second largest economy in the world, is likely to have ramifications in the global manufacturing sector and the supply side dynamics prevalent in the Asian economic and trade corridor. In the current environment of subdued growth in developed economies, the South-East Asian countries will find it difficult to replace the demand from China. China's slowdown has impacted the global growth and India is very well integrated into the global economy.

In such an economic environment, it becomes pertinent for India to usher in structural reforms, which can strengthen its manufacturing base to build resiliency towards both changes in demand and price variations. Also, India's thrust towards reinvigorating its manufacturing sector at this juncture will not only help in employment creation but will also help in generating domestic demand.

## World Manufacturing Value Added (% growth)



Source: World Bank

Note: Average growth of USA, Japan and world is for the period 2010-2013

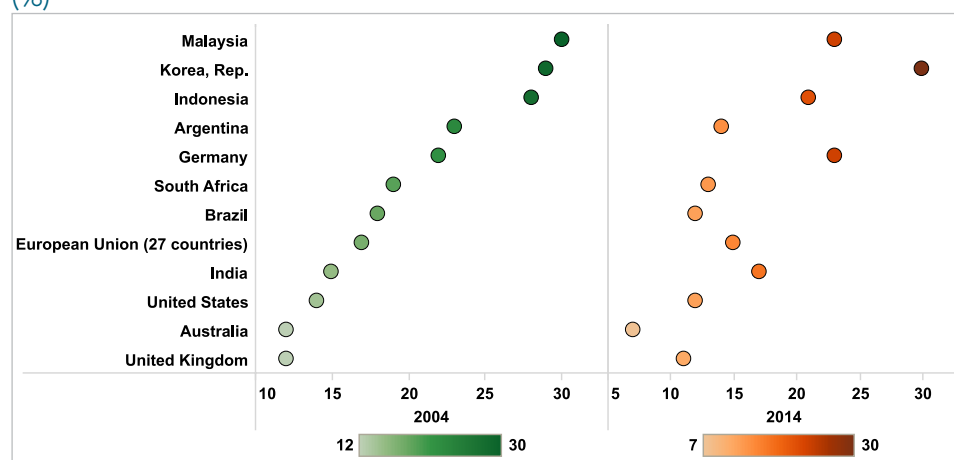




## Change in share of manufacturing to GDP in the last decade

In the last decade, the share of manufacturing sector output to GDP has declined in many countries. The following graph depicts that countries such as Argentina has witnessed a significant decline in share from 23% in 2004 to 14% in 2014. However, countries like Germany, South Korea and India has witnessed an increase in share during the period.

### Share of manufacturing sector to overall GDP (%)



Source: World Bank

With manufacturing activity slowing down in China and labour costs rising and its calibrating move from investment to consumption driven economy will offer India scope to capture some of the market share of labour intensive products in the global market. India also has opportunity to enter the high value technology intensive sectors primarily because of its labour cost competitiveness and its gradually developing technology prowess. The 'Make in India' initiative of the government, which aims to make India a global manufacturing hub, intends to provide conducive environment wherein target of accelerating manufacturing sector growth can become a reality.

## India's manufacturing sector

Compared to other countries, while India's manufacturing share to GDP is low, it has witnessed

an increase in share along with South Korea and Germany over the past decade as against the decline in share witnessed by the other major South East Asian and BRICs countries.

India's growth story differs from other economies like Japan, South Korea and China because of its service sector driven growth rather than by manufacturing sector. India's transition from its agricultural to a service driven economy (by passing industrial sector) has led to it being the 3rd largest country in terms of Purchasing Power Parity (PPP at constant 2011 international \$). However, despite

being the third largest country, India was not able to gainfully employ its workforce. Developing its manufacturing sector would thus enable India to accelerate its growth rate towards its high long-term potential by gainfully engaging its workforce.

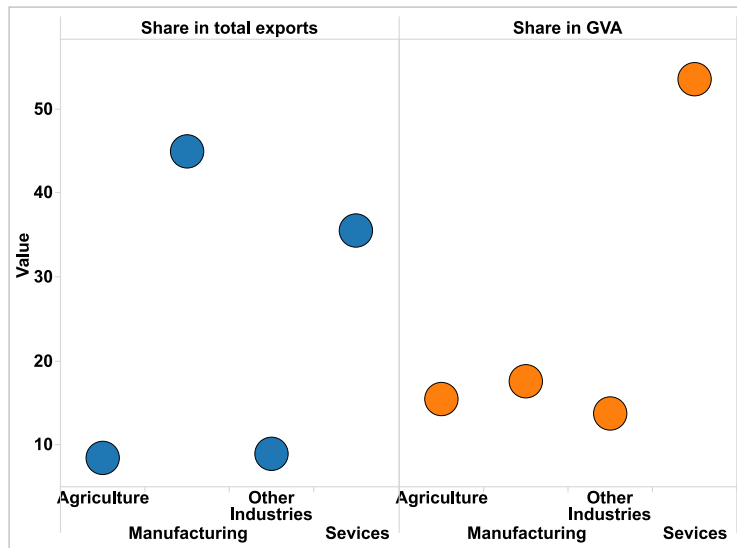
Even as growth of services has led to significant job creation and poverty

reduction, the services sector alone cannot absorb the labour that will enter the workforce in the coming years, even as services now have more economic advantages than 40 years ago, for example, in some digitalised services, the cost of expanding production is getting close to zero. Besides, except during the period FY04-FY10, services exports have been stuck at an average around 33% of international trade since 2000. Moreover, most services still require the producer and consumer to be in the same location, like education, whereas, in theory, all manufacturing products can be traded. In case of India, transition from agriculture to the services driven economy had led to the distribution of wealth to the few sections of the society that could reap the benefits that this sector presented. The services sector contribution to employment remains low while agriculture continues to be the single largest employment generator. The services and industrial sectors provide employment to nearly 51.0% of the population, whereas they



contribute more than 71% in overall gross value added. Furthermore, majority of workers in the agriculture sector are informal workers.

### Share of sectors in GVA and total exports (FY16)



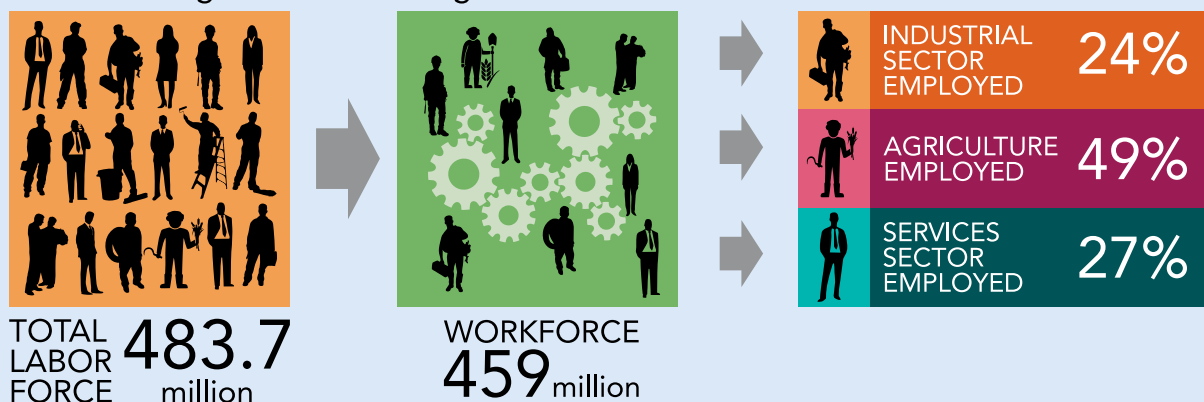
Source: MOSPI & RBI

The International Labour Organization says that countries with a high share of employees in industry tend to have more people in wage-employment, rather than in informal, vulnerable jobs. Technology diffusion from the manufacturing sector has the potential to increase the efficiency across all sectors of the economy. One of the ways to sustain the economic development in India and give it the 'big push' towards the next level of development can be through increase in the productivity growth and technological advancement in the manufacturing sector.

As the share of services sector of India has converged to the international norms, it raises queries on the pace of growth in the future. Whether services sector will continue to sustain its performance exhibited during the last decade will depend on expansion of modern services (business services, communication, banking and e-commerce), or application of information technology to traditional services (retail and wholesale trade, transport and storage, public administration and defense). However, it is also to be noted that the growth and export of services in India is less than that of the People's Republic of China and India's services exports are competitive in only a few areas. Domestically, most of the Indians do not have access to basic services such as healthcare and education and cost of service delivery is high because of weak infrastructure.

The Government of India's two ambitious projects – 'Digital India' and 'Make in India' aims to strengthen India's services and manufacturing sector. In the coming years it will be the development in both the services as well as the manufacturing sector that will help India to grow. Sustaining economic growth and raising the living standards will require shifting labour into both manufacturing and services. The manufacturing sector in India which still has to etch the success story that has been experienced by the East Asian tigers has the potential to provide employment to the increasing labour force of India.

### Manufacturing sector needs to grow to absorb incremental labour in India



Source: NSSO 68<sup>th</sup> Round



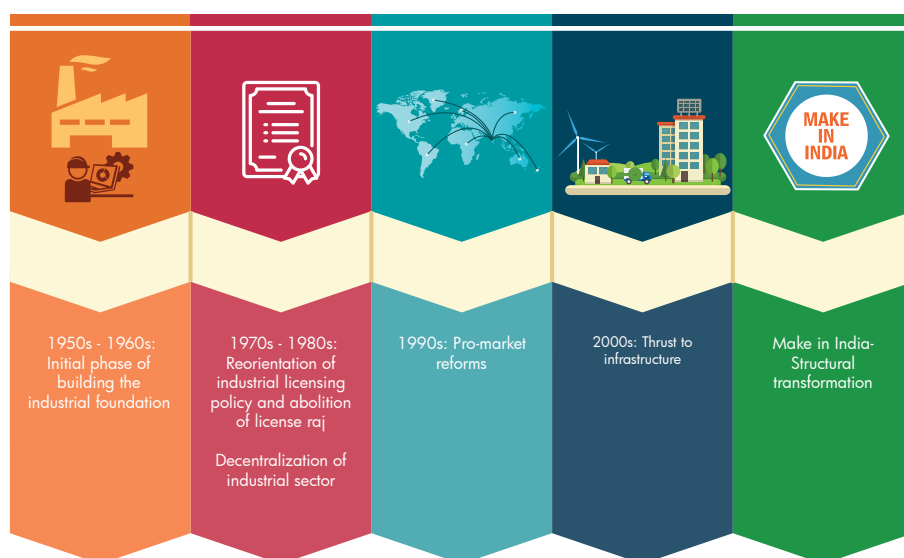
Nevertheless, the manufacturing sector in India will require efforts that are more concerted as it had languished and have long performed below their potential. In India, the share of manufacturing sector in GDP has remained constant since the two decades (80s and 90s) and has hovered around 16% to 17%. While India ranks 34<sup>th</sup> in the overall world in terms of share of manufacturing sector to GDP, with a share of 2.6% of global manufacturing value added in 2013, it is not a dominant producer in any of the broad manufacturing categories. India only ranks higher in low value added segments such as textile, food processing etc.

Products that the Indian manufacturing sector used to manufacture in the 1990s are now imported. For example, the Indian IT hardware industry and optic fibre telecommunication systems industry were impacted owing to reduction of import duty. Opening up of the market for low priced goods also led to loss of market share of television and cellphone handsets market to the foreign companies. The government currently envisions not only to promote the indigenous domestic manufacturing sector but also encourage foreign companies to set up greenfield projects in India. With the Digital India initiative in place, the government also intends to create an electronics manufacturing hub in India.

In order to bring about the structural change in the economy (as envisioned in the transition from around 18% manufacturing share of GVA to a share of 25%), India will also have to move from low value-added to high value added and from low productivity to high productivity sectors or activities. According to the classic dualism model (Lewisian model), economic development is by definition a process of shifting resources from low to high productivity sectors, thereby raising economy-wide levels of productivity. The critical drivers of the structural change will

involve costs, inclusion of technology at each level of the value chain, product innovation, resource efficiency and the ability to match the type of skills to the structure of industry and industrial policies adopted. Key features of the reforms taken over the years to promote industrialization and the approach taken under the Make in India programme of the current government to promote the manufacturing sector are outlined below:

## PHASES OF INDUSTRIAL REFORMS



## Reforms during 1980s: Pro-business reforms

- Import liberalisation, particularly of capital goods and intermediate goods
- Extension of export incentives through the tax system and liberal access to credit and foreign exchange
- Significant relaxation of industrial licensing requirements through direct 'delicensing' of some industries and through 'broad banding' which permitted firms in some industries to switch production between similar product lines
- Decontrol of administered prices of key intermediate inputs
- Correction of overvaluation of the currency



## Reforms during 1990s: Pro-market reforms

- Abolition of industrial licensing and limiting the scope of public sector monopolies to a small number of industries
- Liberalization of forward direct investment and portfolio investment
- Trade liberalization including the elimination of import licensing and the progressive dismantling of non-tariff barriers
- Financial sector liberalization, including the removal of capital controls on capital issues, free entry for domestic and foreign private banks and the opening up of the insurance sector
- Liberalization of investment and trade in important services, such as telecommunications

## Reforms during 2000s: Thrust to infrastructure

- India finally removed quantitative restrictions on imports of manufactured consumer goods and agricultural products
- Manufacturing policy to increase the share of manufacturing to the GDP
- Clustering high-tech industries and services (for example, in software parks)
- Setting up Special Economic Zones and Agri-Economic Zones to promote exports
- Formulating state-level industrial policies to attract investments
- Power-sector reforms that restructured state Electricity Boards by separating generation, transmission and distribution activities

## Make in India - Structural transformation

- Ease of Doing Business
- Facilitating investment
- Fostering innovation
- Strengthening of Indian IPR regime

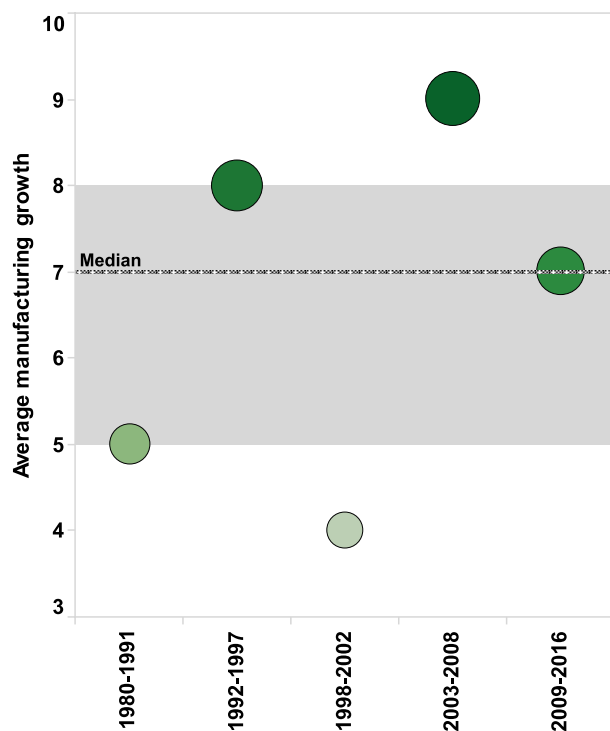
- Labour and land reforms
- Taxation reforms

## Current scenario in India's manufacturing sector

In the recent period, weak consumption and investment demand along with slow and uneven global economic recovery have all contributed to slowdown in manufacturing activity. High interest rates, elevated level of inflation, slowdown in investment activities and sluggish demand conditions resulted in a decline in production levels during the last three years. The manufacturing sector faces numerous constraints. Supply chain uncertainties are a biggest constraint to manufacturing growth and competitiveness, while the cost and ease of doing business scenario has negatively impacted business efficiency. Poor infrastructure, regulations related to land acquisition, labour and taxation pose biggest hurdles to businesses. The nation's infrastructure challenges are a major hindrance towards becoming globally competitive.

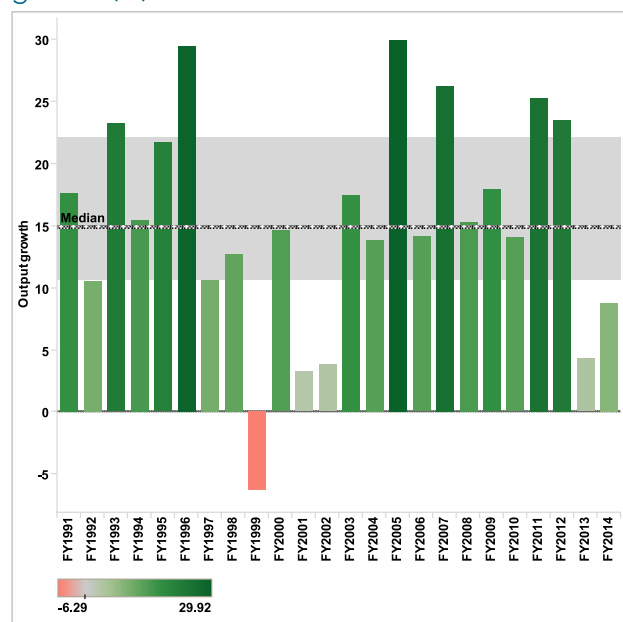


## Performance of the Indian manufacturing Sector



Source: CMIE and D&B Research

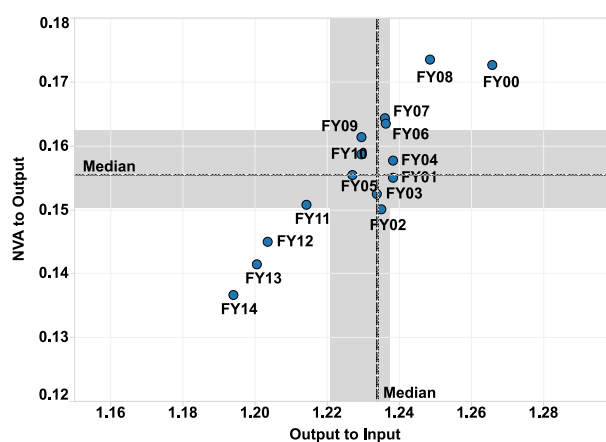
## Registered manufacturing sector output growth (%)



Source: MOSPI and D&B Research

In India, there is a wide difference between registered and unregistered manufacturing sectors in terms of productivity. The registered manufacturing sector, which is much more productive than their counterpart, has a greater potential for structural transformation. However, as India grows and the manufacturing sector develops we expect that the unregistered segment will tend to become more organized and the growth trend and productivity of both the segments will need to converge to achieve a high and sustained growth along with a greater share in GDP.

Input intensity and Net Value Added (NVA)  
to output - Registered manufacturing (NVA/  
output and output/input)



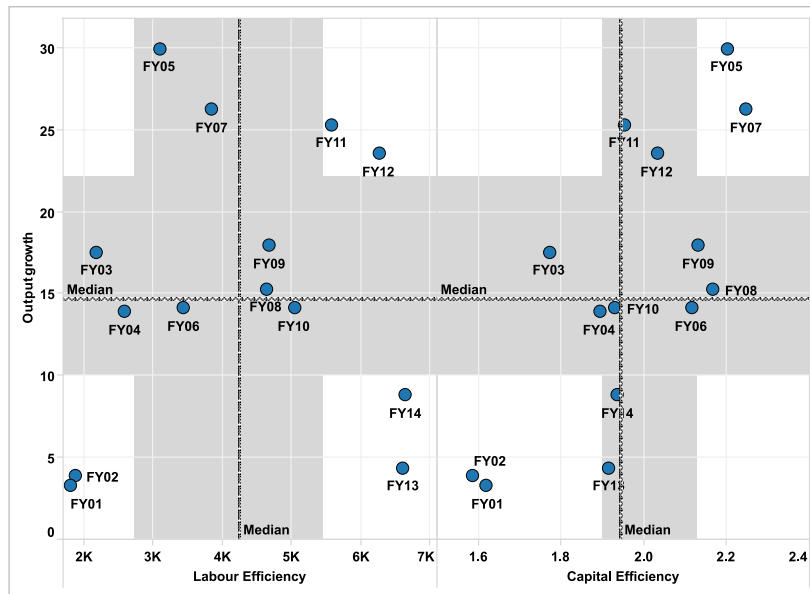
Source: MOSPI & D&B research

- Input intensity and domestic value addition declined over the years, especially since FY09. Besides, moderation in the efficiency levels and unutilised excess capacity might have also led to decline in the ratios measuring the productivity levels in the registered manufacturing segment

Indicators like net value added to output and output to input ratio indicates that productivity of the registered manufacturing sector has been deteriorating since FY09. The ratio of net value added to output has declined from around 21% in FY97 to around 14% in FY14. Thus, there is scope for the Indian industry to increase the domestic value addition and add to the technology depth, upgrade the skill of the workforce and improve integration through backward and forward linkages and thus climb up the value chain.



## Tracing labour and capital efficiency in line with output growth over the years (Registered manf)



Note: Capital efficiency denotes a value of output / invested capital;  
Labour efficiency denotes net value added by employees per 1000

Source: Annual Survey of Industries, MOSPI

The ratio of output per unit of invested capital has dropped in the recent period which indicates that per unit of capital invested yields to lower output than witnessed during the boom period of the Indian economy i.e. FY04 to FY08. Thus, it is not only the access to capital/funds but also the efficient use of capital that needs to be improved to increase the productivity of the manufacturing sector. Moreover, unutilized capacity owing to the slowdown in demand had also contributed to capital inefficiency in the recent period. While capital efficiency has slowed down, the number of labours required to produce one unit of net value added has declined. This could be either because of infusion of more capital or incorporation of technology in the manufacturing process. Technological diffusion in the manufacturing sector as it adapts to the new process and becomes more competitive will lead to displacement of labour. India needs to strategically map out the growth areas of its manufacturing sector that will be able to absorb the transfer of unskilled labour from the rural areas or the agricultural sector as well as the skilled labour from the urban and semi-urban areas. However, lack of industry specific skill sets and vocational training which enables the industry or the

services sector to readily absorb labourers impacts labour efficiency and leads to ineffective distribution of labour. The government has duly noted this and hence the 'Skill India' campaign initiated attempts to fill in the skill gap.

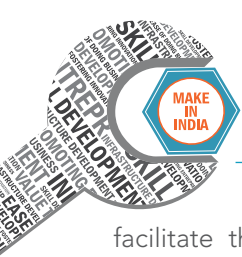
## Growth outlook of the Indian manufacturing sector

The contribution to growth brought about by the manufacturing sector in Japan (1970s & 1980s), South Korea (1980s) and China (1990s) is well known (TP Bhat, ISID). India has now embarked on the path to strengthen its manufacturing sector and increase

its contribution to the GDP. While the growth model followed by the countries cannot be completely emulated in the contemporary period, however certain patterns/ models can well be imbibed – which includes development of infrastructure, encouragement to enterprises and creation of new entrepreneurship, availability of finance, innovation in manufacturing, skill development and most notably support from the government. The current government has initiated the drive to reinvigorate the manufacturing sector. The 'Make in India' initiative of the government intends to represent an attitudinal shift in how India relates to investors; not as a permit-issuing authority, but as a true business partner. While the vision of "Make in India" is laudable, turning it into reality would be a tall task. The competitiveness of the Indian industry lags behind most of its peer group countries. The thrust to make India a global manufacturing hub thus, could only be realized by strengthening infrastructure, improving skills, inducing flexibility in labour markets, and making them available at a competitive cost.

The various measures taken by the government in terms of measures for ease of doing business, creation of conducive environment for the manufacturing activities, focusing on improving industrial policies and FDI enhancement would to a great extent





facilitate the growth of the manufacturing sector and push India on a high and sustainable growth trajectory in the coming years. Implementation in a timely manner holds the key. However, in order to fulfill its potential, a wider array of initiatives needs to be implemented. The slower than anticipated pace of reforms owing to the growing dissonance between the ruling party and the opposition (government lacks majority in the Upper House) are also imposing hurdles in realizing greater benefits. The Goods and Services Tax (GST) and Land Acquisition Bills are critical to revive long-term growth prospects. Large private firms will not enter into labor-intensive manufacturing unless we move to a system that makes room for more flexible contracts in the labour market and resolves labour market disputes more swiftly. There is a need for more fundamental policy reforms to address weak physical infrastructure and a rising energy shortage. Thus, we expect India to realize the target of 25% share in manufacturing at best only by 2025. The manufacturing sector would retain the current share of around 18% by FY16, reach the level of around 20% by FY19 and achieve 22.5% by FY23. In order to achieve this, Dun & Bradstreet expects the manufacturing investment to grow from around US\$ 109 billion in FY15 to US\$ 490 billion in FY25.

D&B also evaluated the growth and status of 6 major industrial sectors by 2025; the share of 6 major industrial sectors in India's economy i.e. Mining, Metals, Machinery & Equipment, Chemical & Pharma, Textile & Leather and Food processing is expected to grow from around 17% in FY14 to approximately 23% by FY25. India has the capability to push its manufacturing contribution to GDP to 25% by 2025. The stage has been set and the initiatives rolled out. The initiatives taken to promote the manufacturing sector will benefit all the other segments of the economy. The overall growth momentum of the economy offers incentives not only to the domestic entrepreneurs but also to the foreign investors. The Indian manufacturing sector will slowly but surely gain the foothold in the coming years.

## Why would India emerge as a manufacturing hub?

India's long-term growth potential is determined by its favorable demographics, relatively high savings, domestic market integration and efforts made by the government. The advantages that the country offers in terms of availability of skilled man power at relatively low costs and huge domestic market are expected to enable India emerge as one of the world's most attractive manufacturing destination.

**Rise of middle class:** The rise of middle-class consumer base and increasingly well-educated labour force will support India to realize the goal of becoming a leading manufacturing hub.

**Competitive factors:** Competitive labor costs and improved logistics infrastructure will support the manufacturing units to function efficiently. As wages increase in developed countries, the diversity in labor and low input costs would enable companies to shift production facilities to cheaper locations such as India. Moreover, with major players in global trade such as China witnessing a slowdown accompanied by a rise in wage cost, India could seize the opportunity by providing the critical enablers in place such as targeted infrastructure improvements and more open trade and investment regimes.

**The map of talent:** With increasingly well-educated labour force, higher-skilled functions such as R&D are set to gravitate towards such locations. To increase productivity and bring about up-gradation from low level technologies to complex technologies requires greater and diverse skills. In spite of India having a huge educated workforce, requirement of the industry remains largely unmet as industry specific skills is not imparted by the academic institutions at large.

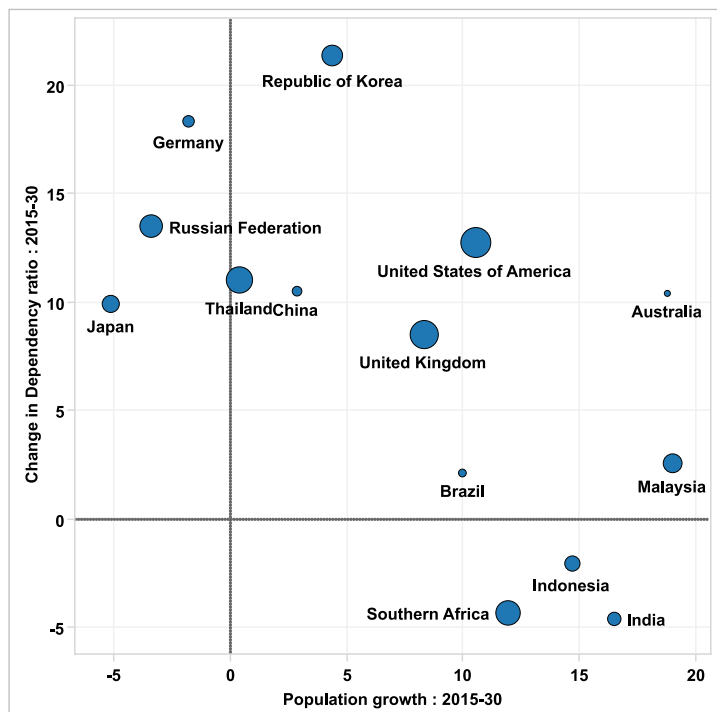
## Falling dependency ratio

Higher population growth along with a decline in the dependency ratio brings about a unique favourable scenario for a country as it can benefit potentially from sizeable labour supply, lower spending on old age population and increase in savings rate. By 2030,



India would be in the most favourable position than its counterparts in the Asian economies like China, the major developed countries and even better than South Africa. With a population projected to increase to more than 1.4 billion by 2025, and 113 million additional workforce that are expected to join the workforce by 2025, the demographic dividend poses challenges for the government to provide for more productive employment generation.

### Dependency ratio of countries v/s population growth during 2015 to 2030



Source: World population prospects, United Nations

**Greater share in South-South trade:** The similar market structure of developing countries would enable MNCs of emerging markets to exploit opportunities in India, given that the government offers them policy support and other critical support in terms of infrastructure, ease of doing business, skilled and cheap labour etc. India can emerge as a major player in the South-South trade and in this process develop into a manufacturing hub over the coming years. Since 1990, South - South trade - or trade between emerging markets - has increased from 8% of world trade to around 23% in 2014, and is expected to increase over the coming years.

Acceleration of South – South trade have been driven mainly by a growing middle class, supply chain specialization and strategies pursued by emerging-market governments to capture a share in trade between the emerging countries. It is the developing countries, which are emerging as major importers and consumers of commodities produced by other developing countries owing to economic and population growth. Within developing Asian countries exports have increased by 8-fold over the last two decades (1995- 2013), while India's export to developing Asia have increased by around 23 times during the same time. Share of India's exports to regions such as Africa, Asia and Oceania remain high at 58% of its total exports in FY16 from around 43% in FY99.

**Supply chain specialization:** The global value chains has opened markets for industrialization. The fragmentation of supply chains with production hubs in the developing countries feeding intermediary products into final goods, assembled by developed countries has led to an increase in global trade. With China slowing down, India should try to capture a segment in this supply chain if it aims to establish itself as a global manufacturing hub.

### What needs to be done?

To bolster the manufacturing sector, India needs to develop its supply side scenario, develop skill level of workers, provide enabling infrastructure, ensure deployment of technology, instill best practices and strengthen research and development. A productive business environment requires conducive policy framework, financial support, technology readiness, efficient labour, market access, infrastructure and goods market efficiency.

**Policy framework:** An enabling policy framework to support the manufacturing sector growth is inevitable. The 'Make in India' initiative of the Government thus tries to build the enabling framework for manufacturing sector to become





competitive. Make in India was designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build best-in-class manufacturing infrastructure. India needs to bring about structural reforms addressing all the factors of production i.e. land, labour, capital, entrepreneurship and technology.

### Removing the regional disparities in manufacturing sector performance in India:

There lies potential that should be exploited as indicated by the unequal growth and development of the manufacturing sector in different states in India. The share of the manufacturing sector to Gross State Value Added (GSVA) in only 10 states (incl Union territory) in India exceeded 20% as of FY15. In 7 states, the share of manufacturing hovers below 10%. Data from the Annual Survey of Industries show that from the total 33 states and union territories in India, only eight states accounted for around 70% of the net value added in the organized industrial sector, contributing significantly towards industrial development in India in FY14.

**Ease of doing business:** According to World Bank, in 2016 India ranked 130<sup>th</sup> out of 189 countries in terms of the ease of doing business. India ranks way behind all the BRICs nations. The government has initiated a number of measures to facilitate doing business in India. However, a lot more needs to be done to scale up the ranks. The steps taken by the government to provide ease of doing business

**Research & innovation:** India's spending on R&D remains abysmally low when compared to the BRICs and the other comparable developing countries. The spending on research from the present level (2005-2014) of 0.8% of GDP must increase to at least 2% of GDP. The Science, Technology and Innovation (STI) Policy, 2013 envisages increasing R&D expenditure to 2% of GDP with enhanced participation of private sector through policy and reform processes. Given the need for a strong Intellectual Property (IP) regime also mandated by WTO, the current government has taken several initiatives to create a conducive environment for the protection of intellectual property rights of innovators and creators by bringing about changes at legislative and policy

level. The government has also laid specific focus on improved service delivery by upgrading the infrastructure, building capacity and using state-of-the-art technology in the functioning of intellectual property offices in the country.

**IPR initiatives:** India is a member of the World Trade Organisation and committed to the agreement on Trade Related Aspects of Intellectual Property. India is also a member of World Intellectual Property Organization, a body responsible for the promotion of protection of intellectual property rights throughout the world. India is also a member of the following important WIPO administered International Treaties and conventions relating to IPRs:

- Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure
- Paris Convention for the Protection of Industrial Property
- Convention Establishing the World Intellectual Property Organization
- Berne Convention for the Protection of Literary and Artistic Works
- Patent Cooperation Treaty
- Protocol Relating to the Madrid Agreement Concerning the International Registration of Marks – Madrid Protocol
- Washington Treaty on Intellectual Property in respect of Integrated Circuits
- Nairobi Treaty on the Protection of the Olympic Symbol
- Convention for the Protection of Producers of Phonograms Against Unauthorized Duplication of their Phonograms

### Shift from low value added sectors towards high value added sectors:

Within manufacturing, there is a need to shift structurally from low value added sectors towards high value added sectors. In order to make this transition, along with spending on R&D, sectors would also require adopting new and advanced manufacturing technologies. Definite policy thrust is required for the development of technology intensive sectors such like aerospace,



defence, high precision machinery, pharmaceuticals, etc. These subsectors are not only research and technology intensive they have significant backward linkages. While India ranks 34<sup>th</sup> in the overall world in terms of share of manufacturing sector to GDP with a share of 2.6% of global manufacturing value added in 2013, it was not a dominant producer in any of the broad manufacturing category. India only ranks higher in low value added segments such as textile, food processing etc. Channelizing and incentivizing the educated and skilled workforce towards understanding and absorbing the new-age technologies would only help in increasing the value addition to the manufacturing sector.

**Industrial infrastructure:** The nation's infrastructure challenges are a major hindrance towards becoming globally competitive. In order to make the initiatives of the government such as 'Make in India' successful, the infrastructure of the country needs to be overhauled. We hope that the step towards constructing industrial corridors, industrial clusters, smart cities, nurturing innovation and skill development will catalyse the growth of the manufacturing sector going ahead. India is the 3<sup>rd</sup> largest producer of power, however Indian industries suffer from lack of access to quality power.

**Provision of uninterrupted power:** Power is an important input in the manufacturing process. Technology up-gradation becomes unviable in case of absence of secure and quality power. The government initiatives for coal block allocation, gas pricing and commitment to provide 24\*7 power is expected to address the need of the industry. The dedicated rail freight corridors, the five planned industrial and economic corridors, multi modal logistic parks and warehousing the cold chain infrastructure would provide a platform for the manufacturing sector to become competitive as logistics play a critical role in the modern intelligent supply chain management.

**ICT Infrastructure:** Despite India being the world's third largest internet user country, India ranked 89<sup>th</sup> in the Networked Readiness Index for 2015 (which measures the capacity of countries to leverage ICTs). Among the subindices, India ranks 115<sup>th</sup> in

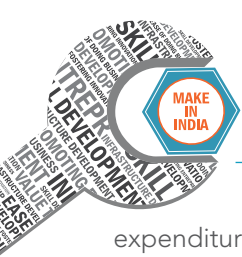
ICT infrastructure. Business need to leverage ICT technology to become efficient in their products and processes.

**Enabling trade:** India ranked 96<sup>th</sup> on the overall ranking for Enabling Trade index. It lags far behind China and South Africa and trails Brazil by a few notches. India ranks 135<sup>th</sup> on tariff barriers, which indicates that access to India's domestic market is difficult for foreign investors. At 12.4%, average applied tariffs are among the world's highest while India has a low 11% share of duty free imports. The tariff regime is complex and characterized by a high quantity of distinct tariffs and vast tariff dispersion across tariff lines. Moreover, quality of logistics, connectivity and border administration plays an equally, if not more important role than tariffs in determining bilateral trade costs.

**Trade policies/facilitation:** In order to be a major player in the Asian and world trade, India should continue to seek facilitation measures with other countries. India has signed a number of Free Trade Agreements (FTAs) and Preferential Trade Agreements (PTAs) and is currently negotiating various other FTAs, as also considering renewal/expansion of some of the existing FTAs/ PTAs. However, it is observed that exporters are not able to fully benefit from such FTAs due to lack of knowledge about what such agreements offered. Moreover, red tape and corruption in connection with border administration (74<sup>th</sup>) lead to inefficiencies and delays. Improved trade facilitation measures, trade financing options, governance at custom points and joint ventures can assist Indian exporters, particularly SMEs to grow their industries on the basis of growing trade relationships with other countries.

**Health & education:** Higher education spending and access to healthcare would increase intangible wealth. Investments in social infrastructure i.e. health and education would be warranted to improve the quality of workforce and addressing the employment issues. Even though healthcare in India has improved over the years, it still lags behind Brazil, China, Russia and few other developing countries. Healthcare spending as a % of GDP in India is lowest among the BRICS nations. In terms of per capita health





expenditure India not only remains far behind the other Asian and emerging economies, the increase in per capita health expenditure during the last decade has not been adequate in comparison with the growth rate achieved. Besides, out of pocket health expenditure in India remains quite high.

While literacy levels increased from 64.8% in 2001 to 73% in 2011, it is significantly below the world average of 85% as of 2010. Amongst the BRICS nations, literacy levels in China were 95.1% while Brazil attained 90.4%, South Africa 92.9% and Russia had around 100% literacy rates as per World Bank estimates of 2010. According to UNDP report, 2015 estimates, India's adult mean years of schooling (2014) at 5.4 years is well below the other emerging market economies such as China (7.5 years) and Brazil (7.7 years). A matter of particular concern is the steep dropout rate after the elementary level.

**Strengthening the SME segment:** One of the primary reason for Indian manufacturing not being competitive enough is the significant presence of small-scale unregistered manufacturing units across the entire spectrum. Even the registered manufacturing sector is highly skewed towards low scale. SMEs in India have not been able to build the competencies to compete with their global counterparts. The policy initiatives for the small scale industries should aim towards up-scaling them and incentivizing them to become medium and large scale industries to increase the competitiveness of the manufacturing as well as the services sector.

**Increasing efficiency of capital invested:** While the investment activities had weakened considerably, with high number of projects being stalled and shelved during FY12 - FY15, concerns have risen over the productivity and the efficiency of the capital invested.

Capital productivity is therefore a challenge. However, one of the biggest concerns here is fall

in productivity level. A reflection of the fall in the productivity growth of the capital has been the rise in the Incremental Capital Output Ratio (ICOR). The ICOR in the manufacturing sector has been in the range of 5-7% during FY12 to FY14. Since there has been a structural fall in the efficiency of capital, removing structural bottlenecks is therefore, urgently warranted to facilitate investment by domestic as well as foreign investors.

**Increasing manufacturing exports:** The share of manufacturing exports to total exports (including services) of India has reduced from around 57% by the start of the century to around 46% by FY15. Moreover, around 41% of the manufacturing exports as of FY14 consist of low value added products that do not involve high-end technology orientation such as textiles, gems & jewellery, leather and handicrafts.

#### Exports – Share of exports of the manufacturing sub-segments exports to total manufacturing exports (%)

	FY00	FY10	FY14	FY15	FY16
Leather and Manufactures	5.4	2.9	2.9	3.0	2.9
Chemicals and Related Products	12.0	15.1	15.8	15.5	16.9
Engineering goods	17.2	33.1	34.9	36.7	33.2
Textile and Textile Products	33.1	17.2	16.6	16.7	17.5
Other manufactured goods	32.4	31.7	29.7	28.2	29.5

The task to reviving manufacturing will definitely require imbibing technology at each level of the manufacturing segment. Technology in manufacturing is stuck at the basic or intermediate level. R&D expenditure is low and investment from both private and public sectors remains inadequate. Compared to other major developing countries, India's share of high technology exports in overall exports has been abysmally low. Among the developing countries, high-technology exports

#### Inline Product Quality Inspection - Food, Pharma, Consumer Products



Safeline X-ray Inspection Systems



Safeline Metal Detection Systems



In Motion Checkweighing Systems

#### METTLER TOLEDO

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18001028460  
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account for 44% of total exports in Malaysia and 25% for China, while for India this ratio stands at around 8%.

### Under the Make in India campaign the Indian government aims to

- Establishing a vibrant IP regimen the country
- Efficient processing of IP applications by inducting additional manpower, augmenting IT facilities and automation in Intellectual Property Offices
- Adopting best practices in IP processing
- Strengthening public delivery of IP services
- Highest levels of transparency and user-friendliness

### Trade & investment policies for manufacturing

It is now widely accepted that substantial growth in both manufacturing and services is essential to sustain GDP growth of 8% per annum. In a bid to provide further impetus to the manufacturing sector, the government has taken several regulatory measures in terms of foreign investment and trade. This section seeks to elaborate on the major foreign investment and trade related initiatives.

### Key policy initiatives related to merchandise trade

#### Merchandise Exports from India Scheme (MEIS)

MEIS was introduced through the Foreign Trade Policy (FTP) 2015-20. The scheme aims at offsetting infrastructural inefficiencies and associated costs involved in export of goods manufactured in India. The 5 different schemes under the previous Foreign Trade Policy (FTP) (namely Focus Product Scheme, Market Linked Focus Product Scheme, Focus Market

Scheme, Agriculture Infrastructure Incentive Scrip, Vishesh Krishi And Gram Udyog Yojana (VKGUY)) have been merged under MEIS. The scheme has product and market focused incentives for over 5,000 tariff lines. Rewards under MEIS are payable as a percentage of realized Free on Board (FOB) value of covered exports, by way of MEIS duty credit scrip, which can be transferred or used for payment of a number of duties including the basic customs duty (BCD), excise duty and CENVAT. The MEIS is also extended to the units located in SEZ.

#### Status Holders and Approved Exporter Scheme (self-certification by status holders)

Business leaders who have excelled in international trade and have successfully contributed to the country's foreign trade are proposed to be recognized as Status Holders and given special treatment and privileges to facilitate their trade transactions, in order to reduce their transaction costs and time. Further, these Status Holders will be enabled to self-certify their manufactured goods as originating from India with a view to qualify for preferential treatment under different Preferential Trading Agreements [PTAs], Free Trade Agreements [FTAs], Comprehensive Economic Cooperation Agreements [CECAs] and Comprehensive Economic Partnership Agreements [CEPAs] which are in operation.

#### Reduced export obligation under Exports Promotion Capital Goods (EPCG) scheme

EPCG scheme allows import of capital goods including spares for pre-production, production and post-production at zero duty subject to an export obligation of 6 times of duty saved on capital goods imported under EPCG scheme, to be fulfilled in 6 years reckoned from authorization issue date. The new FTP reduces the export obligation to 75% from 90% under the EPCG scheme. This is for exporters who opt for domestic procurement of capital goods

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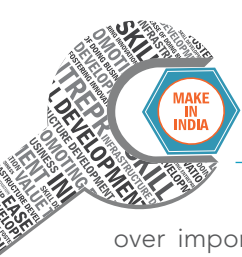


Material Characterization

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over imports. In the earlier FTP, export obligation was based on the FOB value which has now been changed to the value of duty saved (either customs or excise duty). This way firms will be induced to procure locally but will still face export obligation since they are subjected to excise duty concessions. The new measure is expected to lower import dependence and would provide fillip to the domestic capital goods manufacturing industry.

### Interest Equalisation Scheme

Interest Equalisation Scheme (earlier called Interest Subvention Scheme) on Pre & Post Shipment Rupee Export Credit came into effect from Apr 1, 2015 for five years. The rate of interest equalisation would be 3%. The scheme would be available to all exports of MSME and 416 tariff lines. Scheme would not be available to merchant exporters.

### Measures for trade facilitation and ease of doing business

The new FTP has proposed certain measures such as online filing of documents/applications; online inter-ministerial consultations for approval of exports of SCOMET (Special Chemicals, Organisms, Materials, Equipment and Technologies) items, norms fixation, import authorization, export authorization, etc; simplification of procedures/processes; online applications for refunds; and mobile applications for FTP. The digitization and e-governance initiatives are expected to save time and cost for companies. Further, the Central Board of Excise and Customs (CBEC) has developed an 'integrated declaration' process leading to the creation of a single window which will provide the importers and exporters a single point interface for customs clearance of import and export goods.

In addition, there are other miscellaneous measures which are expected to boost manufacturing exports going forward. For instance, under the new FTP,

Export Oriented Units (EOUs) have been allowed to set up warehouses near the port of export. This is expected to help in reducing lead time for delivery of goods and will also address the issue of unpredictability of supply orders. Besides, 100% EOU units have been allowed to supply spares/components upto 2% of the value of their manufactured goods to a buyer in domestic market for the purpose of after sales services. In view of the current slowdown in global trade, 5 years period for EOU to achieve positive Net Foreign Exchange Earnings (NFEE) cumulatively can be extended by one year. The government also proposes to provide export clearance in a single day under a new 'Make in India green channel'. Under this facility that will begin at select ports, cargo clearance will shorten from about a week to a few hours.

Major trade agreements that will help in boosting merchandise exports are as below:

- India has extended duty free tariff preference to 33 Least Developed Countries (LDCs) across the world
- In line with India's "Look East Policy", India has signed a Comprehensive Economic Partnership Agreement with South Korea which will provide enhanced market access to Indian exports
- The US has restored its program for concessional duty treatment to Indian products, called 'Generalized System of Preferences', till 2017
- India and South Africa are considering prospect of setting up a joint venture (JV) for mining and owning coal blocks in South Africa
- India and Belarus set a trade target of US\$ 1 billion by 2018
- India and Poland have set an ambitious target to increase bilateral trade from US\$ 2.3 billion in 2014 to US\$ 5 billion by 2018
- India is likely to grant most favoured nation (MFN) treatment to 15 countries that are in talks regarding an agreement on the Regional Comprehensive Economic Partnership (RCEP)

Source: IBEF

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## Key policy initiatives related to Foreign Direct Investment (FDI)

During Apr 2000 to Mar 2016, India received FDI (including equity inflows, re-invested earnings and other capital) worth US\$ 424.2 billion. The country was one of the top destinations for FDI inflows from Asian countries, with Mauritius contributing 33%, Singapore 16% and the UK contributing 8% of the total FDI inflows. In recent months, the government has endeavored to restore confidence of foreign investors and augment foreign capital inflows to increase growth in the manufacturing sector. Realizing the significant role of FDI in manufacturing sector, the Department of Industrial Policy and Promotion (DIPP) revised the consolidated FDI policy, 2015 in Nov 2015. The revised FDI policy amends the approval process, sectoral caps, entry and investment conditions in order to promote foreign investment in the country. The key policy revisions are as below:

- For infusion of foreign investment into an Indian company which does not have any operations and also does not have any downstream investments, government approval would not be required, for undertaking activities which are under automatic route and without FDI-linked performance conditions
- No requirement of FIPB approval for foreign investment by swap of shares
- The government approval will be required for establishment and transfer of ownership or control of the Indian company only if the company concerned is operating in sectors/ activities which are under Government approval route rather than capped sectors.
- The threshold limit for FDI approvals that may be considered by FIPB is increased to ₹ 50 billion
- Manufacturing (unless otherwise provided in specific sectors) is covered under the automatic

route. Further, a manufacturer is permitted to sell products manufactured in India through wholesale as well as retail mode, including e-commerce without government approval

- 100% FDI is now permitted under automatic route in Limited Liability Partnerships (LLPs) operating in sectors/ activities where 100% FDI is allowed under automatic route, and there are no FDI-linked performance conditions
- An Indian company or LLP having foreign investment will be permitted to make downstream investment in another company or LLP in sectors in which 100% FDI is allowed under the automatic route and there are no FDI-linked performance conditions

Apart from these regulatory initiatives, the Ministry of Finance intends to introduce the residency permit policy, which will allow key executives of foreign companies making investments worth US\$ 2 billion or more in India to avail various facilities such as special package on upscale housing, residency permits allowing long stay in the country, and cheap rates for utilities.

The government has also relaxed FDI policy in 15 sectors, such as raising the foreign investment limit for some sectors, easing the conditions for others and putting many on the automatic route for approval. The sectors that benefited from the relaxation include real estate, private banking, defence, civil aviation, single brand retail and news broadcasting. In case of the construction development sector, the government has removed area restriction of floor area of 20,000 sq. mtrs in construction development projects and has mandated minimum capitalization of US\$ 5 million to be brought in within the period of six months from the commencement of business. Exit and repatriation of foreign investment is also permitted after a lock-in-period of three years.

The government of India recently relaxed the FDI policy norms for Non-Resident Indians (NRIs). Under

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this, the non-repatriable investments made by the Persons of Indian Origin (PIOs), Overseas Citizens of India (OCI) and NRIs will be treated as domestic investments and will not be subjected to FDI caps.

The government is expected to further simplify rules for Foreign Direct Investment (FDI) such as increasing FDI investment limits in sectors and include more sectors under the automatic approval route, to attract more investments in the country. This will help Indian manufacturing sector to attract more FDI going forward.

## Manufacturing sectors with permitted level of FDI

Sector	FDI
Defence Sector	49% under automatic route; beyond 49% government approval route
Rail infrastructure projects	100% FDI allowed under automatic route
Medical devices	100% FDI allowed under automatic route
Petroleum refining by PSUs	49% FDI allowed
Enterprise manufacturing items reserved for small scale sector	100% FDI allowed
Pharmaceuticals – greenfield	100% FDI allowed under automatic route
Pharmaceuticals - brownfield	74% FDI under automatic route and government approval route beyond 74%
Construction	100% FDI under automatic route is permitted in completed projects for operation and management of townships, malls/ shopping complexes and business centres
Regional airport transport service	49% under automatic route
Establishment & operation of satellites	100% under the government route

Teleports, Direct to Home (DTH), Mobile TV etc	100% FDI allowed
Print Media	26% FDI allowed
Greenfield & Brownfield airport projects	100% FDI under automatic route
All the items other than above are under the automatic route.	

## Recent key FDI agreements

- The Government of India and Japan signed an agreement for doubling of Japanese investment into Indian companies in the next five years. Indo-Japan agreement is categorised into five broad areas like development of select townships in India, promotion of investment and infrastructure development, further development and cooperation in information technology, enhancing cooperation in strategic sectors, Asia-Pacific economic integration.
- Pepsi plans to invest ₹ 5 billion to set up another unit in Maharashtra to make mango, pomegranate and orange-based citrus juices.
- Apple will build its first technology development centre outside the US in Hyderabad with an investment of US\$ 25 million.
- Chinese mobile handset maker, Coolpad Group Ltd, has committed US\$ 300 million for setting up a research and development (R&D) centre and its own assembly line in India by 2017.
- Kellogg Co. has proposed to make large investments in manufacturing and plans to set up its first Research and Development (R&D) facility in India at Taloja, near Mumbai.
- The government of Karnataka signed an agreement with the Taiwan Electrical and Electronic Manufacturers Association for the purpose of creating a Taiwanese electronic manufacturing cluster near the Bengaluru airport, with an investment expectation of ₹ 32 billion.
- Posco Korea signed an agreement with Shree Uttam Steel and Power (part of Uttam Galva Group) to set up a steel plant at Satarda in Maharashtra.
- Foxconn signed a Memorandum of Understanding (MoU) with the Government of Maharashtra to invest US\$ 5 billion over the next three years for setting up a manufacturing unit between Mumbai and Pune.

Source: IBEF, News paper articles

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# Future manufacturing technologies - The next stage for India

Even as the manufacturing sector, domestically as well as globally, is facing numerous headwinds, especially after the financial crisis, it is entering a dynamic new phase led by technological transformation. Maintaining technological superiority in manufacturing is seen by both the developed and developing countries as a source to increase economic growth, exports and jobs. Machine automation in various sectors has replaced manual labor. Today's factories globally are turning smart by embracing new-age processes/technologies like flexible manufacturing, bi-manufacturing, nanotechnology, 3D printing, internet of things and robotics. The Internet connected our machines and increased plant-floor communications. The cloud computing technologies has the power to change the way products are made, accelerating the development life cycle by enabling seamless collaboration and creating a smooth, agile supply chain. All these are converging to create new industries, new business models and new products. Future factories will be technology intensive with demand for highly skilled and mobile labour. These evolving technologies not only require more highly skilled workforce but are also likely to create job that did not previously exist like designing, building, installing, repairing, managing and interacting with new-age technologies.

Manufacturing companies have to embrace these advances as the changing economics of production and distribution and frequent shifts in consumer demand and delivery channels are forcing manufacturers to adopt new process and make new products. In the years ahead, global economic growth and prosperity is largely going to be defined

by the goods that are produced and in the way they are produced. Generation Y, that currently makes up the majority of the work force, will be much older and as a result, its demands will be different. Given their advancing age, there will be an increased demand for health care & related facilities, easy access to food and convenient modes of transportation.

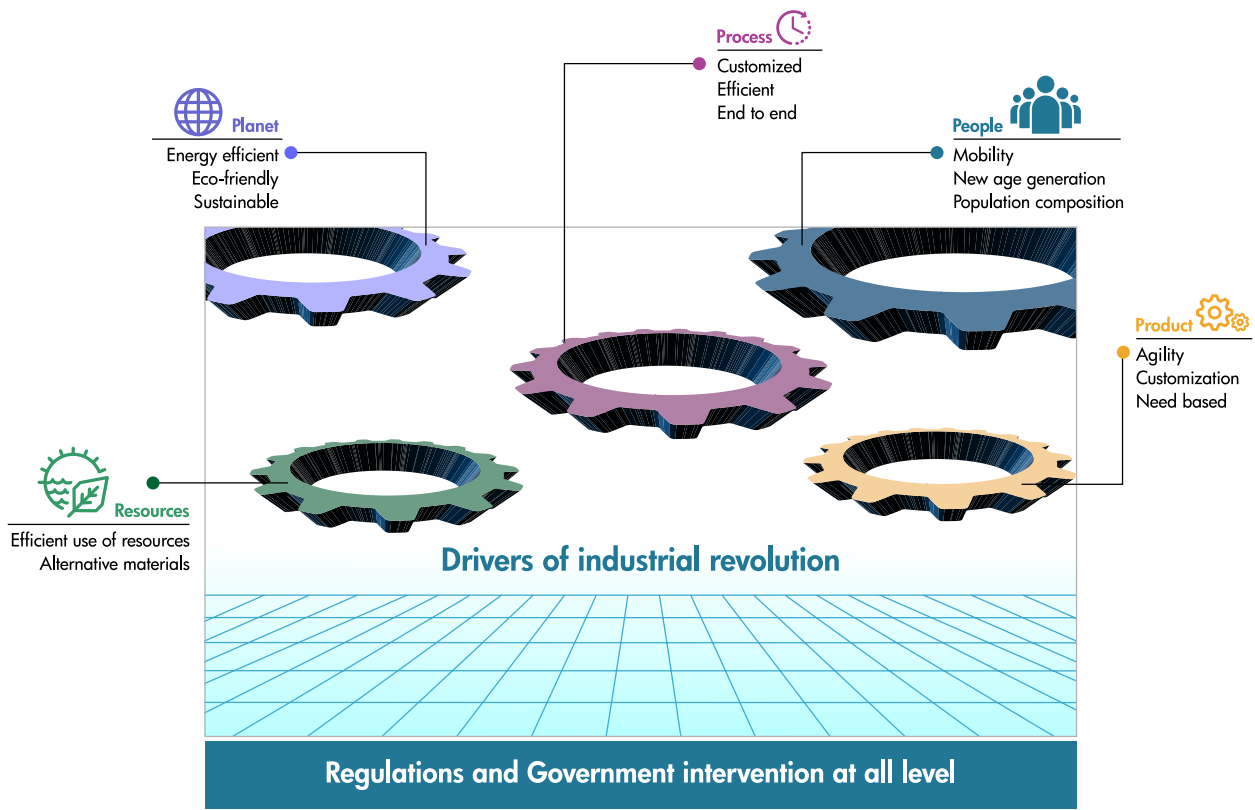
There is an increasing trend amongst the Indian manufacturers towards adoption of such new technologies as they aspire to improve productivity, compete against rivals and try to gain more customers and market share. However, it is still a long way to go for the overall manufacturing sector in India to embrace such technologies on a large scale as cost, skill and R&D constraints still prevail at large.

In this chapter we have tried to cover broad based manufacturing processes which are impacting the current manufacturing systems in India and are likely to be imbibed by the Indian manufacturers at large in the future.

## Sustainable manufacturing

Sustainable manufacturing technology/process will be considered as the broader framework for the development/evolution of any futuristic manufacturing system/technologies. It is expected that most of the manufacturing technologies would largely evolve under the three broad systems - **Advance Manufacturing System, Flexible Manufacturing System and Reconfigurable Manufacturing system** over a period of time. These in turn are expected to develop under the sustainable manufacturing framework in the future.





## Sustainable Manufacturing

Sustainable manufacturing will seek to act in the combined interest of environment, society and economic goals. Conservation of energy and natural resources which are safe for employees, communities, and consumers, mounting regulatory pressures, high compliance costs and volatile energy prices are some of the factors that would drive emergence of a 'circular economy' in which end of life products are reused, remanufactured and recycled and products are redesigned with recovery in mind.

The shift to 'cradle-to-cradle' paradigm, where all inputs and outputs are considered to be technical nutrients (fully recyclable) or biological nutrients (biodegradable), from 'cradle-to-grave' paradigm, where inputs and outputs are not put back into service, could be also be attributed to forces of competition. A competitive market, forces companies to adopt sustainable manufacturing practices as they fear losing their market share to a peer with the first-mover advantage.

Sustainable manufacturing practices can range from very simple process improvements to large investments in new technologies and product redesign. A closed-loop material flow system, recycling wastes to use them as raw material, not only has positive effects on the environment but it also aligns well with the innate desire of companies to boost their bottom line growth. Raw material substitution reduces the cost of ownership as recycled wastes that go into production are less expensive than virgin materials. Hence leveraging technologies to manufacture products using efficient inputs that help reduce expenditure makes a compelling business case for going green.

Developing green products enhances the ability of the manufacturer to enter new markets which translates into more potential sources of revenue. Greening of product packing is an integral part of sustainable manufacturing. Companies could save on material usage by optimizing the packing design of their products. P&G has reduced its plastic consumption by redesigning the package of its Olay products. It has saved over 400 tons of packaging a year (the weight of a Boeing 747).

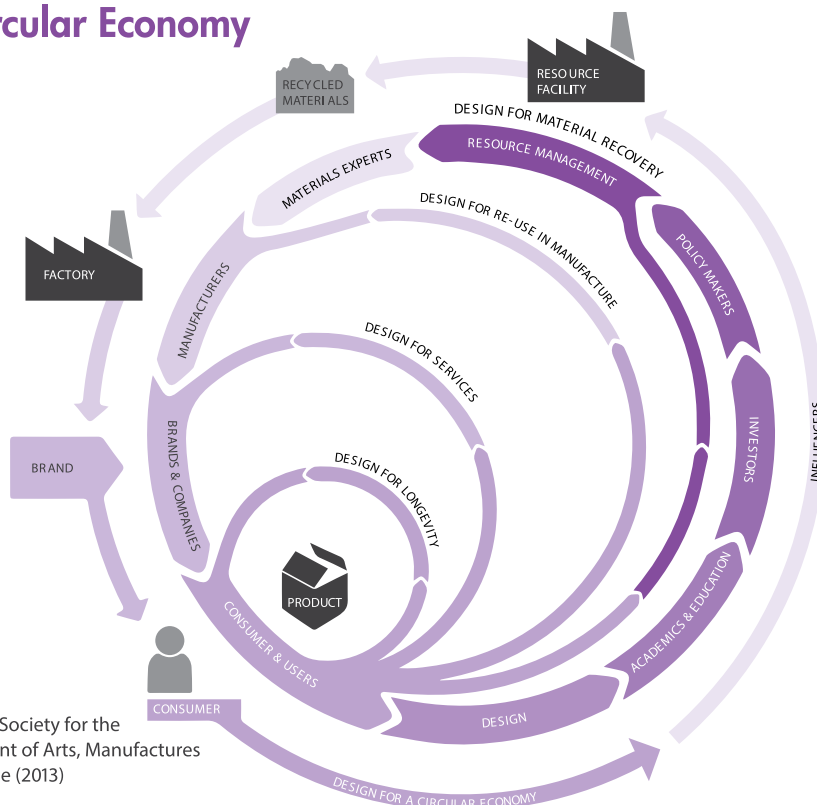




Source: UK Government, Office for Science

Sustainable manufacturing in India is at the nascent stage. Green energy will need to become more affordable to the broad population for manufacturers to adopt the various practices/technologies. The government is aiming to have a solar energy generation capacity of 100GW by 2022 and has committed to reduce carbon emissions relative to GDP by 30-35% from 2005 levels by 2030. While there has been significant policy development, solar power still needs further technological improvements for it to become more competitive. The onus is on the manufacturers to incorporate 'Green' as a core part of their business strategy, and push for 'Green' across the value chain.

## The Circular Economy



Source: Royal Society for the encouragement of Arts, Manufactures and Commerce (2013)





## Manufacturing Process (System)

The manufacturing processes in future are expected to largely evolve under the broad three systems over a period. **Advance Manufacturing System, Flexible Manufacturing System and Reconfigurable Manufacturing system.**

### Advanced Manufacturing System (AMS)

Advances in manufacturing will likely become increasingly networked. In the coming years, manufacturing is expected to advance to new frontiers, resulting in an increasingly automated and data-intensive manufacturing sector that will likely replace traditional manufacturing as we know it today.

Advanced Manufacturing is the integration of technology based systems and processes in the production of products. Advanced manufacturing can be transformational in offering a portal into staying competitive in the global marketplace. Manufacturing today is digitally enabled, distributed, and democratized. Companies that don't invest in technology could fall prey to 'Digital Darwinism' as manufacturing is evolving to the point where technological advancements and improvements will come from machines and systems themselves, through predictive analytics, advanced controls, and smarter systems. Progressive automation technologies with advanced software platforms, robotics, and new fabrication techniques, like 3D printing, are re-defining manufacturing for the future.

According to Paul Fowler advanced manufacturing harnesses the efficiency of mass production and marries it to the flexibility of custom manufacturing. The aim is to respond quickly to customer demand by using high-precision information technology. Advanced manufacturing points to an increasingly automated world that will continue to rely less on labor-intensive mechanical processes and more on sophisticated information-technology-intensive processes. An advanced workforce will be needed to develop and maintain these advances

in manufacturing. Advanced manufacturing will become increasingly globally linked as automation and digital supply-chain management becomes the norm across enterprise systems. This trend will be enabled by adaptive sensor networks that allow intelligent feedback to inform rapid analysis and decision-making. Advanced manufacturing processes will likely be more energy and resource efficient in the future.

Significant leaps in technology are driven by the creation of advanced materials. Advanced materials remain as a gateway to new manufacturing technologies as well as a driver of novel processes, such as additive manufacturing and nanomanufacturing, which can herald the development of revolutionary products. Advanced materials include unique composites of plastic, glass fibers, carbon fibers, ceramics, metals and nano-materials finer than smoke particles. Advanced materials could help manufacturers in the substitution of critical materials (Rare Earth Metal) as these materials are very crucial to certain sectors like energy and electronics. Also, supply chain risks and uncertainty in price levels or price fluctuations forces manufacturers to look for alternative materials that are less vulnerable to shocks in price and supply, making it a compelling business case to use advanced materials.

Developments in advanced material technologies are necessary to fuel the growth of several disruptive process technologies like Nanotechnology, Industrial biotechnology, and Additive manufacturing. Economic development coupled with increasing infrastructure development will fuel the demand for structural materials, like steel, cement, metals and alloys. Therefore it is a veritable necessity for India to make advancements in the field of advanced materials to provide these materials cost effectively. In India, though there is a huge potential for advanced materials, currently there are only a few players in the market.



Realizing this huge potential, Tata Advanced Materials Limited has forayed in very different market segments from aerospace to defense to various industrial segments. It also has tie ups with global companies like The Boeing Company, Saab Aerostructures and Pratt & Whitney - United Technologies.

## Flexible Manufacturing System (FMS)

The predominant factor affecting the manufacturers' perception is the ability to respond quickly to the rapidly changing market. This trend is increasingly pushing the manufacturers worldwide to adopt FMS. The capacity of a FMS to make facilities more robust against supply-chain disruptions and its ability to accommodate any process changes with quick tooling and instruction changeover will find increased adaptability across the sectors over a period of time.

A FMS can concurrently process more than one product style as opposed to an automated production line. The capacity of a FMS to make facilities more robust against supply-chain disruptions and its ability to accommodate any process changes is a major reason why this technology is on the radar screen of companies globally. Flexible manufacturing system provides immediate response for managing workloads, enabling companies to practice lean principles. The degree of flexibility that a FMS offers translates directly into low setup time, low work in-process, low inventory, short manufacturing lead time, high machine utilization and high quality.

The three levels of manufacturing flexibility are Basic flexibilities, System flexibilities, and Aggregate flexibilities. By embracing FMS technologies, companies can open their doors to various dimensions of flexibilities like Machine Flexibility, Production Flexibility, Product Flexibility, Routing Flexibility, Volume Flexibility and Expansion Flexibility.

By embracing FMS technologies, Chicopee Manufacturing Limited - a Canadian manufacturer of aerospace systems, was able to handle more than 200 individual shop orders per week. They received a shipment every day with all the raw materials that they needed to produce the parts for one aircraft—34

different parts. The flexible manufacturing system produced those parts on a 24x7 basis for more than five years. It had also enabled Chicopee Manufacturing Limited to operate efficiently by reducing setup times through accurate and reliable machine loading, unloading and part storage.

This capital-intensive technology is yet to take off in the Indian manufacturing sector. Only a few companies have adopted FMS, with the automotive sector emerging as the market leader. Flexible Manufacturing System is redefining car manufacturing in the country.

FSM has given Hyundai Motor the ability to switch product mix on any given line. Hence, the company can produce different variants of its cars all on the same production line, or increase the supply of any given car to meet the market demand efficiently without involving much delay. Flexible Manufacturing System has helped Renault Nissan Automotive India in creating common assembly processes between companies (Nissan and Renault) to shift similar platforms easily and cost-effectively. This would benefit the company by reducing the lead-time and investments largely when launching new models.

While FMS has many advantages, it may not always be the most optimal method of manufacturing due to substantial pre-planning requirements, sophisticated machinery and high cost of developing the system. Also many firms do not possess the necessary resource and expertise to implement flexible manufacturing systems.

## Reconfigurable Manufacturing System (RMS)

RMS is machine systems that can be arranged or replaced quickly and reliably in order to quickly adjust its production capacity in response to sudden market changes that can address the flexibility in the customization of products. RMS is specifically designed to address the "customized flexibility". It is designed to facilitate smooth production when the market exhibits unpredictable demand conditions. RMS is likely to be more pervasive in India in the coming 2-3 decades.







spillover effects would still enhance the overall manufacturing efficiency of India.

Despite the potential it has to be a highly disruptive technology, to both conventional processes and supply chains, it remains a nascent technology with applications majorly in the automotive, aerospace and medical sectors, both globally and domestically. The emerging field of advanced materials and rapid strides in machine technology would bring AM closer to the mass market.

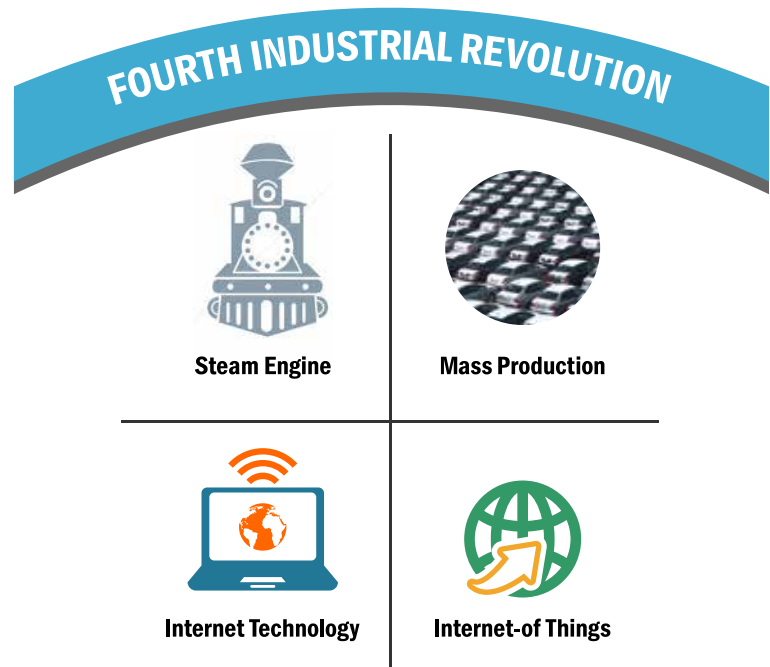
## Internet of Things (IoT)

The IoT is expected to change the entire manufacturing landscape as sensor embedded devices are already making impressive headway in the manufacturing sector. IoT, often referred to as the fourth industrial revolution is the convergence of physical things with the world of the internet.

Internet-of-Things is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and has the ability to transfer data across network without requiring human-to-human or human-to-computer interaction. The Internet-of-Things has the potential to radically improve visibility in manufacturing to the point where each unit of production can be “seen” at each step in the production process. More devices include embedded intelligent sensors, components and finished products that can start communicating with manufacturers and with each other from the shop floor. This is the beginning of smart manufacturing. Machines will have the technology to monitor their own health and fine tune manufacturing to achieve the best possible tool life and results.

Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications. The interconnection of these embedded devices (including smart objects), is

expected to usher in automation in nearly all fields – manufacturing, utilities, logistics, automotive, intelligent buildings, smart cities, healthcare, or even agriculture.



The ability to capitalize on revenue opportunities or achieving a faster ROI, by adopting IoT, is no longer affecting the manufacturers' perspective. Efforts are needed, on both the policy front and technical front, to overcome infrastructural constraints and the problems of scalability, and interoperability. This calls for creating a roadmap on the standardization of IoT and building a regulatory framework, to present a viable business model.

In support of this, the Government of India has already laid out a draft IOT Policy document and is working closely with the industry associations, like NASSCOM and IESA, to facilitate the integration of IoT with the development of the nation.





The Department of Electronics and Information Technology, India has come out with 'Draft Policy on IoT' with an objective of creating an IoT industry in India worth US\$ 15 billion by 2020. It has been assumed that India would have a share of 5-6% of global IoT industry.

On the human resource development front, the report has proposed a slew of policies like, introducing cross country pacts for IoT education exchange programs and introduction of IoT Curriculum at M.Tech & B.Tech levels. Under IIRC (International IoT Research Collaboration scheme) the government will collaborate and initiate treaties with other countries to generate joint projects for R&D in IoT on 50% contribution basis. All these policies will provide the required impetus for development of the IoT industry, which is currently adopted only in a few sectors. A reflection of this momentum is witnessed in the new programs and initiatives that are mushrooming across the country. The Andhra Pradesh (AP) cabinet has recently approved the first-of-its-kind policy on IoT with the prime objective of turning the state into an IoT Hub by 2020. The state government also aims to attract at least 100 IoT companies to set up their operations and development centers in AP.

The Indian Government's plan of developing 100 smart cities in the country could lead to a massive and quick expansion of IoT in the country. The launch of the Digital India Program of the Government will also provide the required impetus for development of the IoT industry in the country. Sectors such as healthcare, automotive, logistics, oil and gas are the early adopters of this technology in the country.

Hindustan Petroleum is using IoT to automate many of its processes and has installed sensors in field units to monitor performance. Since field units of Hindustan Petroleum are connected to the Internet, they can be controlled and managed from a remote operations center.

## Nano-Manufacturing (NM)

As the need for companies to develop higher performance materials increases in order to reduce cost and waste, the industrial applications of nanotechnology should increase greatly in the coming years. Nanotechnology is multidisciplinary and it has the ability to bring tremendous changes in virtually all manufacturing aspects because of the enormous applications it has in various

streams. Manipulating arrangements between atoms to form nanosystems – with unique physical, chemical and biological properties – opens the door to applications which mark the beginning of a truly innovative technological era (ec.europa.eu). Fabrication of products by integrating nanomaterials into the production process or other products is known as nanomanufacturing.

Nanotechnology and nanomaterials have several implications for sustainability, due to their potential to confer significant economic and environmental benefits through more efficient energy generation and storage systems, reduction of emissions, resource saving and substitution of hazardous substances. It can thus be expected to have a significant influence on a wide range of manufacturing sectors in the future. Nanotechnology could enable a paradigm shift of clean alternative energy. It would aid in expanding the battery storage capacity and cheaper production of solar cells. Improved materials efficiency and its application in the industrial battery systems will help reduce energy losses resulting from electrical grid interruptions.

In India, nanotechnology has primarily been a government led initiative. However, it still remains in its infancy. Only a few companies like Dabur, Mahindra and Mahindra, and Tata chemicals have adopted this technology. While there is considerable nanotechnology, R&D in India, much of it still remains at a conceptual level and the applications have failed to materialize. Enhancement of IP protection will play a key role in linking R&D to commercial production.

While nanotechnology has the potential to significantly impact all aspects of life, from introducing new drugs to improving production efficiency to solving the emerging global energy crisis, it still has to overcome the technical challenges it faces to enable a viable manufacturing system. Challenges like producing requisite amount of nanomaterials needed for large scale manufacturing while maintaining the quality and properties of these materials during the integration processes, concerns of its safety to human health, and lack of adequate skill level are some of the major impediments to the development and adoption of nanotechnology.



## Bio-Manufacturing (BM)

While the technology has the potential to profoundly alter the manufacturing processes, it is also the sought after technology when it comes to the question of addressing climate change. Manufacturers are seeking to employ bioprocesses to achieve process optimization and to decrease operating costs. Increasing thrust on companies to adopt sustainable manufacturing practices and the need to address the problems of depleting natural resources will continue to drive this trend forward. Besides pharmaceutical, bio-manufacturing has applications in several sectors like agriculture, chemical, energy, food processing, paper & pulp, and textile. It would result in giant leaps in performance and capabilities of these sectors through novel products and applications like biosensors, biofuels, bioenergy, biochemical, etc.

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India is among the top 12 biotech destinations in the world. As per the Association of Biology Led Enterprises (ABLE), the Indian biotech industry is expected to grow at an average growth rate of around 30% a year and reach US\$ 100 billion by 2025. A roadmap for fostering biotechnology development has already been laid out.

The impetus for biotechnology development comes majorly from the government with the establishment of Biotechnology Industry Research Assistance Council (BIRAC) to support biotech startups. The government has also entered into several bilateral agreements with multinational organizations and other countries to foster innovation. Foreign Direct Investment up to 100% is permitted through the automatic route for Greenfield and through the government route for brownfield, for pharmaceuticals. It has also set up various R&D units across institutions and is striving to provide a supportive environment. Karnataka, Andhra Pradesh, Maharashtra, Tamil Nadu and Kerala have been proactive in supporting the biotech sector by establishing world-class biotech parks and clusters. Biocon Limited, Serum Institute of India, Panacea Biotech, Novo Nordisk India and Dr. Reddy's Laboratories Ltd. are some of the leading biotech companies in India.

The future of biomanufacturing would be synthetic biology. Synthetic biology conjoins engineering and science with an aim to produce novel biological parts and systems inexpensively with greater precision. Synthetic biology has the potential to create new biological entities like new viruses to produce useful drugs, and industrial enzymes that improve production efficiency. Synthetic biology will have applications in several sectors like pharmaceuticals, agriculture, biofuels, environmental sensors, and advanced materials to meet the unmet medical and industrial needs. The success stories of synthetic biology, like the creation of an antimalarial drug, are few. There has to be a major breakthrough in the technology for the realization of all these applications. Policies are also needed to address the concerns related to biosecurity.

## Robotics Manufacturing (RM)

Industrial robots are reshaping the global manufacturing landscape. The global manufacturing sector is witnessing a sea change in the way robots are being deployed. Industrial robots have an





edge over human labor where precision is a major factor in the production process and could lead to a transition from low value-addition manufacturing to high value-addition manufacturing. Robotic manufacturing has taken several strides and has now come to a stage where robots are deployed across a range of applications and are designed to work alongside humans. Industrial robots have an edge over human labor where precision is a major factor in the production process and could lead to a transition from low value-addition manufacturing to high value-addition manufacturing. Robotic manufacturing has taken several strides and has now come to a stage where robots are deployed across a range of applications and are designed to work alongside humans. This new generation of 'collaborative' robots is a major breakthrough in the field of robotic manufacturing. Collaborative robots are an affordable alternative to fixed automation and could be deployed quickly as they don't require third party integration, resulting in decreased lead time and increase in cost savings. They are also capable of delivering faster ROI as they are re-trainable across different tasks.

Advancement in artificial intelligence, integration of robotics with a host of other technologies, like vision guidance, force sensing and speech recognition, has scaled up reliability and safety. This would also pave way for machine-to-machine knowledge sharing which will offer companies the amount of flexibility they would need in order to produce new products, and meet rapidly changing consumer needs without having to invest heavily in programming costs. Hence, robots manifest themselves as a necessary tool for flexible manufacturing concepts and are imperative to intelligent production.

A few Indian e-commerce players have taken advantage of these developments to shorten the order processing window by deploying robots that are capable of locating, picking and replacing merchandise in their warehouse.

Automated storage and smart inventory management helps in on-demand stock audit without impacting the warehouse operations.

The overall robot density is low in India. According to the International Federation of Robotics (IFR), the estimated operational stock of multipurpose industrial robots in India, at the end of 2015, was estimated to be only 14,300 compared to the global robot population of 1,664,000.

## CONCLUSION

The new era of manufacturing will be marked by highly agile, networked enterprises that use information and analytics as skillfully as they employ talent and machinery to deliver products and services to diverse global markets. Factories will turn smart by embracing new-age processes/technologies. All these technologies will converge to create new industries, new business models and new products. These evolving technologies not will only require more highly skilled workforce but are also likely to create jobs that did not previously exist.



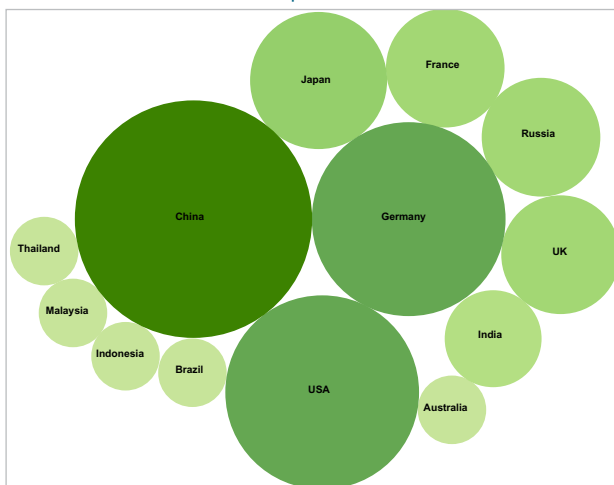
# Global benchmarking

## Introduction

Indian economy has grown at a fast pace over the last one and a half decade sustained by supportive policy measures and demographic changes. But this growth does not follow the trajectory of developed nations in their dependency on manufacturing and has relied rather unconventionally on the dynamic services sector.

This is a curious case of growth not buoyed by a robust economy riding on a strong manufacturing sector. It is a well demonstrated fact that sustained growth is usually accompanied by significant strengthening of production and related sectors. The question to be asked is how did India skip manufacturing robustness and march into service dominance; and if manufacturing doesn't pick up, will services sector alone be able to support the growing population base?

Share of merchandise exports (current US\$) in world merchandise exports 2014 (%)



Source: World Bank

But before we delve into the possibilities and probabilities of this achievement, it is important to know where we stand vis-a-vis a set of developing and developed economies. The direction forward, and the strength of the efforts required will only be visible once we have clarity on how big the current gap is. The vision is clear, the roadmap is drawn; what now remains are questions of 'how' and 'from where' to begin India's path to manufacturing robustness.

Comparing India's manufacturing sector with selected economies



The approach to benchmarking Indian manufacturing has been done in two stages – the Outcome (Manufacturing Performance) and the Enablers (Drivers of Manufacturing Performance). We first look at the current state of the Indian manufacturing, and then based on supporting parameters, benchmark the economy's performance with that of 13 nations



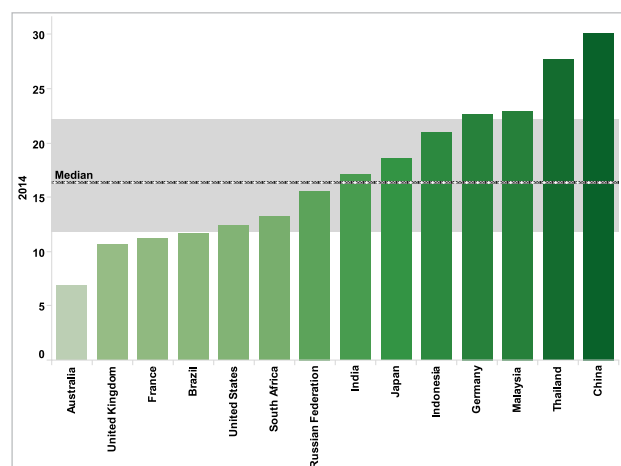


spread across the world. The peer countries have been selected based on the stages of development of each economy, similarities with economic development and robustness of their manufacturing sectors. The report further talks about the thrust areas of the government towards strengthening key drivers. This benchmarking exercise is based on publicly available data sources from various national, international and multilateral institutions.

## Manufacturing performance – Measuring the outcome

The Indian manufacturing sector has been systematically dragged down by political ineffectiveness, policy drift and structural bottlenecks over the last two decades. It is, therefore, not surprising that the share of manufacturing in the total output has remained stagnant during the aforesaid period at ~17-18% whereas the same in case of economies such as Thailand and China has around 30% during last two decades (1995-2015). To add to the country's woes, employment in agriculture (mostly disguised) has remained high despite its share in GDP falling sharply over the years; overall job creation in the economy has been dismal and just about 4.7% of current workforce is skilled compared to 96% in South Korea, 80% in Japan and 75% in Germany.

### Manufacturing value added (% of GDP) during 2014



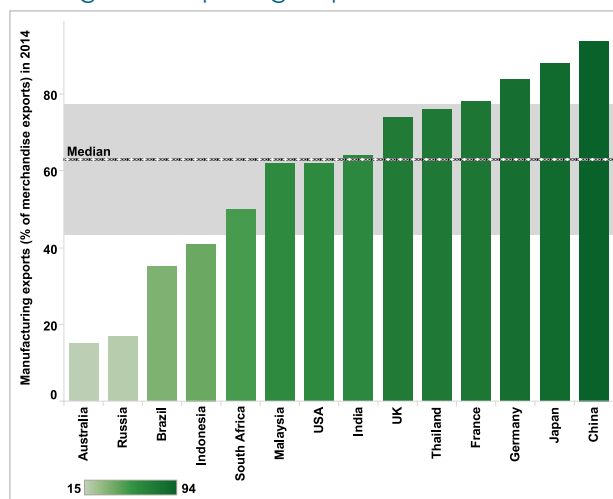
Source: World Bank

\* data of China, Russia and USA belongs to 2013

Realizing that stalled reforms, infrastructural constraints and an unskilled and unemployable labour force could become a drag on manufacturing performance; the government has recently undertaken several measures to mitigate such risks. These include enhanced allocation for infrastructure, decentralization of land and labour reforms to states, and various initiatives towards an investor friendly regime.

However, more needs to be done if India is to get on to the global manufacturing map. India scores abysmally poor in ease of doing business (released by World Bank) on four fronts i.e. starting a business, obtaining permits, enforcing contracts and taxation issues. But some positive results in the rankings also emerge – India is among the top ten protectors of minority interests. However, for India to truly have the force to reckon with the world, the overall score ought to increase bringing India on par with its peer group.

### Manufacturing exports (% of merchandise exports) in 2014 - India marginally above average in the peer group



Source: World Bank

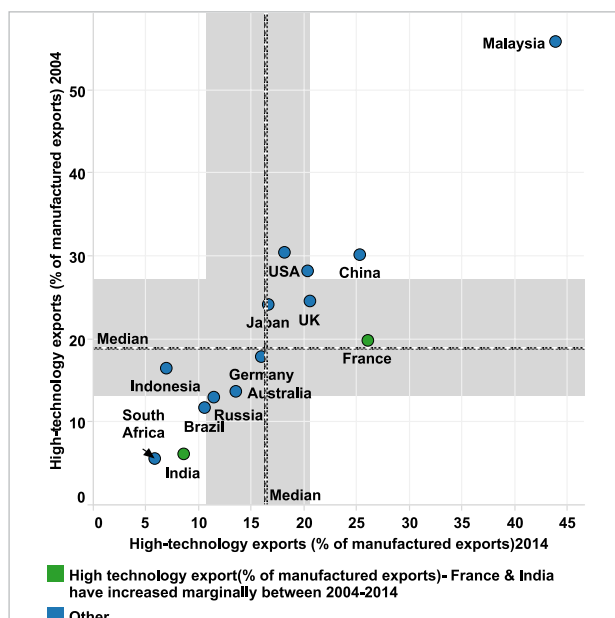
Manufacturing performance, benchmarked using the World Development Indicator (WDI) databases, too points that the business as usual scenario needs to change. While the share of Indian manufacturing sector to GDP is low, the share of manufacturing to exports is promising and in line with developed economies. However, much of this manufacturing



export is at the low-end of the value chain compared to that of high tech exports. Indian high-tech exports that indicate a strong manufacturing base constitute just 9% of the total value, way behind Malaysia's 44%. This is most likely because of India's low spend on research & development less than 1% of GDP as against world average of over 2.1% which, has also made India a laggard economy on measures of logistics/supply chain performance, the Global Competitiveness Index (GCI) and the Global Innovation Index (GII).

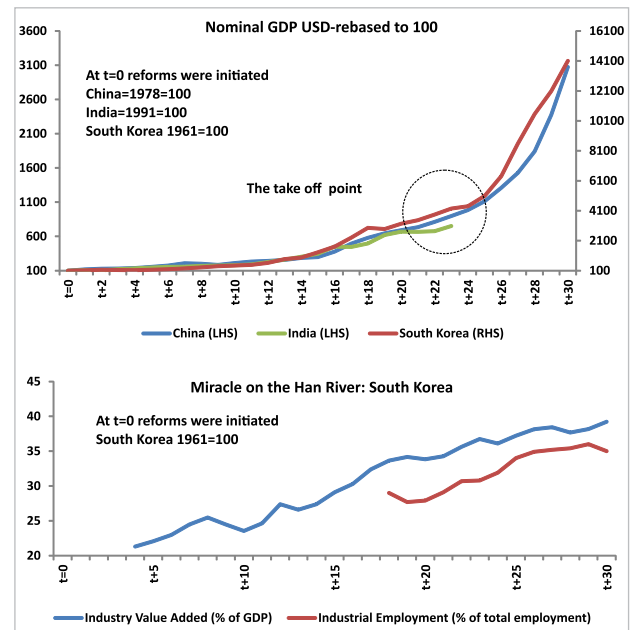
Despite these contrary trends, India stands out with its climbing growth rate, macroeconomic buoyancy and above all a young, growing and relatively inexpensive workforce – a source of potential demographic dividend. This demographic potential that India enjoys – coupled with dynamics of global population ageing and shifting economics of world manufacturing – could be a force to reckon with in a world where dependency rate is increasing in many countries. But tapping this demographic potential requires factors of production – land, labour and capital (physical, financial and intellectual) – to be, both, productive and competitive.

### High technology export (% of manufactured exports)- France & India have increased marginally between 2004-2014



Source: World Bank

Approximating from the East Asian and Chinese experience, a manufacturing boom, over the last 2 decades, could increase share of industrial output and employment and could significantly reduce the number of people engaged in agriculture by shifting them to more productive manufacturing jobs, and in the process positively impact various parameters of economic prosperity.



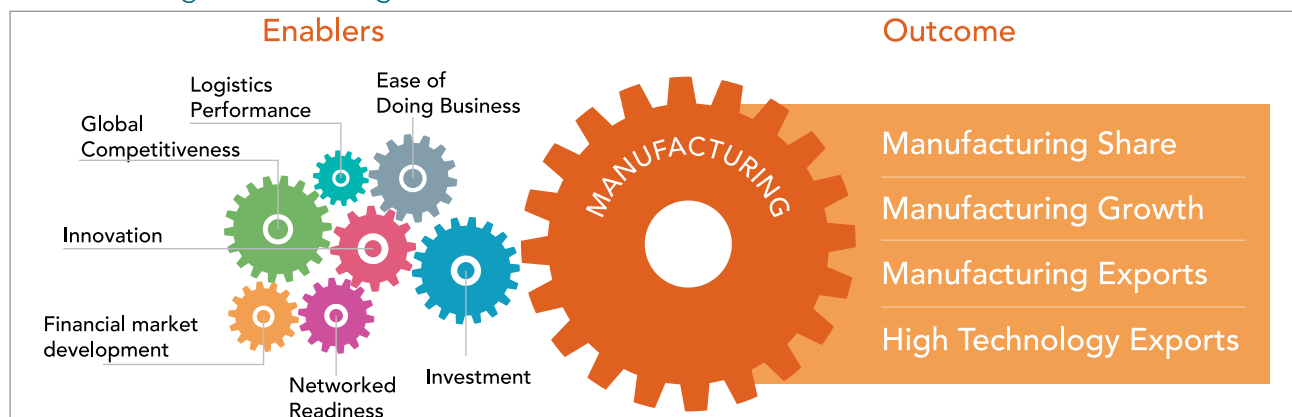
Source: World Bank, IMF

## Manufacturing drivers

Regardless of their size, globally companies in the manufacturing sector face many of the same challenges—increased competition within their sector, evolving managerial skills and workplace cultures, and a greater need to become more responsive to fast changing markets. We notice that key drivers for change can vary depending on the company's size; a one-size-fits-all strategy will not be effective in overcoming manufacturing productivity challenges across different companies. Dun & Bradstreet has identified 7 enablers (or key areas where governments needs to focus with targeted approach) which will impact the manufacturing sector as a whole. In this section we take a close look at how Indian economy measures against the selected group of countries.



## Manufacturing Benchmarking

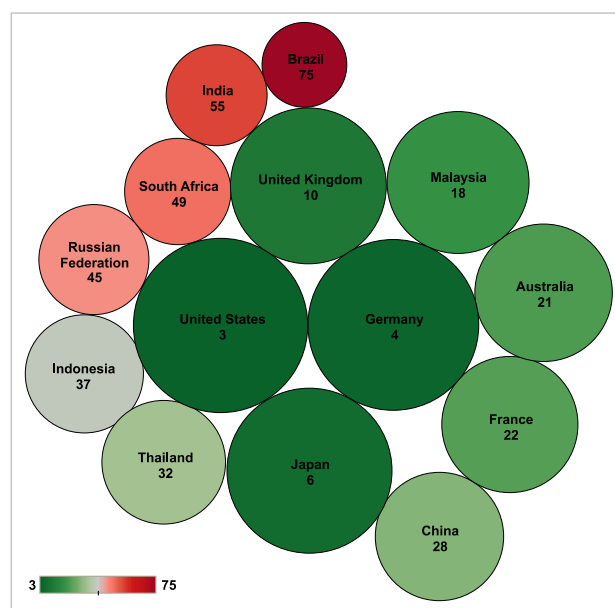


## Global competitiveness

The Global Competitiveness Report for the year 2015 - 16 placed India at 55<sup>th</sup> place in a table that has been topped by Switzerland for seven years in a row. After five years of decline in ranking, the country leapfrogged 16 positions in the latest ranking, primarily on the back of momentum initiated by the current government. However, it still ranks 13 notches lower than it did in 2006 - 07 and continues to languish at the bottom of the current year's table amongst the 13 peer countries selected for this benchmarking exercise. On the other hand, Malaysia, South Africa and Russia have managed to improve their position in the past couple of years, and with the exception of Brazil, rankings for remaining countries witnessed minor adjustments in comparison to the past year.

The position of the Latin American nation worsened drastically from 57 in 2014 - 15 to 75 in 2015 - 16 primarily due to low prospects of growth coupled with deteriorating terms of trade. The United States, continues to rank high at 3 because of its market size, its capacity to innovate and inculcate business sophistication.

## Global Competitiveness Index-Ranking 2015-16

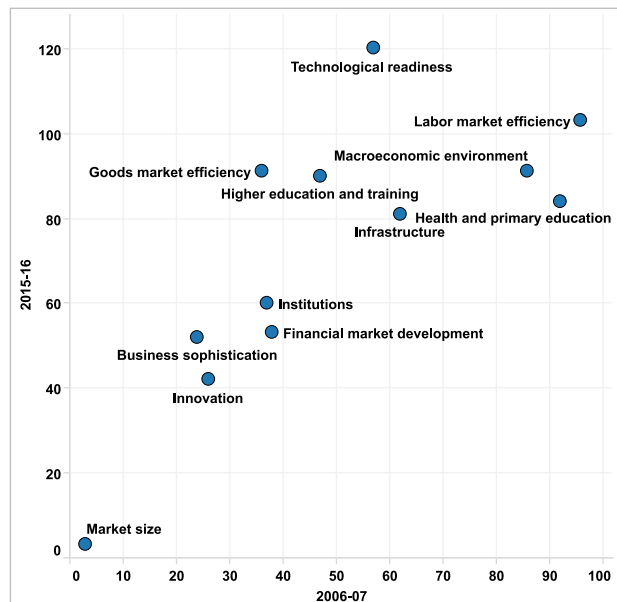


Source: WEF

The individual scores for 12 pillars that form the basis for the global competitiveness ranking shows that though India has improved on a comparative basis; on some of the parameters, it still remains a factor driven economy with corruption, policy instability and access to financing as core problems for doing business. To cite some examples, tax complexities and entry fee force a truck to waste up to 32 hours at various checkpoints on the route from Kolkata to Mumbai. Similarly, plethora of taxes, complex practices and poor infrastructure make road shipments relatively less profitable.

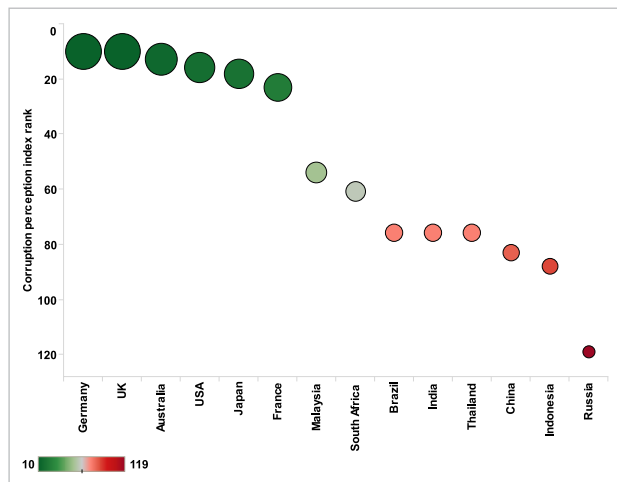


## Position of India on individual pillars of Global Competitiveness Index



Source: WEF

## Corruption perception index ranking 2015 - four out of five BRICS nations ranks poor in corruption perception index



Source: Transparency International

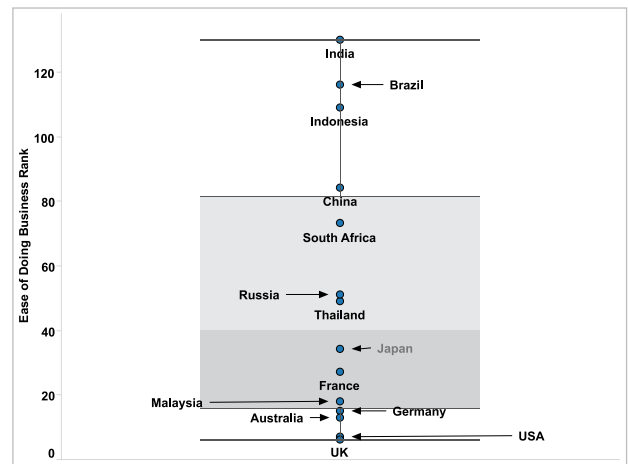
In light of the said challenges, recent policy initiatives of the government related to stability in tax laws, inflation targeting, proposals to reform the transport sector, agri-marketing system and indirect tax regime (i.e. GST), and focus on boosting SME financing augurs well for the competitiveness of the Indian manufacturing sector. And although fostering

an environment entirely supportive of private sector activity will take more time, latest efforts have started to show results in form of India's position in various global rankings, which if sustained, could lead to substantial benefits for Indian entrepreneurs along with potential gains in economic growth and job creation.

## Ease of Doing Business

According to the World Bank's 2016 Doing Business Report, in India it takes 29 days to start a business, 192 days to deal with construction permits, 90 days to get an electricity connection and almost 4.3 years to close down a business. These procedures in the same order take 2.5 days in Australia, 79 and 32 days in Malaysia, and just 7.2 months in Japan. It is not all surprising that the Washington based agency ranked India 130 among 189 countries in its latest report; an improvement of four places from its last year's ranking.

## Ease of Doing Business Rank 2016 - A long mile to go for India



Source: World Bank

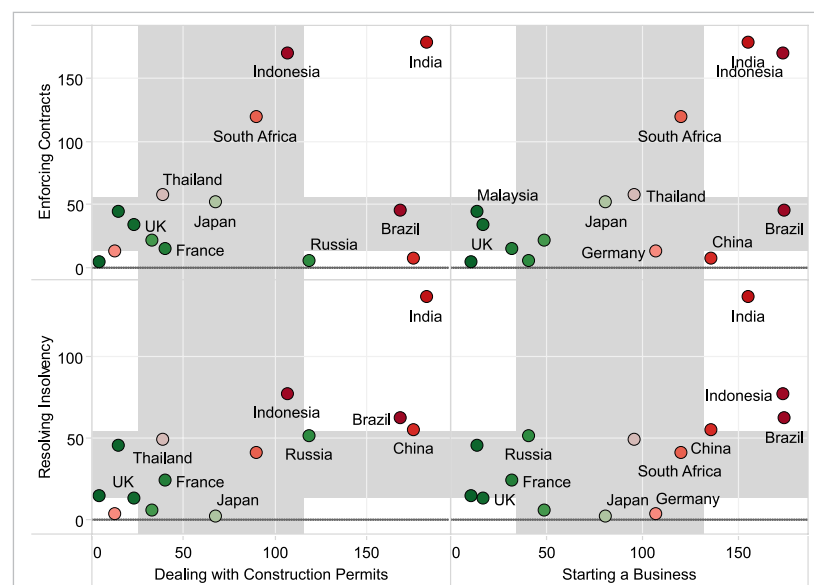
Multiple obstacles in dealing and procuring with various factors of production is the primary reason why manufacturing never boomed in India. Realizing this, the government has put ease of doing business at the top of its priority list. The government is addressing the structural bottlenecks through a combination of initiatives including increased



allocation for infrastructure development and proposed reforms in real estate and financial sector.

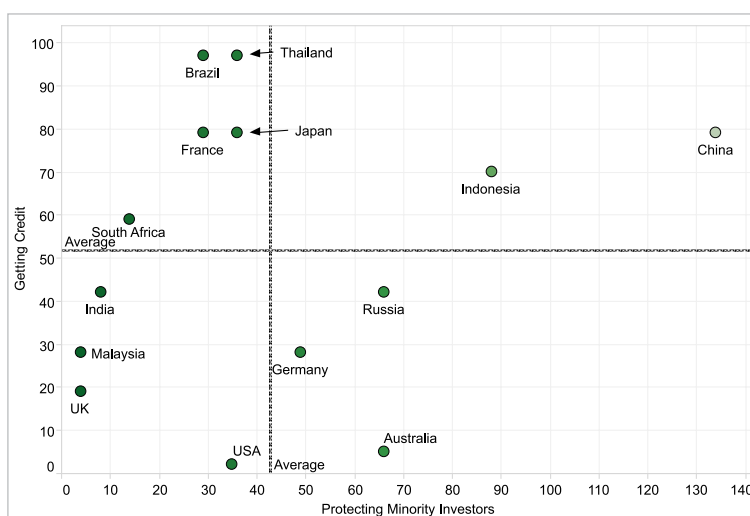
Apart from tabling the GST Bill and Bankruptcy Code, the government has introduced a new benchmarking exercise for states that is expected to foster competition and jolt them to simplify business procedures, with the aim to take India into the top 50 by end of 2017. In addition, to bypass the political wrangling in the Parliament over the land act, it decided to leave the matter of enacting a law on land acquisition to respective states to facilitate manufacturing growth. Lack of flexible labour laws is the other main reason why India lags its Asian peers in manufacturing and has a disproportionately larger unorganized sector. So, in absence of a national consensus on the labour act, the centre has encouraged individual states like Rajasthan, Madhya Pradesh and Maharashtra to reform restrictive provisions and propel industrial activity in their respective states.

## India - An Outlier



Source: World Bank

## India is good in protecting minority investors and getting credit



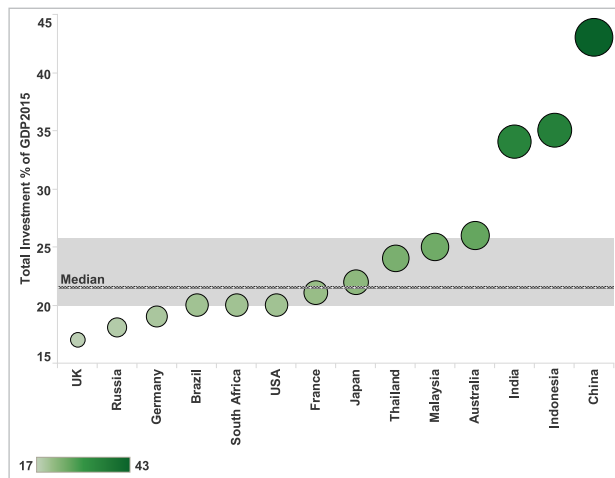
Source: World Bank

## Investments

Capital expenditure by the central government, as a % of GDP, had fallen from a high of ~4% in FY04 to just 1.6% in FY15. The gross capital formation (i.e. investments) in the economy shrank from 39.0% in FY12 to 34.2% in FY15. The figure although higher than most of the peer countries, was much lower than the quantum needed to fulfil the country's infrastructure needs. In contrast, China continued to invest almost 45% of its GDP during the last decade. The decline in investment was largely due to the general economic slowdown.



## Total investment (% of GDP) in 2015 - India yet to catch China



Source: IMF and Mospa

The anemic growth in new projects reflects an investment concern. Excess capacity and high leverage in the private sector is limiting their investment potential and putting burden on the government to stimulate the investment cycle.

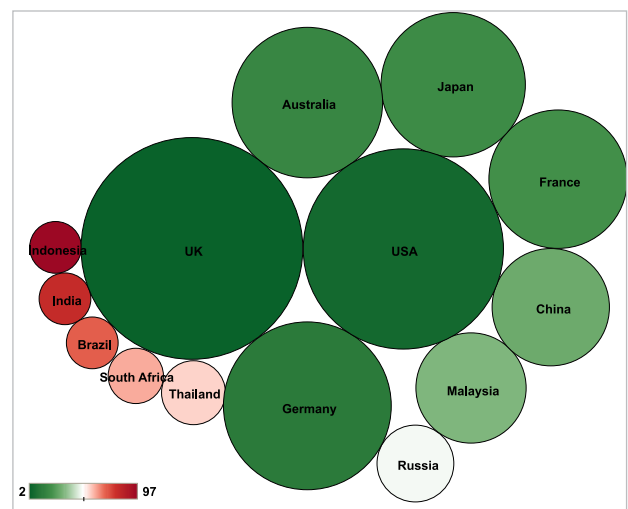
The growth in new projects have been disappointing by both the private and public sector. Investment in new projects stood at ₹ 8.1 trillion as compared to ₹ 10.5 trillion a year ago. Not only the new project investment by the government was less than half of the private sector in FY16, it had fallen by a greater percentage than the fall in the private sector new project investment as compared to FY15. However, majority of the outstanding projects were under the ownership of the government (share of 51%) in FY16. Aggregate outstanding projects increased to ₹ 170 trillion in FY16 compared to ₹ 159 trillion a year ago.

On the other hand, improved macroeconomic fundamentals and governance has resulted in India emerging as the top destination for foreign direct investment. FDI investment in India stood at US\$ 40.0 billion FY16.

## Innovation

While many countries including China and Malaysia have steadily improved their innovation capabilities, India has been on a declining trend. The Global Innovation Index (GII) which ranks economies in terms of their innovation capabilities placed India on 81<sup>st</sup> position, down from 66<sup>th</sup> in 2013. In contrast, China climbed six positions during the same period (from 35 to 29). This is a sharp decline for India some of which can be attributed to a change in methodology.

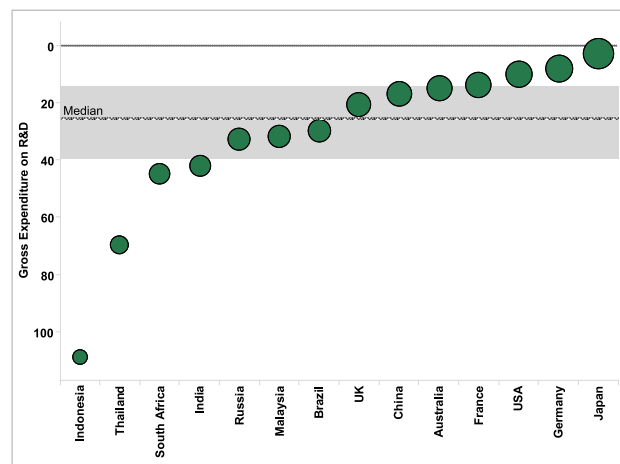
## Global innovation index rank 2015 - India is not focusing on innovation



Source: Cornell, INSEAD, WIPO



## Gross expenditure on R&D ranking 2015 - India is still better off in terms of overall ranking but lagging behind the peer group



Source: Cornell, INSEAD, WIPO

The decline has been perpetuated by low spend on R&D, low school life expectancy, high pupil-teacher ratio, insufficient knowledge absorption amongst students, inadequate skills amongst workers and poor social and physical infrastructure. And overtime, these shortcomings have considerably restricted the country's capacity to innovate with just 50,617 patent grants, design and trademark registrations by its residents in 2014. In the same year, Japan registered a figure of 280,374, United States 324,191 and China, a staggering 1.8 million.

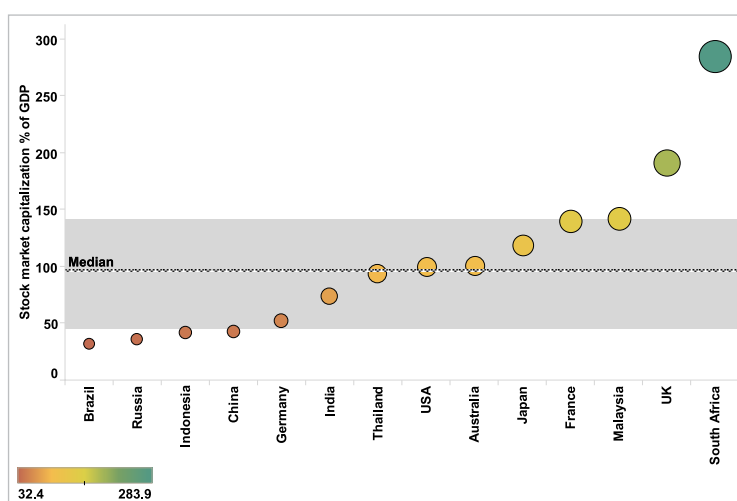
India is a young country that is on the cusp creating unprecedented opportunities and it is time for policy-makers to realize that innovation in materials and processes can potentially generate fresh demand and drive productivity gains across industries and geographies along with maintaining the competitiveness of country's exports. But materialisation of brain-gain would require improving the scientific focus at universities, increasing the expenditure on R&D, investing in modern infrastructure, augmenting the interaction between industry and academia and finally boosting continuous flow of talent in both directions. Accordingly, this will help the country integrate its

efforts along different dimensions of innovation and provide a boost to its manufacturing sector.

## Financial market development

A robust financial sector is critical to development of the manufacturing sector as it not only affects operations but also impacts capital formation and potential investments. The Indian financial markets, though robust, are still in the development phase as evident by the low credit ratios. India ranks in the bottom three on this parameter amongst the peer countries. While domestic credit (as % of GDP) by financial sector and banks is as low as 75% and 52% for India, for United States the ratio stands at 254% and 78%, for Japan 374% and 110% and for China 169% and 142% respectively. Similarly, stock market capitalisation to GDP ratio for India is around 74%; well below the peer group average of 103%, with South Africa topping the chart with 284%.

## Stock market capitalization % of GDP - 2015

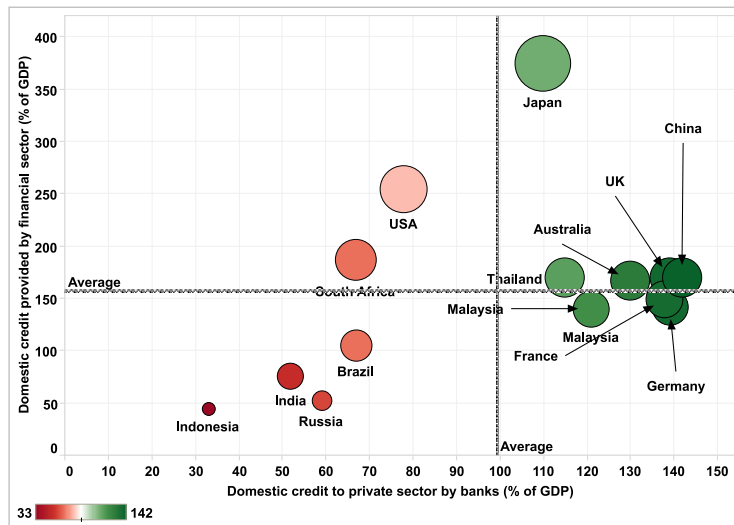


Source: IMF, World Bank and WFE

Relatively low domestic retail investor participation has meant lack of depth in the Indian financial markets. This has resulted in excessive dependent on foreign institutional investors (FIIs) who often demand higher returns and are driven by host of global issues.



## Credit off take-2014



Color represents domestic credit to private sector by banks (% of GDP)

Size represents domestic credit provided by financial sector (% of GDP)

Source: World Bank

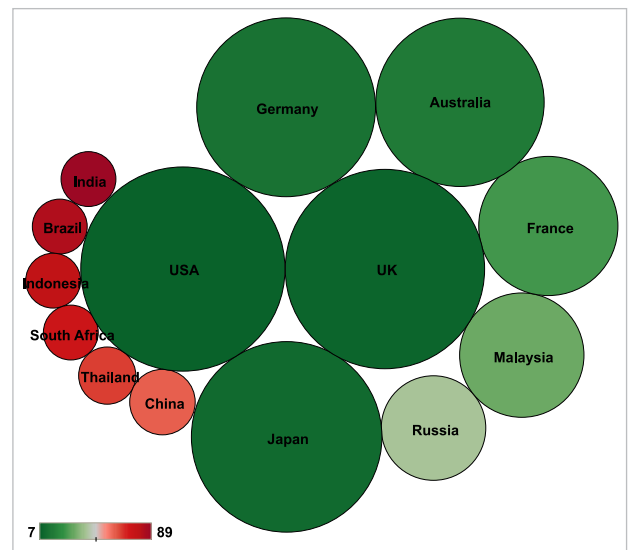
Given the centrality of manufacturing in India, it is imperative to improve the capital factor productivity in the country, encourage domestic retail participation in the markets and reform the corporate debt market. These measures will not only reduce market volatility and but also drive down the cost of capital for the private sector.

## Information and communication technologies

As seen across the globe, information and communication technologies (ICTs) hold the potential to transform economies and societies and promote inclusive growth. The communications technology revolution is underway in parts of the developed world with developing economies playing catch up. Technology has incredible power to improve people's lives, foster economic growth, and create opportunities for individuals, companies and nations around the globe. They allow new models of collaboration that increase workers' efficiency and flexibility.

High income economies dominate the top 31 spots in the latest Networked Readiness Index Rankings (NRI) 2015. Emerging and developing Asia presents contrasting pictures. Over 100 places separate the region's best- and worst-performing economies. The group performance of BRICS is also disappointing. India ranks low in this parameter and is placed at the bottom of the peer set in consideration.

## Network readiness index ranking 2015 - India lacks proper connectivity



Source: WEF

An encouraging result in the rankings is India's 1st position in the affordability sub-parameter which has come about as a result of the fierce domestic competition amongst operators within the rapidly transforming telecommunications sector.

The NRI rankings are a composite indicator made up of four main categories (subindices including Environment, Readiness, Usage and Impact), 10 subcategories (pillars), and 53 individual indicators distributed across the different pillars. We look



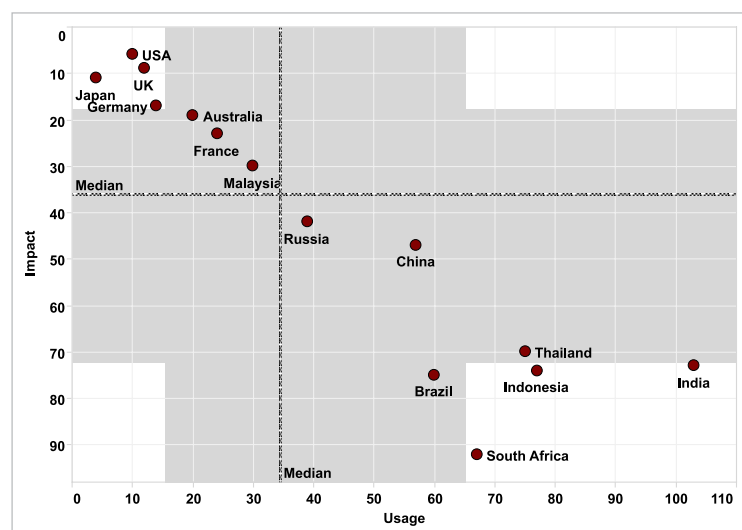


at two key subindices – the Usage subindex that assesses the extent of ICT adoption by a society's main stakeholders: government, businesses, and individuals and the Impact subindex which gauges the broad economic and social impacts accruing from ICTs.

It is encouraging to see that though India may rank low on the usage index, the cumulative social and economic impact of ICT adoption is on par with the developing nations in the peer set. India's 1<sup>st</sup> position in the affordability sub-parameter which has come about as a result of the fierce domestic competition amongst operators within the rapidly transforming telecommunications sector will have a positive impact on communications sector in turn impacting manufacturing positively.

India may not have ranked well in networked readiness and connectivity, but the situation might change rapidly in the near future as the Indian government's Digital India initiative is driving growth, and improved broadband penetration. India is witnessing an expanded 4G rollout, and start of local data centres along with many other initiatives under the digital initiatives of the government

## Impact v/s usage



Source: WEF

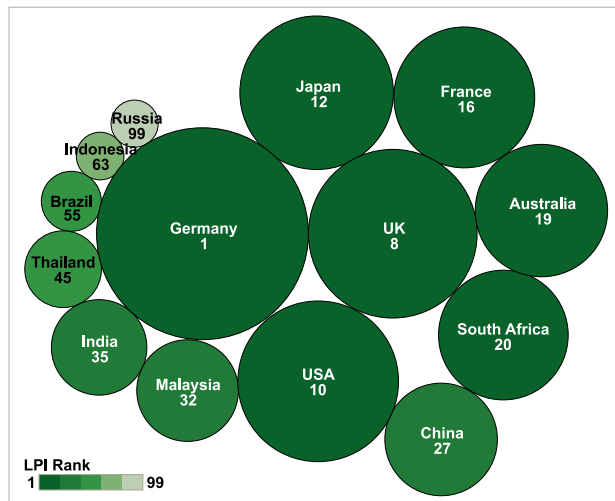
## Logistics performance

It is estimated that the manufacturing sector spends a significant percentage of its revenue on logistics. Improving logistics performance is at the core of the economic growth and competitiveness agenda. This can be done primarily by the gradual improvement of two major aspects, i.e. transportation as well as warehousing and storage. India is taking great strides forward in improvement of transportation infrastructure with the commissioning and development of roads, highways, rail transport and the recent opening of domestic sea cargo routes. Similarly there is policy support under the 'Make in India' program for the warehousing sector with many new warehousing corridors launched. The Delhi Mumbai Industrial Corridor (DMIC), an infrastructure driven industrial investment corridor has been launched with the government allocating a budget of INR ₹ 1,400 crores for the same in the recent budget. There are a large number of country specific investment regions and industrial parks on Public Private Partnership (PPP) model. For example, Japan has committed an investment US\$ 35 billion in the Nimrana, Bechraji, Supa regions; China to invest US\$ 20 billion in next 5 years including two Chinese industrial parks; UK to invest in the Belgaum corridor.

In the most recent edition of the Global logistics Performance Index (LPI) as released by the World Bank in 2016, covering 160 countries, India stands at 35th position, improving considerably from its 54th position in 2014. As per the latest data India scored higher than countries such as Thailand, Brazil, Indonesia and Russian federation. In last two years, India has improved on customs ranking from 65 to 38, jumping up by 27 positions. Tracking a consignment has become easier with ranking improving from 57 to 33 i.e. up by 24 positions. The quality of infrastructure and logistics services improving from 58 to 36 and 52 to 32 in 2016 respectively.



## Logistics performance index rank 2016



Source: World Bank

## Logistic performance index 2016 - Parameterwise performance



Source: World Bank

## Conclusion

As discussed, Make in India initiative is a unique programme and is likely to help India in becoming as a global manufacturing hub. The program – one of the largest of its kind has been acknowledged globally and investors across the globe are positive that the program will achieve desired targets.

As seen, the elasticity of response of Indian manufacturing to even a small incremental reform

push is very high. In the recent years, India's manufacturing sector has rapidly grown in size and endeavors to meet international quality standards increasing the nation's competitiveness vis-a-vis its peer set. A significant improvement in the parameters highlighted above will bring the sector up the curve rapidly.

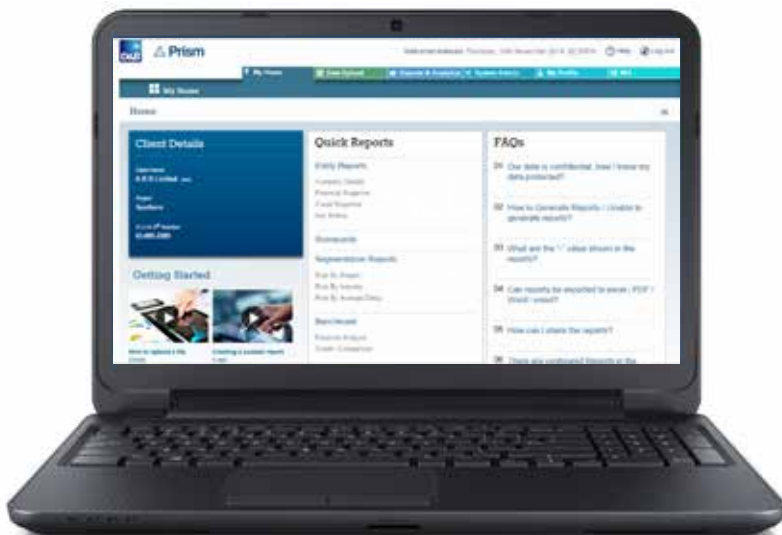
Information and communication technologies have a potential to almost singlehandedly transform economies and societies and promote inclusive growth. India has a rapidly growing communications sector which ranks high on global affordability indices. In the future, this may well be a significant driver of India's growth story.

There are some key areas of improvement that emerge through the benchmarking exercise on which India needs to focus on to accelerate the manufacturing growth trajectory:

- Encourage R&D activities in the sectors by providing necessary incentives and concessions
- Support technology development initiatives
- Develop infrastructure facilities such as roads and railways keeping in mind the regional concentration of the industry across sectors
- Increase reforms in the power sector
- Set-up institutions for providing technical education to the workforce in manufacturing related streams such heavy engineering and construction equipment sector
- Government should provide adequate assurance for protecting IP of the technology towards attracting industries in high tech areas
- Continued thrust on reforms such as simpler tax structures and easier access to formal credit mechanisms along with significant labour reforms.

Combined with the ongoing trends of globalisation, sustainability and the move to services the Indian manufacturing sector is poised for a rapid expansion riding on increased government support and investor confidence.





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GROWING RELATIONSHIPS THROUGH DATA



# Constraints to manufacturing

The government has set the goal of raising the share of manufacturing to 25% of GVA by 2025. On the contrary, over the last few years, the growth of the manufacturing sector has remained stagnant in turn leading the sector's contribution to the economy falling to 16%. Nonetheless, with signs of economic recovery getting visible and restoration of reforms process, the sector seems to have regained its lost momentum. While optimism is certainly high, there is a long way to go in order to achieve the target set for manufacturing sector. India needs to address various constraints that are holding back its manufacturing sector. The constraints to the Indian manufacturing growth, both internal and external include:

**Infrastructure constraints** – Infrastructure inadequacies (transport, power and communication) leads to cost disadvantage for the Indian industry affecting their competitiveness. Inland transport is inefficient, electricity is unreliable and communication is not at par with its peer countries. On infrastructure parameter, India is placed at 81 rank out of 140 countries under the Global Competitiveness Index for 2015-16. India's ranking is way below other BRICS nations like Brazil (74), Russian Federation (35), China (39), South Africa (68), as well as some of its peers like Korea (13), and Malaysia (24). India's ranking for Networked Readiness Index is also quite low, for the year 2015 India was placed at the bottom of the BRICS nations.



The unorganized segment of the manufacturing sector faces lack of infrastructure support like certification labs, testing facilities and inefficient and polluting technologies and processes. Hence to eliminate infrastructural constraints, India needs to create adequate systems that ensure the long term funds for industrial investment.

**Technology constraint** – With regards to technological readiness, India remains one of the least digitally connected countries in the world. Despite centres of excellence and clusters of innovation, India has been unable to leverage technology for the benefits of its entire population.

Technological capabilities of most players are extremely limited in the industrial sector. There are few firms which stand at par with their global counterparts in terms





of product design capability and process technology. Under Global Competitiveness Index 2015-16, India's ranking on the basis of firm-level technology adoption is at 102 far below the BRICS nations. A strong innovation culture is necessary if India is to solve the structural problem of weak manufacturing performance.

Further, India, despite having a significantly large educated workforce, has the lowest number of total Research and Development personnel per million inhabitants (2010). Thus, more needs to be invested in human capital and research, if this potential is to be realized.

**Constraints of factor of production** – Emerging Indian MNCs face difficulties in setting a foothold in a highly unequal and globalized world economy, dominated by large multi-national companies and characterised by fragmented global value chains. Land, infrastructure and inadequate supply chains pose major constraints for businesses. Difficulties in land acquisition for setting up industries, enforcing contracts and unfavourable labour laws create inefficiencies in production.

The government has started addressing these issues. For instance, the government has announced a unified Labour Identification Number (LIN) in order to simplify business regulations and secure transparency and accountability in labour inspections. Besides, 'Insolvency and Bankruptcy Code 2015' has now been passed in the parliament that provides for resolution of insolvency in a speedier and time-bound manner. While these are indeed welcome steps, more reform measures are required to truly unlock the potential of the country's vast human resources. Many state governments have initiated the process of modernization of land records and creating land banks which will help the land acquisition easy for the industry.

**Skill constraint** – The current government's 'Make in India' initiative needs to be complimented with the Skill India programme. To ensure employment in the growth process of the manufacturing sector in the pace of increasing capital and knowledge intensity rapid skill up-gradation is required. Moreover,

skill-intensive sectors are dynamic sectors in India. These sectors could become uncompetitive, if skill development does not keep pace with demand for skilled labour. In the Budget for FY17, the government has allocated ₹ 18.04 billion for skill development as well as has proposed to set up 1,500 Multi Skill Training Institutes.

**Constraints for doing business** – According to the World Bank (Global Competitiveness Index) the top four problems for doing business are corruption, policy instability, inflation and access to financing. Tariff barriers, poor infrastructure and corruption pose impediments to doing business in India. Access to India's domestic market is made difficult by high tariff barriers. The tariff regime is complex and characterized by a high quantity of distinct tariffs and vast tariff dispersion across tariff lines.

In last two years, India has made some progress in its Ease of Doing Business Ranking. The country has made significant improvement in two indicators namely 'starting a business' and 'getting electricity' which pushed the country up on the ladder. Yet there is substantial scope for further improvement in India's ease of doing business ranking.

**External constraint** – Trading environment is becoming more challenging and negotiations of mega-regional trading arrangements threatens to exclude India. Trade integration within Asia and between Asia and the United States under the Trans-Pacific Partnership (TPP) and integration between the markets of North American and Europe under the Trans-Atlantic Trade and Investment Partnership (TTIP) will happen once these agreements are negotiated and ratified. Any possible exclusion from the mega-regionals would be perturbing as these two agreements are likely to cover about half of the world trade.

**Policy constraints** - There is a need for more fundamental policy reforms to address weak physical infrastructure and a rising energy shortage. The policy initiatives for the small scale industries should aim towards up-scaling them and incentivizing them to become medium and large scale industries. The Goods and Services Tax (GST) and Land Acquisition



Bills are critical to revive long-term growth prospects of the manufacturing sector. Large private firms will not enter into labour-intensive manufacturing unless we move to a system that makes room for more flexible contracts in the labour market and resolves labour market disputes more swiftly. In order to encourage research & development activity in the industrial sector, the government has released India's first 'National Intellectual Property Rights (IPR) Policy' recently. The policy aims to push IPRs as a marketable financial asset, promote innovation, and entrepreneurship, while protecting public interest.

**Environmental constraint** - Achieving low carbon industrialization is yet another challenge, which has a number of interrelated implications for industrial policy and industrialization in general. Growth of the manufacturing sector has to be environmentally sustainable.





# Corporate Publications



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## SFO Technologies Pvt. Ltd.

### About SFO

In the early 1990's with the incorporation of the flagship company of NeST group, SFO Technologies Pvt. Ltd., the first Electronics Manufacturing Services (EMS)/ Original Design Manufacturing(ODM) company in India was established Kochi. SFO is today the fastest growing EMS/ODM company in India, with highly diversified business interest across sectors like Aerospace & Defense, Communications, Energy, Healthcare, Industrial and Automotive & Transportation. SFO has their presence in North America, Europe, Middle East and Japan serving Fortune 100 list of technology companies like GE, Toshiba, Siemens, Alstom, Hitachi etc and have emerged as the largest exporter of electronics hardware from India. SFO operates as a one-stop solution for Technology Services comprising of R&D Services, Hardware and Software Engineering Services and Manufacturing Services.

### Unique Business Model

The unique business model of forging 'Long Term Strategic Partnerships' with multi-nationals across the globe to provide concept to product EMS/ODM services has enabled SFO to build a wide spectrum of Electronic sub-assemblies and fully integrated products. The range of products comprise of Ultrasound, ECG, Infant Care, CT, X-Ray & ATM Machine sub-systems, Power Tools, Fire & Security products, Smart Energy Meters, Fibre optic products etc. showcasing the depth of their competency in end-to-end services from design to manufacturing, whether for low or high volume manufacturing.

### Design Centres

The Design Centers of SFO serve as a hub for joint innovation in technological advancements, enabling OE's to introduce trend-setting products. A strong presence in futuristic technologies like digital, Internet-of-Things, and mobile apps & analytics provide the much desired

advantage to SFO. Product development, leveraging multiple domain competencies including high-speed electronics, RF & Wireless, power electronics, networking, optronics and mechanical/plastics is the forte of SFO. In depth knowledge of multiple hardware platforms, firmware and application development strengths, industrial designs, testing and certification facilities along with product engineering services (VAVE) enables SFO to achieve product realization meeting specified 'cost, quality and time' constraints.

### World Class Quality

SFO's state of the art plants in Kochi, Bangalore and Mysore are certified for conformance to many international standards such as NADCAP, Appraisal for Special Process in Electronics, ISO 9001:2015, ISO 14001, ISO 13485, AS 9100, TL 9000, CMMI ML5, Version 1.3, ISO 27001, ISO 26262 & ESD S20:20.

### Manpower

To be the front runner to keep manpower satisfied in all the various businesses for decades is highly challenging. Surprisingly, SFO's iteration is only a meager 3%.

### Contribution to Make in India - Nest Hi Tek Park

Latest novel offering from SFO is the first Private Special Economic Zone (SEZ) for manufacturing sector in Kerala. Nest Hi Tek Park, Kochi are factory premises which are being offered for rent/lease/outright purchase to companies who are interested in setting up their own manufacturing base in India.

### Conclusion

This company with 'Customer First and Employee Friendly' culture has built a robust and sustainable business. Their commitment to honor what is promised remains unchallenged, even at most challenging times. Greater success is sure to come their way in the years to come.



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## Bühler offers Innovative solutions for Food Processing Industry

As a global market leader, Bühler offers comprehensive & innovative solutions for the Food Processing Industry. As part of 'Make in India' initiative for the global market, we at Bühler India are manufacturing a wide range of machines for the food processing industry such as PesaMill™ - Wheat flour, RoastMaster™ 60 - Coffee Roaster, SmartSnax™ - direct expanded snacks and machines for processing paddy to rice etc.

### PesaMill™ :

The atta process with PesaMill™ is a better alternative to traditional stone mills. Bühler's Atta process with PesaMill™ is the first industrial process technology for the production of atta flour with a completely authentic taste under perfect hygienic conditions. When it comes to flexible application options for flour production, the Bühler high-compression PesaMill™ offers the ideal solution for a variety of flour qualities. As part of a seamlessly integrated grinding

system for producing flour, PesaMill™ sets new standards in terms of food safety, flexibility, energy efficiency and operating costs. As a key component of integrated grinding systems, PesaMill™ is particularly flexible in use. For example, a single PesaMill™ can replace up to twenty traditional stone mills used for atta flour production. The sturdy design ensures consistent product quality and long-lasting, reliable operation. Capacity of PesaMill™ is 130 tonnes per day.

### RoastMaster™ 60 – new dimension in coffee flavour creation:

Every coffee manufacturing application requires individual roasting processes for optimized flavour and bean properties. The RoastMaster™ 60 adapts to your needs and offers a maximum of process flexibility. It inspires your product innovations with traditional and with more sophisticated multi-step roasting profiles. The proven drum roasting technology of the



PesaMill™



RoastMaster™ 60





RoastMaster™ 60 ensures a reliable, efficient and safe roasting operation. The optimized degree of roast, the roasting time and the roasting profile must be precisely reproduced for consistently high quality coffee products. The multi-step process allows for optimized flavour creation for any coffee blend and varieties and ensures excellent consistency. RoastMaster™ 60 has a capacity of 60 kg/batch and an hourly capacity up to 240 kg/h.

### SmartSnax™ - Singlescrew Extruder:

The new single-screw extruder from Bühler offers direct expanded snacks/cereals production of the highest quality at high production rates. With the possibility of using various raw materials (ex. corn grits & rice grits); our customers can easily adjust the product density and texture to get desired taste profile. With a variety of screws and die plates available as optional items, customers can produce multiple shapes using the same extruder.



SmartSnax™ - Singlescrew Extruder

### Bühler Profile :

Every day, billions of people come into contact with Bühler technologies to meet their basic needs for foods and mobility. The global production and processing of wheat, maize, rice, pasta, chocolate and breakfast cereals relies strongly on us. Furthermore, Bühler is a leading solution provider of die casting and surface coating technologies, with an emphasis on automotive and optics. In 2015, Bühler has around 10,800 employees in over 140 countries and has generated a turnover of CHF 2.4 billion. Bühler India is a 100% subsidiary of Bühler AG, Switzerland. The facility at Bangalore manufactures the main rice machines, coffee roasters, single screw extruders and flour milling machines. More than 550 employees support the individual needs of all the customers based in South Asia. Besides Bangalore, Bühler India has offices in Delhi, Pune, Hyderabad, Kolkata and Raipur. Trained specialist engineers cater to after sales service throughout the life cycle of the equipment or plant.

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