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Winning together US and India investment opportunities and synergies

August 2016



Foreword

US and Indian companies—working, partnering and winning together

India-US bilateral relations have developed into a ‘global strategic partnership’ based on shared democratic values and increasing convergence of interests on bilateral, regional and global issues.

According to ‘Future of India: The Winning Leap’, a 2014 report by PwC, India has seen its GDP rise by more than 1 trillion USD over the past two decades.¹ The Department of Industrial Policy and Promotion indicates that total foreign direct investment (FDI) received by India in April–December 2015 was 40.82 million USD.² During FY2015, India received the maximum FDI equity inflows from Singapore at 10.99 billion USD, followed by Mauritius (6.12 billion USD), the US (3.51 billion USD), the Netherlands (2.15 billion USD) and Japan (1.08 billion USD).³ India is an attractive FDI destination due to a range of factors—wage arbitrage, availability of a large and educated pool of workers and professionals, a government that is keen to make India a preferred FDI destination, and initiatives such as Make in India, which are designed to harness India’s economic advantages.

While several foreign companies have operations in India, some issues need to be addressed to ensure India’s place as a leading investment destination. For example, ‘The Future of India: The Winning Leap’ indicates that in 2013, India ranked 134 out of 189 economies in the World Bank’s Ease of Doing Business index. PwC’s analysis and discussion with experts in this field suggest that there are some low-hanging fruit that could be harvested to improve this ranking—in areas such as ease of starting a company and payment of taxes. Other improvements will require more complex policy and mindset changes. An additional benefit of improving ease of doing business in India could be greater confidence in India on the part of multinational companies, which would translate into larger flows of FDI and know-how into the country—two essential ingredients for growth and innovation.⁴

In PwC’s 19th Annual Global CEO Survey (released at Davos in January 2016), India was rated as a bright spot among nations where businesses maintained similar confidence levels as last year.⁵ The confidence reposed by Indian CEOs in the economy is quite encouraging. The survey indicates that around

two-third of the CEOs in India are very confident of their company’s growth in the next 12 months, as opposed to only 35% globally.⁶ CEOs in India see more growth opportunities for their companies today than they did three years ago.⁷ When asked ‘Which countries, excluding the one in which you are based, do you consider most important for your overall growth prospects over the next 12 months?’, 39% of Indian CEOs listed the US, which makes it their leading choice for the second year running.⁸ Clearly, the US is an important trade partner for India, and US and Indian companies can continue to engage in a dialogue on how to partner together and benefit from one another’s macro and demographic strengths.

PwC is privileged to be the knowledge partner for this convention. IACC has invited policymakers, regulators, investors and industry leaders to the convention. This convention will be a common ground for the ‘who’s who’ of both countries to deliberate on the key challenges and opportunities originating from enhanced synergies between them. To achieve this objective, PwC has put together this background paper titled **‘Winning together-US and India investment opportunities and synergies’**. The paper has been prepared in consultation with PwC’s sector teams and is designed to cover various aspects of these sectors in India with the aim of enhancing the US-India economic engagement.

Our industry experts have provided overviews of several sectors in terms of an industry snapshot and investment opportunities for US companies. We hope this paper provides a forum for increased conversation, engagement and trade between India and the US.



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1. PwC. (2014). Future of India: The Winning Leap. Retrieved from <https://www.pwc.in/assets/pdfs/future-of-india/future-of-india-the-winning-leap.pdf>

2. Indian Brand Equity Foundation. (2016). Foreign direct investment. Retrieved from <http://www.ibef.org/economy/foreign-direct-investment.aspx>

3. Ibid.

4. PwC. (2014). Future of India: The Winning Leap. Retrieved from <https://www.pwc.in/assets/pdfs/future-of-india/future-of-india-the-winning-leap.pdf>

5. PwC. (2016). 19th Annual Global CEO Survey. Retrieved from <http://www.pwc.in/assets/pdfs/publications/ceo-survey-2016/19th-annual-global-ceo-survey.pdf>

6. Ibid.

7. Ibid.

8. Ibid.

Introduction

In July 2016, the International Monetary Fund (IMF) projected India's GDP growth at 7.4% for fiscal year 2016–17. This is the highest growth projected for any country for the current year; China comes a distant second at 6.6%. India, which is the world's third-largest economy based on its gross domestic product (GDP) in purchasing power parity (PPP) terms, is expected to lead the world as well as emerging countries in terms of growth this year and next year.

A logical corollary to that is that India will also become a preferred destination to invest and do trade with.

While analysing India and its prospects, IMF highlighted that the country's 'economy is on a recovery path, helped by lower oil prices, positive policy actions and improved confidence'. The key areas where it has recommended further reforms, however, include the product market, labour, infrastructure, banking, the legal system and property rights, and fiscal structural reforms. Further, IMF found that India has done well in three areas: innovation, capital market development and liberalisation in trade, and foreign direct investment (FDI). Recent developments across the world also testify to India's stability. Brexit, for instance, which surprised the global financial markets, poses an important downside risk for the world economy and has worsened the global outlook for 2016–17. In India, however, economic activity remains and is expected to remain buoyant.

With over two years of the Bharatiya Janata Party-led National Democratic Alliance government at the Centre, a large number of initiatives have been taken, making India a desirable country to do business with. For instance, several sectors have been opened up to higher FDI (from retail to defence), taxation has been made more transparent and visa norms have been eased considerably.

That India has become a better investment destination is also reflected in the fact that its ranking has jumped 12 places to 130 out of 189 countries on the World Bank's latest 'Ease of Doing Business' index. This rise was based on three factors—ease of starting a business, obtaining construction permits and access to electricity in the country.

The government has emphasised inclusive growth through national programmes such as Jan Dhan Yojana on financial inclusion; the Swachh Bharat campaign on inculcating civic sense in people, hygiene and preventive healthcare; and 'Housing for all by 2022'. These initiatives are aimed to ensure that sustainable development in the country will help India develop further. This may also result in higher disposable incomes with consumers and higher spending power with the government. For instance, under the Jan Dhan Yojana, over 20 crore bank accounts were opened, which have earned deposits of over 30,638.29 crore INR (about 4.5 billion USD). These funds can be used for infrastructure development and more economic activity, thus providing more avenues for investments both by domestic companies and global companies wanting to do business in India.

India-US relations

US is India's traditional and most important trading partner. Their bilateral relations have been cemented further in the last two years, touching political and economic aspects such as increased issuance of visas, visits by dignitaries, initiatives to combat terrorism, as well as trade.

For instance, India continues to remain the world's largest arms importer, accounting for 14% of the global imports in 2011–2015, with the US being one of its biggest suppliers. Both countries now aspire to increase bilateral trade to the tune of 500 billion USD from the current 100 billion USD plus annually.



Preface

During his address in New Delhi in January 2015, President Obama said, 'I firmly believe that the relationship between the United States and India can be one of the defining partnerships of the 21st century.' As nations committed to democracy, liberty, diversity and enterprise, India and the United States are bound by common values and mutual interests. As multicultural, pluralistic societies, the world's oldest and largest democracies are natural partners and allies.

India's path to economic empowerment will be led by international trade, as is evident from the economic growth trajectories of Japan, China, Taiwan, Korea, Germany, etc., in the recent past.

As the apex bilateral chamber, Indo-American Chamber's (IACC) focus during the last year has been on enhancing the US-India economic partnership, led by deliberations on increasing bilateral trade to 500 billion USD from 132 billion USD in 2015, through a series of pan-India initiatives across key focus sectors. Moving beyond trade in goods and services, the economic partnership focusses on a wider range of defining parameters: joint ventures, greenfield investments, technology transfers, co-development and co-production.

The drivers of economic synergy will focus on the following sectors: banking, insurance and financial services; oil and gas; defence and aerospace; infrastructure; digital India for inclusive growth (to pave the way for the demographic dividend becoming a reality, with the world's youngest workforce); energy, including new and renewable; technology in heavy industries; railways and dedicated freight corridors; and pharma (specially intellectual property rights [IPRs] issues).

Through this convention, we intend to create a platform for both policymakers and sector specialists to strategise on the way forward and create an action plan with both governments acting as the key enablers.

This joint report by PwC and IACC evaluates the present status of the thrust sectors and explores new approaches required across sectors. The report also outlines how both governments will need to overcome the current challenges and create an innovative path for boosting bilateral trade and synergising core competencies across the defined sectors.



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Executive summary



India is well positioned as a major investment destination for the global community, particularly the US. Its macroeconomic stability, resilience and ability to deal effectively with external shocks and the government's proactive initiatives are making India a large and approachable market that is capable of yielding steady and attractive returns to investors in the medium-to-long term.

In this report, we discuss some sectors where the joint efforts made by the Indian government and companies are earning good dividends. These sectors also have immense future potential not just for domestic growth but also to strengthen India's position as a global business hub.

■ Aerospace and defence (A&D)

India has an enviable position in the global A&D sector. It is the world's largest importer of major weapons, with a 15% global share during 2010–2014. Besides, its military expenditure was the sixth highest in the world in 2015. Under the Make in India campaign, India rolled out several policy initiatives to lower entry barriers. These include FDI beyond 49% and up to 100% under the government approval route and improving ease of doing business in defence manufacturing. The new Defence Procurement Procedure (DPP) 2016 has made the sector more vibrant.

In 2015, the Framework for the US-India Defense Relationship was completed, which will guide and expand both nations' bilateral defence and strategic partnership over the next 10 years. An agreement to pursue four pathfinder projects under the Defense Technology and Trade Initiative (DTTI) as well as a cooperation agreement on aircraft carriers and jet engine technology will cement relations between the two countries. With realignments in the geopolitical space, India and the US are bound to be accredited with the status of 'natural allies'.

■ Banking, financial services and insurance

With its favourable demographics (around 53% of population will be in the working age bracket from 2016 onwards), India offers a big opportunity to financial services providers. Besides, there is potential for India to become the fifth largest banking industry in the world by 2020 and third largest by 2025. Needless to say, India's banking, insurance and financial sector is expanding rapidly. India is currently the fifteenth largest insurance market in the world in terms of premium

volume and is expected to reach 280 billion USD in 2020, with an insurable population that is anticipated to touch 750 million. The next few years will witness a massive drive towards financial inclusion. RBI has granted licenses to 11 payment banks and 10 small finance banks.

We foresee a huge opportunity in the insurance and fintech sectors. As per NASSCOM, the Indian fintech market is forecast to touch 2.4 billion USD by 2020 from the current 1.2 billion USD. This will attract large US financial institutions, including US investment banks with a fintech focus.

■ Chemicals

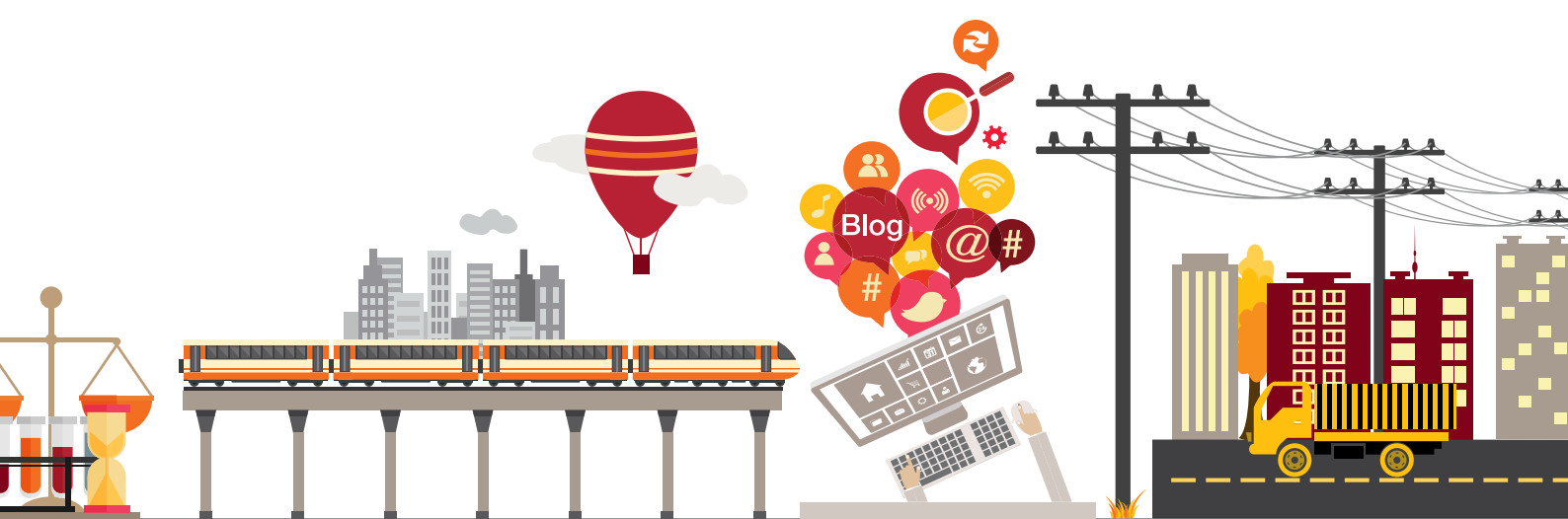
India's chemical sector, which currently is the third largest (in volume terms) in Asia after China and Japan, is expected to grow at a CAGR of 14% to reach 350 billion USD by 2021. The Make in India initiative has further propelled the sector—100% FDI is now allowed under the automatic route, industrial licenses have been abolished for most sub-sectors and Petroleum, Chemical and Petrochemical Investment Regions (PCPIRs), etc. As India moves towards greater production of speciality chemicals because of rising demand, more advanced technologies will be required by speciality chemical companies. This could lead to increased collaborations with global MNCs, besides increased M&A activity.

■ Dedicated freight corridors

The stage is set for India to spend around 3.3 lakh crore INR to set up three new dedicated rail freight corridors (5,500 km in length, adding to the existing 3,300 km) over the next eight years. These include the proposed three new corridors: the 2,328-km-long north-south corridor connecting Delhi to Chennai, the 2,327-km-long east-west corridor linking Kolkata with Mumbai, and the 1,114-km-long east coast corridor from Kharagpur to Vijaywada.

To encourage investment, 100% FDI under the automatic route is permitted for both dedicated freight lines and rolling stock, including train sets, and locomotive/coaches manufacturing and maintenance facilities.

An opportunity exists for US companies for technological advancement in this field. Currently, the presence of US companies in this industry is limited to GE, which recently secured a deal to manufacture and supply 1,000 diesel locomotives over the next 10 years for the Indian Railways.



■ Energy

Given the focus on providing uninterrupted universal access to electricity, the transformation of India's energy mix in the power and utilities sector presents a reliable, fast-growing, well-diversified, and profitable market opportunity for US companies. The imperative to add new capacities to meet social and economic needs is helping India change its energy mix more towards renewables, including solar, wind, mini hydel and biomass-based power, over the next 5–10 years. There is also a huge market for electrical energy storage in India, especially in integrating the renewable energy (RE) sources to the grid.

■ Infrastructure

Close to 12,000 km of highways are expected to be awarded by the end of December 2016 at an estimated cost of 1.4 lakh crore INR, which means big opportunities for private and global companies. In the future, the focus of deal activities will also be channelised towards transactions at existing and upcoming container terminals and support infrastructure such as inland container depots (ICDs) and container freight stations (CFSs) in the hinterland. This may lead to more private equity (PE) investments in liquified natural gas (LNG) assets, divestment transactions of non-strategic assets by non-major port operators and PE exits in assets under restructuring.

The existence of US companies in the road sector is limited only to PE funds. This may change.

■ Ports and inland waterways

There is an opportunity for US firms in mega brownfield expansion projects such as new harbours. Spill-off demand from the major ports and operation and maintenance (O&M) services such as pilotage, dredging and harbouring are good opportunities for foreign investors looking to enter the market.

■ Oil and gas

BP Statistical Review 2016 projects that India's primary energy consumption will grow to approximately 1,500 million tonnes of oil equivalent in 2035 —i.e. 2.2 times the 2015 levels and 10% of the world's energy consumption in 2035. Given these projections, renewables look promising.

Exploration and production (E&P) companies in the US who are keen to invest in India but were wary of the regulatory

risk under the production sharing contracts (PSC) regime may find it interesting to revisit their India investment plans, largely owing to the tectonic shift in both policy and mindset. US companies may like to evaluate investing in Hydrocarbon Exploration Licensing Policy (HELP) bid rounds, subject of course to the technical merits. Another low risk-low return opportunity is the demand-side flexibility (DSF) 2016 bid round which is currently under way.

The oil and gas equipment market represents a large business opportunity to US-based companies. The US is the world's third largest exporter of upstream oil and gas equipment. The International Trade Administration's '2016 Top Markets Report' ranks India in the 28th spot (out of 74 countries) as an export destination for US upstream oil and gas equipment companies. The new policy pronouncements of the government are expected to give a tremendous boost to the upstream oil and gas equipment market.

■ Pharma

The Indian pharmaceuticals industry, which was worth 29 billion USD in 2015, is expected to grow by 11–14% over the next few years to reach 55 billion USD by 2020. Growing population, lifestyle and tropical diseases offer huge potential to US companies. A large number (300+) of US Food and Drug Administration (FDA) approved manufacturing plants (the largest number in any country outside the US) provide opportunities for US companies. The sector has opened up to 74% under the automatic route for brownfield acquisitions and up to 100% FDI in greenfield projects under the automatic route. Indian companies have good capabilities in novel drug delivery systems (NDDS), which can be utilised by US companies to develop value-added generics.

■ Digitisation

The Indian industry has now started adopting digital technologies which are revolutionising factory shop floors, rejigging old business models and making products smarter.

US manufacturing companies who have a presence in India or are planning to set up a new business should outline a digital strategy in order to lower the cost of operations and achieve additional revenues. Further, given that digital is foremost on the minds of Indian CEOs, global consulting firms have an opportunity to implement some of their digital strategies for industrial companies in India.

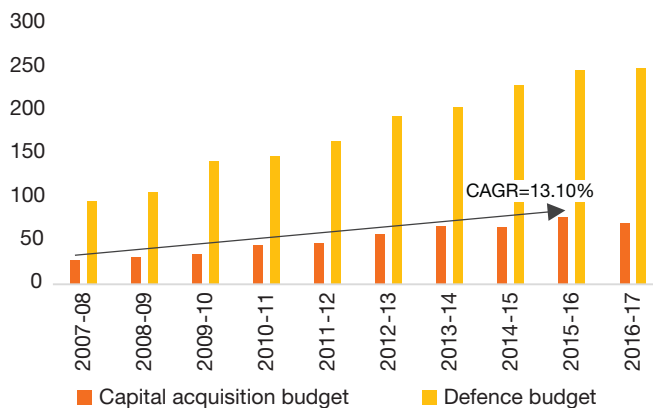


Industry dynamics

With the third largest armed forces in the world (third largest army, fourth largest air force and seventh largest navy), India's military expenditure was the sixth highest in the world in 2015. India is also the world's largest importer of major weapons, with a 15% global share during 2010–2014.¹

Budgetary allocation for capital acquisition has grown with a CAGR of 13.50% over the period of FY07–16.² By the year 2020, India could emerge as the third biggest country in terms of defence-related expenditure.³

Growth of budgetary allocation for capital acquisition in defence



Source: Reports of Standing Committee of Lok Sabha on Defence

1. Stockholm International Peace Research Institute
 2. PwC analysis
 3. PwC analysis

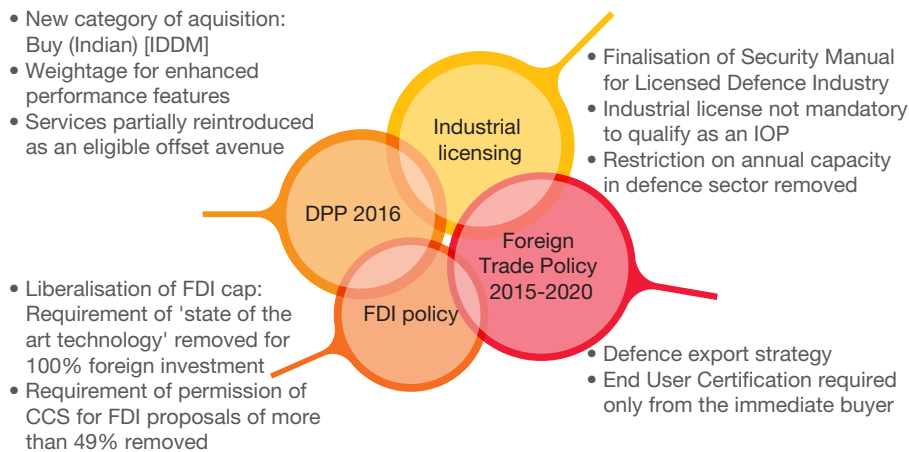
Selected major trends

In order to achieve the goal of self-reliance in defence production, the government, under the umbrella of the Make in India campaign, has rolled out several policy initiatives to lower entry barriers: allowing FDI beyond 49% and up to 100% under the government

commercial airlines (under the approval route). With the relaxation of regulatory hurdles, like the so-called 5/20 rule, the civil aviation sector is poised to create more jobs and revenue for the aerospace and ancillary sectors. Indian domestic airlines are aggressively placing aircraft orders with OEMs.

to be applicable through the supply chain, such as custom duty, service tax, excise duty, VAT and entry tax. Thus, a progressive and stable tax regime should be brought in.

Key enablers for aerospace and defence manufacturing



approval route, improving ease of doing business in defence manufacturing, relaxing norms of industrial licensing and defence exports, bringing flexibility in offset obligations and providing a level playing field for private players, etc. The new DPP 2016 has also been released and made effective since 1 April 2016. Both the Indian as well as foreign defence industry have responded with enthusiasm and expressed their commitment to the Make in India initiative.

India is also the fastest growing civil aviation market in the world. The government has recently unveiled the first-ever Civil Aviation Policy and permitted 100% FDI in scheduled

Selected major challenges

While many issues have already been addressed to varying degrees through the new DPP 2016 and other policy initiatives, there are some outstanding issues which need redressal by the Indian government. The key issues and recommendations are as follows:

- The government should associate timelines with procurement milestones to cut down the tedious and lengthy procurement process. Accountability should be fixed for exceptional delays.
- The tax regime is complicated. While finalising bids, OEMs need to consider multiple taxes that are likely

- The government should bring more flexibility in the offset regime by allowing group companies or subsidiaries of foreign OEMs to discharge offset obligations on behalf of the respective OEMs and easing offset implementation issues. The offset policy is complex and requires further simplification in the implementation stage as the documents to be submitted to MoD are voluminous, without any scope of e-filing.
- In order to build a healthy ecosystem, a strong and dedicated government-industry interface mechanism should be implemented through which sellers can showcase their products and services and approach the relevant authorities as and when required.
- Riders in the FDI policy, such as linkages with 'modern technology', have to be objectively refined so as to enable international defence companies to exercise adequate control over the ventures that these companies are forming with Indian partners.

- The government should address the implementation issues that may come up in relation to DPP 2016 provisions such as IDDM and strategic partnerships. The timing to meet the increased 40–60% indigenous content in IDDM should be flexible and the definition of indigenous content should include both the cost of raw material and value addition.

Vision of the future

In 2015, the Framework for the U.S.-India Defense Relationship was completed, which will guide and expand both nations' bilateral defence and strategic partnership over the next 10 years. An agreement to pursue four pathfinder projects under DTTI as well as a cooperation agreement on aircraft carriers and jet engine technology was signed. Further, the Joint Strategic Vision for the Asia-Pacific and Indian Ocean Region, which affirms a shared vision of prosperity and stability in the region, was formulated.

Interaction between Indian and US companies is going to be increasingly collaborative in the future. With realignments in the geopolitical space, India and the US are bound to be accredited with the status of 'natural allies'. This interaction can take the form of co-production, technical collaboration, subcontracting or JVs. In India, this is going to be driven primarily by an increase of MSMEs, low-cost skilled labour, fiscal incentives for manufacturing and a huge market for domestic consumption.

Going by the recent momentum of acquisition clearances, procurement expenditure is expected to grow faster than overall spending in defence in the near term. The growth trajectory till 2020 is expected to see an emerging domestic private sector primarily because of reasons like a pressing need to modernise India's armed forces, the government's ambitious Make in India campaign aimed at attracting foreign companies to invest in India's manufacturing sector and offset requirements.

Strong demand continues to drive aerospace OEMs. Both Boeing and Airbus have significant backlogs, which also impacts demand from equipment suppliers. For example, globally, at the end of the first quarter, Airbus had a backlog of 6,716 aircraft, including 5,479 single-aisle airliners. This level of demand is not surprising, given that a number of airlines in

India are expanding, particularly on shorter routes. While backlogs and orders remain strong, we see shifting dynamics—the narrowing cost and value gaps and commodity volatility all beg the following question: Are production rates going too high too fast?

Driven by strong balance sheets, defence companies in the US are looking to expand product lines and increase scope. Consolidation by major weapons manufacturers in the US is unlikely given that the US Department of Defense wants to ensure that bidding on contracts remains competitive; hence, niche technologies remain attractive. However, the Indian market is expected to witness consolidation in the near term, riding primarily on revised offset guidelines, incremental relaxations in FDI norms and the government's Make in India campaign. The agenda in focus in India is to reduce dependence on imports to fulfil defence requirements.

With their rapidly ageing populations, the US, Europe and Japan face continued budget pressures, as the government contends with increased social costs and slow economic development. Therefore, aerospace and defence companies today need to focus on talent management (with an emphasis on productivity, overcoming human resource shortages in developed economies and utilising the availability of resources in developing economies) and knowledge management (intellectual property transfer and protection).

Opportunities for US companies

To successfully enter the Indian aerospace and defence market, it is important to understand the right ecosystem for the business and the various benefits that companies can avail of. The technological hegemony of US companies and domestic presence and support for Indian companies provide an ideal ecosystem for co-production, technical collaboration, subcontracting or JVs in the aerospace and defence sector.

US companies will, inevitably, play a major role in the modernisation and upgradation of Indian military equipment (Aircrafts, artillery, air defence systems, sensors, infantry, armoured vehicles, submarines, frigates/destroyers, aircraft carrier, missiles etc.). This will also include complex shipborne systems like multifunction radars, IT-based systems, sensors (photonics, laser, MEMS), networking technologies for air and undersea applications, platform design capability for aircraft structures, technological assistance that will allow



India to leapfrog development stages of propulsion technology for designing modern aircraft engines and modern avionics systems.

India's entry into the Missile Technology Control Regime (MTCR) as its 35th member is a key milestone in the Indo-US relationship, which will pave the road for increased defence trade and technology transfer between Indian and US companies. The US, which has been working to open the doors for India to the Nuclear Suppliers Group (NSG),

MTCR, Australia Group and Wassenaar Arrangement since 2010 as part of the Indo-US civil nuclear cooperation agreement, played a key role in India becoming a member of MTCR. India hopes that getting high-end missile technology as well as buying the much desired surveillance and armed drones—including Predator, which is made by General Atomics—from the US and other MTCR members will be much easier now.



The world urban population is expected to increase by 72% by 2050.⁴ Many defence contractors see opportunities in constructing and/or managing government infrastructure. There is a growing need for 'smart cities', including civil security in urban areas, which creates a demand for UAVs, biometrics, data analytics, cyber security and protection of critical infrastructure.

Key issues that US companies need to be aware of while entering or expanding in India

DPP 2016:

- New category of acquisition has been introduced: 'Buy (Indian) [IDDM]' with a minimum of 40% Indigenous Content (if designed in India)/ 60% Indigenous Content (if not designed and developed in India)
- Definition of acquisition categories has been elaborated and decision flow charts are provided for the acquisition process
- 'Make' procedure has been simplified with a focus on MSMEs
- Weightage is to be given for enhanced performance features
- Procedural delays are to be reduced and ease of doing business has been focused upon
- Consolidated offset policy unveiled (amendments to DPP 2013 incorporated)
 - Offset threshold has been increased
 - Standard operating procedures have been laid out for change of IOP/products
 - Exchange rate variation to be accommodated
 - 'Services' have been partially reintroduced as an eligible offset avenue
 - Requirement of indigenous content reduced to 30% in 'Buy (Global)' bids where an Indian firm/JV is bidding

FDI policy

- Foreign investment has been allowed up to 100%.
- FDI up to 49% will be under the automatic route and above 49% will be under the government approval route in cases resulting in access to modern technology.

- The FDI limit for the defence sector has also been made applicable to the manufacturing of small arms and ammunitions covered under the Arms Act of 1959.
- Portfolio investment and investment by FVCIs will be allowed up to the permitted automatic route level of 49%.
- The requirement for seeking mandatory permission from CCS for proposals involving FDI beyond 49% has been removed.

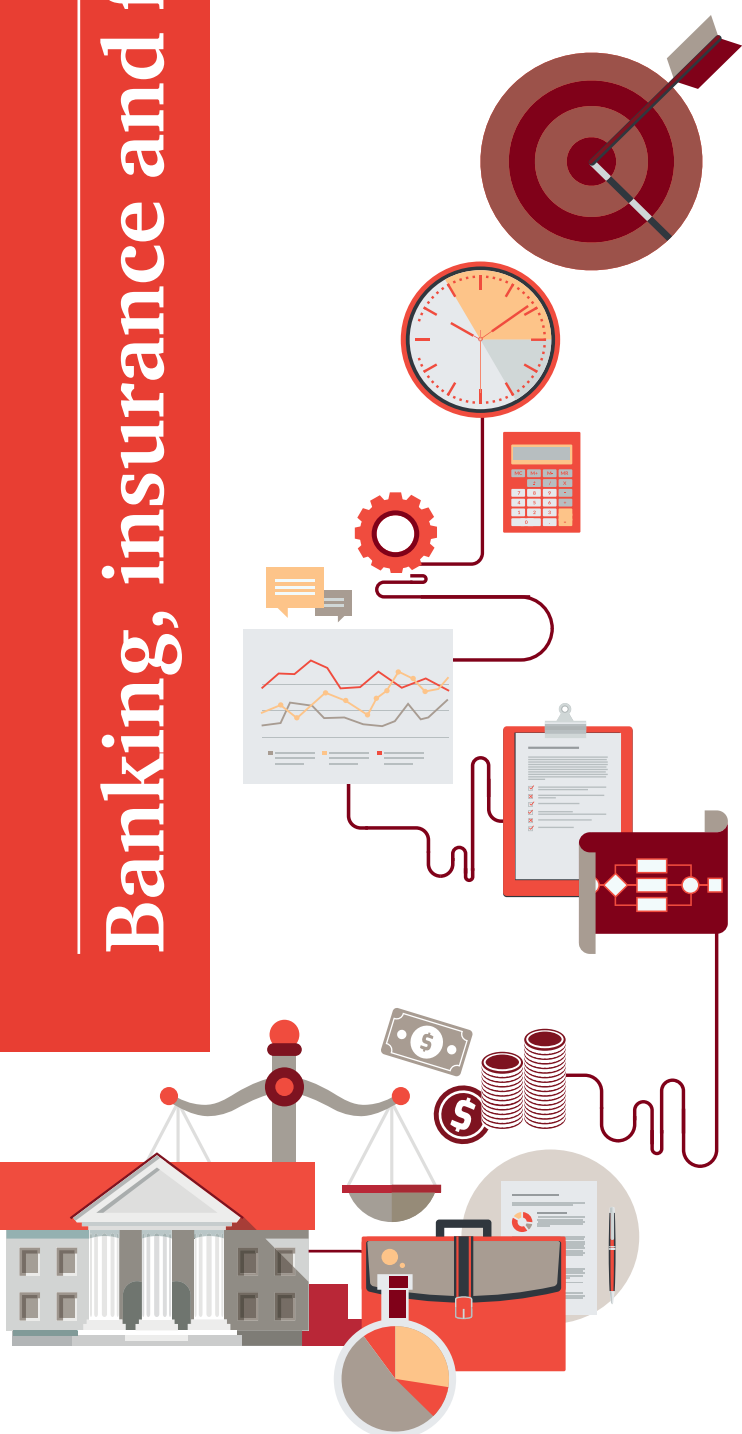
Licensing policy

- DIPP has released a list of products requiring an industrial license.
- Validity of industrial licenses has been further extended up to 18 years for existing and new licenses.
- 'Security Manual for Licensed Defence Industry' has been finalised.
- Industrial license will not be a mandatory requirement to qualify as an IOP.
- The restriction on annual capacity in the defence sector has been removed.

FTP

- FTP 2015–20 has been unveiled
- Defence export strategy has been formulated
- List of military stores requiring NOC of DoDP has been notified by DGFT
- End User Certifications is now required only from the immediate buyer
- Standard operating procedure are now finalised for online application for issue of NOCs for the export of military stores
- Custom duty exemption on import of specified goods by the government for defence purposes has been withdrawn

Banking, insurance and financial services



Industry dynamics

The BFSI sector in India has changed considerably post the economic reforms of 1991. For example, **the banking landscape has changed rapidly post liberalisation, with the advent of new generation private sector banks and the public listing of several PSU banks.**

With its favourable demographics, India offers financial services providers a huge opportunity. Nearly 53% of the country's population will be in the working age bracket from 2016 onwards, leading to an increase in GDP, while the proportion of population aged 65 and above is expected to double from 5% to 10% over the next 20 years. Both these factors will create a huge demand for financial services products.¹

In FY15, Indian gross domestic savings as a percentage of GDP stood at 32.45% which, when compared to the figure for India's peers, is relatively low. In addition, national savings in India are forecast to increase from 647 billion USD in 2014 to 1,012 USD in 2019.² Both these trends are expected to lead to an increase in the need for financial products.

With the potential to become the fifth largest banking industry in the world by 2020 and third largest by 2025,³ India's banking and financial sector is expanding rapidly. Indian banking sector assets have reached 1.96 trillion USD in FY15 from 1.3 trillion USD in FY10, with over 70% accounted for by the public sector.⁴

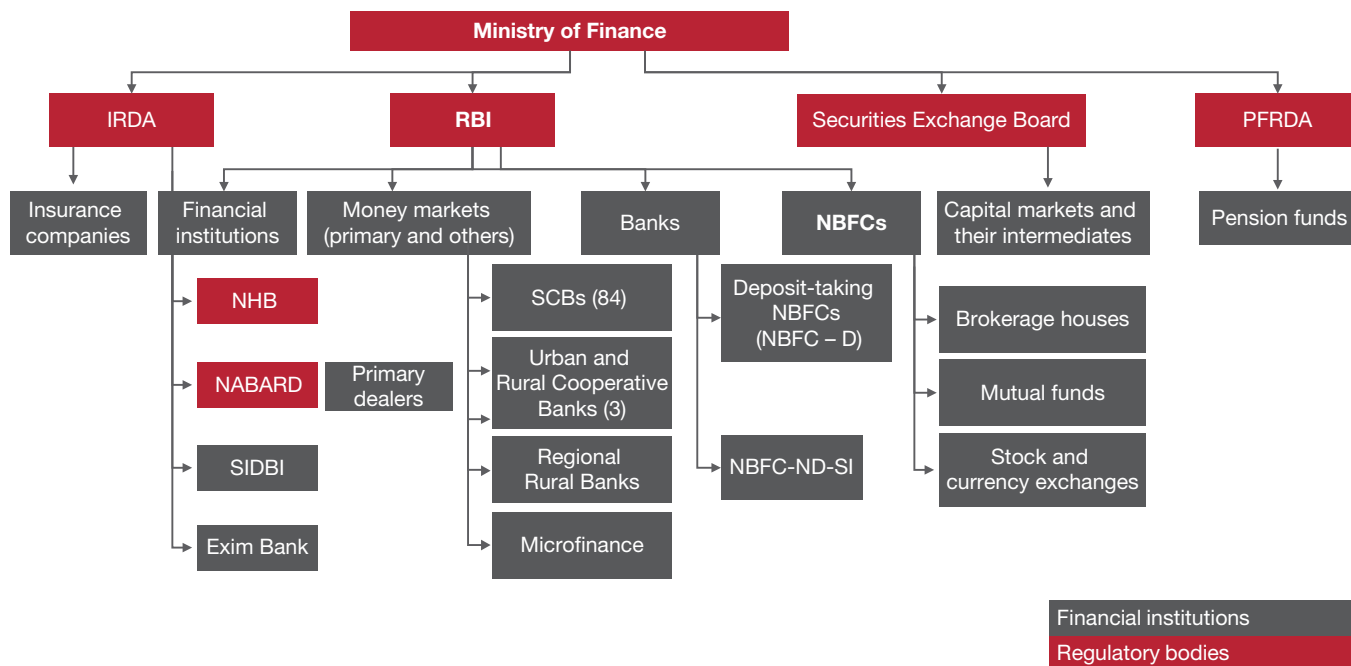
1. 11th Five Year Plan Report, Planning Commission

2. IBEF. (2016). Report on Indian financial services industry. Retrieved from www.ibef.org/download/Financial-Services-January-2016

3. IBEF. (2016). Report on Indian banking industry. Retrieved from <http://www.ibef.org/industry/banking-india.aspx>

4. IBA. (2015). Being five star in productivity: Roadmap for excellence in Indian banking. Retrieved from <http://www.fibac-india.com/images/2011.pdf>

The figure below gives a segmental overview of the Indian financial sector:

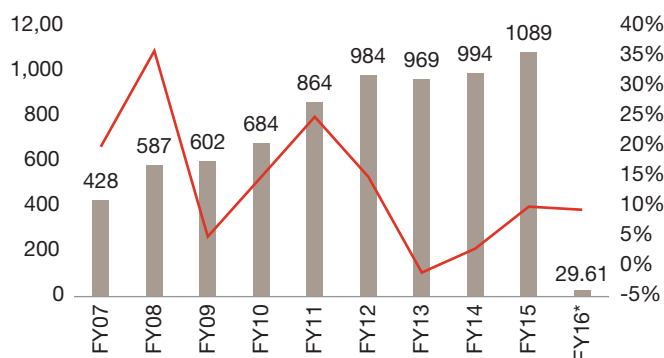


Total lending and deposits have increased at a CAGR of 6% and 12.9% during FY11–15 and FY06–15, respectively, and, backed by a demand for housing and personal finance, are poised for further growth.⁵

Over the last 10 years, NBFCs have come to form an integral part of the Indian financial system. They have been instrumental in providing credit to retail customers in the underserved and unbanked areas. Over the last few years, NBFCs have grown rapidly in India and

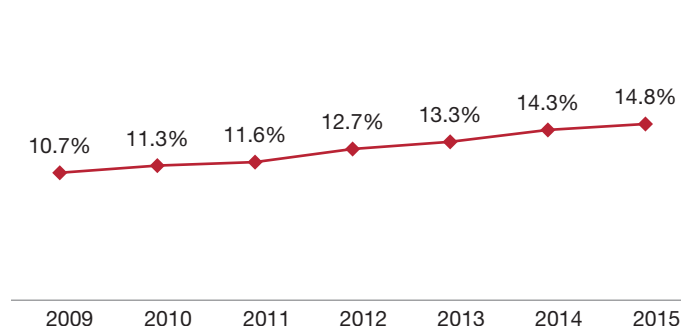
that is reflected in their asset growth pattern. The total number of NBFCs has come down from 51,929 in 1997 to 11,769 as on 30 September 2015, whereas the asset size has grown from 75913 crore INR as at end March 1998 to 16,10,729 crore INR at end September 2015.⁶

Growth in credit over the past few years (billion USD)



Source: Reserve Bank of India (RBI), TechSci Research
FY16* - till October '15

Proportion of NBFC assets to bank assets



Source: CARE Ratings

5. RBI. (2015). Report on trend and progress of banking in India 2014-15. Retrieved from <https://www.rbi.org.in/Scripts/AnnualPublications.aspx?head=Trend and Progress of Banking in India>

6. RBI. (2015). NBFC data. Retrieved from <https://www.rbi.org.in/scripts/SearchResults.aspx?search=NBFC>

NBFCs have gained a market share in the total credit in India. Between 2005 and 2015, the NBFC share in credit rose from 10% to 15%. We expect further growth over the coming few years as credit penetration is low in India and non-bank finance penetration is still low as compared to other economies around the world. NBFC credit (percentage of GDP) in India is 13% as opposed to 26% in Malaysia and 74% in Japan.⁷

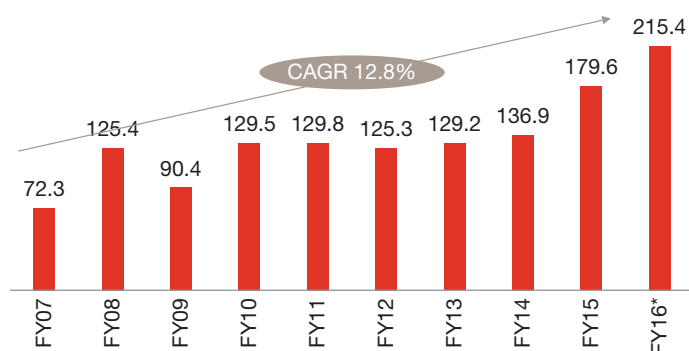
The number of AMCs in India has increased from 33 in March 2003 to 43 in September 2015,⁹ with HDFC MF, ICICI MF and Reliance MF as the top three players by AUM.

In the AMC industry, corporate investors account for around 46.6% of the total AUM in India, while high net worth individuals and retail investors account for 28.9% and 21.5%, respectively.

The Indian life insurance industry continues to be on a high growth trajectory path; favourable demographic profiles and strong macroeconomic fundamentals are expected to drive further growth.

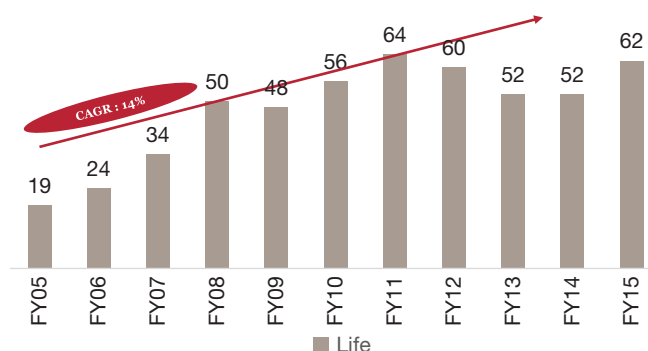
The life insurance premium market grew at a CAGR of 14%, from 19 billion USD in FY05 to 62 billion USD in FY15.

Mutual fund AUM (USD billion)



Source: AMFI, TechSci Research
FY16* - till September '15

Gross premium written in India (billion USD)



Source: IRDA, TechSci Research

Traditionally, NBFCs have performed better than banks on their respective return on equity. The higher profitability has been driven by NBFCs' stringent risk monitoring and risk management policies along with a customer-centric business model. Going forward, it is expected that NBFCs will be faced with higher capital requirements, tighter securitisation norms and more stringent non-performing loan recognition norms, which will affect the industry's overall profitability and bring them on par with traditional banks.

The asset management industry in India is one of the fastest growing in the world and has evolved significantly over the last five years. The total AUM of the mutual fund industry have grown at a CAGR of 12.8% over FY07–16 (till September 2015) to reach 215.4 billion USD. Currently, AUM as a percentage of GDP for India is approximately 7%,⁸ which is considerably lower than that of other emerging economies such as Brazil, which is at 45%. The US has the highest AUM/GDP ratio of 83%.

Indian MFs are dominated by debt funds, which contribute to 45% of the total AUM.

The industry is seeing increasing M&A activity as revenues across the segment are decreasing and combined with the increasing costs, this is putting excess pressure on the medium and small AMCs. In addition, the new SEBI MF regulations call for additional regulatory capital requirements which are putting a burden on the small players.

India is currently the fifteenth largest insurance market in the world in terms of premium volume, and it has the potential to grow exponentially over the next 5–10 years. The insurance industry is expected to reach 280 billion USD in 2020 as India's insurable population is anticipated to touch 750 million in 2020, with life expectancy reaching 74 years.¹⁰

This trend is set to continue as the life insurance penetration level is expected to increase from 3.3% to 5% by 2020.¹¹

With lower levels of competition as compared to other Asian countries, significant scope for penetration in semi-urban and rural areas and further product innovation and development the life insurance industry is expected to quadruple in size over the next 10 years.

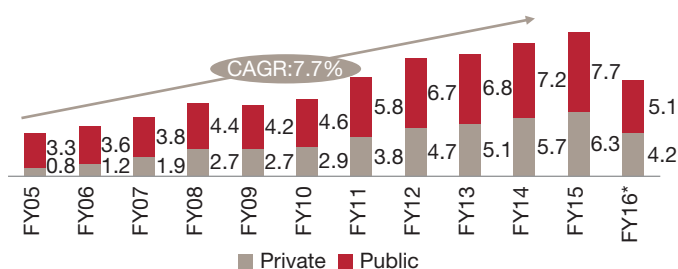
The general insurance industry growth has kept pace with GDP growth in the country and post liberalisation of the Indian insurance industry in the year 1999–2000, the Indian general insurance industry has witnessed rapid growth, growing from 2.6 billion USD in FY02 to 13.9 billion USD in FY15 at a CAGR of 13.8%.¹²

7. IBEF. (2016). Report on Indian financial services industry. <http://www.ibef.org/industry/financial-services-india.aspx>
8. Ibid.

9. IBEF. (2016). Report on Indian financial services industry. Retrieved from <http://www.ibef.org/industry/financial-services-india.aspx>
10. IRDA. (2015). Annual report. Retrieved from http://www.policyholder.gov.in/IRDAI_Annual_Reports.aspx

11. Ibid.
12. IBEF. (2016). Report on Indian insurance industry. Retrieved from <http://www.ibef.org/industry/insurance-sector-india.aspx>

Growth in non-life insurance premium (billion USD)



Source: IRDA, TechSci Research

While the Indian general insurance industry has evolved significantly over the past decade or so, the insurance penetration and insurance density levels are significantly lower than those of developed as well as comparable developing countries. The under-penetration is driven by a lack of overall financial awareness, lack of understanding of general insurance products, low perceived benefits, and propensity to purchase insurance based on reactive drivers.

We expect India's robust economy and growth rate to sustain the growth in insurance premiums written. This

will result in heightened competitive interest from a range of foreign insurers, who are looking to India as a major source of growth as growth in insurance premiums in their home country stagnates.

With the easing of the FDI norms in the insurance sector over the past year, approximately 20 deals have been announced in the insurance sector, with foreign investors infusing capital into Indian insurance companies. In addition, a few life insurance companies are also looking to conduct an IPO, which would be a first in the country.

Financial inclusion

Over the next few years, the focus of Indian financial service providers will be on financial inclusion, wherein banks will look to address the growing financial demands of emerging India. While the credit disbursal of all SCBs has more than doubled from FY08 to FY15, a credit gap still exists for the unbanked and underbanked population in India.

As part of its push for financial inclusion, the RBI has granted licenses to 11 payment banks and 10 small finance banks which will look to service the financial services needs of customers in semi-urban and rural sectors. These banks will give stiff competition to existing established banks and are expected to disrupt the banking landscape from 2016 onwards. In addition, we expect NBFCs to continue to serve unbanked customers by further developing products and services for retail asset-backed lending, lending against securities and microfinance.

Distribution models

We foresee distribution of financial products as the main challenge to fulfilling the goal of financial inclusion. Branches of financial institutions have historically had limited penetration across smaller cities. This has led to high transaction and distribution costs, making their business in rural areas unviable.

To address this issue, insurance companies will be focussing on new distribution channels such as bancassurance, online distribution and NBFCs, which allow them to widen their reach and reduce operational costs. In addition to encouraging investments from smaller cities, SEBI has allowed AMC's to hike their expense ratio up to 0.3% on the condition that they generate more than 30% inflow from smaller cities.



Technology

In an effort to remain competitive with potential fintech disruptors, financial services providers are aggressively looking to enhance their technology infrastructure and gain competitive advantage through cutting edge online and mobile solutions.

It is estimated that by 2020, three in every four insurance policies will be influenced by online channels. Further, sales through online channels will grow by 20 times, indicating the impact of technology on financial services in the future.

Regulatory and capital requirements

Over the next few years, Indian banks will need to address the issue of growing GNPA's and NNPA's. As per the Global Financial Stability Report released by IMF, 36.9% of India's total debt is at risk, which is among the highest in the emerging economies, while India's banks have only a 7.9% loss-absorbing buffer, which is among the lowest.

The overall riskiness of the portfolio of Indian banks will pose a major challenge going forward and keeping this in mind, regulation around strategic debt restructuring was introduced in 2015 with the aim of making banks more proactive in dealing with defaulters. This allowed banks to turn part of their loans into equity.

To fulfil the mandate of financial inclusion, all banks (including PSUs) will need more capital to increase their lending capacity. We believe this capital requirement for PSUs will be addressed through divestment of the government's stake. In addition, as public sector banks look to become compliant with BASEL III norms and increased risk capital requirements, they will require the infusion of fresh capital.

In the case of NBFCs, we also see market borrowings becoming a larger part of the funding structure of high-rated ones as their market borrowing rates are significantly lower than those of banks.

M&A (US focus)

Due to its stringent regulatory aspects (especially banking), the financial services sector has not seen a lot of inbound M&A from the US.

In the AMC space, there has been consolidation in the market and market concentration is expected to remain in the near term. There have been multiple exits in the AMC space by foreign players as they have come to realise that domestic firms are better placed to grow in India because of their wider distribution networks. From a US perspective, both Goldman and JP Asset Management have sold off their AMC businesses to domestic firms, while Prudential and Invesco have made substantial investments in this sector. We see opportunities for more US financial institutions to enter this space keeping in mind the headroom for growth in the AUM as a percentage of GDP metric.

With the easing of the FDI norms in insurance and the recent approval of 49% FDI through the automatic route, there has been a large increase in foreign investment in this sector. We expect this trend to continue as India presents a great business opportunity for insurance companies with its favourable demographics and low insurance penetration levels.

In the insurance space, Liberty Mutual increased its stake in its JV with Videocon, indicating the potential interest that US insurers have in India. US companies have also been active in the insurance broking space in India, which has seen increased activity in terms of JVs with domestic firms.

Insurance

We foresee a large opportunity in the Indian insurance space for US financial institutions. Over the last few years, we have seen a steady increase in penetration levels as household incomes have grown and the government continues to make the sector more lucrative for foreign participants through the easing of the FDI norms. As the disposable income of the Indian middle class grows, we



see an increasing interest in insurance and an ever-growing demand for innovative products. We believe American insurance companies, with their extensive experience across world geographies, are well placed to help potential Indian partners take advantage of this growing market segment.

The distribution model for insurance products is also undergoing an evolution and to increase insurance penetration in India, alternative distribution channels have emerged in the industry. We believe technology will play a very important role in the expansion of these distribution channels—for instance, the rise of online distribution models has led to an increase in insurance penetration levels and helped companies reduce costs. We believe this is another area where US insurance companies have had success, and Indian insurance companies could leverage the knowledge and experience of their US counterparts in this area.

In terms of distribution channels, as the Indian market matures, we will see the growing influence of IFAs and insurance brokers. Existing local brokers in India will face serious challenges around

product design and development, which can be addressed by partnering with established global brokers. While certain US-based brokers already have a limited presence in India there is an opportunity for them to create a scale business which provides a range of high-quality products and services to Indian corporate and retail customers.

Fintech

Another area where we see huge potential for US companies is the Indian fintech sector. Financial technology start-ups are disrupting the traditional markets of established financial institutions such as banks and, in essence, creating new markets for themselves. As per NASSCOM, the Indian fintech market is forecast to touch 2.4 billion USD by 2020 from the current 1.2 billion USD. While India's fintech sector growth is not comparable to that of some of its global peers, the availability of a cheaper tech workforce and a large tech-savvy young population is set to propel the growth in this sector. Increasingly, the BFSI sector in India is looking at fintech as an enabler rather than a disruptor and this has led to a spate in deal activity within this sector.

Large US financial institutions including US investment Banks, have launched fintech-focussed accelerator firms to take advantage of the opportunities in the fintech space of emerging economies, including India, and we expect this trend to continue over the next few years as the fintech industry in India matures.

Currently, the US dominates the global fintech industry, with the most mature players and access to the largest pools of finance. We see established US fintech firms looking at India as the next big opportunity for their product offerings as they seek to leverage the ever-growing demand for technology-driven financial services products and solutions.

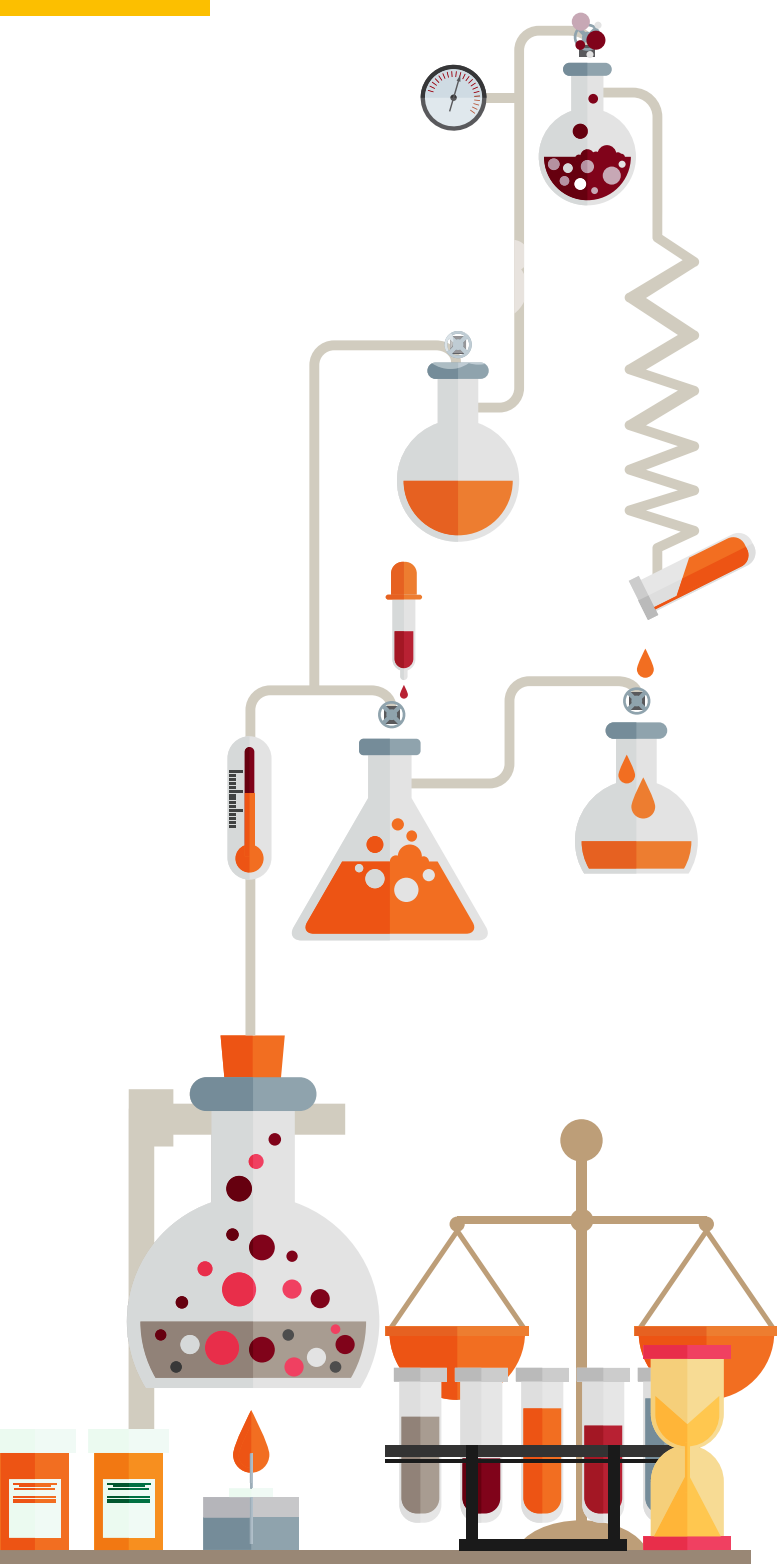
Two specific areas within the fintech space which we consider to be of interest to US firms are payment and P2P lending. The mobile payments industry in India has been valued at about 1.15 billion USD in 2016, growing from 86 million USD in 2011 and clocking a CAGR of 68%.¹³ We see growing interest from US fintech companies looking for strategic collaborations across the India digital payments space to leverage the growing demand for digital and mobile payments.

In P2P lending, the global market is expected to grow at a CAGR of 60% to 1 trillion USD by 2025, up from 9 billion USD in 2014,¹⁴ with the US being the biggest and the most mature market. Currently, India lacks a regulatory framework in this segment; we expect this situation to change over the next few years. Once the industry matures, we see the possibility of established US firms partnering with local Indian firms to take advantage of this fast-growing sector



13. The Economist. (2015). Slings and arrows. Retrieved from http://www.economist.com/sites/default/files/20150509_intl_banking.pdf

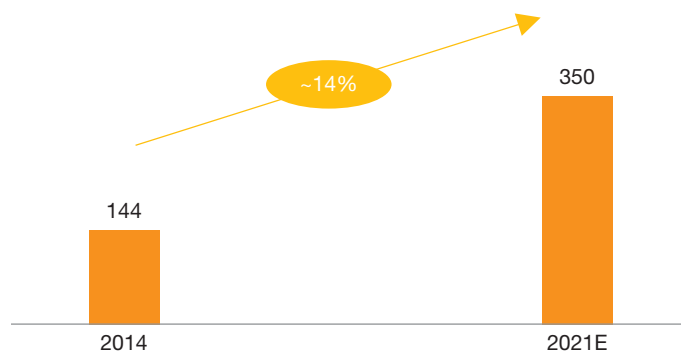
14. Statista. (2016). Value of global peer to peer lending from 2012 to 2025. Retrieved from <http://www.statista.com/statistics/325902/global-p2p-lending/>



Industry dynamics

The Indian chemical industry is estimated to be around 144 billion USD¹ and contributes to about 1.4% of India's GDP. India is the third largest chemical manufacturer (in volume terms) in Asia after China and Japan. The sector is expected to grow at a CAGR of 14%² to reach 350³ billion USD by 2021.

Growth in chemical industry (billion USD)



E: Estimate

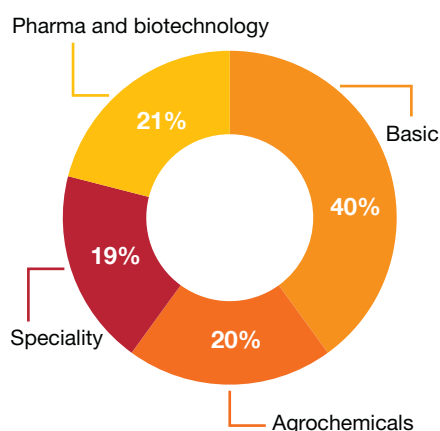
1. <http://www.makeinindia.com/sector/chemicals>
 2. <http://www.makeinindia.com/article/-/v/direct-foreign-investment-towards-india-s-growth>
 3. <http://www.makeinindia.com/article/-/v/direct-foreign-investment-towards-india-s-growth>

The Indian chemical industry is poised to grow due to following demand drivers:

(1) Steady domestic demand: India's GDP growth outlook (7–8% over the next few years) with rising population and low per capita consumption of chemicals. In the past, the growth rate of chemicals has been higher than the overall GDP growth rates and that trend is expected to continue.

(2) Emergence of conducive export opportunities led by China's environmental issues: Tightened pollution control norms and increasing cost of labour and power.

Chemical industry segmentation



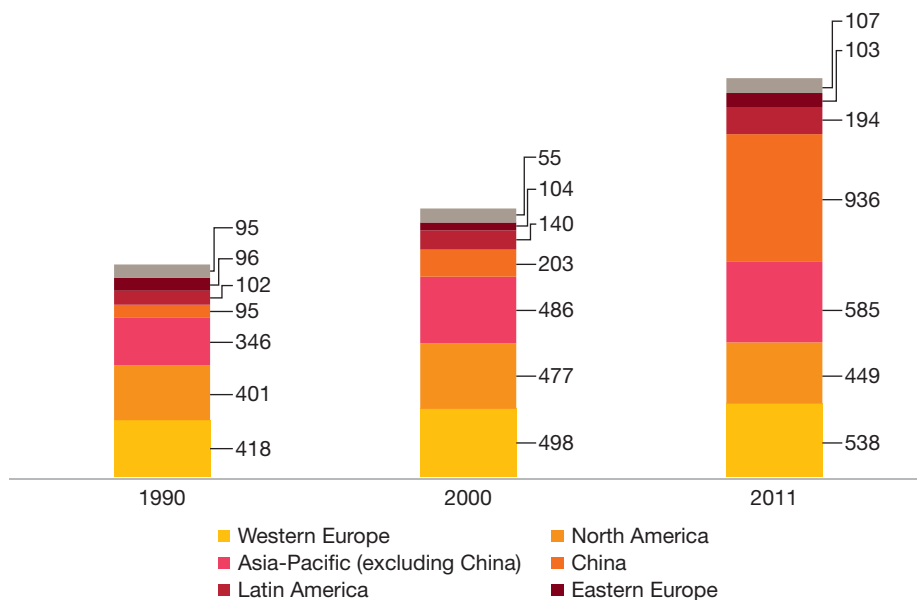
Source: Planning commission 12th Year Plan

Furthermore, government initiatives like Make in India have given this sector a push —100% FDI is now allowed under the automatic route, industrial licensing abolished for most sub-sectors, PCPIRs, etc.

The shift to Asia

Production and labour cost advantages as well as strong regional demand growth in Asia has led to a shift of industry value chains to Asia. The shift was further aided by the economic

Geographical split of the chemical industry



Source: IHS Global Insight



Growth through M&A

Year	Bidder	Target	Target description	Rationale
2015	Clariant	Vivimed Labs Ltd (personal care portfolio business)	India-based personal care portfolio business of Vivimed Labs	Strengthening of product portfolio
2015	Frutarom Industries Ltd	Sonarome Pvt. Ltd	India-based company engaged in the manufacture of fragrances, flavours, and seasonings for food products, cosmetics, toiletries, etc.	Expanding operations in India
2015	Evonik Industries AG	Monarch Catalyst Pvt. Ltd	India-based manufacturer of nickel catalyst for oils and oleo chemicals	Strengthening of product portfolio
2014	Nihon Nohyaku Co. Ltd	Hyderabad Chemicals Ltd	India-based company engaged in manufacturing pesticide products	Access to manufacturing facility
2014	Clariant Chemicals (India) Ltd	Plasticemix Industries	India-based company engaged in the production of master batches	Expansion of product portfolio and customer base
2013	Brenntag AG	Zytex Group (chemical distribution division)	India-based chemical distribution division of Zytex Group	Strengthening of product portfolio and distribution network

growth in Asia (primarily India and China) and an increasing consumer market base. The recent regulatory amendments in China are conducive to India and are also aided by the Make in India initiative by the government.

With a rapidly growing Indian economy and rising disposable income, the demand for specialised products is also increasing. This has led to a greater demand for speciality chemicals. The industry is also achieving critical economies of scale. As India moves towards greater production of speciality chemicals, more advanced technologies will be required by speciality chemical companies. Moreover, the limitation of resources in terms of finance required to support this growth could lead to collaborations in various forms with global MNCs.

However, the major roadblock to the growth in the chemicals sector in India is the availability of feedstock. The costs of these raw materials are high in India compared to countries like China, the Middle East and other South East Asian countries, such as Thailand and Indonesia. The way to overcome this challenge is by using alternate feedstock.

Several global players have used the M&A route to aggressively grow their business in India

India has approximately 70,000⁴ chemical units installed, dominated by small-scale units. In the last five years, several large and medium-sized chemical companies have used the M&A route to establish their presence in India (see table below). In the coming years, the trend to grow through M&A should continue as it provides speed to market, access to the manufacturing and distribution network, etc. Though India has already attracted global MNCs owing to rising domestic demand and growth prospects, the new entrants will intensify competition for smaller players, leading to gradual consolidation.

Opportunities for the US companies

There is vast potential for investment in the Indian chemical market, especially in the speciality chemical segment. Companies operating in the speciality chemicals segment are expected to maintain healthy growth rates because of growth in end use industries like personal care, automotive, construction, etc.

Strong end use industry growth is expected to boost demand of the chemical products and thereby offers an opportunity for chemical companies to grow. The need for advanced technologies and access to funds to support growth would lead to M&A activity in the sector.

4. Department of Chemicals and Petrochemicals. (December 2013). Draft National Chemical Policy



Dedicated freight corridors



Industry dynamics

In June 2015, CCEA approved a cost estimate of the eastern and western DFC projects (including land), at 81,459 crore INR.¹

India may spend around 3.3 lakh crore INR to set up three new dedicated rail freight corridors over the next eight years. The three new corridors will be 5,500 km in length, adding to the existing 3,300 km.²

As announced in the FY 16 Railway Budget, the proposed three new corridors are the 2,328-km-long north-south corridor connecting Delhi to Chennai; the 2,327-km-long east-west corridor linking Kolkata with Mumbai, and the 1,114-km-long east coast corridor from Kharagpur to Vijaywada.³

Selected major challenges

Land acquisition

Even though the DFCCIL has been able to acquire almost 90%⁴ of the land, the remaining 10% still poses a challenge and can get in the way of completion of the project.

Cost overruns

The Ministry of Railways will be carrying out such a large-scale project for the first time through PPP, and time and cost overruns coupled with rehabilitation and resettlement measures may prove to be critical operational parameters to guard against.

1. http://dfccil.gov.in/dfccil_app/Project_Funding

2. http://www.business-standard.com/article/economy-policy/india-to-invest-rs-3-3-lakh-cr-on-three-new-rail-freight-corridor-arms-116060301321_1.html

3. http://www.business-standard.com/article/economy-policy/india-to-invest-rs-3-3-lakh-cr-on-three-new-rail-freight-corridor-arms-116060301321_1.html

4. DFCC press release

Organisational structure

Since the DFCs are being developed under DFCCIL, organisational issues regarding diversion of traffic, sharing of revenues, and operations of rolling stock may need to be spelt out clearly to avoid any conflicts of interest that may arise once the DFCs are operational.

Vision of the future

DFCs are the much-needed infrastructure to enable railways to reliably service freight customers. Once the five corridors are operational, it will mark a paradigm change in the logistics sector in India.

However, funding the DFC projects may prove to be a major challenge. International banks, multilateral institutions and PE firms are expected to increase exposure to this sector. Since this is a high-growth sector, interested private players may see strong organic growth, and M&A activity may not see much action till 2020.

The DFC and Indian Railways will see major investments in the next decade in the country and can outpace other sectors in infrastructure by size and investments.

Indian Railways has already taken 1,50,000 crore INR in financing support from LIC for its various ongoing projects till 2020, and the DFC is expected to be a major beneficiary of these funds.

The near future will see major players worldwide investing in railways, given the increasingly transparent procurement tendering process and size of these contracts.

Opportunities for the US companies

Hundred per cent FDI under the automatic route is permitted for both dedicated freight lines and rolling stock, including train sets, and locomotive/coaches manufacturing and maintenance facilities. One of the clear-cut opportunities for the US companies to present their technical capabilities lies in the corridor's objective to ensure technological advancement in the field.

A part of the new freight corridors, which are to be built in the coming future, are planned to be financed through PPPs, where not only the US firms but also companies across the globe could target this means of financing as a potential entry into the market. This is mainly because the government is helping retain the risk factor here.

The presence of the US companies in this industry is limited and exists through the company GE, which recently secured a deal to manufacture and supply 1,000 diesel locomotives over the next 10 years for the Indian Railways.⁵

Following are some opportunities that are there for the taking for US companies demonstrating the right capabilities-

DFC opportunity	Potential type of firm
Supply/maintenance of specialised wagons for specific commodities as well as high capacity wagons (rolling stock approved by RDSO)	Companies that design and manufacture railcars and that specialise in welding, cleaning and maintenance of all railcars; manufacturing of flat-deck cars and well-type cars
Locomotive manufacturing	Companies having experience in freight locomotive manufacturing, standard as well as new designs, including hybrid diesel-electric power system locomotive
Manufacturing and supply of domestic containers (similar to European or American style swap bodies), road-railers and other intermodal equipment (approved by RDSO)	Manufacturers for container transport
Track laying, safety and maintenance	Suppliers for railway track maintenance and construction



5. <http://www.makeinindia.com/sector/railways>

Digital has significant potential to scale up the growth of the Indian economy while ensuring inclusive development. The possibilities are immense. In the past, the growth story of India did not make inroads into the bottom of the pyramid. On one side, there was a lack of technology infrastructure (low bandwidth) and on the other hand, there was a lack of players focussed on digital in the Indian market. Leading billion-dollar IT companies like Infosys, TCS, Wipro and HCL were mainly focussed on serving the international IT services market.

1. <http://www.forbes.com/sites/saritharai/2016/01/06/india-just-crossed-1-billion-mobile-subscribers-milestone-and-the-excitements-just-beginning/#4af8c0385ac2>
2. <http://www.internetlivestats.com/internet-users-by-country/>

number of rural Internet users.³ This growth has also been supported by an increase in 3G services to customers. With the recent launch of 4G services in the country, this growth is expected to maintain its upward trend. It is notable that more than 80% of mobile Internet users access the Internet for the purpose of social networking.⁴ Also, it is important to note that the growth of mobile Internet usage is highly demand-driven and, as a result, the e-commerce industry has grown significantly.

According to industry estimates,⁵ the technology sector in India is expected to grow significantly over the next five years and is seen as a one-trillion dollar opportunity with a possible contribution of around 25% to the GDP. With the fast-paced growth of digital literacy and mobile phone production, the Internet economy itself is projected to reach 200 billion USD in the next five years.

The Digital India programme,⁶ launched by the Government of India, is doing wonders in taking the benefits of technological advancement to the masses. With the power of digital, the government is spearheading a new era of development in various areas such as education, healthcare, agriculture, financial services, retail and urbanisation.

In the digital space, both Indian companies as well as international players are breaking new ground and competing for a growing market share. An interesting example of the digital change is shown by the entry of Uber in the Indian markets. Uber took the markets by storm, leading to the emergence and rapid growth of Indian companies like Ola. Similarly, Amazon is growing immensely, with robust competition from domestic players such as Flipkart and Snapdeal in the

e-commerce industry. Payment gateway solutions like Paytm have ushered in a new era of digital payments in India. These, in turn, are fuelling the digital revolution in India and opening up new avenues in the digital space for both domestic and international players.

The time is ideal to break the mould and enter the Indian digital market with innovations as well as already established models for rapid, sustainable and demand-driven growth.

Selected major trends

The digital industry is cutting across several sectors. The major trends in the industry are in line with the international trends of mobility and services 3.0, big data, e-commerce, smart cities, public service efficiencies and innovations.

	Digital themes	Key opportunity areas	Existing scenario
1	Mobility	<ul style="list-style-type: none"> Smartphone-based solutions GIS/GPS enabled services Cloud computing 	Several players from small to large organisations. Organisations like Uber and Ola are transforming the landscape.
2	Big data and services 3.0	<ul style="list-style-type: none"> Information convergence and analytics Social media observatory Proactive, personalised and contextual services 	A growing area with several medium-sized players
3	e-commerce	<ul style="list-style-type: none"> Digital commerce Payment gateways M-commerce 	Growing exponentially with scope for significant growth. Major players include Amazon, Flipkart and Snapdeal.
4	Smart cities	<ul style="list-style-type: none"> Smart Cities programme of Government of India P4 (Public private people partnerships) institutional mechanisms 	Still an open field with major MNCs such as IBM, Siemens, Cisco and Ericsson, pushing for reforms
5	Public service efficiency	<ul style="list-style-type: none"> Aadhar ID (e-ID) linked services E-services/m-services - G2C, G2B, G2G Citizen participation and engagement 	Dominated by large IT companies such as Infosys, TCS, Wipro, Tech Mahindra and HCL
6	Innovations	<ul style="list-style-type: none"> Blockchain IoT 3D printing 	Still in its infancy. Increasing focus of start-up community.

3. IAMAI press release, 2014. Retrieved from http://www.iamai.in/PRelease_detail.aspx?nid=3222&NMonth=11&NYear=2013.

4. Chowdhary, M. (2013). How much has social media penetrated in India? IndiaSocial. Retrieved from <http://www.indiasocial.in/socialmedia-penetration-india/>

5. http://economictimes.indiatimes.com/articleshow/50839825.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

6 <http://www.digitalindia.gov.in/>

Selected major challenges

Like other industries, digital has its own share of challenges. The following are three major challenges:

- **Evolving technologies call for new policies:** The technology landscape is evolving fast and is propelling the government to come up with policies at a fast pace. Indian government systems are still learning the art of adapting to technological changes. However, the technological advancements are happening at lightening speeds, making it hard for governments to keep pace with relevant policy changes. For instance, the state of Andhra Pradesh released a dedicated policy document for the Internet of things.
- **Security concerns:** Digital has given rise to various security concerns, right from cyber security to national security for India. Theft of credit information and password details is a grave threat as a majority of the Internet users are still not very aware when it comes to digital literacy. As a result, a large section of the population remains vulnerable to security hacks, which leads to both monetary and psychological loss. Also, the draft National Geospatial Policy released by the Government of India, which puts restrictions on the use of the Geographic Information System (GIS) maps, clearly highlights the extent of national security worries.
- **Too much noise for customers:** With low barriers to entry, the digital space is witnessing a lot of entrepreneurs vying for attention from the same customer. This is leading to large spends on marketing and communications for companies. However, from a customer standpoint, there is too much noise and they are increasingly finding it difficult to choose the right direction.

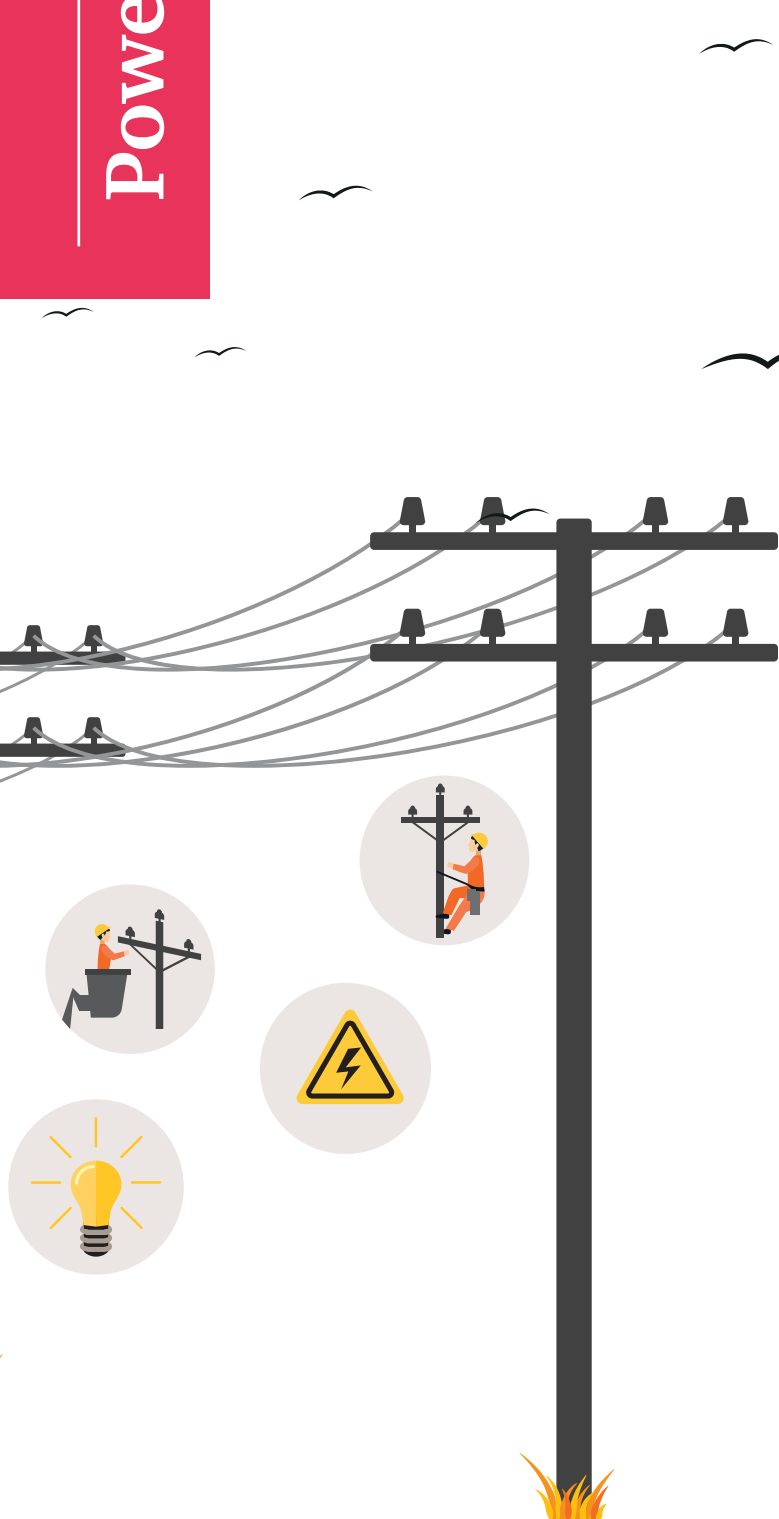
Opportunities for US companies

There are a significant number of opportunities for US-based companies to enter and invest in the Indian digital space. In fact, the early market entrants in most sectors were US-based companies that have already found and established a large market in India. With the government's emphasis on Digital India, this is an ideal time to penetrate the Indian market. In the last three years, the market has seen a bit of consolidation with very high valuations. Similar to the US industry, the acquisition of small players by large companies is the most prominent trend of the season.

The opportunity areas for US-based companies in each of the trends have been highlighted in the diagram that is presented along with the previous response.







Industry dynamics

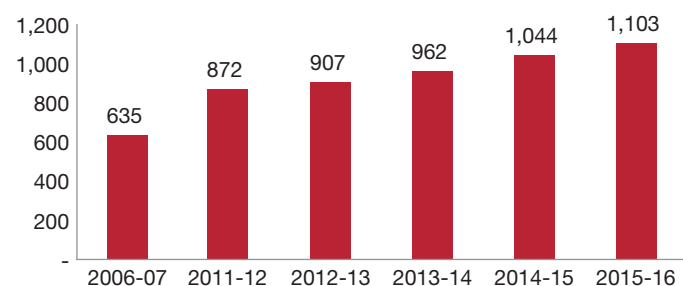
The electricity sector in India is also undergoing significant growth and change. Among other aspects, the government is focussed on providing universal access and 24/7 supply of power. The primary fuel sector has been revamped, EE in sectors is being addressed, and a major attempt at transforming the energy mix, with a goal of 175 GW of RE by 2022, is under way.

Electricity production has crossed 1,103 BU (2015–16) with a growth of 8.2% over the last decade (2006–16). India is currently the third largest producer, surpassing Japan and Russia, and the fourth largest consumer of electricity in the world with an annual per capital consumption of 1,010 kWh. The installed capacity has reached 303 GW (as of 31 March 2016), growing at a CAGR of 14.3% in the past 10 years.

Although coal continues to be the primary source of power generation, with 61% (185.17 GW) share in capacity, RE capacity is gaining focus due to emphasis on lesser emissions and a major push from the Government of India, which has set an ambitious target of achieving total renewable capacity to 175 GW by the end of 2022.

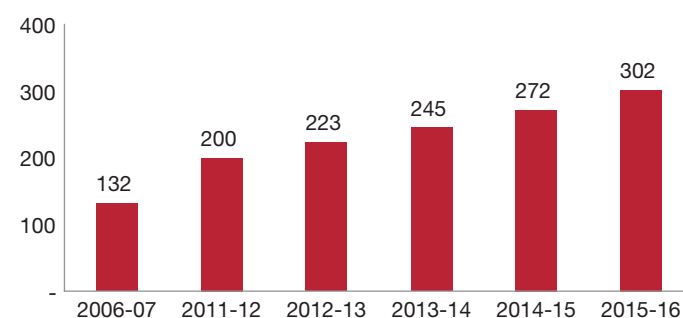
The base demand for power has grown at a CAGR of 5.9% from 862 BU in 2010–11 to 1,114 BU in 2015–16 and is expected to increase to 1,393 BU by 2018–19, thereby growing at a pace of 8.4%. Power deficits have been significant but not entirely overcome; in FY 2015–16 India suffered an energy and peak deficit of 2.1% and 3.2% respectively, down

Electricity generation in India (BU)

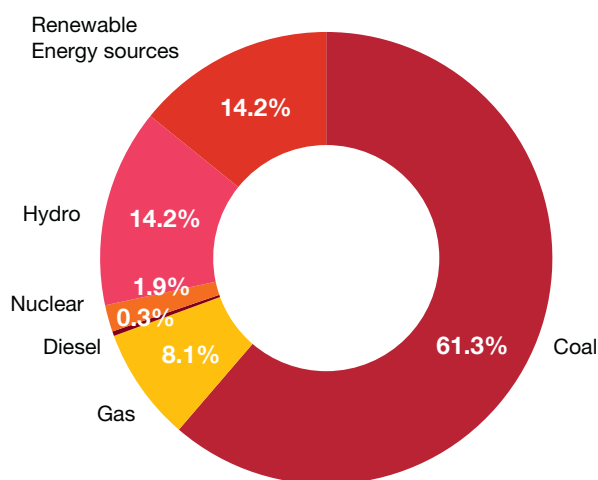


Source: CEA

Installed capacity (GW)

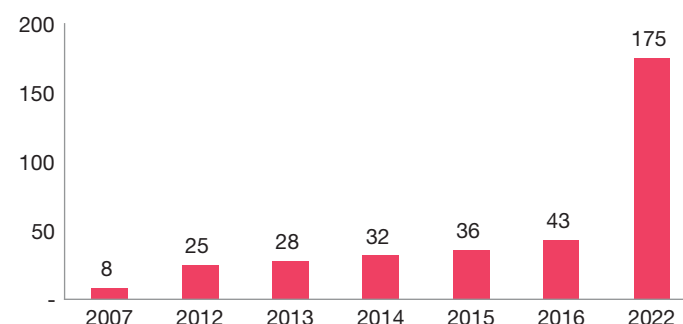


Mode-wise installed capacity (GW)



Source: CEA, Ministry of Power

Renewables installed (capacity over the years in GW)



from 8.7% and 9% three years back in FY 2012–13. With the government's focus on providing electricity to rural areas, the power T&D system is being extended to remote villages, resulting in an increase of the total length of transmission lines in the country by a CAGR of 6.1% from 358,580 circuit kilometres (ckm) in 2006–07 to around 554,774 ckm in 2015–16.

The entire value chain of the power sector in India is dominated by the central and state sector utilities. Major public and private sector players have been listed on the right side:

Generation	Transmission	Distribution
NTPC Ltd	PGCIL	State DISCOMs
NHPC Ltd	State transcos	Tata Power Co Ltd
NPCIL	Alstom T&D India Ltd	CESC Ltd
NLC Ltd	KPTL	Torrent Power Ltd
SJVN Ltd	KEC International Ltd	REL
State gencos	SPGV	
Adani Power Ltd		
JSW Energy Ltd		
Tata Power Co Ltd		
Torrent Power Ltd		
Green Infra Ltd		
Greenko Power Pvt Ltd		
Orient Green Power Co Ltd		

Major players in the US

Generation	Transmission	Distribution
AES Corporation	ISO New England	Pacific Gas & Electric
Southern Company	PJM Interconnection	Southern California Edison
American Electric Power	Southwest Power Pool (SPP)	Florida Power & Light
Duke Energy	California ISO	Consolidated Edison
Luminant	New York ISO	Georgia Power
Reliant Energy	Electric Reliability Council of Texas	Virginia Electric & Power

Selected major developments

Rise of renewable energy with key focus on solar power-- With a major push from the government to achieve total renewable capacity to 175 GW by the end of 2022 (100 GW from solar, 60 GW from wind, 10 GW from biomass and 5 GW from small hydro), it is imperative that the Indian electricity market pivots rapidly towards a significantly higher reliance on RE and EE. Solar power capacity additions is expected to rise rapidly over the next few years, driven majorly by commissioning of projects allotted under different state policies, National Solar Mission (Phase II) and aggressive expansion plans by central PSUs. Moreover, government initiatives to facilitate land acquisition, improve transmission infrastructure and funding issues will support capacity additions.

Much-needed reforms for the T&D sector--The Ministry of Power has launched major reforms in 2015, focussing on better regulation of DISCOMS and faster roll-out of investments:

- **IPDS:** For strengthening of sub-transmission and distribution networks in the urban areas, metering of distribution transformers/feeders/consumers in the urban areas, and IT enablement of the distribution sector
- **DDUGJY:** Targeting rural electrification of 18,452 villages by 1 May 2018 (7,012 villages have already been electrified in 2015–16) and strengthening of sub-transmission and distribution networks in the rural areas

- **UDAY scheme:** Aimed at improving the financial situation of state-owned DISCOMS
- **Changes in policy, regulation and industry structure--** The Electricity Act, 2003, which pioneered development of the sector, is being amended to introduce new elements to enhance competition and improve the quality and reliability of electricity supply. The proposed amendment is aimed to reform the distribution business by segregating the network and supply business, with the latter to be opened to other players, allowing consumers to choose their suppliers by eliminating the existing barriers to open access. Also, to drive the energy mix change, mandatory targets through RPOs for solar power is to be upped from the current 3% to 8% by 2022. Further, a new RGO has been proposed which requires fossil fuel plants to produce 10% of their capacity through renewable sources and allows them to bundle renewable and conventional supply in a single contract. The regulators are also to be empowered to deal with non-compliance of RPOs and limit cross-subsidy surcharge to 15% of the relevant tariff.

Selected major challenges of the Indian power sector

Financials of DISCOMS— Several of the 73 DISCOMs are currently suffering from volumetric losses, which further gets manifested in delay of payments to generators and suppliers, thereby affecting the complete value chain. Financial positions are stretched due to high amounts of debt raised to fund the projects, which in turn have resulted in higher interest costs.

Consequently, financial problems faced by local DISCOMS are often exacerbated by cash flow shortfalls and delay in subsidy compensation payments due from state governments and poor metering and inefficient billing and collection. All these factors give rise to poor performance, inadequate investment, high T&D losses and regular power outages.

The government has already initiated several measures, including the UDAY scheme to arrest further losses and improve the financial health of DISCOMS.

- **Delay in clearances, slow progress on civil works--** Land acquisition and obtaining environment and forest clearances have been challenging, which further leads to delays in commissioning of projects. Also, resettlement and rehabilitation issues along with interstate water disputes adds to the problems, especially in the development of hydropower projects.

The government has taken certain policy measures to address these issues which are likely to reduce the delays.

- **Financing environment--** High lending rates and increase in financing cost at the time of project appraisal impacts the project cost and in turn the tariffs. A robust credit enhancement mechanism for funding through increased participation by global funding agencies in the entire value chain will boost the energy sector.

Vision of the future

Upsurge in demand: The Indian economy is expected to continue the growth trajectory, riding on the advantages of the increasing population of the working age group, rapid urbanisation and private consumption. With various initiatives like the Ease of Doing Business and Make in India, investors see India speeding up pace towards becoming one of the world's top destinations for manufacturing as well as a regional hub for operations. With improvement in the economic outlook, improved industrial activity, rural electrification and increased residential consumption, demand for power is expected to grow at a CAGR of 8–8.5% over 2015–16 to 2019–20.

Improvement in the financial health of DISCOMS: Led by the implementation of the UDAY scheme, the rising revenue gap and the subsequent cash constraints are expected to be catered to, thereby leading to increase in capital expenditure by utilities, which would in turn result in reduction of AT&C losses. Furthermore, this would help the utilities free up their balance sheets, allowing generators to see increased offtake of electricity and faster payment.

Expansion through acquisitions: As can be seen in the recent past, approximately 5.5 GW of capacities have been acquired over the past 12 months by several large players in the sector like Adani Power, Reliance Power, JSW Energy and NTPC. Recently, Tata Power acquired solar and wind power generation assets of 1.4 GW for 92.5 billion INR. Going forward, it is expected that large players will increasingly seek the inorganic route for expansion in order to alleviate the risks on account of execution, owing to land acquisition issues and delays in clearances.

Increased investments in the sector with major focus on renewables: The constant emphasis on clean energy by the government has resulted in increased FDI capital inflows in the power sector. FDI inflows in the power sector has reached 869 million USD in 2015–16, up from 707 million USD in FY 2014–15. Also, it is estimated that India needs 200 billion USD of additional investment in renewables by 2022—half of it from abroad—to increase its wind and solar power capacity.

India's PFC and REC provided a 14.7 billion USD boost to the country's renewable segment by offering cheaper finance to low-risk commissioned renewable energy firms. In October 2015, a consortium led by Abu Dhabi Investment Authority acquired an undisclosed stake in India-based renewable energy company ReNew Power Ventures for 265 million USD. Also, Lightsource Renewable Energy the leading energy company in UK and

Europe plans to invest 3 billion USD in India to set up solar plants totaling 3 GW of capacity. Japan's SoftBank, along with Foxconn Technology Group of Taiwan and Bharti Enterprises plans to invest 20 billion USD over the next 10 years for solar projects in India. Thus, gauging the huge potential in the sector, especially in RE, investors are expected to invest in India's energy story.

Opportunities for US companies

Investment scenario

India's power and utilities sector presents a reliable, fast growing, well-diversified, and profitable market opportunity for the US companies. The imperative to add substantial new generation capacity to meet social and economic needs is helping India reshape its energy mix towards renewables quicker than other regions. With India's per capita energy consumption being about one-third of the world's average and below other comparable developing countries, the opportunities from the market are vast and immense.

Around 293 global and domestic companies have committed to generate 266 GW of solar, wind, mini hydel and biomass-based power in India over the next 5–10 years. The initiative would entail an investment of about 310–350 billion USD. Some international players are looking to enter India's power sector independently, relying on their expertise and assets from developed markets, where growth and returns are subdued.

- Sterlite Grid, India's largest private operator of transmission systems, is joining hands with US major Burn & McDonnell for its 3,000-crore INR (462.5 million USD) power transmission project in the Kashmir Valley.
- Hilliard Energy plans to invest 3,600 crore INR (600 million USD) in Ananthapur district of Andhra Pradesh in the solar and wind power sector for the generation of 650 MW of power.

- ThyssenKrupp India, the Indian arm of the German engineering conglomerate, plans to make high-grade environment-friendly boilers which use less fuel for the Indian power sector by collaborating with a foreign company.
- Aditya Birla Group has announced a partnership with the Abraaj Group, a leading investor in global growth markets, to build a large-scale RE platform that will develop utility-scale solar power plants in India.
- Japanese Internet and telecommunications giant SoftBank, along with Bharti Enterprises and Taiwanese manufacturing giant Foxconn, plan to invest 20 billion USD in solar energy projects in India.

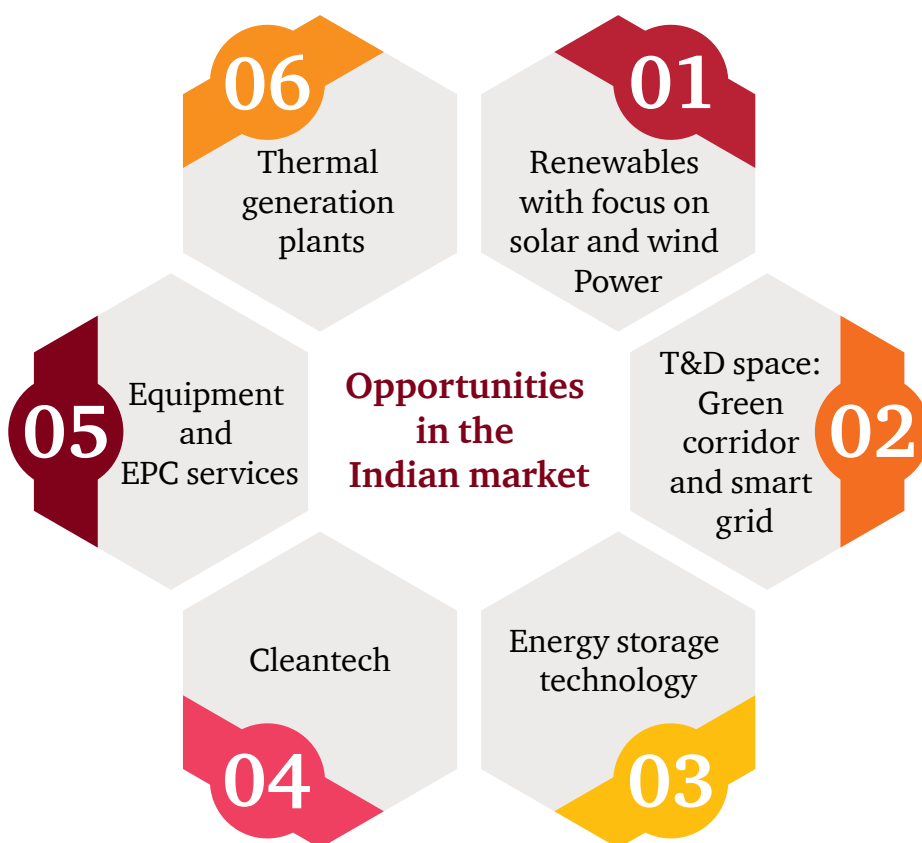
Others are looking to partner with an Indian company, trading investment and expertise for access in the market. Partnering can mitigate risks around land acquisition, environmental clearances, rehabilitation and resettlement of the affected population, but it may also introduce complexities around managing a joint venture in an emerging economy. There are several assets in advanced stages of construction with owners who want to exit, either because they lack the expertise to manage the project or due to related fuel or capital issues.

Moreover, with emerging prospects in various sectors, changes in policy and industry structure and support from

the Government of India and the power and utilities industry promises to be an exciting and profitable time to invest in India.

Major areas and opportunities for investment in the Indian market are mentioned below.

in building up capability and uncovering opportunities for capacity additions. The increased focus of the Government of India towards RE has created attractive opportunities for investments in this sector.



Strong growth in generation capacity led by per capita consumption, urbanisation

There is strong growth opportunity in power generation led by exponential growth in the economy, increasing propensity for electricity consumption and urbanisation. India has made considerable progress

Investment in cleantech

A majority of installed capacity in India is coal based as coal is the most abundant fuel available domestically. As the demand for electricity grows, the role of coal would remain undiminished. Indian coal, however, has high ash and mineral content. Hence, the focus is on development of clean coal technologies, which is of paramount importance for a country like India.

Opportunity in power evacuation

The huge capacity addition plan in India also offers opportunity for developing evacuation capacities and supply-related OEMs like conductor manufacturing, insulator manufacturing, tower fabrication and EPC.

Gap in equipment manufacturing capacity

The current scenario presents India with immense opportunities for investors in the manufacturing sector (OEMs) for building up capacities to cater to the growing requirements.



Energy storage market

With increased RE generation and need to address frequent power outages, there is a huge market for electrical energy storage in India. Increased RE generation capacity has posed a challenge in managing the grid, and energy storage will play a key role in integrating the RE sources to the grid.





Industry dynamics

Roads & Logistics

Close to 12,000 km of highways are expected to be awarded by the end of December 2016 at an estimated cost of 1.4 lakh crore INR.

By December 2016, NHAI and MoRTH are expected to award 7,000–8,000 km of projects.

NHDICL expects 1,450 km of project awards by December 2016 and further 3,800 km are in the pipeline.

State highways are likely to be robust and around 4,000 km are expected to be awarded in FY 17; PPP is likely to remain the key procurement format.

Major EPC players from India are Larsen & Toubro, Punj Lloyd, Hindustan Construction Company, Shapoorji Pallonji group and some of the major BOT players are IRB, Ashoka Buildcon, and Sadbhav Infrastructure.

Ports & Inland waterways

Total traffic handled at Indian ports was approximately 1,071 MTPA in FY 15, with major ports constituting 56% of the share

Five-year trend of 10% growth in port capacity in the country expected to continue

Currently, the port capacity in the country stands at around 1,600 MTPA. Over the last four to five years, most capacity additions have been driven by non-major ports. Going forward, major ports such as the Jawaharlal Nehru Port (JNPT), Visakhapatnam and Ennore are expected to contribute towards capacity augmentation. Still, these expansions may fall short of the government's target to reach around 2,300 MTPA by 2017.

There are 14,500 km of potentially navigable inland waterways in the country, of which five inland waterways have been declared.

Out of the ones mentioned on the right side in the map, developmental work is being carried only on the first three national waterways, and national waterways 4 and 5 has proposals for the same kind of work in the pipeline.

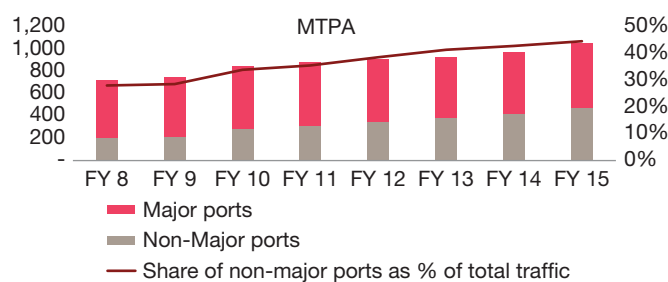
Selected major trends

Roads and logistics

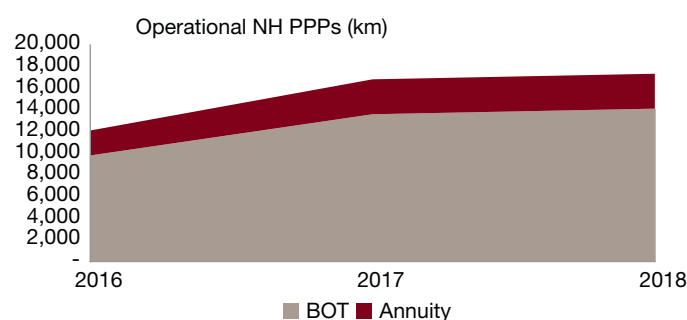
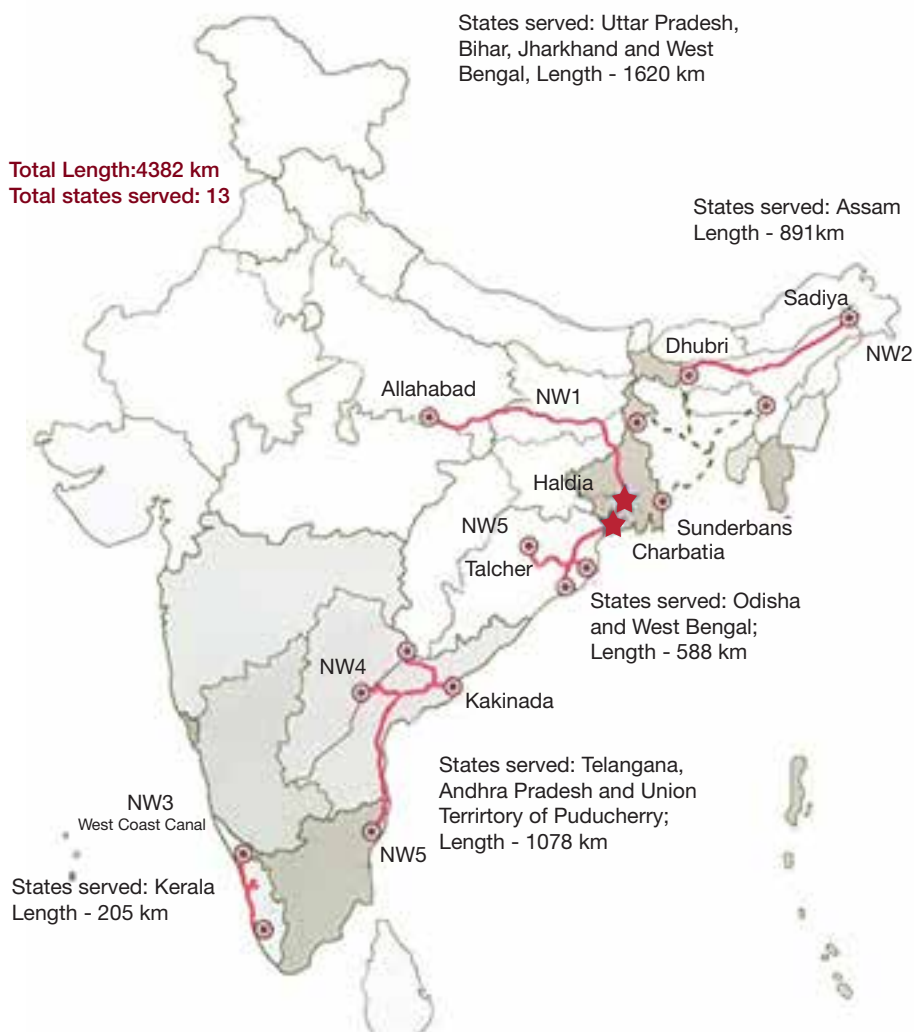
The government is starting to retain the traffic risk

The government is beginning to retain the traffic risk to help boost private investment in the sector. A clear example of this is the hybrid annuity model—the model is a mix of EPC and BOT formats, with the government and private enterprise sharing the total project cost in the ratio of 40:60, respectively. It has been successfully tested by Karnataka (two of the projects achieved financial closure in December 2014, and six more in pipeline of financial closure), MoRT&H has launched a similar model although with substantial changes in the payment mechanism

With close to 12,000 km of NH BOT-toll projects expected to become operational over the next three years, toll collection contractors may see significant opportunities, as well as pure operation and maintenance contracts.



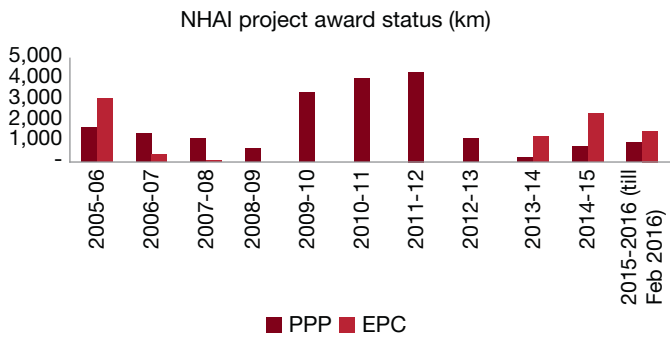
Source: Indian Ports Association, PwC Strategy& analysis



PwC analysis

Continued Momentum expected on EPC Projects-

EPCs are likely to play a key role, supported by a central budget allocation to the tune of 55,000 crore INR (plan outlay) as announced in the recent Union Budget 2017. However, institutional capacity may have to be strengthened as EPC returns in a large quantum and after a long hiatus.



Source: NHAI

Operation & Maintenance capability crucial going forward

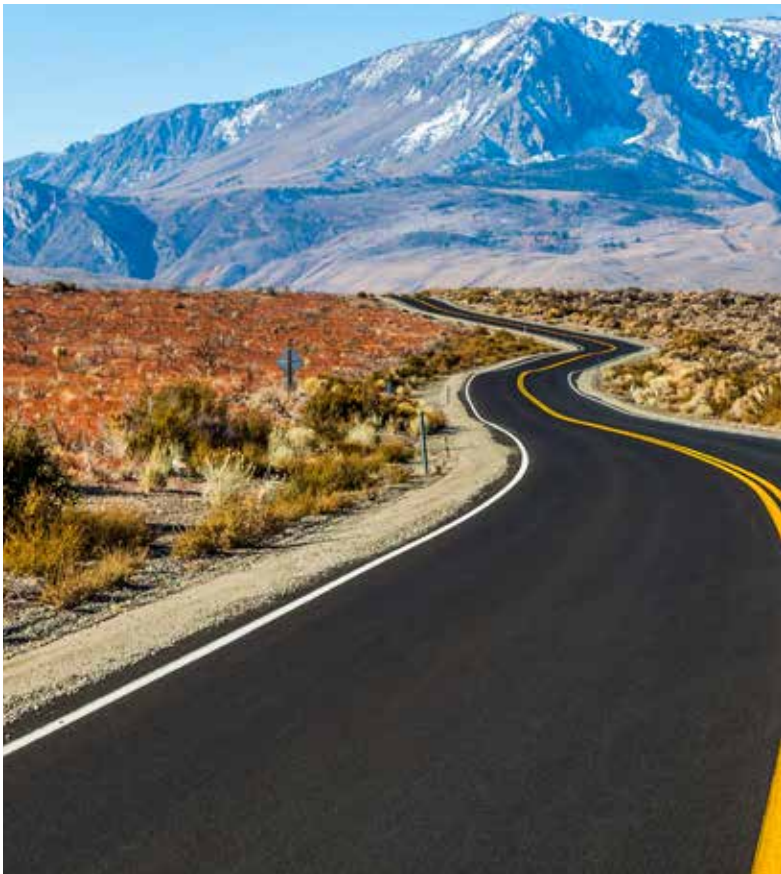
O&M as a separate capability is getting facilitated by a recovery of the PPP scenario in the market; this will not only allow developers to not worry about building on their O&M capabilities but will also create an opportunity for mid-cap players to enter the market

Road is the most preferred mode of logistics transportation in India, and its dominance is expected to continue in the coming years

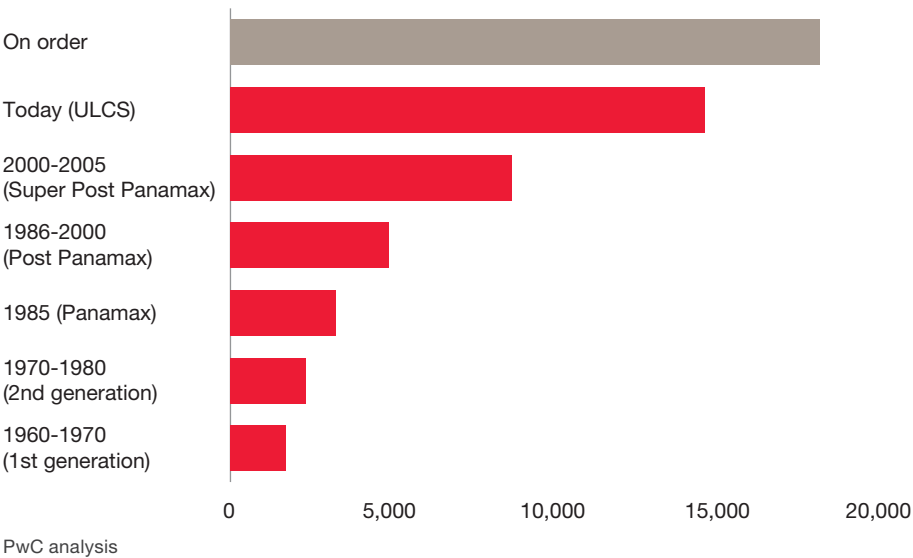
Over a period of time, reliance on roads has increased due to growth in overall freight movement coupled with roads becoming the preferred mode of transportation.

The rise in share of roads vis-à-vis other modes of transport is primarily due to the following:

- Last-mile connectivity
- Flexibility to carry heavy volumes
- Small shipment size compared to trains

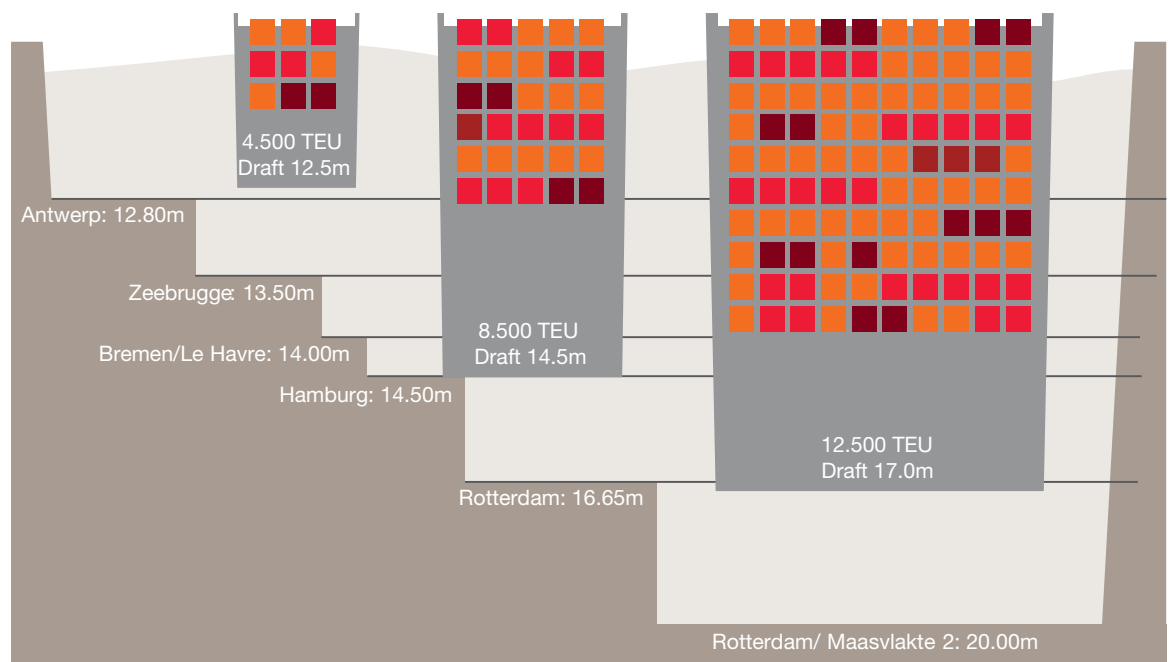


Ports and inland waterways - Order-book of global liners are showing a clear trend towards larger vessel sizes



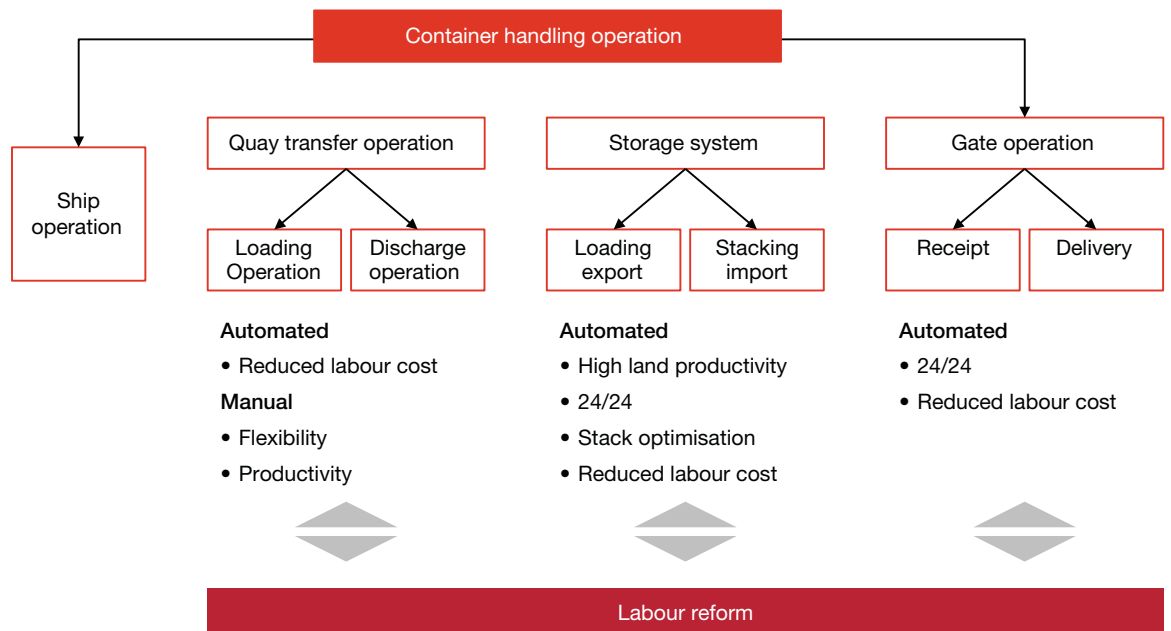


Larger vessel sizes to drive need for deep sea access further necessitating infrastructure investment



PwC Analysis

Automation expected to play a key role...



PwC analysis

Selected major challenges

Roads and logistics

The biggest challenges the industry is facing is securing environmental clearances and acquisition of land to implement the projects. The recently launched land acquisition bill too has not proved efficient in eradicating these problems. In addition, faster settlement of dispute and litigation cases in a time bound manner is essential to boost the interest of the private sector.

Ports and inland waterways

One of the main concerns continues to be timely execution of greenfield projects. More than 80% of the completed projects have been delayed due to lack of timely clearances. Most of these clearances pertain to land and environment. The existing model concession agreement needs to be strengthened to clearly define the roles of the governing agency and the developer along with timelines for critical stages.

With fall in coal import volume (the government is trying to eliminate imported coal movement altogether in five years), many ports that have been set up, keeping in mind coal imports will come under pressure. PE investors in such port assets were waiting to exit over the next 12–24 months, which may now be delayed. Such port operators may have to pivot to alternate cargo to maintain volumes.

Some of the challenges faced by the inland waterways are as follows:

- Inadequate depth of the inland waterways
- Inadequate air draft
- Lack of night navigation and MRO facilities
- Inadequate inter-modal connectivity
- Evacuation (since road commute to terminals is below par)

Vision of the future

Roads and logistics

Going forward, we will see consolidation in M&A activity not only from US developers but also from other countries, who will find the Indian market attractive from a risk/reward point of view. The prevalent market condition is conducive for a new player to enter into road sector in India.

Ports and inland waterways

In the future, the focus of deal activity will be channelised toward transactions at existing and upcoming container terminals and its support infrastructure like ICDs and CFSs in the hinterland. Some of the things that can be experienced in this industry in the near future are PE investments in LNG assets, divestment transactions of non-strategic assets by non-major port operators, and PE exits in assets under restructuring. IPOs of established non-major ports may happen in the next couple of years as well.

Inland waterways is still in its initial stages and is a relatively new industry with immense potential. The increase in number of NW is surely to attract private investment from domestic players. As for foreign players, there will be at least 3–4 years as the industry has to first break from the shackles of the infrastructure challenges it suffers from to be in a position to facilitate foreign investment.





Opportunities for the US companies: Infrastructure

Roads and logistics

The days of cut-throat competition are slowly disappearing, making way for a market with limited players, this situation poses as a great opportunity for foreign players to showcase their capabilities and enter the market. The existence of the US companies in this industry are limited and only exist in the form of PE funds invested in road assets.

When entering the Indian market, the US companies must consider their relationships with the local contractors as this will prove to be an essential prerequisite to survive in this industry.

Ports and inland waterways

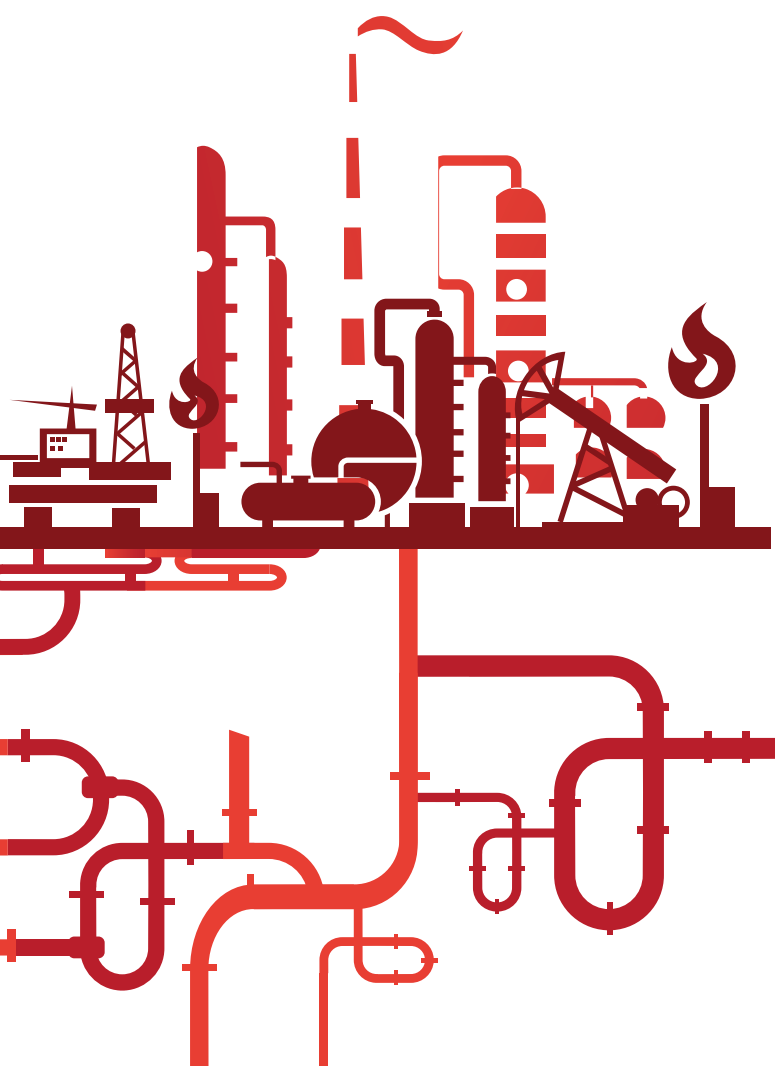
Current harbours at major ports are stretched to their limit. Ports like Paradip may resort to construction of new outer harbours (Visakapatnam Port did this a few years ago), and this will require in-depth technical study as well as capital investment. The US firms may be inclined to participate in such mega brownfield expansion projects.

Port projects involving investment of over 10 billion USD identified for award during the next five years and SEZs are being developed in close proximity to several ports—comprising coal-based power plants, steel plants and oil refineries.

A spill-off demand from the major ports and O&M services such as pilotage, dredging and harbouring stand as good opportunities for foreign investors looking to enter the market.

Some of the foreign investors already present in this sector are PSA Singapore and Dubai Ports World (UAE), but there are no known significant investments from the US firms as of now.¹

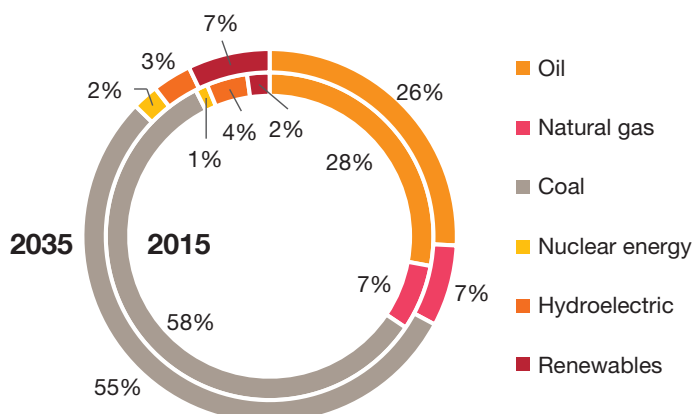
1. <http://www.makeinindia.com/sector/ports>



Industry dynamics

EIA 2016 projects India as the world's fastest growing economy with an average growth rate of 5.5% per year from 2012 to 2040. Energy consumption and economic growth go hand-in-hand. India relies heavily on conventional fossil fuels for fueling its economic growth. As of 2015, coal with a share of 58% dominates India's energy mix followed by oil (28%) and natural gas (7%).

India's primary energy mix



Source: BP Statistical Review 2016

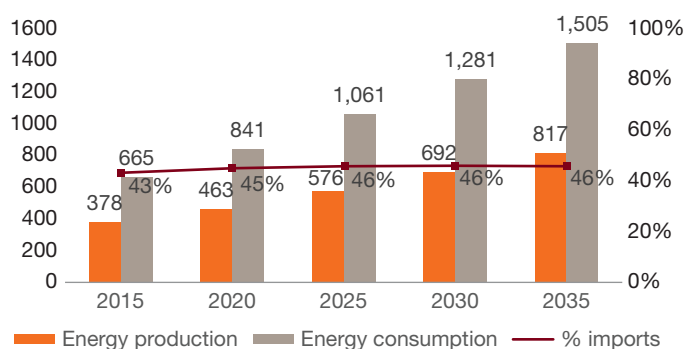
BP Statistical Review 2016 projects India's primary energy consumption in 2035 to grow to approximately 1,500 million tonnes of oil equivalent—2.2 times of the current 2015 levels and 10% of the world's energy consumption in 2035. Reliance on fossil fuels is expected to continue even in 2035.

Renewables look promising, growing by more than 6.5 times from 2015 to 2035. Securing energy to support economic growth targets is a key challenge, especially for Indian policymakers since more than half of the energy requirement will have to be imported. Therefore, India's quest for energy security offers significant investment opportunities to companies in the hydrocarbons sector.

Refining capacity of 230 MMTPA makes India the fourth largest refiner in the world with 4.5% of the world's share, and a leading exporter of refined petroleum products. State-owned refining companies, namely IOCL, BPCL and HPCL control 59% of the refining capacity and balance 41% capacity is with private and joint venture companies such as RIL and EOL. In the

import terminal, this too on the west coast of India. In 2014, India emerged as the fourth-largest LNG importer and accounted for 5.7% of the global imports. Domestic transportation and marketing of natural gas/re-gasified LNG is dominated by GAIL (India) Limited.

India's energy import requirements (MMtoe)

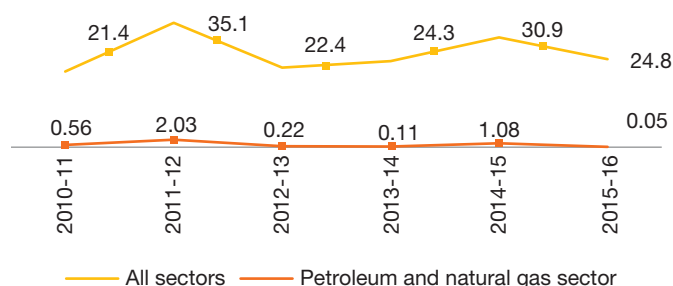


India's oil and gas industry has traditionally been dominated by NOCs across the entire value chain. In the E&P segment, ONGC is the dominant player with limited presence of private sector players such as Cairn India and RIL. Domestic oil and natural gas production in 2015 was 41 MMT and 2.8 bcfd respectively.

petrochemicals segment, RIL and IOCL are the dominant players.

PLL established the first LNG import terminal in India in 2004—2005 on the west coast of India in Dahej, Gujarat. PLL also operates the Kochi terminal in the southern part of India. Besides PLL, Shell operates the Hazira LNG

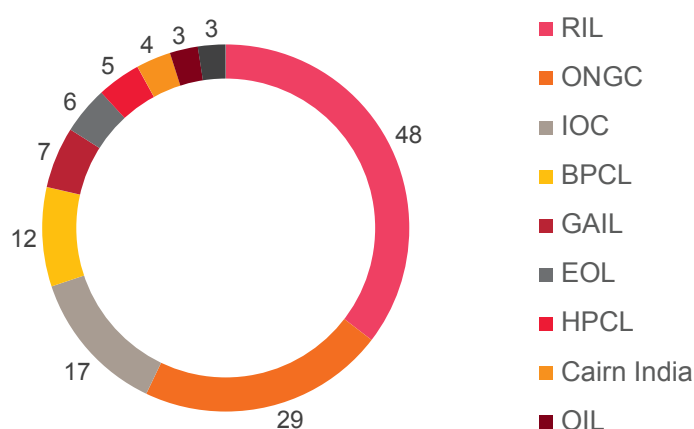
FDI inflows into India (billion USD)



The government allows 100% FDI under the automatic route in E&P, infrastructure for LNG regasification and marketing of petroleum products and private sector refining projects. The FDI limit for public sector refining projects is 49%. There is an entry barrier of 300 million USD for private investors in the retail marketing business. The oil and gas sector in India received total FDI inflows of 4 billion USD over the last five years which is around 2.5% of the total FDI inflows into India during the same period. Foreign companies have largely invested in the E&P sector in India. These include companies such as Cairn Energy, BP, Niko and BG. Shell has invested in the LNG import terminal and in the retailing of petroleum products.

To augment domestic oil and gas production, NOCs have taken equity positions in E&P acreages across the world. OVL, a 100% subsidiary of ONGC, has emerged as the second largest E&P company in India on the strength of its production in overseas assets. RIL has invested in Eagle Ford and Marcellus shale gas basins in the US. GAIL has signed a TSA with Dominion Cove Point LNG for booking 2.3 MMTPA liquefaction capacity in the Cove Point LNG liquefaction terminal. This is in addition to the offtake agreement signed by GAIL with Sabine Pass Liquefaction LLC for supply of 3.5 MMTPA LNG from Sabine Pass terminal. IOCL has invested 1 billion USD in an integrated LNG project in British Columbia, Canada.

Market capitalisation of Indian oil and gas companies as of 6 July 2016 (billion USD)



Source: Money Control

Select major trends

Upstream

The government is committed to reducing the overall import dependence of oil and gas from the current 77% to 67% and 50% by the years 2022 and 2030, respectively. With the objective of increasing domestic production, the government recently introduced a slew of policy measures to increase transparency and reducing administrative discretion in the upstream sector in India.

To promote exploration and development of new exploration acreages, the government introduced HELP. This new policy replaces NELP, which has been in existence for the past 18 years. Major policy changes introduced under HELP include a revenue sharing model instead of cost recovery-based PSCs, unified licence for all forms of hydrocarbons, marketing and pricing freedom for both crude oil and natural gas produced, and an open acreage policy.

In March 2016, the government introduced a policy allowing pricing and marketing freedom to encourage operators to develop deep water fields. Immediately after the announcement, the ONGC board approved a 5 billion USD deep water project in the KG basin with production targets of June 2019, owing to improved economics.

Under the newly introduced Marginal Field Policy, the government identified marginal fields, which the NOCs were not able to monetise due to a variety of reasons. Sixty seven such fields under 46 contract areas have been offered by the government to investors under the 2016 DSF bid round which was launched by the government on 25 May 2016. These fields are being offered under attractive fiscal and contractual terms, such as a single unified licence for all hydrocarbons, revenue sharing model, no restriction on exploration activities through the contract period, no oil cess, and freedom for pricing and marketing of gas.

Downstream: Refinery and petrochemical

With the setting up of grassroots refineries in Barmer, Rajasthan, and Cuddalore, Tamil Nadu, and planned capacity expansions in existing refineries, the total capacity of Indian refineries is expected to increase to 307 MMTPA. The government recently announced a mega refining complex with a capacity of 60 MMTPA at a cost of 30 billion USD in coastal Maharashtra. The proposed project will be developed by a consortium of state-owned refining and marketing companies IOCL, BPCL and HPCL.

The government has approved setting up of four investment hubs called Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIRs) in Andhra Pradesh (Visakhapatnam-Kakinada), Gujarat (Dahej), Odisha (Paradeep) and Tamil Nadu (Cuddalore-Nagapattinam), which are expected to attract investment worth 113 billion USD over the next two decades, of which 23.7 billion USD worth of investment has been made till January 2015.

Downstream: Retailing and marketing

The prices of gasoline and diesel have been deregulated by the government effective 26 June 2010 and 19 October 2014 respectively, effectively removing price control. For a dieselised economy like India, deregulation of diesel pricing is expected to change the market dynamics, thereby allowing a level playing field to private players. Private players like RIL and Essar have started reopening their retail outlets and state-owned companies have started preparing themselves for the impending market competition.

In line with its commitments to reduce vehicular pollution levels in India, the government has decided to skip the Bharat Stage¹ V (BS V) level and move directly from BS IV to BS VI by 1 April 2020. Indian state-owned refineries have launched a massive 6 billion USD

refinery upgradation campaign to comply with the BS VI norms. The auto industry is also gearing up to meet the deadline.

In the LPG segment, the government launched a series of initiatives to reduce the subsidy burden on state-owned marketing companies. The DBTL under the government's PAHAL scheme is the world's largest cash transfer programme under which 125.7 million households received direct cash subsidy as of 30 June 2015. Under the #Giveitup campaign, the government appealed to people who can afford to pay the market price of LPG to voluntarily surrender their LPG subsidy. Spurred with the success of these campaigns, the government launched another scheme for providing 50 million free LPG connections to women from below poverty line households.

LNG, gas pipelines and CGD

Availability of natural gas in India declined due to reduced production from RIL's KG-D6 field. In 2014–15, gas consumption was 117 MMSCMD, of which 37% was met through R-LNG imports, which meant that 30% of the 62 MMSCMD LNG capacity remained idle. New LNG import terminals have been planned in Mundra (Gujarat), Ennore (Tamil Nadu) and Kakinada (Andhra Pradesh), with a combined investment of 1.5 billion USD. The existing 15,000-km network of gas pipeline has a capacity of 430 MMSCMD, which is much higher than the current gas consumption. Another 15,000 km of gas pipeline network has been identified to complete the National Gas Grid.

CGD sector receives priority in the allocation of domestic gas for use in CNG (transport) and PNG (domestic) segments. In 2015–16, a total of 15 MMSCMD gas was sold by CGD companies across 60 geographical areas, of which the share of CNG and PNG domestic was 47% and 7% respectively. PNGRB periodically announces bid rounds for licensing of cities.

1. Bharat Stage (BS) norms for fuel emission standards are equivalent to the Euro standards.

Select major challenges

The euphoria generated in India's upstream sector when successive world-class gas discoveries were announced under the NELP regime slowly gave way to a feeling of despair when disputes were arising between the government and operators over operational issues under the PSC. These disputes were related to cost recovery limit, 'micromanagement' by the management committee, procurement issues, methodology adopted for calculation of investment multiple, no incentive for the operator to keep costs low, etc. The last PSC under a NELP round was signed in August 2012. The government seeks to reinvigorate the E&P sector through the introduction of the much 'easier to administer' revenue sharing contracts under the new HELP and DSF 2016 bid round, which addresses most of the operational issues which were troubling the operators.

Another major challenge relates to the pricing of gas which has undergone many changes and witnessed considerable litigation. Currently, the producer price of gas is fixed administratively by the government. This has led to a large number of disputes, loss of revenue, arbitrations and court cases. The government has sought to remedy this by allowing pricing and marketing freedom for gas produced from deep water/ultra-deep water, high pressure/high temperature areas, which are yet to commence commercial production as on January 2016. The price is subject to a ceiling which is determined based on the price of substitute fuels.

Gas demand in India is price sensitive. The recent fall in crude oil prices and resultant decline in price of substitute fuels dampened the demand for gas. Diplomacy and intense negotiations with RasGas, Qatar, which resulted in the waiver of the huge take-or-pay penalty, was an immense relief. Gas marketing companies that had entered into LNG contracts before the oil slump

are finding it difficult to find buyers at those high prices. There are buyers of high price LNG; however, in such cases, accessibility becomes a roadblock. PNGRB, the gas sector regulator, has come under intense criticism for the pace of gas market development, including infrastructure creation.

As the results of the new LPG subsidy become more pronounced, demand for LPG is expected to grow to around 7% over the next three to four years. The main concern centres around growth in the LPG port capacity as India is currently using 125% of its port capacity, leading to large demurrage bills.

Opportunities for the US companies in the oil and gas industry

E&P companies in the US who are keen to invest in India but were wary of the regulatory risk under the PSC regime may find it interesting to revisit their India investment plans, largely owing to the tectonic shift in both policy and mindset. The US companies may like to evaluate investing in HELP bid rounds, subject of course to the technical merits. Another low risk-low return opportunity is the DSF 2016 bid round which is currently underway.

With the introduction of the OALP, technically strong US companies may want to review available data or undertake additional data collection surveys to assess and identify attractive conventional and non-conventional hydrocarbon plays and apply for licensing under the terms of the new policy.

The oil and gas equipment market is a large business opportunity for the US-based companies. The US is the world's third largest exporter of upstream oil and gas equipment. The International Trade Administration's '2016 Top Markets Report' ranks India in the 28th spot (out of 74 countries) as an export destination for the US upstream

oil and gas equipment companies. The new policy pronouncements of the government is expected to give a tremendous boost to the upstream oil and gas equipment market.

India has potential for non-conventional hydrocarbons such as shale gas and gas hydrates. Studies estimate technically recoverable shale gas resources in India at 96 trillion cubic feet. The US companies with their rich shale gas experience can bring in technology and operational know-how to rapidly develop shale gas resources in India. Unified licence for both conventional and non-conventional hydrocarbons operators is another positive for investors.

Indian refineries are exploring opportunities to improve overall efficiency to improve gross refinery margins. The US companies can support Indian refiners with technology solutions to improve energy efficiencies. The US companies can also support state-owned refiners in upgrading their refineries to meet the BS VI fuel emission standard.

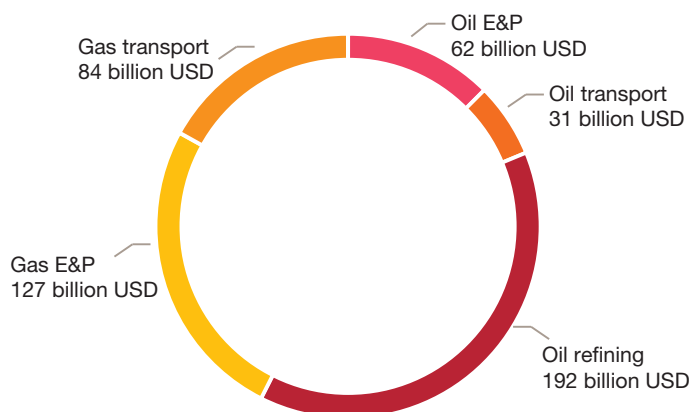
In the LPG segment, it is expected that the demand-supply gap is expected to increase on account of the government's plan to improve rural penetration levels and schemes to reduce subsidy burden. India would need investment in port capacity expansion for LPG import. Also, it would need to broaden its LPG supplies beyond the current supply sources.

In the petrochemicals segment there is a need to address the large demand-supply gap of petrochemical intermediates, such as acetic acid, ethylene oxide and propylene oxide. The projected deficits are sufficient to support multiple world-scale plants. The US companies with access to advanced process technology required to make petrochemical intermediates may want to invest in India.

Vision of the future

There is no doubt that the oil and gas sector will remain a strategic sector, considering its role in the achievement of the country's economic growth targets. Policymakers in India are talking of transitioning from energy security to energy independence, which translates to reduced dependence on imported energy sources. Such a transition requires substantial investment in developing domestic energy sources and supporting infrastructure. Success of India's energy security aspirations would, to a large extent, depend on the effectiveness of the government's policies. Based on the recent policy decisions taken by the government, it seems that a positive start has been made. Critics argue that the government was able to take these decisions only because of the dramatic fall in crude oil prices and the real test of the government will be when prices bounce back.

Investment in oil and gas sector (2015–2040) (billion USD)



Source: World Energy Outlook, IEA

Growing economy and population growth are the main drivers of oil and gas demand in India. The IEA estimates that India will need investments worth 500 billion USD during the years 2013 to 2040 across various segments of its hydrocarbon value chain to increase its energy supply and improve the infrastructure to enable this. Notably import content in the Indian oil and gas sector is in the range of 15% for refinery construction to 70% for upstream operations. This offers significant investment opportunities for foreign players.



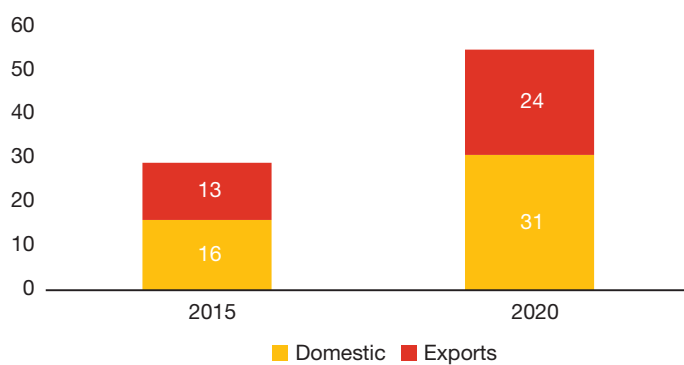




Industry dynamics

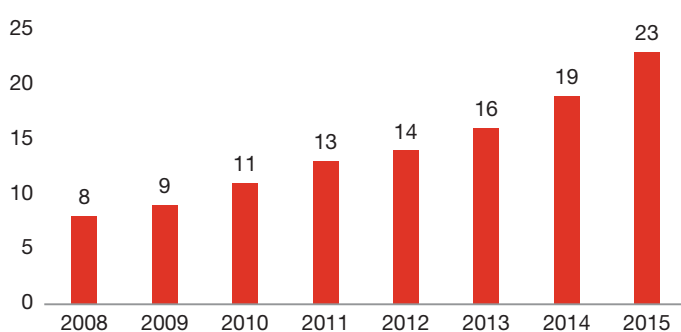
The size of the Indian pharmaceuticals industry was 29 billion USD in 2015 with 16 billion USD of domestic market and 13 billion USD of exports. The industry is expected to grow by 11–14% over the next few years to reach 55 billion USD by 2020.

India pharmaceuticals market (in billion USD)



Per capita sales of pharmaceuticals increased from 8 USD in 2008 to 23 USD in 2015 at a CAGR of 16%.

Per capita expenditure on pharmaceuticals (in USD)



Hysun Inc., a US-based biotech company, recently launched its range of health supplements in India through a JV with PhytoBiotech.

Selected major trends

Below are selected trends for this sector:

1. The projected economic growth of 7%, rising emerging middle class, increasing public health expenditure (government aims to increase public health expenditure from 1.2% to 2.5% of GDP) and penetration of health insurance (with more than 250 million people covered by health insurance) will provide growth opportunity to players in the Indian pharma market.
2. Chronic therapies are growing faster (top 20 brands 14% CAGR over a 4-year period) than acute therapies (8% CAGR).
3. Indian companies are going global (30% of the US market is catered by Indian drugs) and making acquisitions to expand their presence in overseas markets.
4. Indian companies are also increasing their investments in research and development and are entering into licensing arrangements for novel molecules.
5. Reforms are being undertaken in clinical trials regulations to make the approval process timely, predictable and transparent, though more remains to be done.
6. Large number (300+) of US FDA approved manufacturing plants (the largest number in any country outside the US) provide opportunities for US companies.

Selected major challenges

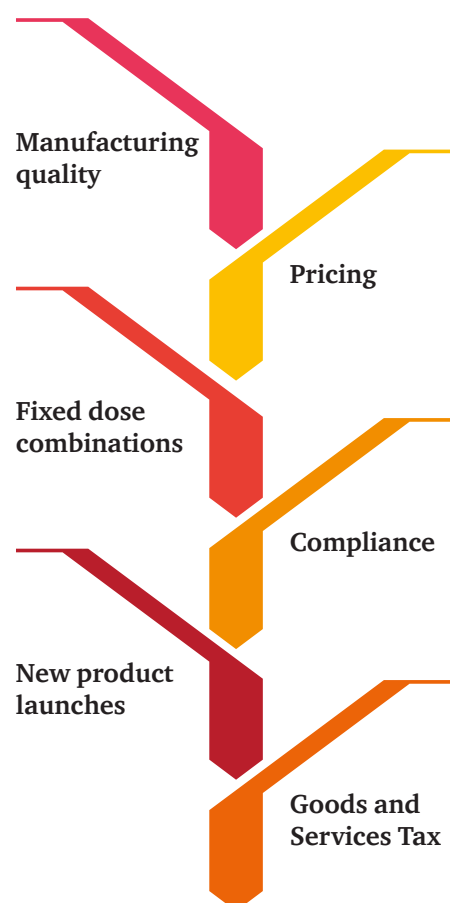
Below are selected challenges for this sector:

1. Indian companies are facing issues with manufacturing quality.
2. The industry is facing pricing challenges with more drugs coming under the ambit of the Drugs Price Control Order.
3. Ban on fixed dose combinations has affected the sales performance of pharmaceutical companies
4. Pharmaceutical companies are also facing compliance issues over their marketing and sales practices directed towards healthcare professionals.
5. New product launches have been an area of challenge for Indian companies.
6. Goods and Services Tax (GST) is expected to lead to transformational changes in the operating model for pharmaceutical companies.

Vision for the future

By 2020, the Indian pharmaceutical industry is expected to grow to 55 billion USD due to volume growth in the domestic market, new product introductions and increase in exports. Regulations will facilitate creating a vibrant and competitive market, ensuring access and affordability for patients while offering a level playing field for Indian and US companies. M&A will continue to drive this sector as Indian companies look to expand their presence in the US market and US companies look to expand their presence in the Indian market. There

will be increased focus on research and development with the growth of clinical research in India and as Indian companies look to new molecules to drive growth.



Opportunities for US companies: Pharmaceuticals

Opportunities for US companies to enter and invest in this industry in India

Pharmaceuticals has been an attractive segment for foreign direct investment (FDI) in India. The sector attracted cumulative FDI inflows worth 13.32 billion USD from April 2000 to September 2015, which amounted to 5% of the total FDIs into India during the same period.

FDI rules have been revised recently. FDI up to 74% is allowed in India in the pharmaceutical sector under the automatic route for brownfield acquisitions. For investments in greenfield projects, 100% FDI is permitted under the automatic route.

India also released its intellectual property rights policy and announced measures to enhance ease of doing business, which are expected to increase investments in India.

How selected US companies developed or expanded their presence in this industry

US companies have adopted a variety of models in the Indian market. Companies like Abbott and Mylan have made acquisitions of Indian companies to expand their presence. Companies like Gilead have created manufacturing partnerships with Indian companies to make their products available in the Indian market. Others like Amgen have created distribution arrangements with Indian companies like Dr Reddy's Laboratories to expand their presence. Companies like BMS also have partnerships with Indian companies like Biocon for research and development.

Industry valuations

Valuations expectations from Indian promoters continue to be high. Finding an Indian company with the right fit with the strategic objectives of the US companies (product portfolio, brands, manufacturing assets, field force, etc.) at the right valuations may be a challenge.

Selected new/emerging areas within this industry that US companies can look at

As US regulations around biosimilars evolve, opportunities may open up for partnerships with Indian companies that work in this area. Sterile injectables, which is an area of perennial drug shortage in the US, could also present opportunities for US companies to look at investments in India. Indian companies have good capabilities in Novel Drug Delivery Systems (NDDS), which can be utilised by US companies to develop value added generics.

Acquisitions

- Abbott
- Mylan

Manufacturing partnerships

- Gilead

Distribution

- Amgen-Dr Reddy's Labs

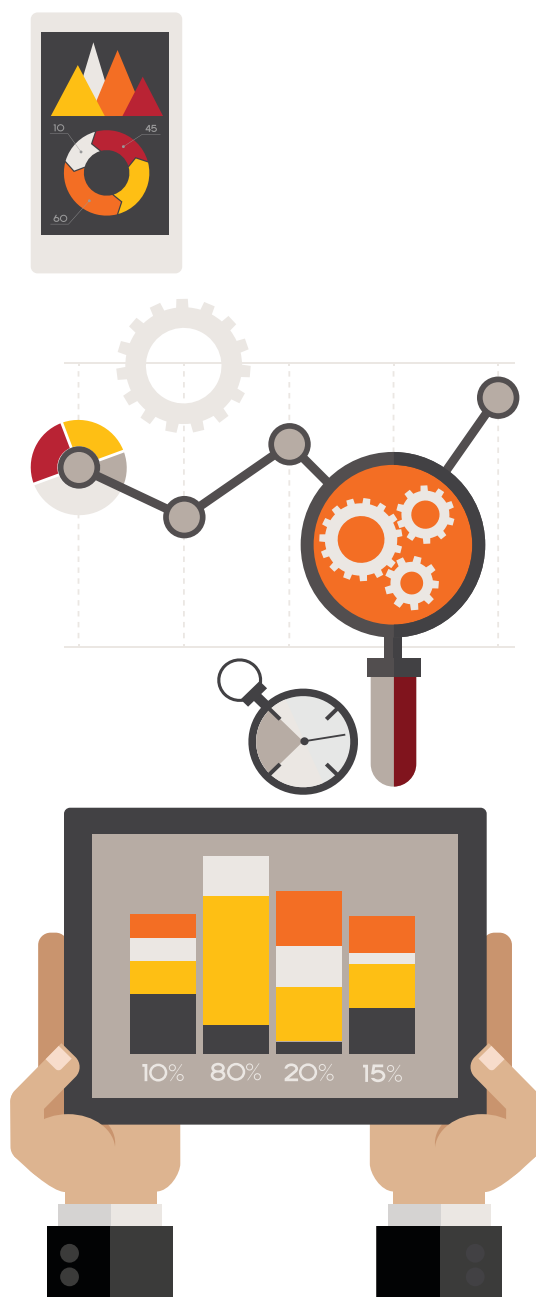
Research and development

- BMS-Biocon





Using digital in manufacturing sector



Over the last few years, shifting economic alignments and changing customer expectations have forced global industrial leaders to reinvent themselves. The industry has now started adopting digital technologies which are revolutionising factory shop floors, rejigging old business models and making products smarter.

Not one to be left behind, the Indian manufacturing sector is poised for a quantum leap in digital manufacturing technologies.

With this transformation, successful industrial companies will become true digital enterprises, with physical products at the core, augmented by digital interfaces and innovative data-based services. These digital enterprises will work together with customers and suppliers in industrial digital ecosystems. These developments will fundamentally change individual companies as well as transform market dynamics across a whole range of industries. This is true for countries all around the world—in both developed as well as emerging markets.

The key focus areas in digital technology for the manufacturing sector in India are:

Integration of vertical and horizontal chains:

- There is an increasing focus on integrating processes vertically across the organisation—from product development and purchasing to manufacturing, logistics and service. All data about operations processes, process efficiency and quality management as well as operations planning is available in real time, supported by augmented reality and optimised in an integrated network.

- Horizontal integration stretches beyond internal operations, extending from suppliers to customers and all key value chain partners. It includes various technologies, ranging from track and trace devices to real-time integrated planning.

Digital wrappers on physical products:

- Digitisation of products includes the expansion of existing products, e.g. by combining smart sensors or communication devices with data analytics, and creating new digitised products which will enhance the customer's usage experience.
- By integrating new methods of data collection and analysis, industrial companies are able to generate data on product use and refine products to meet the increasing needs of end customers and provide effective after-sales service.

Disruption the value chain:

- Data forms the core of a new age manufacturing organisation and using data analytics in operations workflow will make organisations truly digital enterprises.
- Embedding data analytics across various functions provides manufacturing organisations proximity to and flexibility to act on business knowledge and helps them to move from a B2B to a B2C mindset.

Major challenges

Some of the challenges faced by the manufacturing sector in adopting digital technology:

- Lack of digital culture and skills in the organisation
- Establishing strong levels of digital trust, backed up by transparency and non-repudiation that provides proof of integrity and origin of one's own and third-party data
- Need to own relationships with end customers who drive demand or at least integrate with platforms that allow them to access end customers efficiently

Potential benefits to manufacturing companies

- High levels of cost reduction expected from the implementation of smart manufacturing initiatives
- Integrated and improved planning and scheduling for manufacturing; such systems combine data from within the enterprise—from sensors all the way to ERP systems—with information from horizontal value chain partners, such as inventory levels or changes in customer demand
- Integrated shop floor planning to improve asset utilisation and product throughput time
- Predictive maintenance of key assets, which uses predictive algorithms to optimise repair and maintenance schedules and improve asset uptime
- Real-time data availability to enable companies to manufacture personalised products and customise solutions
- Improved customer insight from smart data analytics to allow companies to better focus on additional high-margin business

Vision of the future and roadmap to a successful digital strategy

To move forward with digitisation in the manufacturing industry, acquiring and rolling out digital capabilities across the organisation are all-important. This process takes time, so in order to gain or retain the first-mover advantage over competitors, manufacturing sector companies will need top management commitment and significant implementation investments, which they can obtain using the following steps:

Opportunities for US companies

- US manufacturing companies who have a presence in India or are planning to set up a new business should outline a digital strategy in order to lower the cost of operations and achieve additional revenues.
- Given that digital is foremost on the minds of Indian CEOs, global consulting firms have an opportunity to implement some of their digital strategies for industrial companies in India.



Source: PwC's 2016 Global Industry 4.0 Survey

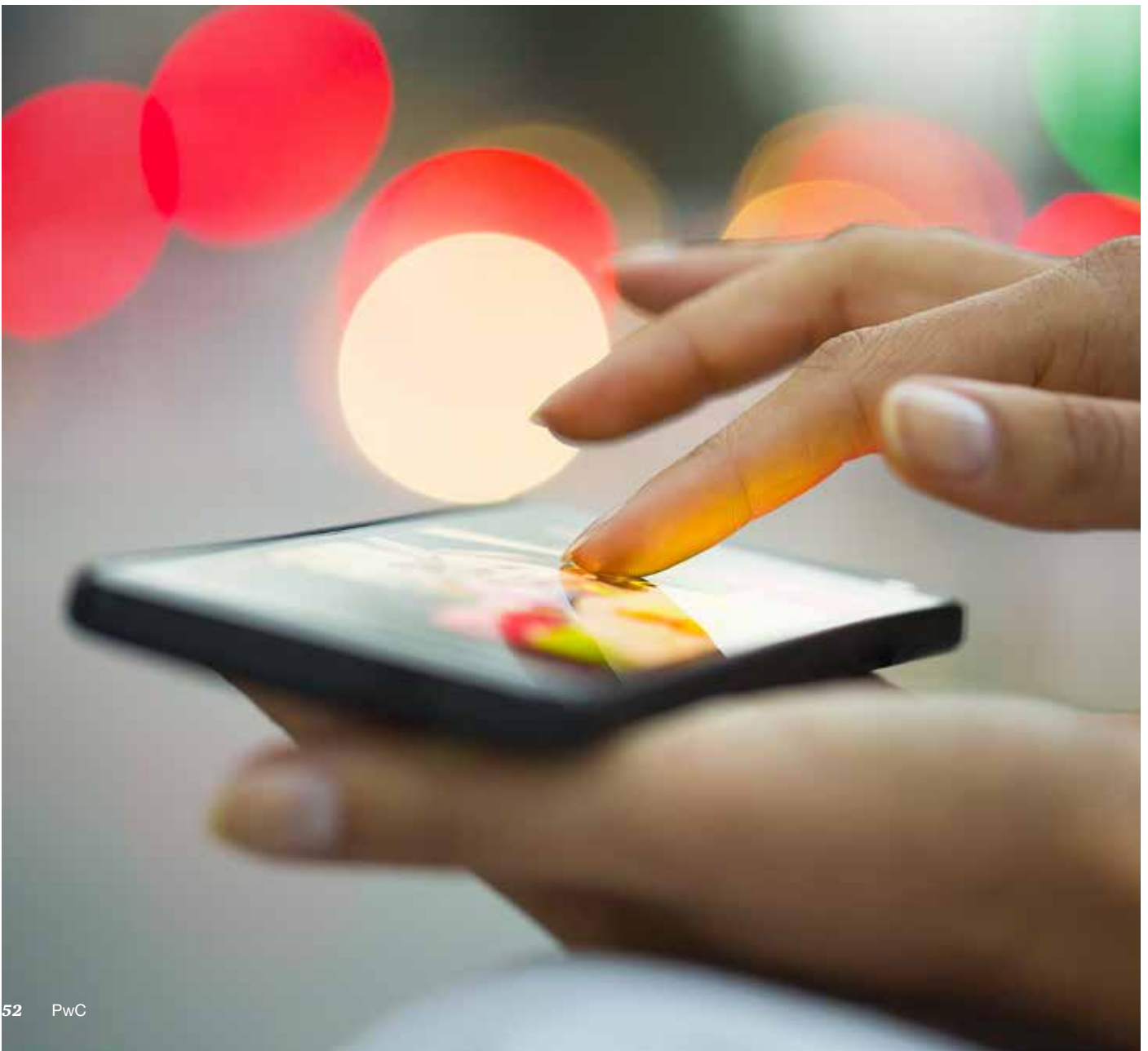
Conclusion

The writing on the wall is clear. India continues to open up its sectors to global companies by raising FDI limits, dropping licenses and regulatory barriers, and inviting high-tech solutions. Besides, developing infrastructure, improving the business environment, building a robust and predictable taxation regime, attracting increased FDI, nurturing international relations, and empowering the people of India are part of the government's endeavours.

At the same time, the government wants to see India break out of the 'big-but-poor' category and take its rightful place with the most developed countries in the world. Initiatives such as Skill India, Digital India, Startup India and the move towards a 'pensioned society', as well as the 'Make in India' and 'Swachh Bharat' schemes, are steps in that direction.

Above all, activities in India—be it in the infrastructure sector or digitisation of manufacturing—are at an all-time high. The high rate of economic growth and projections for coming years indicate that India will continue to be a preferred investment destination. Strategic and other tie-ups between India and the US and better political cooperation between the two countries indicate it is time to intensify business and trade.

A proactive Indian government and companies are looking at their counterparts in the US to facilitate this partnership.



Summary of recommendations/key takeaways

These important session notes were captured during the IACC Annual Convention which took place on 22 and 23 August 2016.

Session name	Recommendations/key takeaways
Aerospace and defence	<ul style="list-style-type: none"> The architects of Make in India consider A&D to be very important as this sector alone can contribute a significant GDP addition of up to 2% by achieving indigenous content of 70% among acquisition of all kinds. By balancing imports with exports, an additional 1.6% of GDP can be created through the multiplier effect. Under the Make in India campaign, India rolled out several policy initiatives to lower entry barriers. These include FDI beyond 49% and up to 100% under the government approval route and improving ease of doing business in defence manufacturing. The benefits of reforms initiated in this domain will take time to materialise given the long acquisition cycle of 4–6 years. The new DPP 2016 is certainly a positive step but implementation of the same will be very crucial. Overall domestic demand is expected to pick up from present levels with the proposed reforms in procurement and regulatory procedures leading to procurement preference towards Indian players. If major Indian players form a consortium, they can combine the experience and track record of PSUs with the agility and efficiency of private players and bag major export orders by competing with global manufacturing giants. OEM sourcing problems: Indian vendors often fail to deliver on time and meet the required quality standards. This problem is especially noticeable in cases where the global majors outsource in the 'build to print mode' without harnessing value chain capabilities and the ability to innovate through redesign, simplification and obsolescence management. Defence acquisition is a lengthy procedure and is marred by delays. At present, global manufacturing giants are hesitant to park their capital in India—in most cases for want of a sustainable business case. However, this scenario is soon expected to change. Strategic dialogues between countries play an important role, but they need to trickle down to the level of bureaucratic efficiencies so that processes are aligned and the outcomes of strategic dialogues are realised on the ground. The import of high-technology components should become easy through strategic relationships and elevate India to a NATO partner like status. Recently, John McCain moved an amendment to the National Defence Authorization Act (NDAA-17) which, if passed, would lead to India being recognised as a global strategic and defence partner. The best technology that is available in the US should also be accessible to Indian companies. The closure of old orders should be expedited and new orders should be obtained. The US has a process of confidential briefing if a nation expresses a desire to purchase its defence systems. This briefing is restricted to the government-government level and does not allow corporate-to-corporate dialogue, which is urgently needed to bid jointly for Indian opportunities under the 'Buy (Indian)' categories (IDDM, 'Buy (Indian)', 'Buy and Make (Indian)' and Make). The most preferred model for the future comprises co-development and co-production. Strategic and bureaucrat-level dialogue is needed to facilitate this model and allow India's capability in frugal engineering and innovation to be harnessed to the mutual benefit of both nations.

Banking, insurance and financial services

- The banking sector is witnessing the last stage of the down cycle, with single-digit inflation for the last three years, a stable currency and the clean-up of books almost complete.
- With macro factors stable, there is a focus on two aspects: (a) resolution of NPA situations and (b) credit directed towards employment generation.
- There have been some signs of credit growth, but this is very consumption driven. To balance this out, growth will have to be investment led as well, for which bank finance will have to pick up—three to five years is the period envisaged. Banks will be back to chasing credit in the next three years or so.
- With regard to resolutions around structural corrections, the government/regulatory bodies (NHA) have a larger role to play than RBI—basically around quicker payments and correction mechanisms.
- The appointment of the new RBI governor holds promise as he has a reputation of targeting inflation in line with market requirements. The timing of his appointment is apt as he will have enough time before the election pressures in 2019. Specialist turnaround/distressed funds have a role to play in the resolution of stressed assets. We are seeing early signs of this—SBI Brookfield launched a stressed asset fund. Generally, in the Indian investment landscape, public markets see better participation by US funds, while private equity, particularly stressed asset related, see minimal participation. This could be area for Indo-American participation in the future.
- From a structural improvement angle and a stressed asset resolution perspective, the participation of current asset owners, along with that of the investing funds, will be critical to achieve the desired outcomes.
- While the bankers on the panel did not consider fintech to be a threat, they did see the potential in leveraging technologies to further their own business:
 - The SBI-Uber partnership is a good example, wherein 61 loans were disbursed in 27 seconds.
 - BoB Bank has customers which fintech cos can leverage through collaboration.
 - In the case of SIDBI, e-commerce/digitalisation is providing the data/track records that can be used for small and medium enterprise (SME) credit appraisals. Thus far, cash transactions have been a major impediment.

On NBFC growth, the panellist had the following views: NBFCs benefit from focusing on niche sectors and from the nimbleness that banks do not have. RBI has encouraged them to move away from sole dependence on bank finance, resulting in large NCD issuances. This provides NBFCs with access to lower cost finance and an opportunity for retail investors to participate.

Chemicals and pharmaceuticals

- The FDA issue Indian companies are facing is more of a cultural issue, and a behavioural change is needed to address it. Timely adherence to compliances, e.g. documentation, is a must.
- The pharma industry has started adopting technology more actively, and manufacturing is taking place through an automatic route. Also, data is being captured online.
- Around 30% of the prescription medication in the US comes from India. The US and Europe are very critical markets for the growth of the Indian pharma sector.
- The following compliances will ensure that we do not break FDA norms:
 - Cultural changes
 - Regulatory norms
 - Right training to people
 - Learning from the mistakes of manufacturing companies that were issued notices by FDA
- Chemical industry: Domestic consumption is quite strong. The specialty chemicals and polymer segments are on the rise. There are 70,000 odd manufacturing units in India. Compliance in the sector is being managed through
 - The Toxic Substance Act
 - Tariff barriers
- Stringent FDA norms enable India to export quality products to the US. However, this does not imply that products that do not comply with FDA regulations are poor in quality. Different countries accept different purity profiles. Different regulatory bodies have different norms. In India, the Central Drugs Standard Control Organization (CDSCO) is the national regulator and there are also bodies of state regulators. Very few facilities in India come under the scrutiny of FDA regulators and the issue is blown out of proportion by the media. All these facilities are given warning letters and are mostly cleared in the next audit.
- To combat the issue of counterfeit drugs, the government has increased the number of posts of health inspectors. Out of the 10,000 large and small manufacturing facilities, 2% have been proven to be producing counterfeit products. The government plans to increase inspection and vigilance.
- Some continued challenges for US companies are IPR challenges, new product launches and pricing challenges with more drugs under the ambit of drug price control. Also, there is a need to work on getting more inbound M&A in pharma.
- The impact of policy measures taken up by the government to improve ease of doing business will be seen in the near future.

Dedicated freight corridors

- The panel discussed the possible implications of the merger of the railway budget and general budget. It was generally agreed that this move would help remove the traditional constraints on the funding of railways infrastructure projects, which were earlier funded primarily from internal accruals of railways and gross budgetary support from the Government of India.
- The panel was also of the view that, at present, funding of railways infrastructure projects does not appear problematic. However, upgradation of railways to the next level in terms of capacity and efficiencies is likely to be constrained in other areas such as availability of track laying and maintenance equipment, requisite skill sets to appreciate next-generation technology and procurement of the same.
- The three additional DFCs, as announced in the FY16 rail budget, were considered to be important for the economy, especially given that with the likely emergence of a unified market under GST, transport requirements will grow manifold. Hence, these new DFCs will help to meet this demand and spur GDP growth.
- While DFCs were considered to be important for economic growth, opinion was divided on the viability of the proposed high-speed rail projects. A section of the panellists felt that it would be preferable if the increase in speed could be achieved using the existing infrastructure.
- The Indian private sector's contribution of the latest technology products to the US market—in terms of higher axle loads and speeds—was noted. These firms are well positioned to meet the many futuristic requirements of the railways, and they can naturally customise their products to the specifications of Indian Railways.
- The need for a holistic view of all the transportation modes through a unified policymaking process was acknowledged. This would enable the efficient and synergistic usage of railways and other modes like roads and inland waterways, and thus help bring efficiencies in the supply chain and reduce costs.
- It was felt that, in general, ease of doing business in the country had increased in recent years. Various state governments are in a competitive mode and attracting investments by easing red tape. This has, in turn, helped new entrants like GE to get work accomplished as per the schedule.
- Lastly, it was felt that the railways are a large market with a huge potential on the speed and capacity fronts, which in turn offers scope to further the GDP of India. There are many opportunities for Indian and US companies to participate in the growth story of Indian Railways.

Digital India for inclusive growth

- **Opportunities with the implementation of the Digital India programme:**
 - The private sector envisions better opportunities, with investments being made in IT infrastructure development, specifically with the National Optical Fibre Network reaching the last mile.
 - Mobile services and Internet connectivity will boost IT-enabled service delivery of the government sector to citizens. Key sectors which can benefit from this would be health, education and retail.
 - Public private partnership will be a big game changer in the area of imparting IT trainings and increasing digital literacy with the institutionalisation of the National Skill Development programme in India.
 - IT Entrepreneurship/Start-Up India will also bring in more business opportunities, specifically Wi-Fi integration with telcos, smart village/digital village/digital locker/e-verification and authentication services, cyber security services, data digitisation and migration services, content development in local languages, cloud-based analytics services, software as solutions, etc.
 - Services are valued less than products by Indian customers. Thus, a better business strategy for information and communications technology (ICT) players in the country is to enhance the perceived value of their services, thereby increasing investments in the IT service sector.
 - Wi-Fi spectrum auction and increasing the speed of the Internet will attract many foreign investors to IT business opportunities in India.
 - Implementation of regulations and better monitoring are required more than new rules and regulations. A liberal scenario of IT investment will create better business opportunities for the Indian market.
- **Key considerations for the implementation of IT opportunities in the government sector:**
 - Engaging citizens in the development of policies/frameworks for the implementation of any ICT transformation project through public consultation will be extremely important for the design of new approaches.
 - Demand and supply of IT-enabled services are presently asymmetric, and with the enforcement of better policies and frameworks, the existing situation can be harmonised.
 - The IT ecosystem of the government is changing with time, and the implementation of technology solutions at a faster pace is necessary to meet citizens' service needs.
 - Digital literacy is imperative for the adaptation of IT innovations in the government sector.
 - The convergence of networks, cloud services, mobility solutions and data is essential for the government to perform and achieve its intended objectives. With respect to the integration of network infrastructure with cloud infrastructure, the panellists were of the view that we have quite a few assets which, if integrated seamlessly, would yield a multiplier effect. For example, on the network infrastructure side, we have state WANs (SWANs), the National Knowledge Network (NKN) and now the National Fibre Optic Network (NFON), which is currently under roll-out. Further, on the database/cloud infrastructure side, we have the SARVAM database and the MeghRaj Cloud Initiative. If all of these are combined in a seamless manner, a multiplier effect can be realised.

Energy

- A collaborative environmental approach among all stakeholders involved in the ICT transformation is the key to improving citizen service delivery.
- Intelligent investment in digital transformation projects would reap better benefits than a silo approach by state governments. Overall, the central government should create frameworks for investments for the states to adopt.
- Security of data and privacy issues should be addressed with the implementation of new tools and technologies in the developed markets. Here, the key is defence in depth. That is, a multi-layered approach to security is called for. Also, while prevention and detection would continue to be of paramount importance, equal emphasis (if not more) has to be laid on response and recovery in case of a breach.

- There is an apparent surplus of power generation, but it needs to be seen against the background of 50 million households which are yet to be electrified, per capita consumption of about 1,000 units and the fact that we envisage a GDP growth rate of about 8%. Despite the initiatives on energy efficiency, we may have only 2–3 comfortable years in terms of demand–supply. Hence, our goals for capacity addition need to be framed from a long-term planning perspective in order to support economic growth.
- The panel emphasised the need for a healthy mix of different resources of energy to optimally operate the system and minimise the cost of generation. There is a concern around the lack of growth in hydro generation capacity. There is also a need to speedily implement actions for the development of ancillary services market. Pumped storage capacity would be very helpful for overall stability of the grid.
- The plan to add 175 GW of renewable generation is in the right direction. This opportunity has brought together a number of Indian and American companies. The Government of India, along with Power System Operation Corporation (POSOCO) and regulators, has been working on a plan to ensure smooth integration of RE.
- While adding solar capacity, one needs to take into account the fact that it takes 120 days to add 100 MW solar, whereas it takes 1,200 days to create the transmission infrastructure to evacuate power. Hence, there has to be an emphasis on adding transission capacity to ensure smooth capacity growth in renewables.
- The Indian electricity market has novel structures and initiatives. This, along with the smart grid initiatives, can easily ensure an asset utilisation level of 60%, which many of the developed countries are aspiring to, using various technologies. There is a need to develop best practices within India rather than emulating those of other countries to achieve an overall increased level of asset utilisation.
- There has to be a focus on the health of the electricity distribution companies. The Secretary of Power highlighted the success of the government's UDAY scheme in helping utilities. The results are already evident in the first quarter of 2016–17: reduced interest rates and reduced cost of power. The Ministry of Power is rapidly working to make available information on all feeder-level losses to public domain through the use of technology. This will help utilities reduce AT&C losses.
- The programme to add 175 GW of renewable energy and also the capacity additions in transmission will entail significant funding. The supply of long-term competitive financial resources will need to be ensured for the sector. Green bonds, infrastructure development funds, etc., have been providing some support, but a lot needs to be done on enforcing RPOs and improving the health of distribution companies to ensure the availability of funds. A mechanism of credit enhancement will be important to bring down the cost of funds. International Finance Corporation (IFC) has been a significant investor in green bonds issued by Yes Bank.
- The regulations on creating battery capacity to support grid operations is important as batteries operate both as sources as well as sinks. A framework is needed to attract investments in battery infrastructure.
- The Government of India has undertaken several policy initiatives and interventions to ensure the optimal utilisation of coal through coal swapping, construction of transmission lines, etc. These measures will accelerate the pace of development in the sector.
- The Secretary, Ministry of Power and Government of India welcomed the suggestion of creating a supportive policy environment for the development of geothermal potential in the country.

Infrastructure: Ports, inland waterways, roadways and logistics

- **Roads and highways:** Debottlenecking stalled projects and the adoption of hybrid annuity and EPC models have provided a much-needed thrust to the sector. Improvement in land acquisition and environmental and railway clearances are further paving the way for a robust sectoral outlook. Consequently, road construction is moving towards a 41 km/day target from the current 22 km/day. The government also plans to increase the NH network from 96,000 km to around 2,00,000 km, which will substantially help the logistics sector. However, state-level clearances and permits for crushers, quarries, etc., need to improve and require effort from the state administration.
- **Ports:** Along with mega programmes like Sagarmala, which is targeting investments worth 12 lakh crore INR with a specific focus on industrial clusters, multiple programmes for modernisation and improvement in draft are being undertaken. A customised approach is being taken to suit port specificity. For example, Mumbai Port is looking at ship repairs, marinas and cruise businesses, and has already tied up with 59 cruise liners. To address port connectivity issues, a Port Rail Connectivity Corporation is being created. The focus on efficiency has in fact led to public ports becoming more efficient than private ports by 2.6%. However, investors in cruise and marina development remain apprehensive, especially about ease of doing business aspects.
- **Inland water transport:** This is seen to be the key focus in the next couple of years and resonates well with the government's effort to optimise logistics costs. The Minister for Road Transport and Highways and Shipping noted that while 40–47% of traffic travels by inland waterways in China and Europe, India is yet to tap the full potential of this mode, which currently has only a 5–6% share. With the right initiatives, inland waterways can substantially help India in reducing logistics cost from 18% to 12%. The government has plans to develop 18,000–20,000 km of rivers into inland waterways eventually. Currently, five national waterways have been declared and are at various stages.

- **Financing:** Getting stalled projects back on track has improved liquidity in the market. Financing has improved especially for road projects. The launch of initiatives like the National Investment and Infrastructure Fund (NIIF) and credit guarantee schemes by the India Infrastructure Finance Company Ltd (IIFCL) is likely to further improve the situation.

Impact of the low oil price scenario on OPEC

- At its current production level of 30.4 million barrels per day, OPEC contributes to 35% of the total oil supply in the world. The percentage is likely to be maintained in the coming years. More than 80% of the world's proven crude oil reserves are located in OPEC member countries.
- Currently, there is an oversupply situation in market, primarily due to the increased production of shale gas and tight oil in the US, which is reducing prices of oil and gas. However, the demand-supply balance is expected to alter the situation by Q3 of 2017, after which the prices of crude oil and gas are expected to go up.
- OPEC's role has changed from that of a 'swing' player, which used to balance production to maintain prices, to that of maintaining a market share in a world which has seen a significant shift in the fuel basket, with the rise of newer hydrocarbon sources such as shale gas.
- Given the current market dynamics, OPEC's influence on the price level of crude oil has reduced considerably, although it will continue to maintain its importance in the oil and gas market in future.

Houston's pivotal role in the US oil and gas market

- The oil lobby has been very strong in the US and has financially supported the election campaigns of presidential candidates; thus, it is in a position to exercise a strong influence on the country's policies.
- Companies in Houston are well established and will not easily relinquish the power they wield.
- Houston is the energy capital of the world and still exerts considerable influence over Washington.
- US geopolitics is based on the premise of maintaining energy security for itself.
- The US has done really well in terms of diversification of energy sources and reduction of import dependence, so much so that it has started exporting LNG.

Impact of low oil prices on remittances from the Middle East to India

- Every year India receives about 65–70 billion USD of remittances from the Middle East. Therefore, reduction in jobs in the Middle East due to the low crude oil price scenario will definitely impact the foreign exchange earnings of India. There is also the social aspect of the loss of people's livelihoods.
- The Middle East has a pool of skilled resources. These can be managed well and their skills harnessed if India is to transition from energy security to energy independence. India has benefited significantly from the low crude oil price recorded since mid-2014. This period of low crude oil prices should be used by India to make investments in developing infrastructure and E&P activities.
- The low crude oil price is a blessing for an import-dependent country like India. Lower oil prices have made it possible for the government to undertake policy measures to relax price control in key products like gasoline and diesel, including reforms in subsidy administration for LPG and kerosene.
- The fuel retail business will undergo transformation in India's oil and gas space. Differentiated pricing across retail outlets will be a reality soon. There is a lot of interest in the retail fuel market in India. Focus on dealer and staff training, etc., will gain prominence.
- While the low crude oil price has had different impacts on different groups, the net impact has been positive owing overwhelmingly to the fact that India imports 80% of its crude requirements. On the other hand, low crude oil prices have negatively impacted crude oil exporting countries/regions such as Nigeria and the Middle East, which are destinations for export items from India.
- Clear policy statements such as a 10% reduction in import dependence by 2022 by the Government of India will help India in achieving the goal of energy security.

Potential benefits of new technologies in the oil and gas industry for India

- Capital efficiency should be at the core of all business decisions. Innovation and technology are critical for the development of the industry, and India should be more outward focused.
- US-based shale gas companies have responded to the decrease in oil prices by significantly reducing their cost of production through the adoption of cutting-edge technologies.
- Investments need to be evaluated from the perspective of 'total cost of ownership' rather than just the initial capex. The total cost of ownership takes into account all life cycle costs, which gives a better view of capital efficiency.
- Safety and emission control should be drivers for technology adoption in India.

Using technology in heavy industries

- India has already embarked on an ambitious programme to upgrade its fuel quality from Euro IV to Euro VI by April 2020.
- Technology adoption is an imperative for India's oil and gas sector. The role technology played in the development of the US shale gas market and its impact on oil and gas prices is known to all.
- Import content in the Indian oil and gas sector ranges from 15% for refinery construction to 70% for upstream operations. Therefore, technology adoption in India is a must.
- Investment in technology should not just focus on oil and gas, but should also be encouraged for the development of other renewable sources of energy.
- Heavy industries have started adopting digital technologies which are revolutionising factory shop floors, rejigging old business models and making products smarter. Industry 4.0 needs to be adopted in India. Although Germany conceptualised industry 4.0, as the IT hub of the world, India can help make this concept a reality.
- Not one to be left behind, the Indian manufacturing sector is poised for a quantum leap in digital manufacturing technologies.
- As the leader in manufacturing technologies, the US can help transform India by transferring its unique technologies.
- Presently, India has the manufacturing capacity and capability; however, knowledge-based engineering which can reduce process time and optimise product design are needed. 3D models need to be developed for better accuracy and speed in the manufacturing of products.
- 3D printing can also enable the customisation of products on a real-time basis. This technology can be used for products which are manufactured in low volumes and cater to niche markets/customers.
- Virtual reality is growing rapidly; it allows manufacturers to receive feedback on products on a real-time basis.
- Predictive analytics is changing the world in a big way; it has the potential to bring in huge savings for any nation. The only significant point of concern for adopting this technology in India is the final cost to the customer.
- Major disruption of the labour market is anticipated if all these new technologies are implemented in India. The capital goods policy announced by the government could address these concerns. The policy's mission statement is to increase the sector's contribution to India's manufacturing to 20% by 2020, up from the current 12%. This will be done by doubling production, thus making India one of the top capital goods producing nations in the world. The policy also aims to increase exports and lay emphasis on market development, promotion of technology and creation of structural enablers. All subsectors are set to receive a push under Make in India.
- In Germany, academia and industry are very closely linked. Unless Indian industry is able to tap into this vast resource, realising 4.0 will be a challenge. Academia needs to change and industry needs to support this change by investing more in educational institutes.



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Glossary

AMC - Asset management company	EIA - Energy Information Administration
AMFI - The Association of Mutual Funds in India	EOL - Essar Oil Limited
AT&C - Aggregate technical and commercial	EPC - Engineering Procurement and Construction
AUM - Assets under management	ERP - Enterprise resource planning
B2B - Business to business	FDI - Foreign direct investment
B2C - Business to consumer	FVCI - Foreign venture capital investor
BCFD - Billion Cubic feet per day	GDP - Gross domestic product
BFSI - Banking, financial services and insurance	Gencos - Generation companies
BG - British Gas	GNPA - Gross non-performing advance
BOT - Build Operate and Transport	HELP - Hydrocarbon Exploration Licensing Policy
BP - British Petroleum	HPCL - Hindustan Petroleum Corporation Limited
BPCL - Bharat Petroleum Corporation Limited	IBA - Indian Banks' Association
BU - Billion units	IBEF - India Brand Equity Foundation
CAGR - Compounded annual growth rate	ICD - Inland Container Depots
CCEA - Cabinet Committee on Economic Affairs	IDDM - Indigenously designed, developed and manufactured
CCS - Cabinet Committee on Security	IEA - International Energy Agency
CEA - Central Electricity Authority	IFA - Independent Financial Adviser
CFS - Container Freight Stations	IMF - International Monetary Fund
CGD - City gas distribution	IOCL - Indian Oil Corporation Limited
DBTL - Direct benefit Transfer for LPG	IOP - Indian offset partner
DDUGJY - Dindayal Upadhyaya Gram Jyoti Yojana	IoT - Internet of Things
DFC - Dedicated freight corridor	IPDS - Integrated Power Development Scheme
DFCCIL - Dedicated Freight Corridor Corporation of India Limited	IPO - Initial public offering
DGFT - Directorate General of Foreign Trade	IRDA - Insurance Regulatory Development Authority
DIPP - Department of Industrial Policy and Promotion	JNPT - Jawaharlal
DISCOMs - Distribution companies	KG - Krishna Godavari (offshore sedimentary basin on the eastern coast of India)
DoDP - Department of Defence Production	KPTL - Kalpataru Power Transmission Ltd
DPP - Defence Procurement Procedure	LIC - Life Insurance Corporation of India
DSF - Discovered small fields	LNG - Liquefied natural gas
DTTI - Defence Technology and Trade Initiative	M&A - Mergers and acquisitions
E&P - Exploration and production	MEMS - Microelectromechanical sensors
EE - Energy efficiency	MF - Mutual fund

MMSCMD - Million standard cubic metre per day	P2P - Peer-to-peer
MMT - Million tonnes	PCPIR - Petroleum, Chemicals and Petrochemicals Investment Region
MMtoe - Million tonnes of oil equivalent	PE - Private Equity
MMTPA - Million tonnes per annum	PFC - Power Finance Corporation
MNCs - Multinational companies	PFRDA - Pension Fund Regulatory Development Authority
MoRT&H - Ministry of Road Transport & Highways	PGCIL - Power Grid Corporation of India Ltd
MRO - Maintenance, Repair and Operations	PLL - Petronet LNG Limited
MSME - Micro, small and medium enterprises	PNGRB - Petroleum and Natural Gas Regulatory Board
MTPA - Million Tonnes Per Annum	PPP - Public Private Partnership
NABARD - National Bank for Agricultural and Rural Development	PPP - Purchasing power parity
NBFC - Non-banking financial company	PSCs - Production sharing contracts
NBFC-ND-SI - Non-deposit taking systemically important NBFCs	PSU - Public sector undertaking
NELP - New Exploration Licensing Policy	RBI - Reserve Bank of India
NH - National Highways	REC - Rural Electrification Corporation
NHAI - National Highway Authority of India	RE - Renewable energy
NHB - National Housing Bank	RGO - Renewable generation obligation
NHIDCL - National Highways and Infrastructure Development Corporation Limited.	RIL - Reliance Industries Limited
NHPC - National Hydroelectric Power Corporation	RPO - Renewable purchase obligation
NLC - Neyveli Lignite Corporation	SCB - Scheduled Commercial Banks
NNPA - Net non-performing advance	SEBI - Securities and Exchange Board of India
NOC - No objection certificate	SEZ - Special Economic Zone
NOC - National oil companies	SIDBI - Small Industries Development Bank of India
NPCIL - Nuclear Power Corporation of India Ltd	SPGV - Sterlite Power Grid Ventures
NTPC - National Thermal Power Corporation	SPP - Southwest Power Pool
NW - National Waterways	T & D - Transmission and distribution
O&M - Operation and Maintenance	Transcos - Transmission companies
OALP - Open Acreage Licensing Policy	TSA - Terminal service agreement
OEM - Original equipment manufacturer	UAV - Unmanned aerial vehicle
ONGC - Oil and Natural Gas Corporation Limited	UDAY - Ujwal DISCOM Assurance Yojana
OVL - ONGC Videsh Limited	VAT - Value added tax

Notes

Notes

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