

# Railway sector – A key driver for 'Make in India' program

FICCI

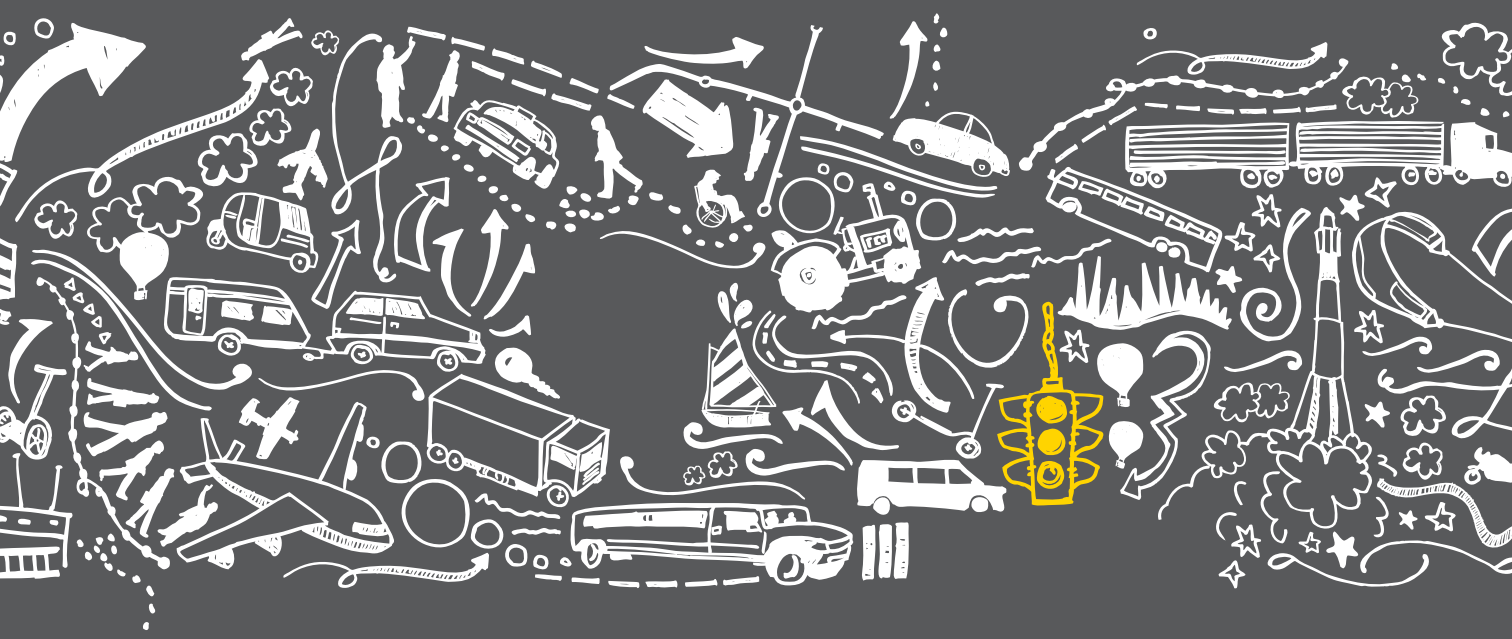
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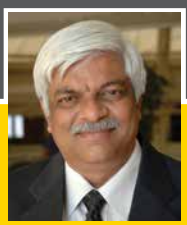
EY

Building a better working world

# Foreword

# FICCI...





## Mr K Ramchand

Chairman, FICCI National Committee on Infrastructure and Managing Director - IL&FS Transportation Networks Ltd

I am pleased to share with you the FICCI-EY Report on 'Railways sector – a key driver for Make in India Program' to be released at the second edition of SMART Railways Conclave organized by Federation of Indian Chambers of Commerce and Industry.



The government's flagship 'Make in India' initiative has encouraged companies to invest and manufacture in India. Thus, creating tremendous business collaboration opportunities between domestic and global players to synergize their manufacturing capabilities for indigenous consumption as well as exports of Indian manufactured railway products especially, Railway/ Tramway locomotives, rolling stocks and parts thereof

With this background, a comprehensive report – "Railways sector – a key driver for Make in India Program" has been prepared by EY, the knowledge partner and FICCI. The report highlights the significance of the railway sector for Make in India campaign. The report also touches upon the implications of technological upgradation of railway infrastructure in India for leading Indian manufacturing firms, for global MNCs and also for SMEs.

I hope this report will help to put in perspective the large opportunities for the private sector not just in India, but in the global rail market.

# Foreword





**Gaurav Taneja**

Partner and National Director – Government & Public Sector

EY, in association with FICCI, is pleased to present a report on manufacturing potential in the railway sector.

Indian Railways is one of the largest railway systems in the world with a route length of 67,368 kms. It plays a critical role in aiding economic and social development of the country through connectivity, mobility and commercial activities. Close to 23 million passengers are carried by railways every day and over 1 billion tonnes of freight is ferried across the country every year.

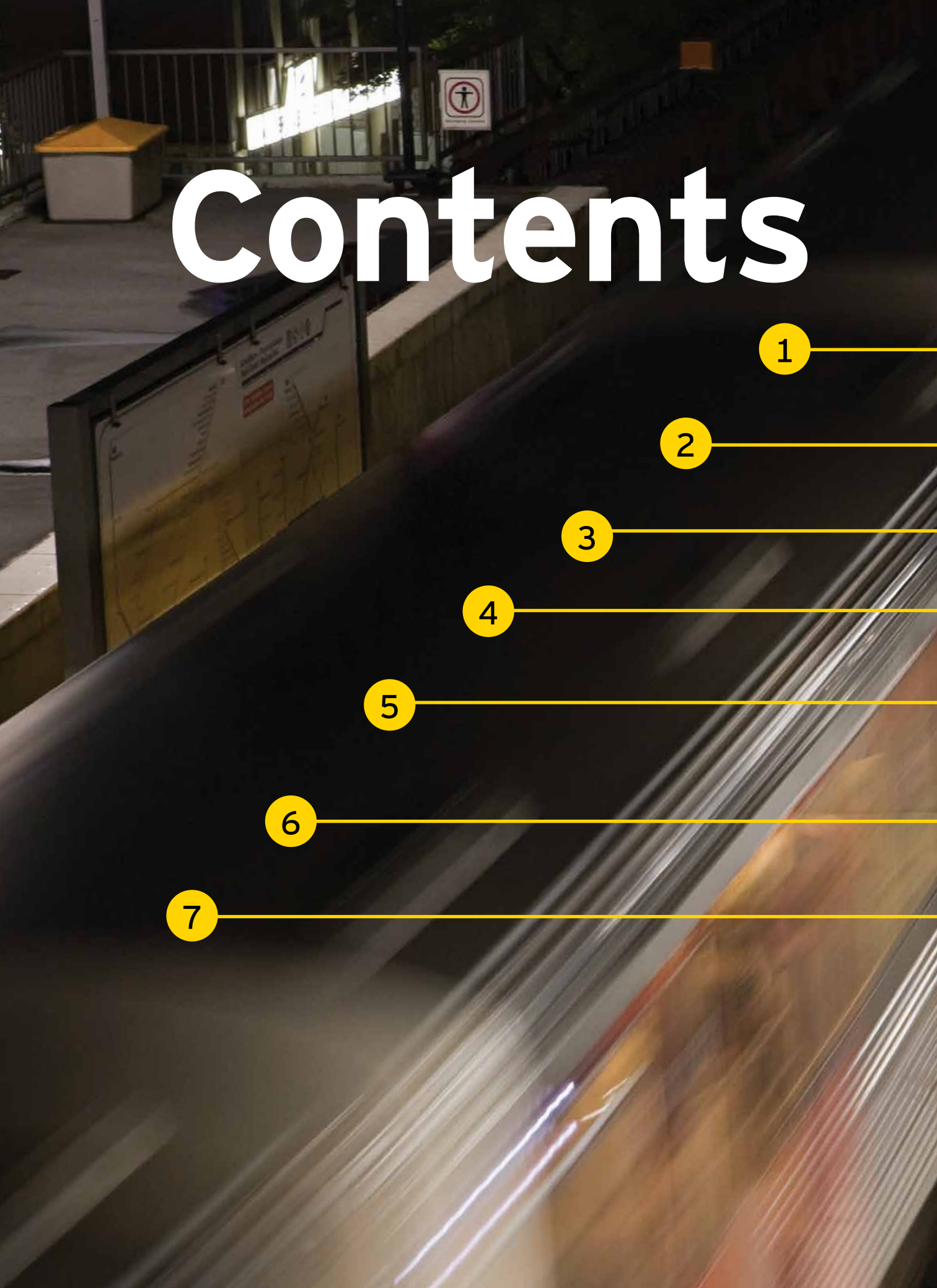


Indian Railways is focusing on many themes such as modernization of existing tracks, new generation locomotives, train sets for high speed inter-city travel, high-speed railway lines, deployment of on-board train protection system with cab signalling, etc. All these initiatives are progressing and there is a substantial increase in investment in the railway sector in the past four years. As Indian Railways aims to modernize and upgrade its technology, the alignment with the Make in India program is essential. The recent PPP model followed by the Ministry of Railways for new generation of locomotives, in which leading firms like Alstom and GE, have set up their factories in India is an example of how railways can contribute to the Make in India program and enable India to become the manufacturing base for railway equipment. More such initiatives to attract the leading global firms to set shop in India are required. India is known for its frugal engineering and there are many examples of solutions designed in India, in health care, automotive and consumer durable sectors, which have been globally adopted. There is a need to do the same in the railway sector as well. The government will need to play a pivotal role not only in inducting new technologies in this sector but also to increase India's share in the global rail market. The policies followed by China and the US in framing conditions of local manufacture in government-led procurement are relevant case examples.

Indian SMEs play an important role in railway sector manufacturing. It is essential for the SME sector to get due consideration and a hand-holding assistance as the railways sector moves up the technology curve. Financial assistance, provision of adequate skills and training and upgrading manufacturing processes of SMEs are some of the measures that need to be looked into.

I take this opportunity to express my gratitude to industry members for their support, which helped us significantly in gathering valuable insights and framing a point of view.

I hope you find this report interesting and informative.



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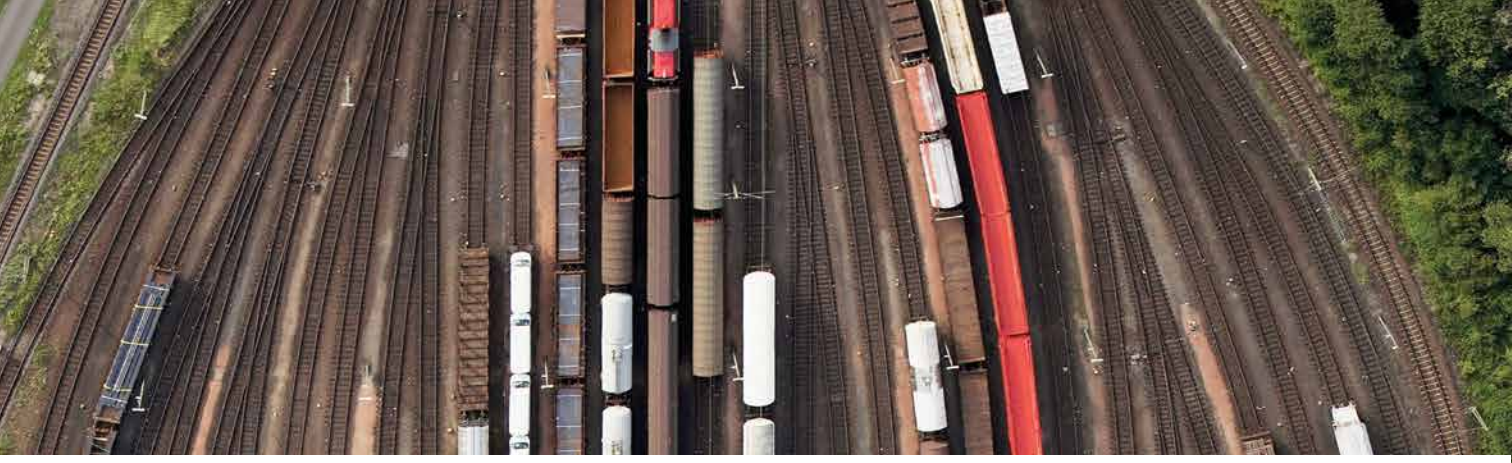
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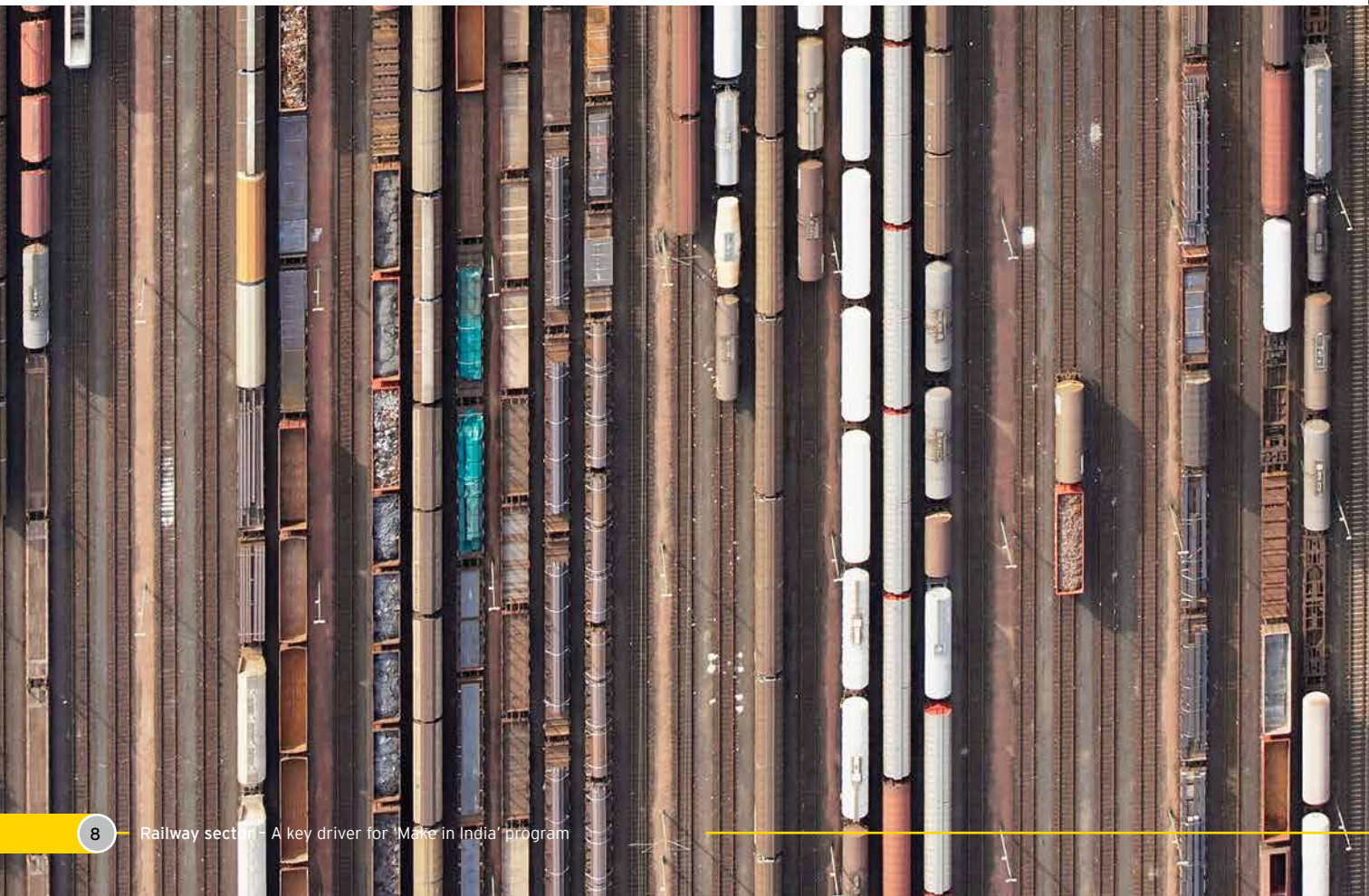
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# 1 Characteristics of rail industry in India

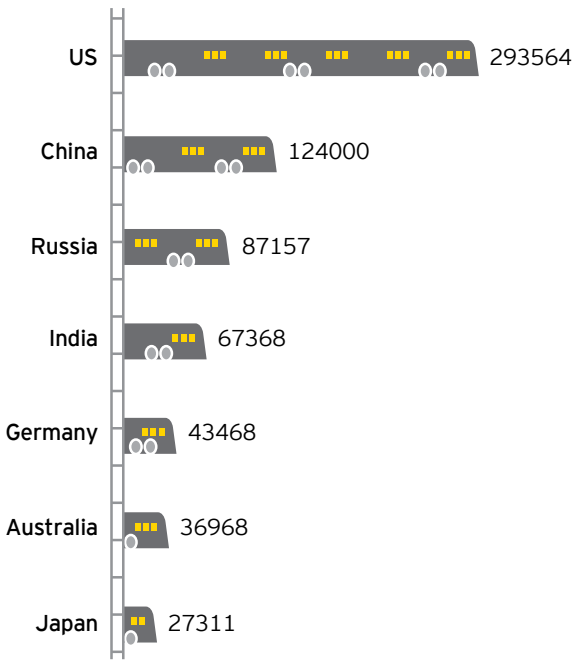


Indian Railways (IR) is a mammoth public sector organization that manages the fourth largest rail network in the world in size, with 121,407 kms (75,439 mi) of total track over a 67,368 kms (41,861 mi) route. In 2017, it also became the world's largest commercial enterprise in terms of number of employees. With total assets at INR4.71 lakh crores that roughly turns out to be US$69 billion[1] as on March 2017, Indian Railways is tracking new highs. Today, it carries close to 1.2 billion tonnes of freight per annum and over 23 million passengers[2] in 19,000 trains that run every day.

In India, both the track gauge[3] and the mix of passenger and freight traffic carried by the railway network are distinctive features.

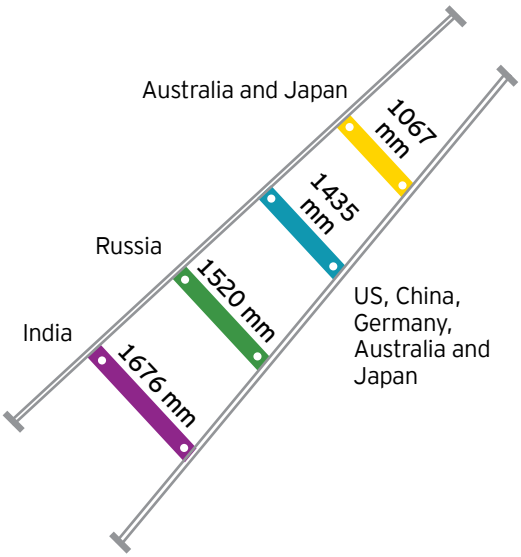
The railway gauge in various countries and the size of the rail network are indicated in exhibit 1.

**Exhibit 1. Route length of railway network in kms**




Source: https://www.cia.gov/library/publications/the-world-fact-book/rankorder/2121rank.html as it stood on 14 August 2018; https://www.cia.gov/library/publications/the-world-factbook/-fields/print_2121.html as it stood on 14 August 2018

**Exhibit 2. Railway gauges and the different countries where they are found**




Source: https://www.cia.gov/library/publications/the-world-fact-book/rankorder/2121rank.html as it stood on 14 August 2018; https://www.cia.gov/library/publications/the-world-factbook/-fields/print_2121.html as it stood on 14 August 2018

Broad gauge (1676 mm), which is a predominant railway gauge in India is also found in Sri Lanka, Bangladesh, Pakistan, Chile and Argentina. Out of the total rail length of broad gauge in the world, India's share[4] is close to 60%. Standard gauge (1435 mm) is the most common railway gauge in the world. It is not present in the main railway networks in India but in the Metro rail projects.

Both India and China are unique in terms of the traffic mix carried on the railway network with high passenger as well as freight traffic, India occupies an apex spot in the world in passenger traffic. Exhibit 3 shows how India fares against other countries of the world in freight and passenger traffic.

In the US, while the railway modal share in freight is high, passengers prefer using road and air transport over rail. However, in Japan, it is the opposite. The modal share of railways is high in passenger traffic and less in freight traffic.

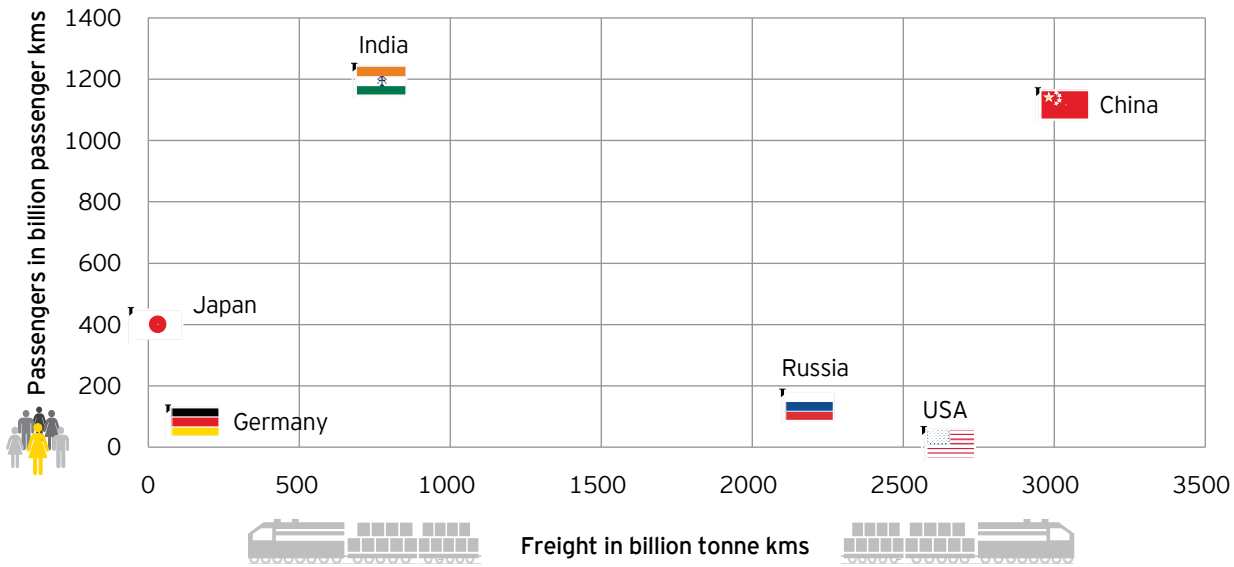
1 http://www.indianrailways.gov.in/railwayboard/uploads/directorate/stat_econ/IRSP_2016-17/Annual_Report_Accounts_Eng/Statistical_Summary.pdf

2 White paper, "Indian Railways – Lifeline of the nation", February 2015, Ministry of Railways

3 Track gauge refers to the distance between two rails in a railway track

4 https://www.cia.gov/library/publications/the-world-factbook/fields/print_2121.html as accessed on 14 August 2018

**Exhibit 3. Railway traffic in selected countries**

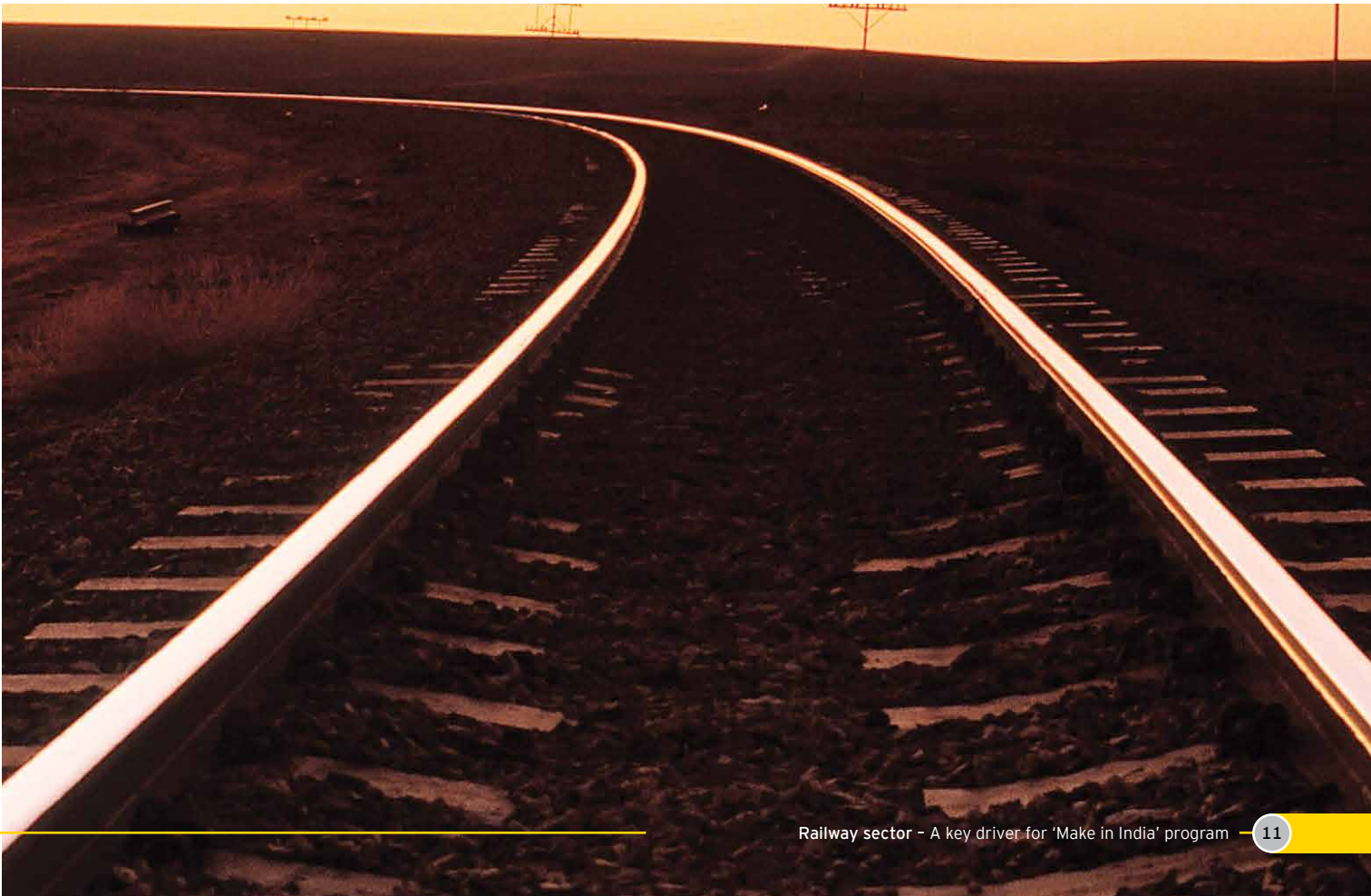



Source: Working Paper no. 47, EXIM Bank of India, "Make in India for the world: Realizing export potential of railways"

The above characteristics of the domestic railway markets have influenced the manufacturing expertise that various countries have developed in the railways sector. Japan's Shinkansen technology for high speed railway is one of the best in the world and the US is a leader in locomotive design for heavy haul. Thus the technological prowess that each country has developed is either in passenger railway or freight railway systems depending on which is more prevalent.

However, in India and China, there are high volumes of both passenger and freight traffic, which has resulted them to develop an expertise in manufacturing rails, sleepers, signaling equipment, locomotives, passenger coaches, freight wagons and electrification-related equipment. China is a world leader in railway-related manufacturing and is a major exporter of railway products. India, on the other hand, still has a long way to go, in leveraging the local manufacturing set up and acquiring a sizable share in the global rail market. These aspects are dealt with in the following sections in this paper.

# 2 Railway market size in India

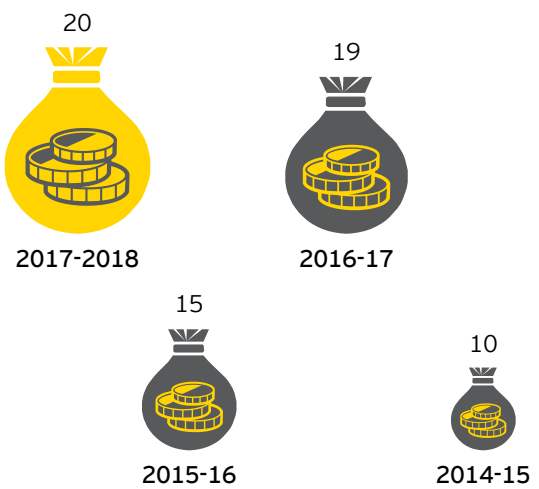


Railway sector in India comes under the control of a single entity, the Ministry of Railways, which owns its infrastructure, is the railway operator and also its regulator. Coaches and locomotives are primarily manufactured in production units (PUs) which are under the administrative control of the Ministry. Private sector firms supply the sub components and sub systems to the railway PUs. Freight wagons are mainly manufactured by the private sector. Rails, concrete sleepers and other components of the rail tracks are manufactured by PSUs and private sector firms, whereas signaling and railway line electrification equipment are mainly manufactured by the private sector.

The size of the railway market is directly determined by the budget of the Ministry of Railways. This falls under two categories - the capital expenditure for setting up new lines, gauge conversions, track renewals, signaling improvements, buying new rolling stock, etc., and the purchases done by the Stores Department of the Indian Railways for maintaining the existing railway infrastructure.

Exhibit 4 gives an insight on the capital expenditure of the Ministry of Railways in the past four years.

**Exhibit 4. Indian Railways - Capital expenditures (in US$ billion)**



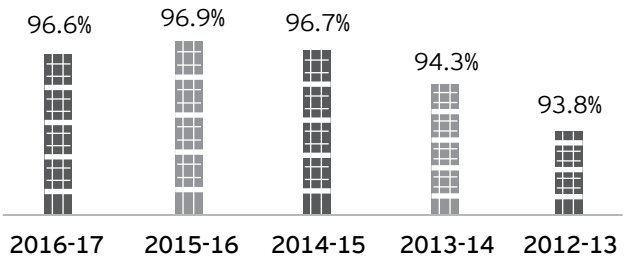

Source: Railway budget speeches of 2014-15, 2015-16, 2016-17, Ministry of Railways; Union Budget speech 2017-18, Ministry of Finance

Note: To convert to US$ billion, exchange rates as on 31 March of each financial year have been taken from https://www.xe.com/currency-charts/?from=USD&to=INR&view=5Y

Railway investments have a multiplier effect of five[5]. (INR1 of incremental investment in railway sector leads to an overall incremental output of INR5 in the economy). Thus an US$20 billion investment by the Ministry of Railways will lead to an incremental boost of US$100 billion to the Indian economy. To put this in perspective, the size of the Indian automotive industry was US$93 billion[6] in 2015-16. Thus the sizable capital expenditure of the Ministry of Railways is important both from the opportunities it provides to the manufacturing firms in India as well as the economic multiplier effect that this expenditure has on the Indian economy.

The store purchases of Indian Railways are also substantial. It was around US$7 billion in 2016-17.[7] A large part of these purchases is done indigenously. Exhibit 5 indicates the proportion of stores purchases which is done indigenously.

**Exhibit 5. Indigeneous percentage**




Source: Statistical summary – Indian Railways 2016-17, Ministry of Railways

The Stores Department is also charged with the responsibility of procurement, storage and issue of stock items used by all the railway departments. The department also maintains 262 stocking depots across the railway network serving various zones and manufacturing units. These stocking depots have over 1.3 lakh components of various descriptions[8]. The stores procurement ecosystem comprises of the track maintenance units, loco sheds, carriage and wagon shops, signal repair shops, repair and overhaul workshops and manufacturing units.

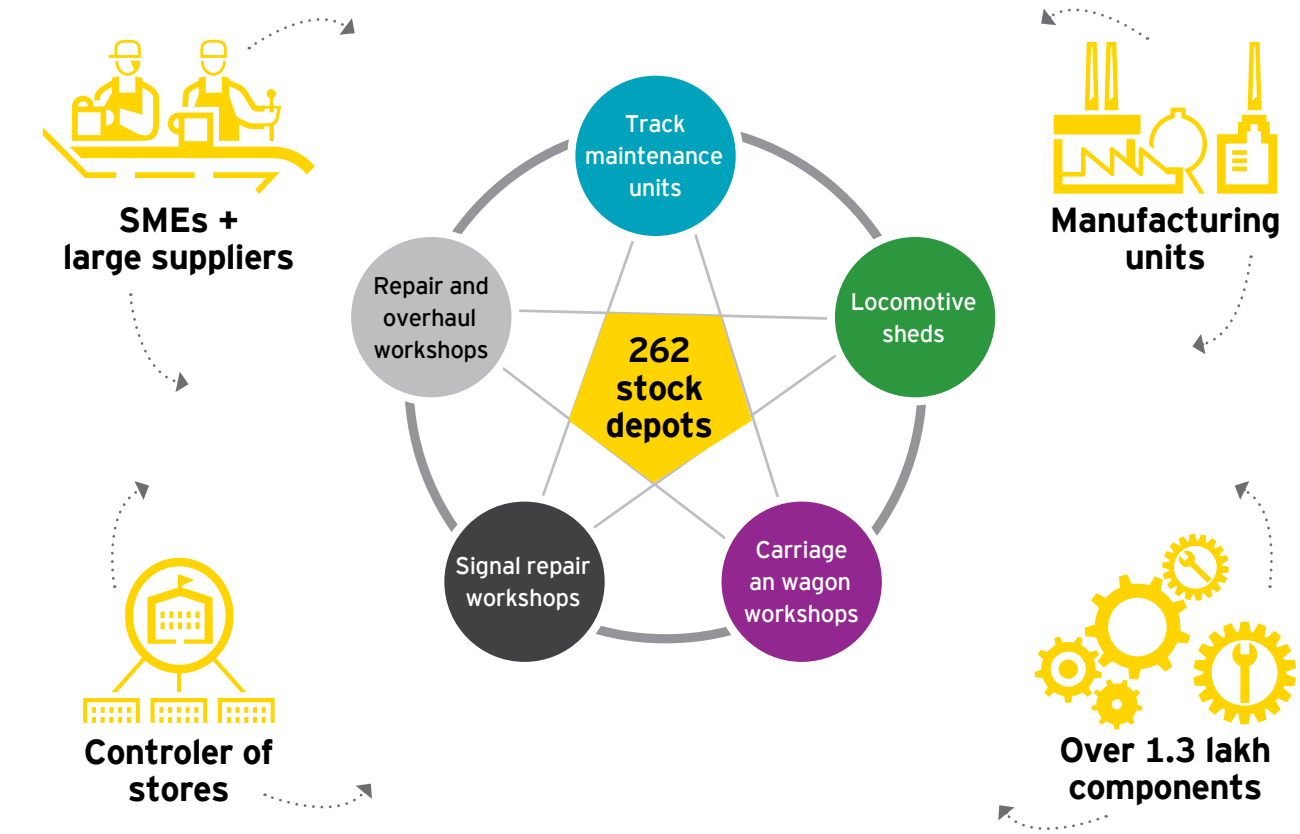
5 Economic Survey of India 2015-16, Department of Economic Affairs, Government of India

6 http://www.makeinindia.com/documents/10281/114126/Automotive+Sector+-+Achievement+Report+%281%29.pdf accessed on 14th August 2018

7 http://www.indianrailways.gov.in/railwayboard/uploads/directorate/stat_econ/IRSP_2016-17/Annual_Report_Accounts_Eng/Statistical_Summary.pdf

8 http://www.indianrailways.gov.in/railwayboard/uploads/directorate/stat_econ/IRSP_2016-17/Facts_Figure/Indian%20Railways%20Annual%20Report_Accounts%20English%202016-17.pdf

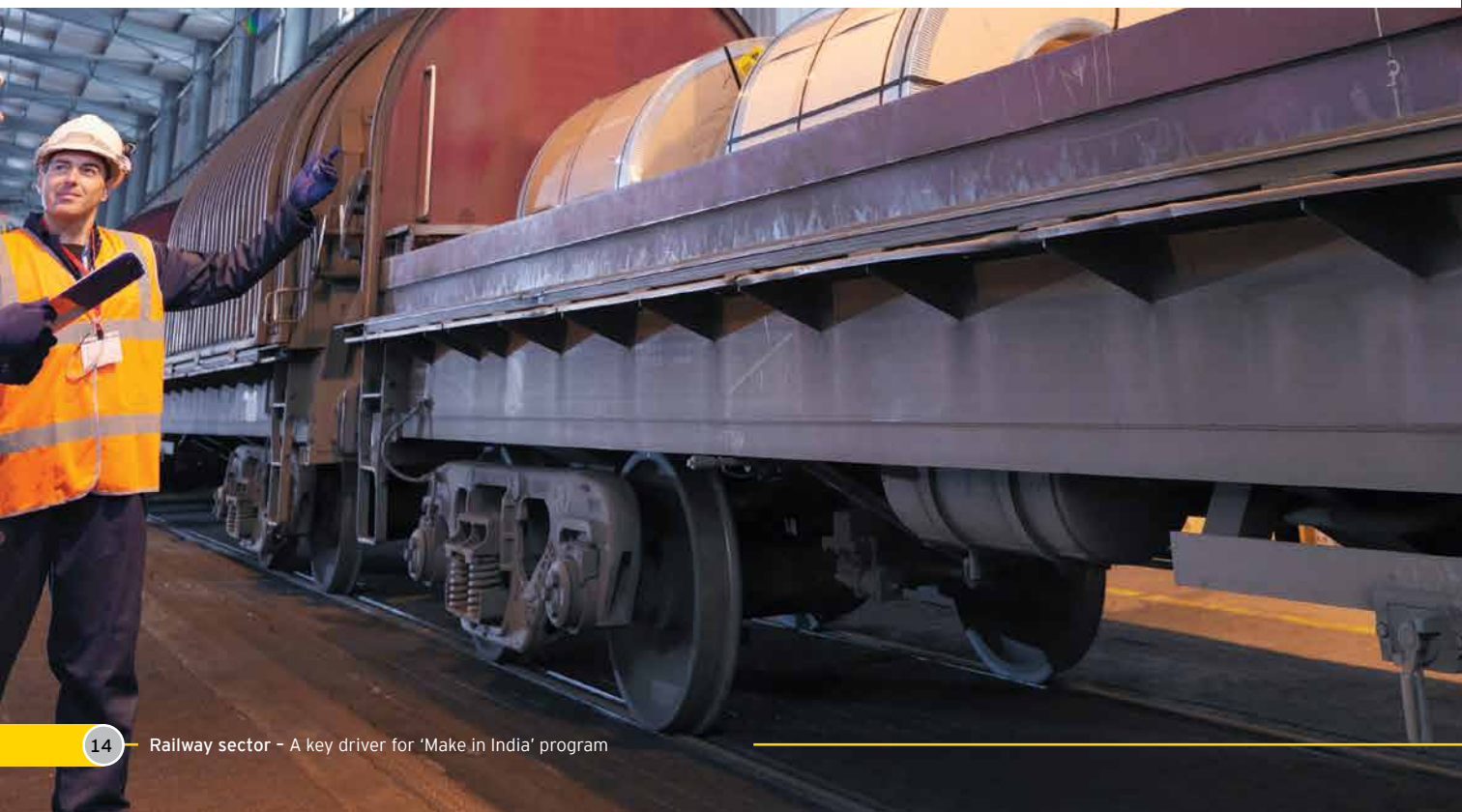
**Exhibit 6. Stores procurement ecosystem of the railways**








# 3 Exports in railway sector from India

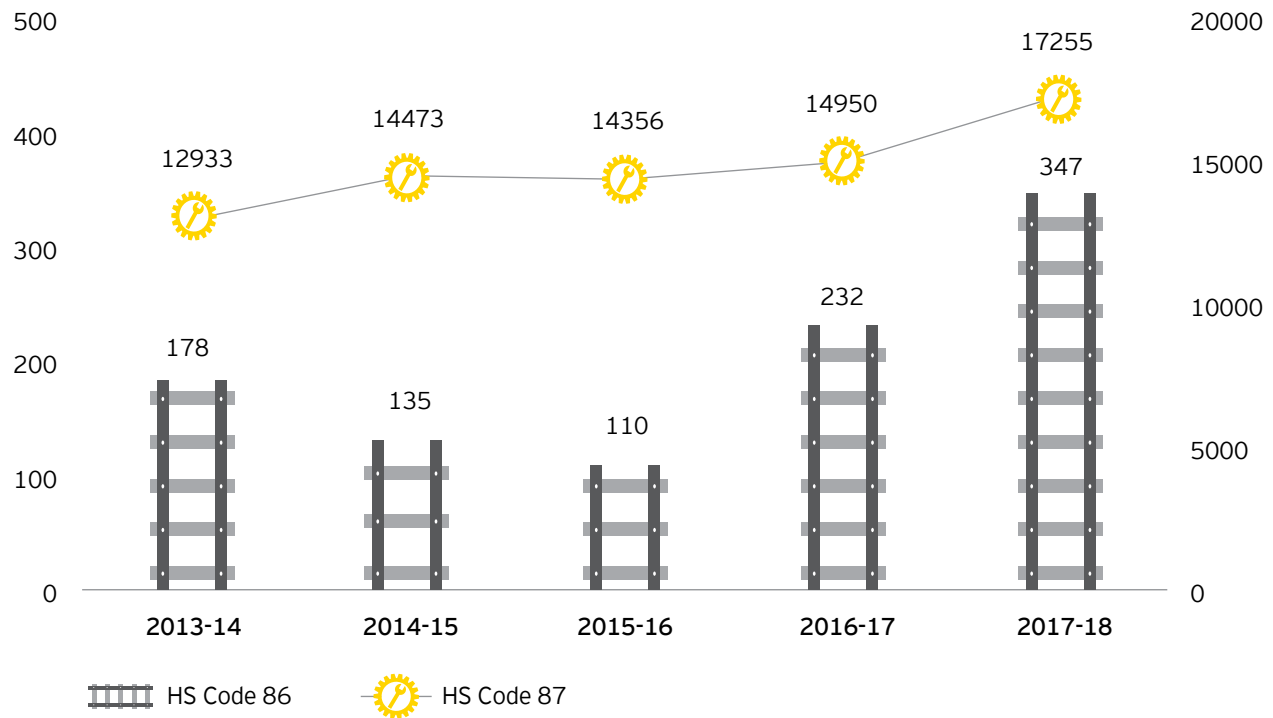


Due to India's established railway ecosystem and large-scale indigenous railway sector manufacturing, it is expected that India would be a large exporter of railway products. However, that is not true. Exhibit 7 shows the exports of India for products under HS Code 86 (HS Code 86 covers railway or tramway locomotives, rolling stock and parts thereof).

For comparison, the exhibit 7 also shows the exports from India under HS code 87 which covers the automotive industry (HS code 87 covers vehicles other than railways or tramway rolling stock and parts and accessories, thereof). The quantum of exports in the automotive industry is 50 to 100 times more than the exports in the railway sector. Both these sectors are important contributors in the manufacturing GDP of India. India is able to leverage its domestic market and be an export base for automotive products. The same has not being done successfully in the railway sector.

India mainly exports railway rolling stock to its neighboring countries like Myanmar, Bangladesh and Sri Lanka. The exports to the neighboring countries are mostly for projects financed by the EXIM Bank of India under the 'Lines of Credit' program of the Government of India.

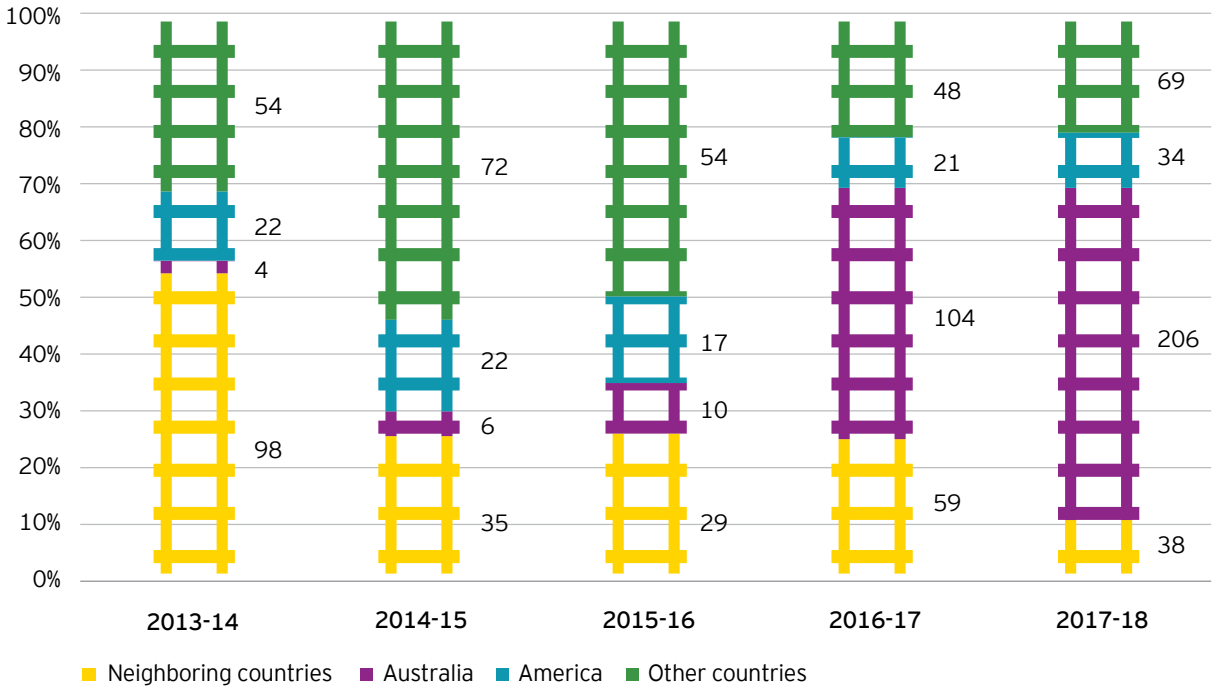
**Exhibit 7. Exports of India in railways and automotive sectors (US$ millions)**




Source: Export Import Data Bank, Ministry of Commerce, Government of India

Exhibit 8 indicates the proportionate share of the various countries in exports under HS Code 86.

**Exhibit 8. Share of countries in India's railway exports (numbers mentioned are the value of exports in US$ million)**




Source: Export Import Data Bank, Ministry of Commerce, Government of India

The increase of exports in the years 2016-17 and 2017-18 is mainly due to the export of Metro coaches to Australia[9] from M/s Alstom[10] from their manufacturing facility located in Sri City, Andhra Pradesh. The exports from the mainline railways manufacturing ecosystem has been minimal.

9 Data extracted from EXIM Data Bank, Ministry of Commerce, Government of India for HS Code 8605

10 https://themetrorailguy.com/2017/09/28/sydney-metro-receives-first-indian-built-alstom-train/

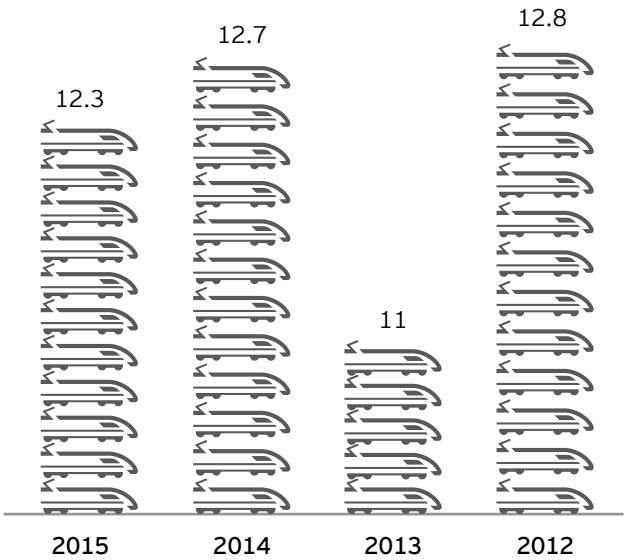


# 4 Railway sector exports from China



Exhibit 9 shows the exports of China under HS Code 86.

**Exhibit 9. Exports of China in railway sector (in US$ billions)**




Source: UN Comtrade Database

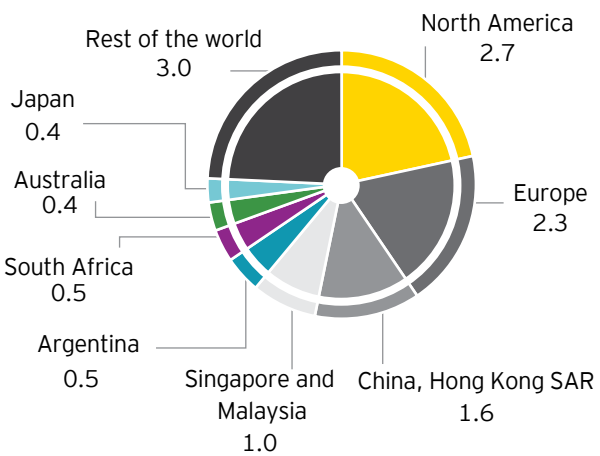
China's exports in the railway sector is at a different scale as compared to India. While India's exports are below US$0.5 billion, China's are above US$10 billion. In fact, China has garnered its focus on railway sector. In the "Make in China 2025" strategy to transform manufacturing industries, railway equipment is identified as a key area.

Over the past 15 years, investment in high-speed railways (HSR) has been an area of special focus of the Chinese government. Starting for a non-existent high speed railway network 15 years back, China today has a high-speed railway network exceeding 15,000kms. The network covers 90 cities and since 2010, China has been spending about $100 billion a year on rail developments.[11]

This large-scale investments in high-speed railway has helped China to develop its expertise and also to reduce unit costs of setting up high-speed railway line. The unit cost of China's HSR infrastructure is about US$17-21 million per km, while the comparable cost in Europe is US$25-39 million per km. Due to the lower costs, China has been able to bid for, win and build high-speed railway networks outside their country. In Turkey, China has built 533 kms long high-speed railway network based on the Chinese technology that has been operational since 2014[12].

In order to bridge the technological gap, China followed technology transfer with global MNCs. During the years 2003-04, two major state-owned railway train manufacturers, China South Locomotive and Rolling Stock Corporation (CSR) and China North Locomotive and Rolling Stock Corporation (CNR), signed technology transfer contracts with Alstom, Siemens, Bombardier and Kawasaki Heavy Industries[13]. After learning from the technology transfers and adapting the technology, China designed its own high speed train "CRH380A"[14] in 2010.

**Exhibit 10. Share of countries in China's railway sector exports in the year 2015 (in US$ billion)**




Source: UN Comtrade Database

11 http://www.uncrd.or.jp/content/documents/5917Presentation%202-High%20Speed%20Railways-Ms.%20Li.pdf

12 http://www.uncrd.or.jp/content/documents/5917Presentation%202-High%20Speed%20Railways-Ms.%20Li.pdf accessed on 14 August 2018

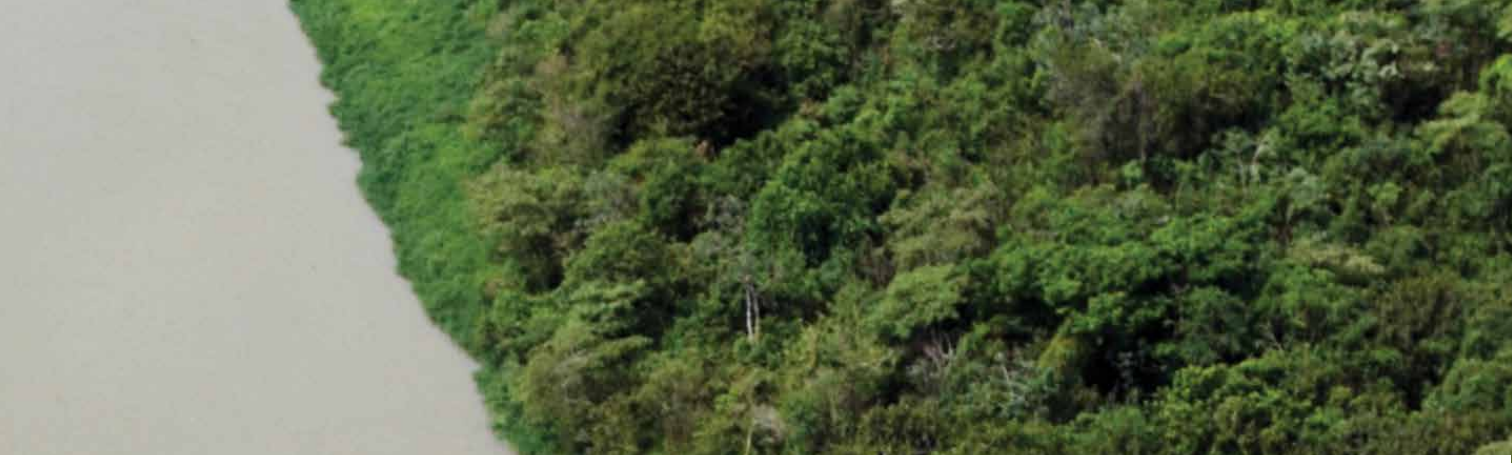
13 "International Technology Transfer and Domestic Innovation: Evidence from the High-Speed Rail Sector in China," London School of Economics centre for Economic Performance, December 2015

14 https://www.wsj.com/articles/SB10001424052748704814204575507353221141616 as it stood on 14 August 2018

Exhibit 10 shows that the countries where Chinese railway exports are in demand, are spread across the world. North America accounts for around 22% of exports related to railway sector from China. Interestingly, Argentina, which has close to 26,000kms of broad gauge track (1,676 mm), imported close to US$500 million worth of goods under HS Code 86 in the year 2015. India's domestic suppliers are all well-equipped to produce railway equipment aligned to broad gauge, as this is the predominant track gauge in India. The prevalent track gauge in China is standard gauge (1,435 mm). Suppliers in China would need to modify their production lines related to rolling stock manufacturing, to specifically cater to the Argentina market. This would imply additional costs. As per UN Comtrade data, India's exports to Argentina under HS Code 86 was a meagre US$20,262. It would be interesting to investigate why India's railway products have not been able to penetrate the Argentina market when the track gauges in both the countries are the same.

To further strengthen China's leading position in the rail export market, CSR and CNR were merged into a single entity called China Railway Rolling Stock Corporation Limited (CRRC).[15] This merger has led to the creation of a new entity of a larger size and scale. This enables China to be more aggressive in the export market. Chinese government has indeed taken steps to enhance expertise in its domestic railway sector as well as aggressively pursue the global rail market.

15 https://www.caixinglobal.com/2015-06-02/101012432.html as it stood on 14 August 2018



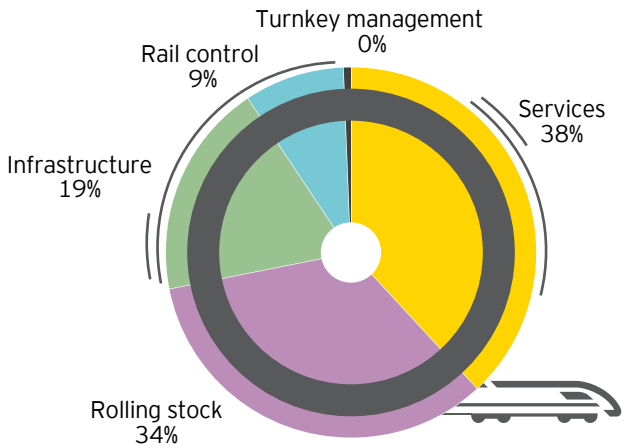
# 5 Unearthing ways to help India tap the global railways export market



As per UN Comtrade data, the total export market under HS Code 86 in 2015 was US$ 38 billion. Out of this, China's share was 32% and that of the US was 11%. India, on the other hand, has only managed a share of less than 1%.

The global railway market was sized at US$172 billion for the period 2013-2015.[16] The segmentation of the overall market is indicated in the figure below.

**Exhibit 11. Segments of the global rail market**



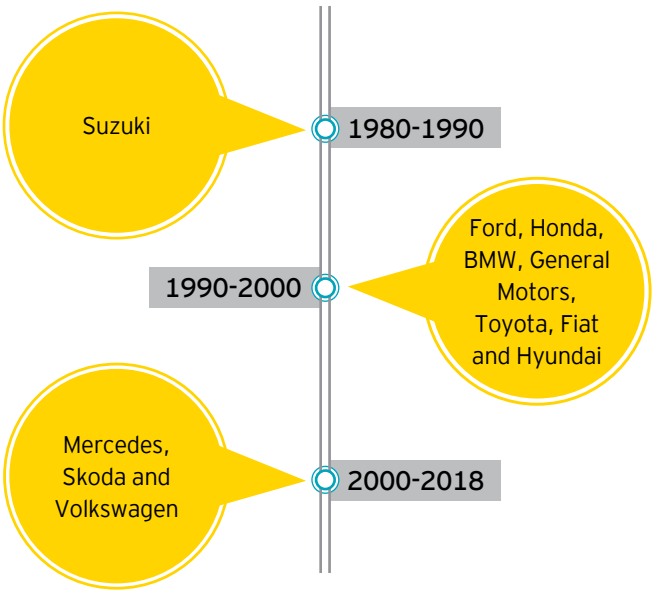

Source: http://www.unife.org/component/attachments/?task=download&id=731

Rolling stock (freight wagons, locomotives, passenger coaches, etc.) and rail control (signaling equipment) accounts for 43% of the total market. These segments are a part of the global rail market which needs to be focused on to meet the objectives of the Make in India initiative.

A comparison with the automotive sector in India would be pertinent. Over the years, the Indian auto industry has emerged to be one of the world's largest, with annual sales of 19.8 million vehicles in FY15. It is also one of the fastest growing markets, with production of 23.4 million vehicles in FY15 and occupying a leading position in several sub-segments.[17] India's domestic automotive market has attracted many global OEMs who have set up their manufacturing units across India.

Exhibit 12 shows the time period during which global companies set up their manufacturing units in India.

**Exhibit 12. Year of setting-up manufacturing units in India by global MNCs**




Source: EY Research

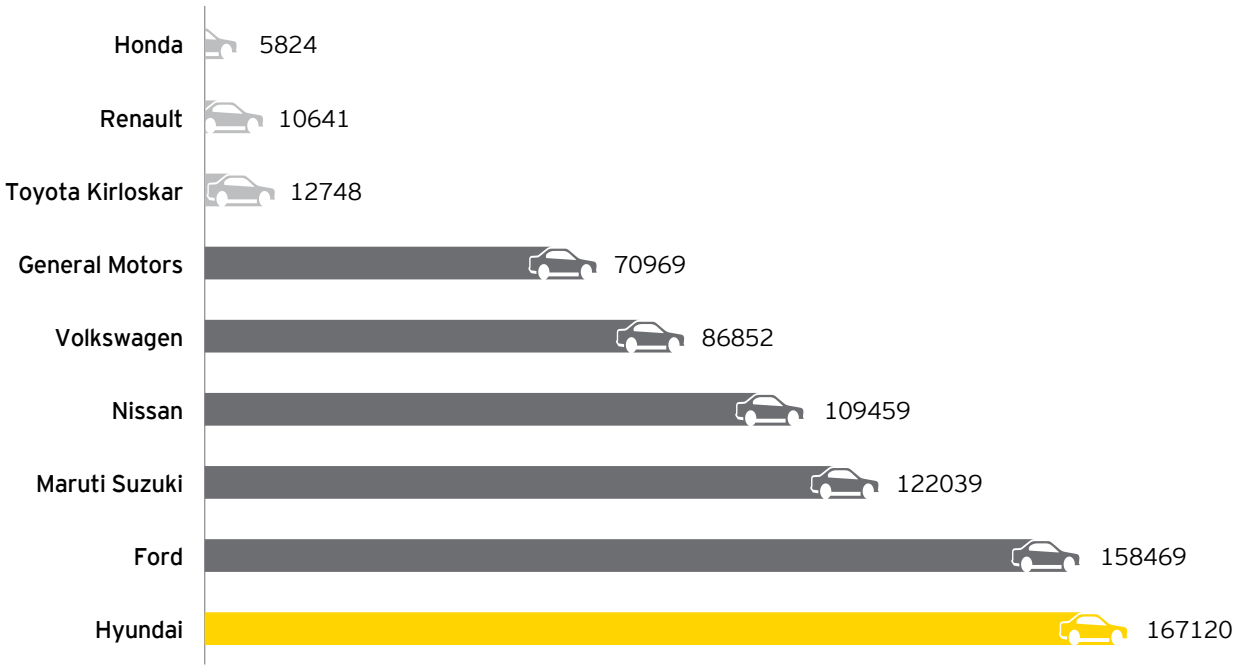
With the entry of global OEMs, Indian auto component manufacturers have reaped benefits in the form of global exposure and technology by collaborating with the foreign suppliers. As a result, many global OEMs have managed to achieve a fairly high level of localization in India.

Global OEMs entered India with the domestic demand as the key driver, but over a period of time, made India as an export base. Exhibit 13 indicates the exports of passenger vehicles from India by global OEMs.

16 http://www.unife.org/component/attachments/?task=download&id=731 as it stood on 14 August 2018

17 https://www.ey.com/Publication/vwLUAssets/EY-making-India-a-world-class-automotive-manufacturing-hub/$FILE/EY-making-India-a-world-class-automotive-manufacturing-hub.pdf

**Exhibit 13. Exports from Indian manufacturing units of foreign OEMs in 2016-17**




Source: http://www.autocarpro.in/news-national/indian-pv-industry-doubles-exports-decade-28943http://www.autocarpro.in/analysis-sales/passenger-vehicle-exports-scale-fy2017-sustain-drive-ford-nissan-vw-gm-24366

Similar to the automotive sector, the large and growing domestic railway sector market in India is also a key factor for global OEMs in this sector. However, there are some key differences between the automotive and railway sectors in India. These are indicated in exhibit 14.

**Exhibit 14. Differences between automotive and railway sectors in India**

| | Automotive sector | Railway sector |
|---|---|---|
| **Buyer** | Multiple buyers – the citizens of the country | Single buyer – Ministry of Railways |
| **Technical compatibility requirement within operational environment** | Negligible – vehicles of various designs can be introduced easily | Very high – change in one sub system (e.g., track) affects other sub systems (e.g., rolling stock) |
| **Responsibility of safety of passengers** | Distributed responsibility | Responsibility of Ministry of Railways |
| **Institutional structure** | Private companies and thus higher operational freedom | Under Ministry of Railways, Government of India and therefore needs to follow strict procedures |
| **Pricing of end products** | Seller is free to determine the price based on the market forces | Social obligations to be met and therefore pressure is on the pricing of services |

As government procurement has a larger role to play in the railway sector in India, there is a need to change the approach in attracting global MNCs and foreign companies to set up their manufacturing units in India from what has worked in the automotive industry. China mandated technology transfer and local manufacturing as a key prerequisite for giving access to foreign firms while developing its local manufacturing sector. Similarly in the US, Congress passed laws to protect the US manufacturing industry. "Buy America" that refers to statutes and regulations applies to federally funded transportation projects. Federal Transit Administration (FTA) rules mandate that rolling stock procurements have at least 60% domestic content and final assembly must take place in the United States.[18]

The method of procurement followed in the diesel locomotive factory at Marhowra and the electric locomotive factory at Madhepura are interesting case studies on how global firms can be attracted to set up manufacturing units in India.

**Exhibit 15. Case studies of Marhowra and Medhepura locomotive factories**

### **Marhowra Diesel** Locomotive Factory

- Contract agreement signed on 30 November 2015 between Ministry of Railways and General Electric (GE)
- Joint Venture (JV) company formed with the Ministry of Railways having 26% share and GE, 74% share
- The agreement was for the construction of diesel locomotive factory with a capacity to manufacture 120 locomotives per annum at Marhowra in Bihar
- A total of 700 locomotives of 4500 horsepower and 300 locomotives of 6,000 horsepower have to be supplied to Indian Railways over a period of 11 years
- Upto 100 locomotives to be supplied during the first two years may be imported, remaining ones have to be manufactured at Marhowra factory
- Two prototype locomotives have been supplied in February 2018 as per the schedule, which are currently undergoing test and trials

### **Madhepura Electric** Locomotive Factory

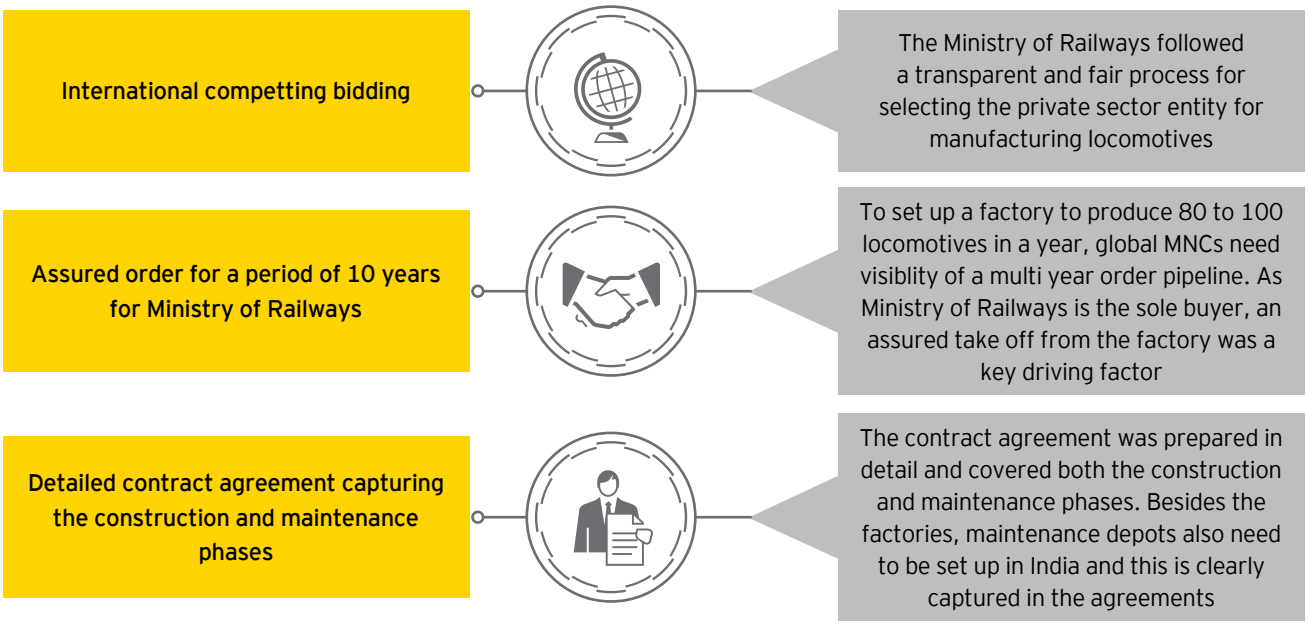
- Contract agreement signed on 30 November 2015, between Ministry of Railways and Madhepura Electric Locomotive Private Limited (a joint venture company of Ministry of Railways and Alstom Manufacturing India Limited)
- The contract is for manufacturing and supply of 800 electric locomotives of 12000 hp capacity by setting up Electric Locomotive Factory at Madhepura/Bihar
- The joint venture company has already started construction activities for the factory at site

Source: http://164.100.47.190/loksabhaquestions/annex/15/AS13.pdf and http://164.100.47.190/loksabhaquestions/annex/11/AU962.pdf

18 https://fas.org/sgp/crs/misc/R44266.pdf as it stood on 14 August 2018

The key features of the Madhepura and Marhowra contracts are indicated in Exhibit 16.

**Exhibit 16. Key features of Medhepura and Marhowra contracts**



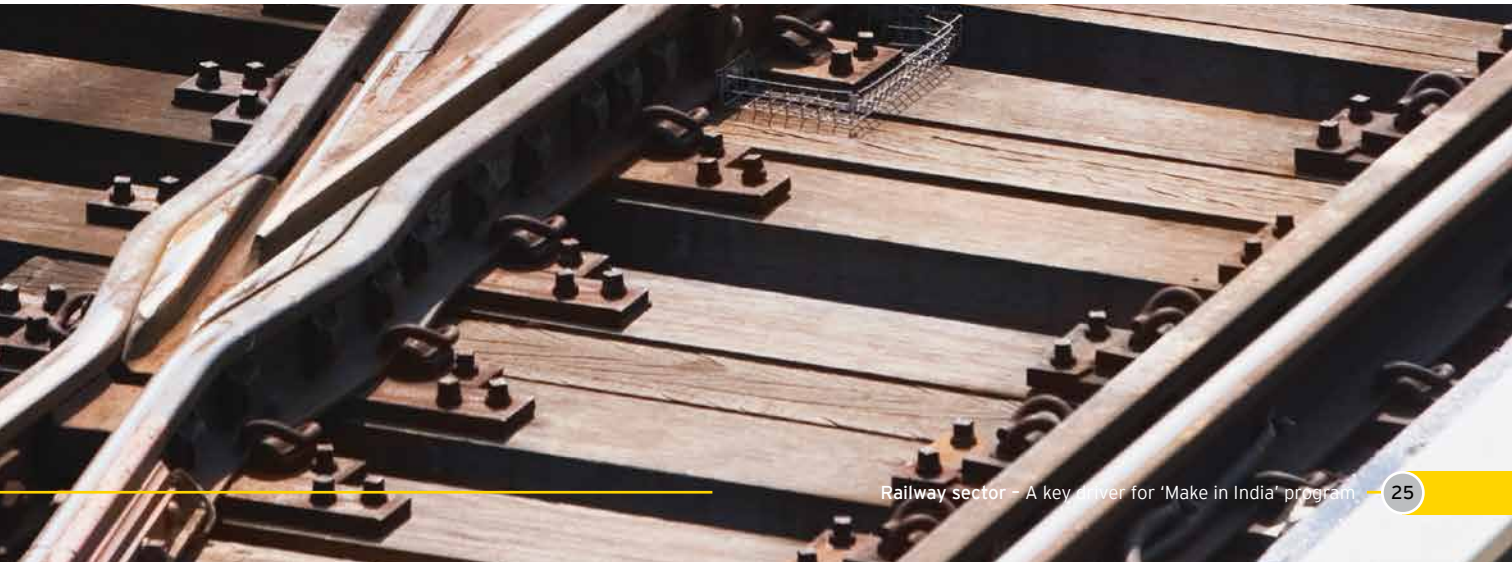

Both these factories will manufacture higher horse power locomotives. As many sub components will get indigenously sourced, Indian suppliers will be able to move up the technology chain and have the opportunity to get integrated into the global supply chain of Alstom and GE. For the first 10 years, the manufacturing facilities of Alstom and GE will focus on fulfilling the mandatory orders from Indian Railways. Post that period, the facilities can also focus on export demand, provided there is adequate capacity after catering to India specific demands.

As Indian Railways aims to modernize its infrastructure, there would be a need to induct latest technology. For example, a work for modernization of complete signaling system, which includes works of Automatic Train Protection (ATP) has been included in the works program 2018-19 for implementation on complete 60,000 route kilometers (RKMs) on broad gauge (BG) network of Indian Railways.[19] Projects of such scale will attract the best in the world and would drive down the costs. Also if a modern railway signal manufacturing ecosystem is established in India, it could become an export base for the rest of the world. The procurement method successfully followed in cases of factories set up at Madhepura and Marhowra could be looked into in all such future initiatives to introduce new technologies into the domestic railway manufacturing set up.

19 http://164.100.47.190/loksabhaquestions/annex/15/AU3609.pdf



# 6 Role of Indian Small and Medium Enterprises (SMEs) in Make in India initiatives in railway sector



Indian SMEs play an important role in railway sector manufacturing. There are over 10,000 SMEs registered on the Indian Railways procurement portal. In terms of the current technology, the existing Indian SMEs are well-equipped to meet the needs of the Indian Railways. However, both from the perspective of offering better services to Indian citizens and also in getting a greater share of the global rail market, there is an urgent need to modernize the railway system in India. As the dedicated freight corridors get commissioned in the near future, there would be a need to introduce higher load carrying freight wagons. With the target to shift newer commodity from road to rail, the need to adopt new freight wagon designs will arise. There is a focus on increasing speed of passenger trains and this would entail enhancements both in track infrastructure and passenger coaches. To make train operations safer, it is required to implement latest signaling systems across the railway network in India. All these initiatives will need upgrading the current technology.

There is a need to focus on the following aspects in order to ensure that the existing SMEs of India are able to rise up to all the needs that a modernizing railway system boasts of.



**SME readiness**

Upgradation in railway technology will be driven by a mix of indigenous innovations and through technology transfers. In the first case, if new designs are introduced by Railway production units or RDSO, there would be a need to assess the readiness of the SMEs to be able to supply as per the new specifications. In case new technology is introduced through a JV mechanism, as it has been the case with GE and Alstom, indigenous procurement conditions will need to be put while taking the level and expertise of the existing vendor base into consideration.



**Skilling and technology upgrade of SME**

Post assessment of the existing vendor base, there would be a need to roll out a program for skilling and technologically upgrading SMEs. OEMs will need to have structured programs to ensure that the higher levels of quality standards and precision are achieved. Educating SMEs on required tool sets, manufacturing methods and processes is essential.



**Financial assistance to SMEs**

Investment by SMEs in product development or process improvement to meet the new requirements might be substantial relative to their respective firm sizes. While the Ministry of MSME and state government has several programs for the MSMEs, access to finance still remains a major concern. There is no program currently in place for offering financial support to the SMEs in the railway sector. This might need to be looked into as newer technologies are introduced in the railways.

# 7 Conclusion

Due to the unique structure of the railways in India, the government can play a pivotal role in inducting new technologies in the railway sector and also to increase India's share in the global rail market. Just like India, China's railways is also completely under the control of government. By adopting a focused approach, China has been able to gear up their railway sector, which in turn has helped them acquire a significant share in the global rail market. Today, they have the largest network of high speed railway lines in the world. Merger of large rolling stock companies had been done in other countries. India could also think of creating an umbrella organization for consolidating in-house manufacturing expertise of the Indian Railways. A focused organization can look at both technical collaborations with leading railway equipment manufacturers as well as effectively scout the world market for avenues where the Indian manufactured railway products can penetrate. Production of ICF design of passenger coaches, a design which is more than half a century old, has been discontinued from April 2018[20]. Only Linke Hofmann Busch (LHB) design coaches which are lighter in weight, have higher carrying capacity, higher speed potential, increased codal life and better safety features will be manufactured in the future. LHB design was adopted by Indian Railways through a technology transfer initiative more than 15 years ago. As Indian Railways targets higher speeds, safer operations and higher payloads, the technology refresh cycles will become shorter. India's SME manufacturing eco system will need to keep pace. There is a need for Indian Railways and railway OEMs who are planning to set up manufacturing units in India to have a focused vendor development framework.

20 http://164.100.47.190/loksabhaquestions/annex/15/AU1327.pdf

# Notes



# Notes





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