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# India: The New R&D Hub For Automotive Industry

Presented By

**The Taplow Group India**

THE TAPLOW GROUP

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# 1. Introduction

- "Research & Development" - Organization for Economic Cooperation and Development defines it as 'creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications'. R&D has become essential in the corporate world as the requirement for new product design and development has increased with reducing product life cycles. Firms willing to relinquish current profits to enhance future performance by investing in R&D are expected to be more competitive in the long run.
- The research ecosystem in India presents a significant opportunity for multinational corporations across the world due to its intellectual capital available in the country. Legions of Indian engineers working across the globe highlight the highly trained manpower available at competitive costs. Consequently, several MNCs have shifted or are shifting their research and development (R&D) base to India. These R&D bases either develop products to serve the local market or help the parent company overseas deliver new innovative generation of products faster to the markets across the world.
- India's R&D investments increased to USD71.48 investors in 2016 (USD billion) billion in 2016 from USD66.49 billion in 2015.
- R&D investments has helped Indian companies to overcome tight competition with affordable products internationally.
- India is a rising economic power and an increasingly important locus of innovation. Spurred by competition unleashed by a liberalization of once stifling regulations, India's private-sector firms are fast improving the quality of their products and services and are rapidly expanding their global presence. At the same time, U.S. and other multinational companies are increasingly locating their advanced research and development (R&D) operations in India to draw on the nation's highly trained scientists, engineers, and managers.
- In the process (and despite the endemic challenges of poverty) India is changing from a locus of low-cost contract research and reverse engineering to a global center of high-value, indigenously generated innovation.
- To sustain this transformation, Indian policy makers increasingly recognize the need for continuing economic reforms, new public investments in the nation's infrastructure, and new policy initiatives and institutions to encourage innovation, expand the skills and knowledge base of its population, and facilitate entrepreneurship.

## 1.1: India as the Global R&D Hub:

- Texas Instruments (TI) was the first foreign company to set up an R&D centre in India. It opened its Bangalore (now Bengaluru) centre in 1985. Although initially developing and supporting proprietary software systems for their Integrated Chip design, it became a full-fledged design centre for application-specific products by 1990. The company has evolved since then. TI India has opened a design centre for 3G wireless chipsets and a centre for developing wireless Local Area Network (LAN) chipsets. The company has developed 225 intellectual property rights (IPRs) at its centre in Bangalore.

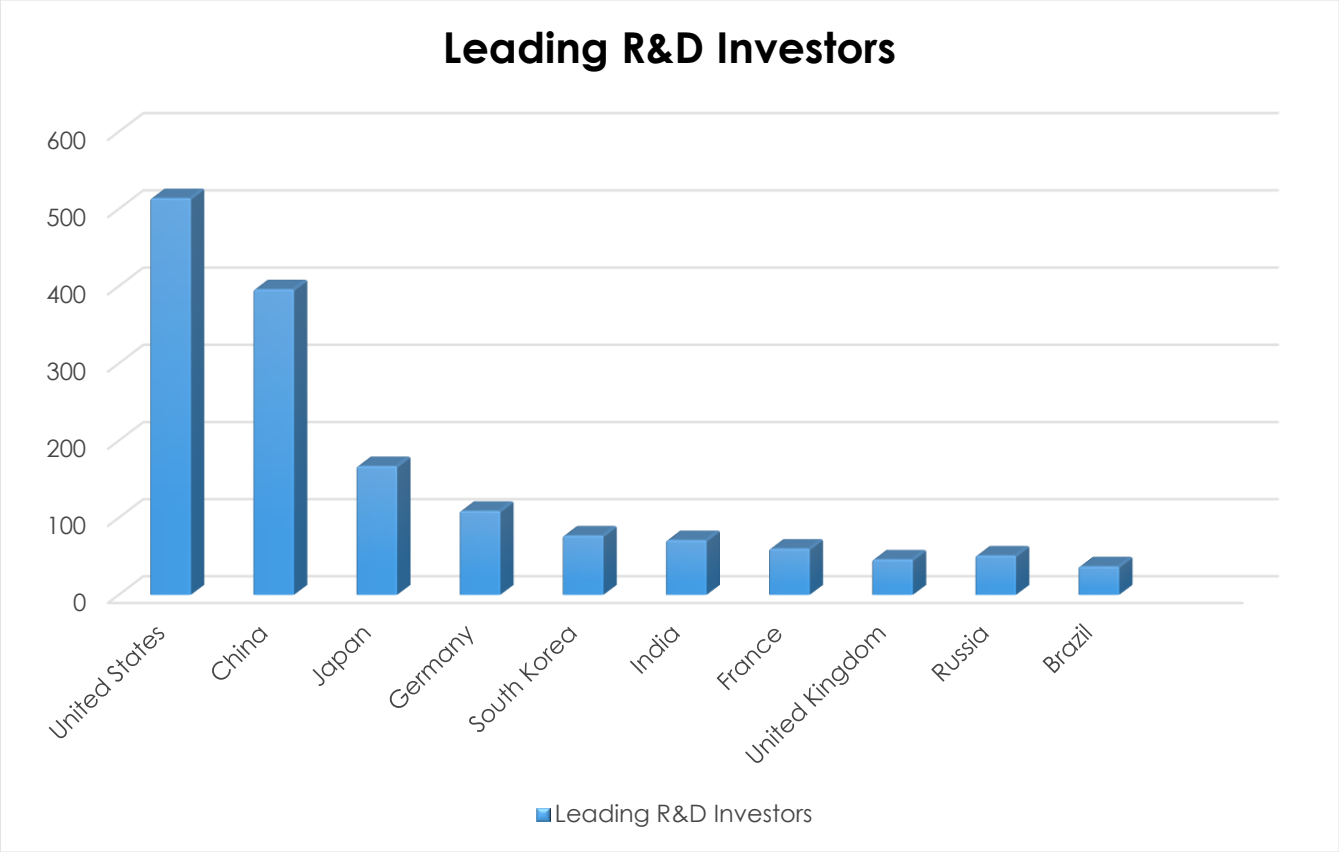
## 1.2: Market Size:

- India's Engineering R&D (ER&D) Globalization and Services market reached US$ 22.3 billion in 2016 and is set to rise to US$ 38 billion by 2020.
- India accounted for 40 per cent (US$ 13.4 billion) of the total US$ 34 billion of globalised engineering and R&D in 2016.
- India has a total of 25 innovation centres in the country and has been ranked as the top innovation destination in Asia and second in the world for new innovation centres. The country accounts for 27 per cent of Asia's new innovation centres.
- India has moved up to the 60th position in the 10th edition of Global Innovation Index (GII) in 2017 and will likely get into the list of the top 25 nations in the next 10 years.
- India ranks second amongst the countries with highest increase in contribution to high-quality scientific research.
- India-based R&D services companies, which account for almost 22 per cent of the global addressed market, grew much faster at 12.67 per cent.
- The market for Engineering R&D (ER&D) companies in India is mainly structured across pure play PES companies such as Cyient, QuEST, eInfochips and the larger IT companies with a PES play such as Wipro, TCS, and HCL. India's ER&D services market is expected to reach US$ 15-17 billion by 2020 and North America continues to be the largest market contributing to 55 per cent of revenues.

## 1.3: Road Ahead:

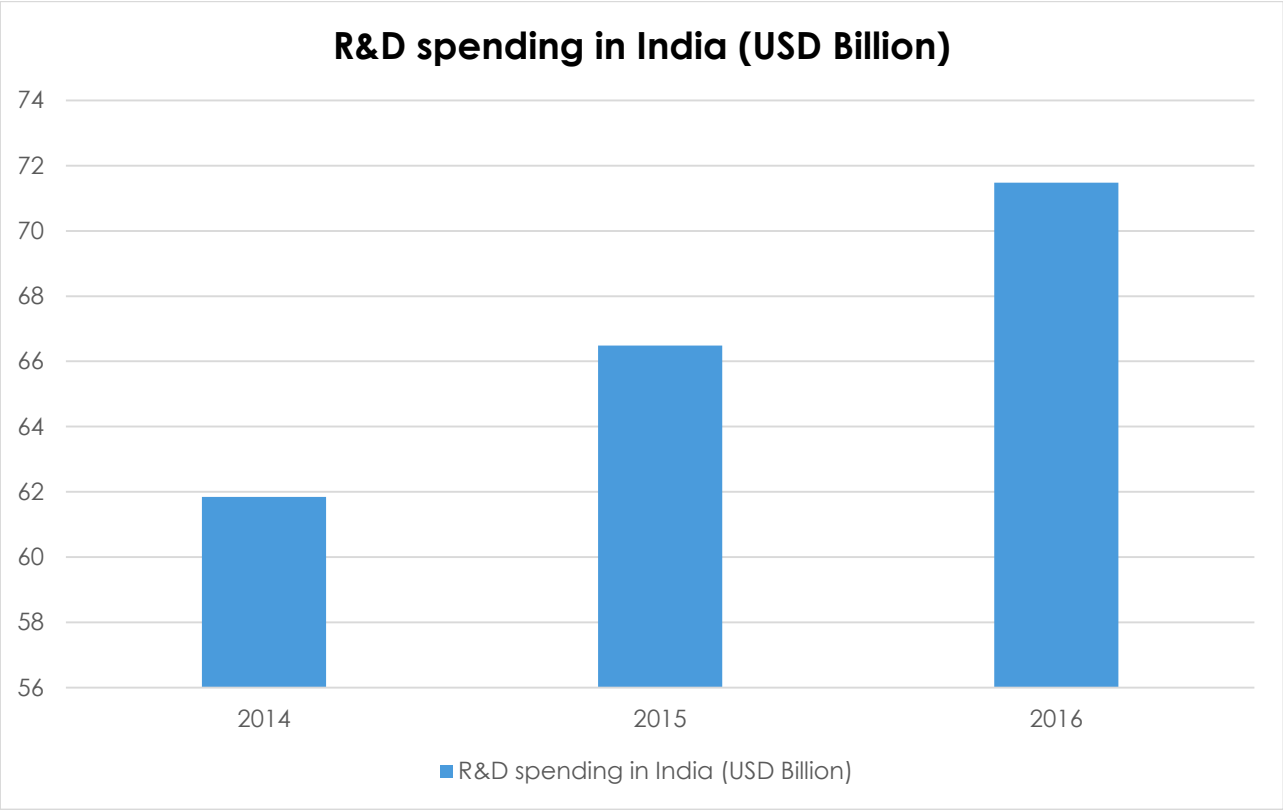
- With the government's support, the R&D sector in India is all set to witness some robust growth in the coming years. According to a study by management consulting firm Zinnov, engineering R&D market in India is estimated to grow at a CAGR of 14 per cent to reach US$ 42 billion by 2020.
- India is also expected to witness strong growth in its agriculture and pharmaceutical sectors as the government is investing large sums to set up dedicated research centres for R&D in these sectors. The Indian IT industry is also expected to add to the development of the R&D sector.

## 2. Leading R&D Investors around the globe

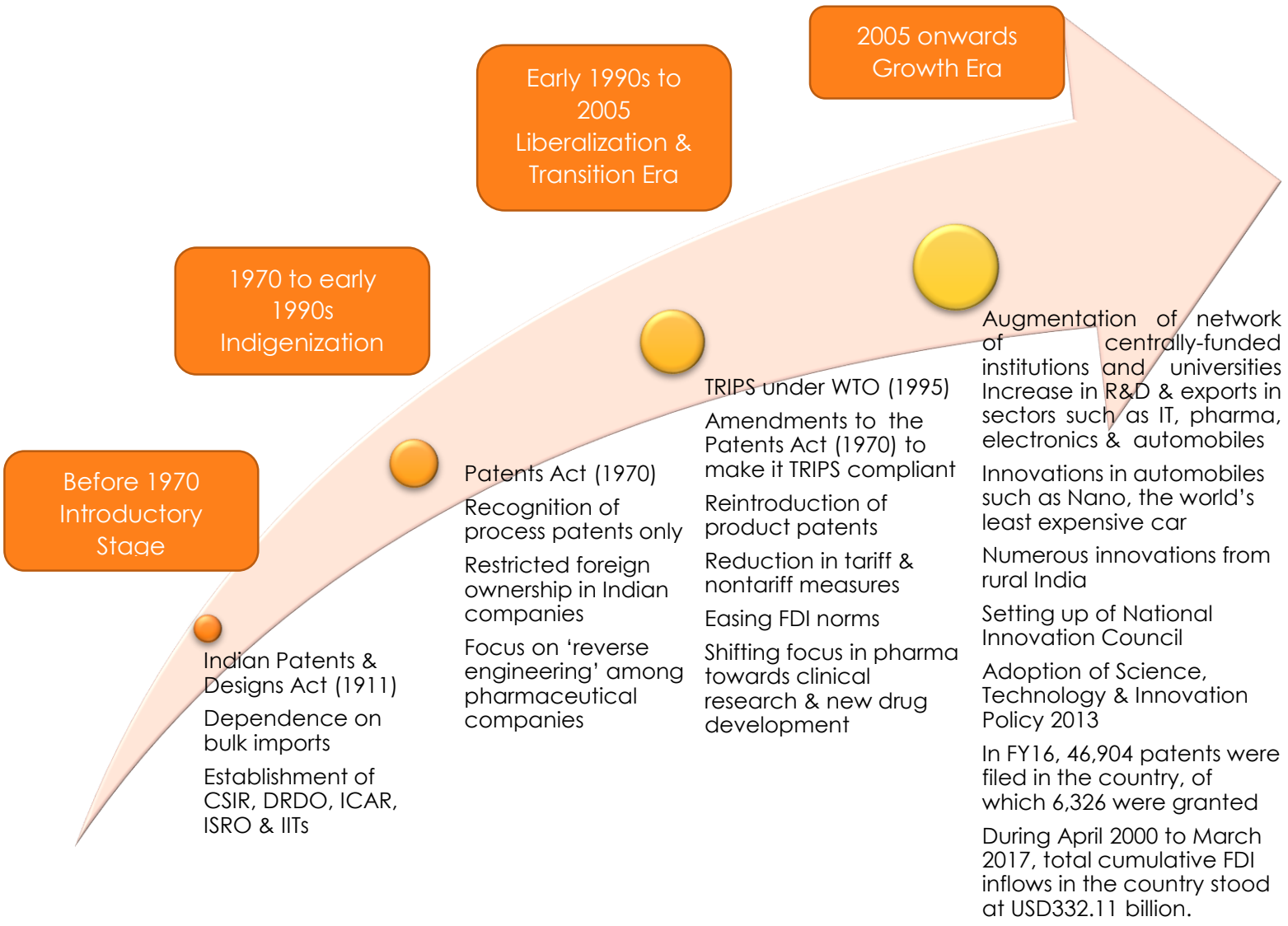


## 2.1 Strong Growth in R&D Investments in India over the Years:

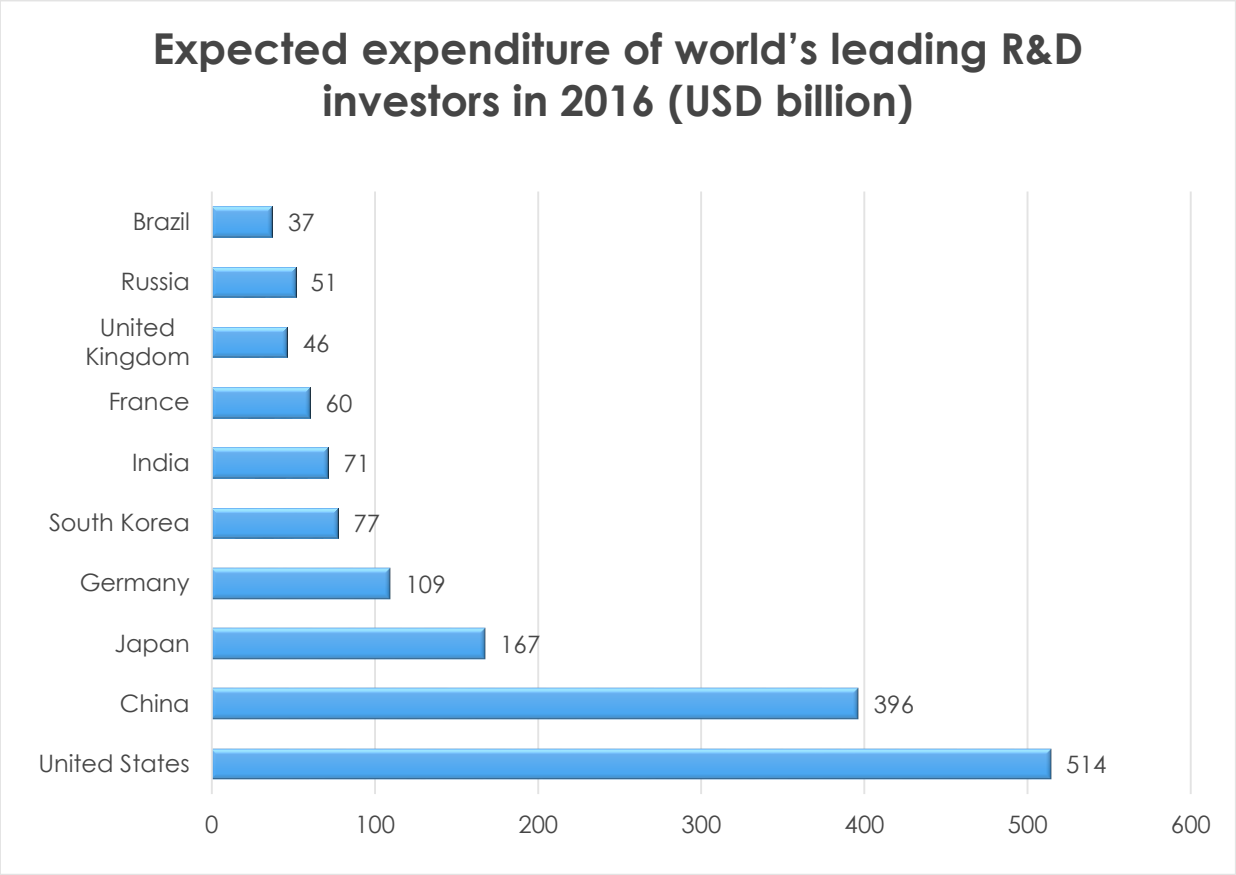
- India's share of global R&D spending rose to 3.53 per cent in 2015 from 3.43 per cent in 2014 & is forecast to be at 3.67 per cent in 2016
- As of March 2017, World Intellectual Property Organization (WIPO) stated that India is emerging as a leader in frugal & demand driven innovation among various countries across the globe.
- In May 2017, the central government introduced various startup intellectual property protection schemes to ease patent filing for startups & promote awareness & adoption of IP rights. Moreover, under these schemes, the central government bears the fees of the facilitators for patents, trademarks or designs that a startup may file. Startups only have to bear the cost of the statutory fees.



## 2.2 Evolution of Innovation and R&D in India



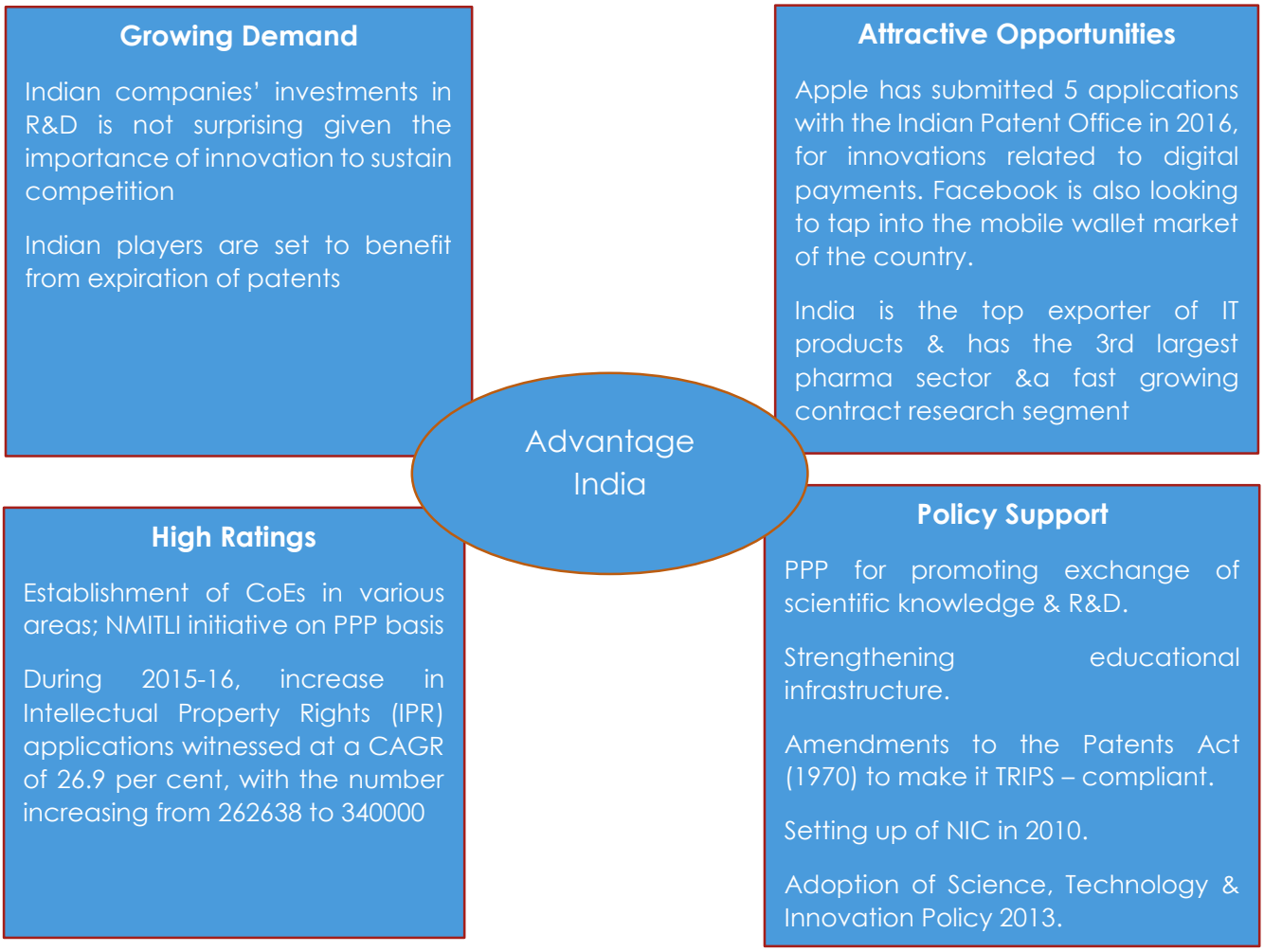
## 3. India among the world's leading R&D investors




- India's R&D investments increased to USD71.48 billion in 2016 from USD66.49 billion in 2015.

- R&D investments has helped Indian companies to overcome tight competition with affordable products internationally.

# 4. Advantage in India



# 5. Global R&D Automotive Market

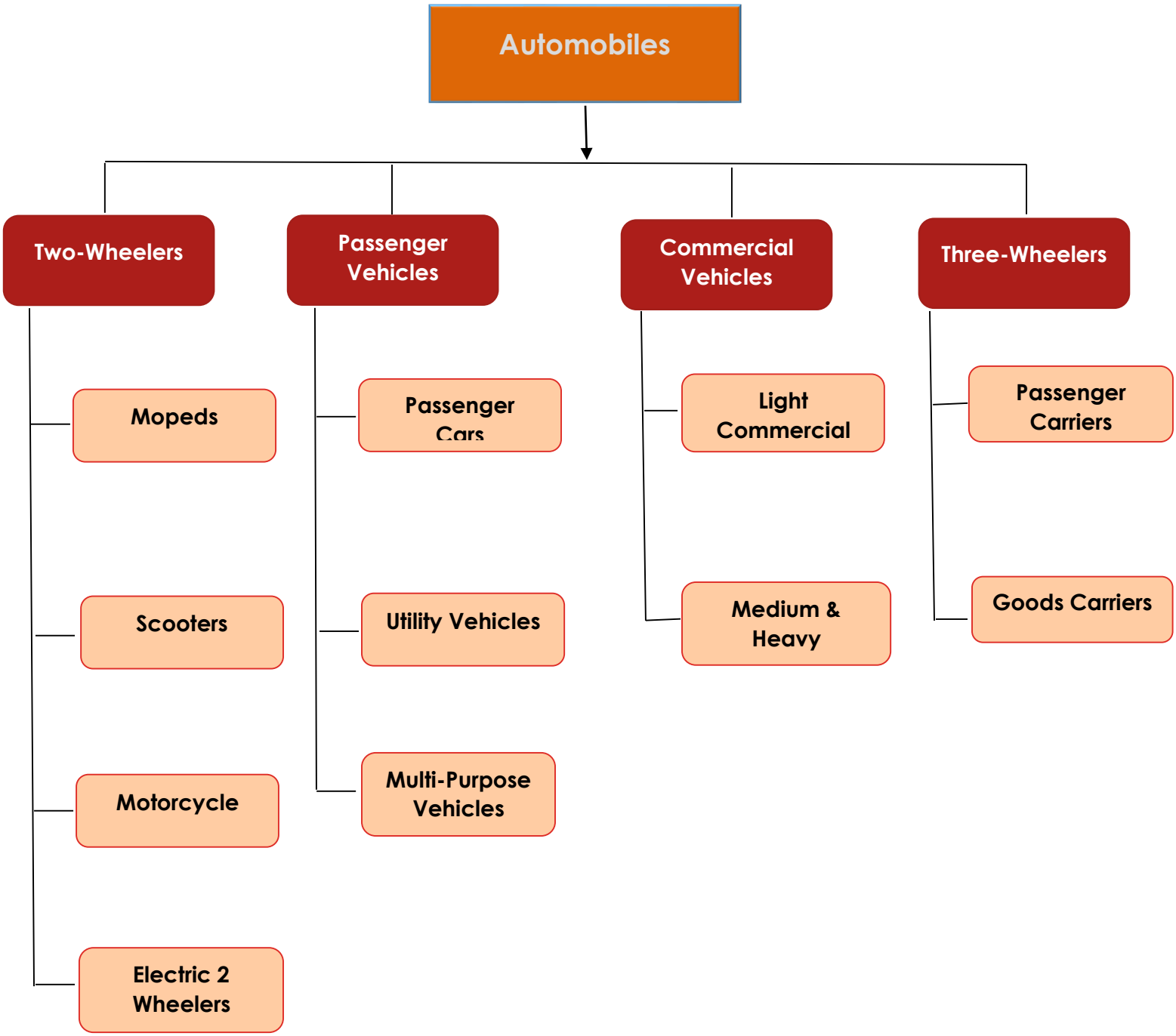
## Market Overview

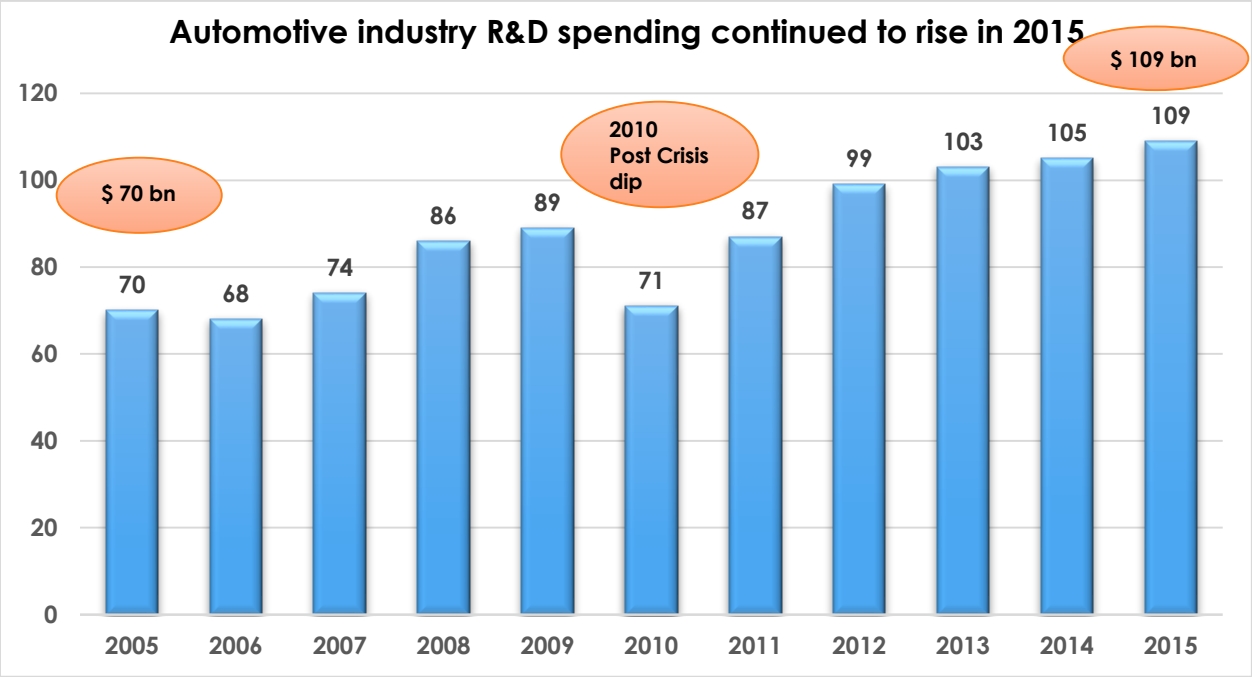
- The global automotive industry is in the throes of the largest technological changes in more than 100 years.
- India is transforming into a global R&D hub for the automotive and auto components sectors as most auto giants are setting up R&D centres in the country. The country offers several key advantages to global auto majors: Lower R&D costs, availability of skilled human capital, and a potentially large domestic market that justifies the investment.
- Having established itself as a small car hub, India is now becoming a formidable choice for performing R&D activities. Auto giants, including small car makers and luxury car manufacturers like Mercedes-Benz, have set up R&D centres in the country over the past few years.

## Market Performance

- The rise of technology in the auto components manufacturing sector globally and its by-products such as mobility, connectivity, fuel efficiency, electric cars and autonomous driving, have brought forward a huge playfield for the Indian manufacturers to compete and innovate in.
- The Indian auto components sector is already driving innovation, and increasing its investments in R&D.
- Automotive industry R&D spending grew by 4.5% from 2014 to 2015
- The future of the automotive space is inching faster towards electric and digital solutions.
- China has the highest number of auto R&D centers, with 55. In comparison, India has 30 and the Bay Area in the US has 20.

## 6. The Automotive Market is Split into Four Segments




Automotive industry R&D spending continued to rise in 2015
$ 109 bn
$ 70 bn
2010
Post Crisis
dip
120
100
80
60
40
20
0
70
68
74
86
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109
2005
2006
2007
2008
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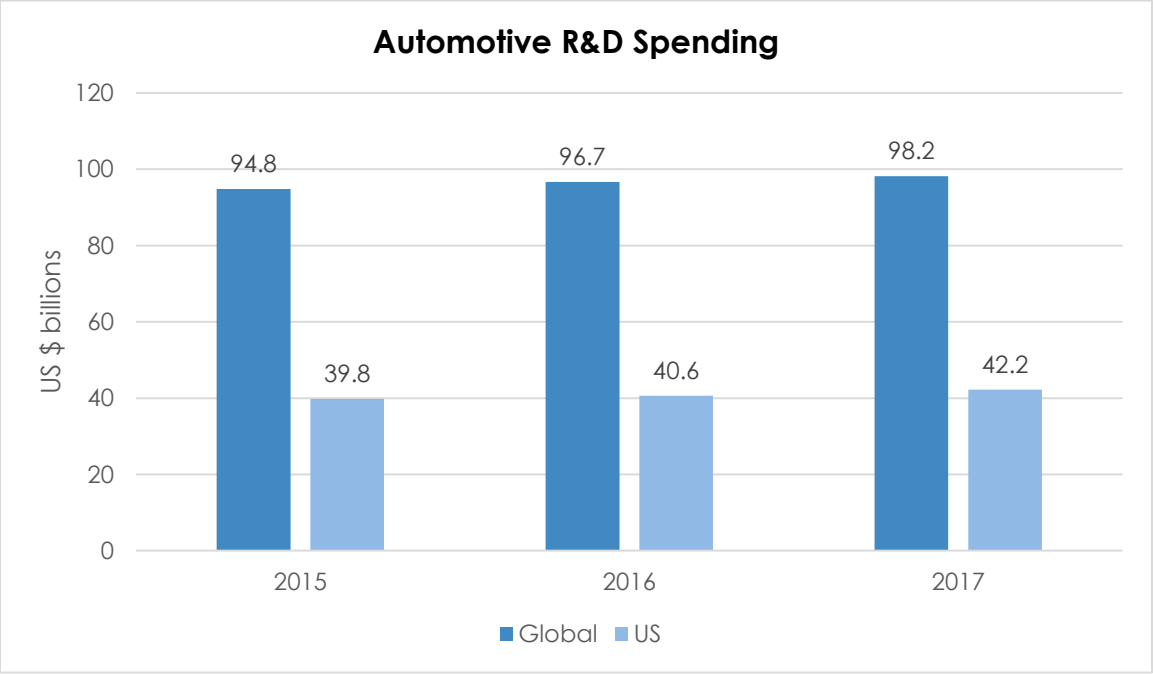
2014
2015


Automotive R&D Spending
US $ billions
120
100
80
60
40
20
0
94.8
39.8
96.7
40.6
98.2
42.2
2015
2016
2017
Global
US

# 7. Key Players in R&D - Scientific and R&D Organizations

| Organization | Business Description |
|---|---|
| **Council of Scientific and Industrial Research (CSIR)** | • CSIR is India's largest R&D organization, with 38 national laboratories, 39 outreach centers, 3 Innovation Complexes, 5 units, 4600 active scientists supported by about 8000 scientific & technical personnel. On an average CSIR files about 200 Indian patents & 250 foreign patents per year. About 13.86 per cent of CSIR patents are licensed, a number which is above the global average. It is engaged in scientific industrial R&D for economic, Environmental & societal benefits for the country.<br>• Its research areas span across aerospace, biotechnology, chemicals, energy, foods, information dissemination, leather, metals, minerals & manufacturing etc. CSIR filed 323 patent application in FY16. |
| **Defense Research and Development Organization (DRDO)** | • DRDO is engaged in design & development of weapon systems & equipment in accordance with the requirements of the military services.<br>• DRDO had a network of 50 labs & establishments to carry out research. It has over 5,000 scientists & about 25,000 other scientific, technical & supporting personnel. DRDO has filed 85 patent application in FY16. |
| **Indian Council of Agricultural Research (ICAR)** | • ICAR is one of the largest national agricultural organizations in the world. It consisted of 99 institutes & 53 agricultural universities across India. ICAR has filed 63 patent application in FY16.<br>• It is the apex body for coordinating, guiding & managing research & education in agriculture, including horticulture, fisheries & animal sciences in India. |
| **India Space Research Organization (ISRO)** | • The organization has 19 centers across India to pursue R&D activities & ISRO currently has a constellation of 9 communication satellites, 1 meteorological satellite, 10 earth observation satellites & 1 scientific satellite.<br>• Its research areas include communication satellites for television broadcast & remote sensing satellites for management of natural resources. |

| | |
|---|---|
| **Indian Council of Medical Research (ICMR)** | • ICMR is the apex body in India for the formulation, coordination & promotion of biomedical research & one of the oldest medical research bodies in the world. ICMR has filed 10 patent applications in 2016.<br>• The council has a fleet of 21 institutes (mission oriented national institute), 6 regional medical research centers & 5 units engaged in medical research. |
| **Centre for Development of Advanced Computing (C-DAC)** | • C-DAC is a premier R&D organization of the Department of information Technology (DIT).<br>• It is engaged in research in the areas of supercomputers, applied electronics, technology, applications & health informatics. C-DAC filed 20 patent applications in FY16. |

# 8. Key Players in R&D – Automotive/ Construction Equipment Sector

| Organization | Business Description |
|---|---|
| **Tata Motors** | • Tata Motors is the biggest automotive manufacturer in Pune, and the biggest one in India. The huge Pune campus consists of their corporate HQ, R&D Center and Manufacturing facility for their cars and trucks. |
| **Land-Rover** | • Land-Rover also started assembling some models near the Tata Motors Pimpri-Chinchwad facility. |
| **Bajaj Auto** | • Bajaj Auto was one of the early automotive players in Pune. They have big base in Akurdi, Pune (R&D, Corporate and Manufacturing). A large new plant has been recently opened at Chakan. |
| **Mahindra Two-Wheelers (Formerly Kinetic Motors)** | • Manufacturers of Scooters, Mopeds and Bikes. Kinetic Motors has been an important player in the Mopeds and Gearless 2 Wheeler space in India. Their famous models include the 'Luna' and 'Kinetic Honda'. |
| **Mercedes-Benz** | • Mercedez-Benz entered the Indian Market in the 1990s, initially with a partnership with the Tatas. Later on, they setup an independent venture, Mercedez-Benz India. The Pune facility manufacturers and assembles a range of their well-known luxury cars. |
| **Volkswagen** | • Volkswagen opened a massive new plant in Chakan, Pune. |
| **Mahindra & Mahindra** | • M&M inaugurated a huge plant at Chakan. Spread over 700 acres and built with an investment of nearly Rs 5,000 Crores (1 Billion Dollars), this plant will manufacture various models of SUVs and Commercial Vehicles. Mahindra is also planning to manufacture new models from Sssanyong Motors. |

| | |
|---|---|
| **JCB** | • JCB manufactures construction, earth moving and other industrial equipment. Their Talegaon plant and design center opened in 2006. |
| **BMW India** | • BMW is a German multinational automotive manufacturing company which currently produces automobiles and motorcycles, and also produced aircraft engines until 1945. |

# 9. Views from Industry Leaders

**ShriKrishan Yogi, Regional President: Brose India Automotive Systems Pvt. Ltd**

- Indian automotive industry experienced a positive year with a two-digit growth. The global automotive industry is going through the disruption. Digitization, automation and new business models are revolutionizing the industry, and the automotive industry is facing similar challenges. The Indian automotive industry has also started experiencing the global disruption effects now.
- With global mobility trends, India is set to witness major changes in the form of technology-driven trends like electric vehicles (EV), shared mobility, connectivity and autonomous driving, along with stricter emission norms (Bharat Stage VI) & safety norms.
- Electrification is getting lead in Indian auto sector as Indian government is giving lot of importance due to their attractive solution to growing levels of vehicle pollution, especially in metros. The government target to go all electric by 2030 is highly optimistic as the present level of charging infrastructure is not encouraging. By 2030, realistically speaking ~30% of electric mobility can be achieved.
- With Budget 2018 expectations, higher R&D deductions (from 100% to 200%) will encourage multinational companies to bring their global technology programs in E-mobility, safety, electronics, and connected vehicles in India.

**Madhur Aneja, President, Region India: Vibracoustic**

- The convergence of disruptive technological trends will continue to challenge the automotive sector. Megatrends like vehicle electrification and autonomous driving, while changing the future of mobility, will throw up new avenues and abundant opportunities for component manufacturers. Success will lie in quickly identifying the shifting markets and adapting business model to benefit from the new revenue pools

**Sagar Hemade, Vice President and Managing Director: Tenneco Automotive India**

- The immediate opportunities for the Indian Auto industry are legislation and Technology. Safety norms, emissions regulation, changing customer preference and digitization. The ability to quickly transition to new norms and trends with the support of global suppliers who have experienced these transitions in other parts of the world will help OEMs leverage these opportunities.
- These technology shifts and legislative demands require all players in the industry to reinvent traditional business models based on:
  - Strong technology road maps and strategic positioning well in advance to capture the growth.
  - Building new competency and capabilities, new product technologies and new manufacturing models.
  - Adapt organization structures to drive innovation in line with the changing end user requirements.

**Sources:**

https://www.ibef.org/download/Innovation-and-Patents-June-2017.pdf

https://www.ibef.org/download/Automobile-April-2017.pdf