EXPORT-IMPORT BANK OF INDIA

WORKING PAPER NO. 93

INDIAN AUTOMOBILE INDUSTRY : AT THE CROSSROADS

EXIM Bank's Working Paper Series is an attempt to disseminate the findings of research studies carried out in the Bank. The results of research studies can interest exporters, policy makers, industrialists, export promotion agencies as well as researchers. However, views expressed do not necessarily reflect those of the Bank. While reasonable care has been taken to ensure authenticity of information and data, EXIM Bank accepts no responsibility for authenticity, accuracy or completeness of such items.

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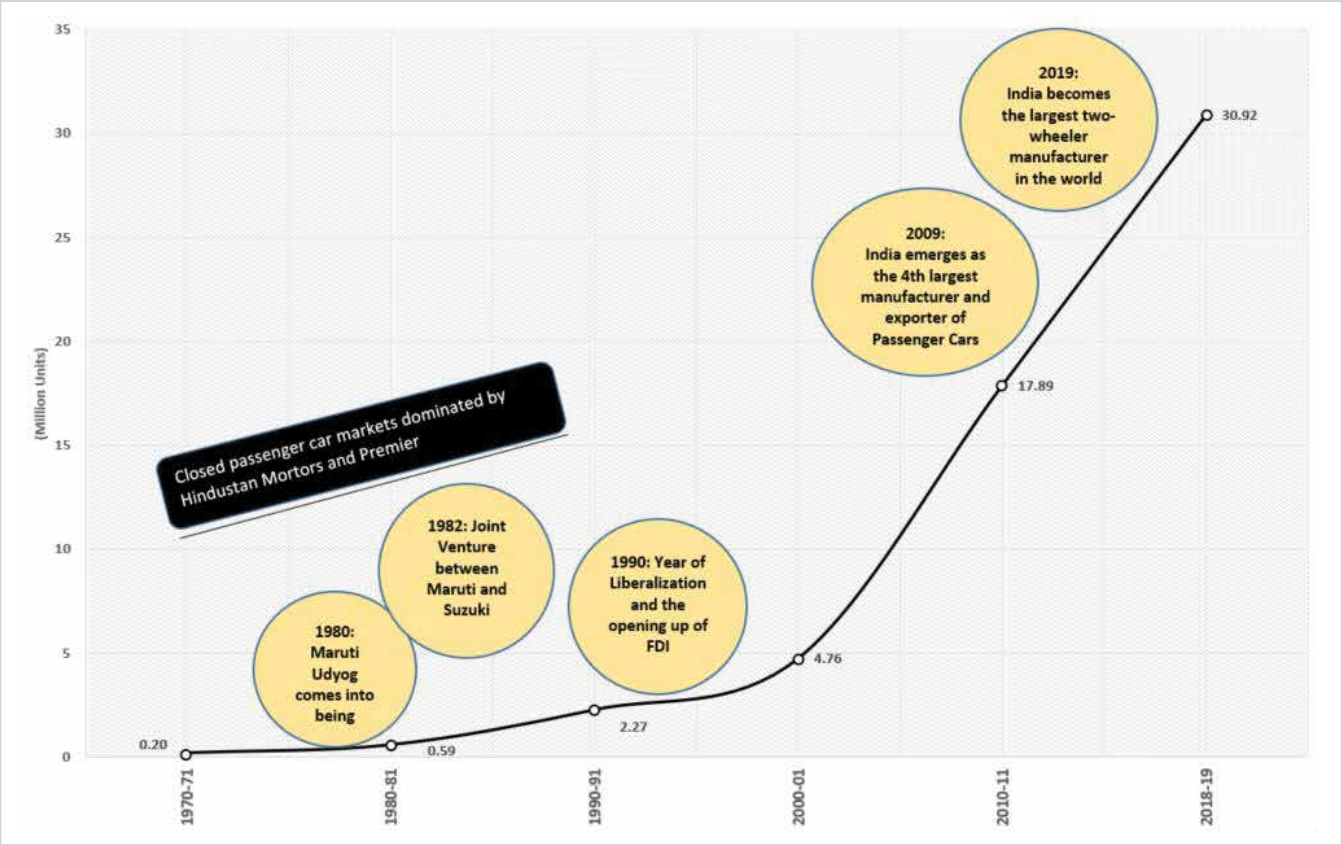
EXECUTIVE SUMMARY

A well-developed transportation system plays a key role in the development of any economy, and India is no exception to it. In 2018, the sector contributed to 7.1% of India's GDP and 49% of the manufacturing GDP.

It is important to acknowledge that the sector assumes the center-stage as a driver of any country's socio-economic growth as it strengthens the upstream & downstream linkages. The significance of various sectoral linkages that the auto sector builds, is enough to bring multiple sectors in disequilibrium with only the auto sector being the epicenter.

The above fact gets amplified by the IMF's World Economic Outlook October 2019, which mentions the auto sector contributing around 20% of the slowdown in GDP in 2018, and roughly 30% of the slowdown in global trade.

Growth of Indian Automobile Industry: 1970-2019

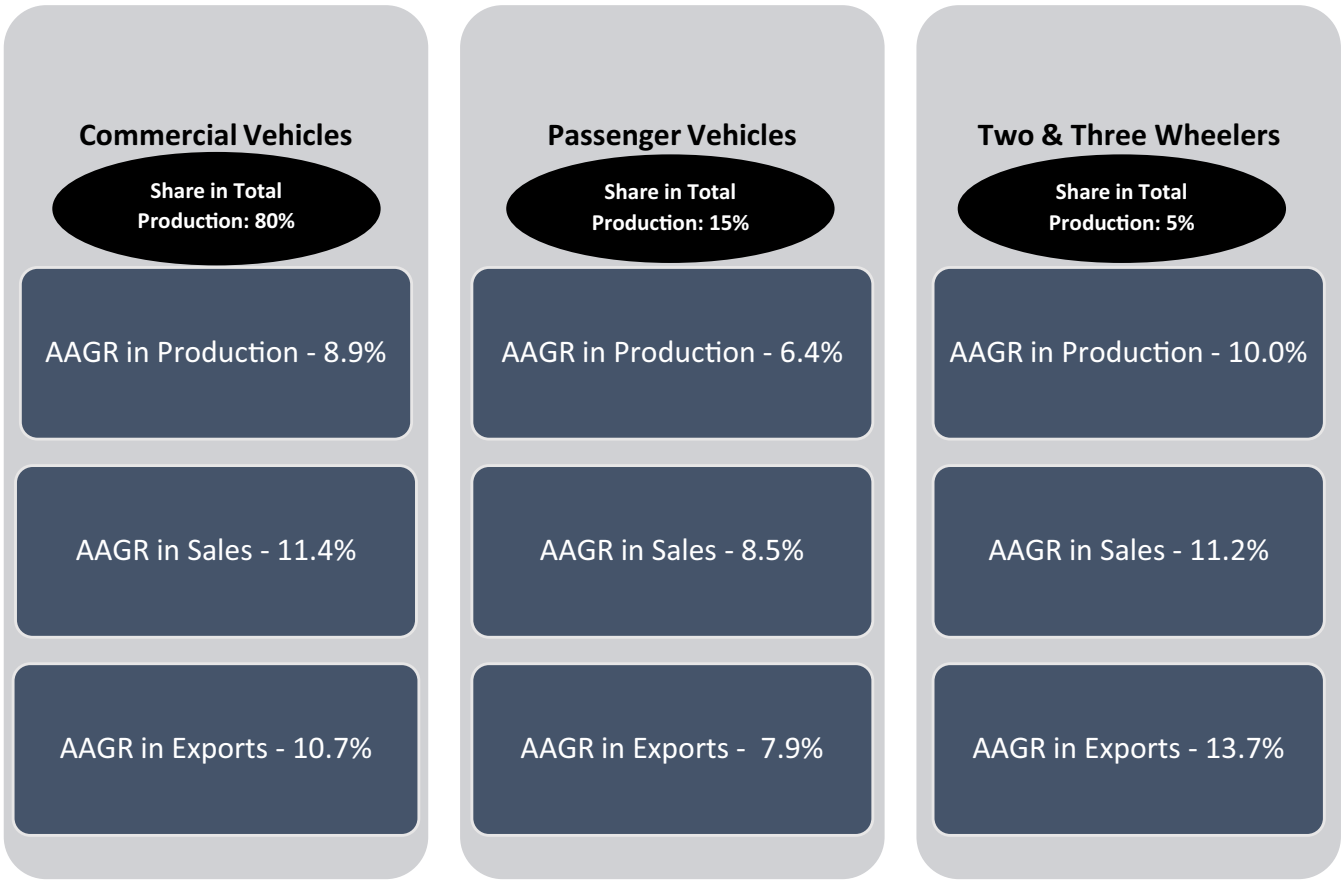


Source: EXIM Bank Research

Since the year 2000, motor vehicle production in India (excluding two and three-wheelers) has grown from 8 lakhs units a year, to over 5 million units. Including two and three wheelers, the figure has grown manifolds from 4.76 million units to 31 million. Three key factors that have propelled the overall growth in the automobile sector in the last few decades were, rising incomes, availability of vehicle loans, and opening of the industry to FDI. With regards sub-segments, while the two-wheelers underwent substantial evolution, becoming the world's largest manufacturer in 2019, the commercial vehicles growth was largely driven by the growing infrastructure needs in the economy.

Regarding investments, the auto sector in India attracted a total of US$ 23.5 billion worth of FDI equity inflows during 2000-2019, emerging as one of the top five sectors of the economy to receive the highest FDI equity inflows. For the year 2018-19, the total FDI equity inflows in the sector stood at US$ 2.6 billion.

Stylised facts of the Indian Automobile Industry



AAGR calculation is for the period FY 2009 to FY 2019
Source: EXIM Bank Research

Since the onset of slowdown in third quarter of FY 19, the total domestic automobile sales in India have shown a consistent decline, falling by 9.3% from October 2018 to November 2019. In contrast to the decline in domestic production and sales, the numbers on export front have been encouraging. Amidst the slowdown, when both the production and domestic sales of automobile registered a decline, exports from the sector increased by an average of 3% on a y-o-y basis during November 2018 and November 2019.

To obtain a comprehensive picture of the sector's export competitiveness, three indices – Revealed Comparative Advantage Index, Trade Intensity Index and Intra-Industry Trade Index are analyzed for select 31 HS codes at the 6-digit level. Out of these 31 items, Indian exports for just six items were found to be at a revealed comparative advantage. With regards trade, amongst its top ten markets, India had the highest index of 64.68 with Nepal, followed by Bangladesh at 49.96, delineating the importance of India's automobile exports in the two countries.

Amidst the ongoing global concerns on climate change, India's policy perspectives have evolved and undergone a paradigm shift, with reorientation of focus towards sustainable mobility through alternate fuels and electric vehicles. Given that India's market share of electric cars is a meagre 0.06% compared to 2% in China and around 39% in Norway, the alternate vehicle segment holds the potential to bring about substantial shifts in the way auto industry has operated in the last few decades. It is to be noted that batteries, which make up roughly one-third of the cost of today's electric vehicles, along with fuel costs will determine how quickly Plug-in Electric vehicles (PEVs) become the demonstrably cheaper option for personal transportation and, thus, how rapidly this market expands. The manufacturing costs will, as a result rise, on account of unique assembly lines for PEV batteries. The Study has in detailed put into perspective the various policies that were put in China, Norway and USA to spur the alternate vehicle use.

The automobile industry in India has gone through phases of phenomenal growth. Apart from establishing itself as a prime destination for manufacturing of automobiles, India has also moved up the ranks to emerge as an auto export hub for both passenger and commercial vehicles.

The sector has long been characterized as a 'sunrise' sector, and over the decades has been one of the world's fastest growing market, especially for passenger cars and two wheelers. However, the sector currently is at an inflection point, faced with headwinds that will determine the direction of its transition. While a part of the ongoing slowdown has been closely associated with the declining aggregate demand in the economy, a part of it is also attributed to the inevitable structural changes that have occurred within the auto sector. The Study herein has attempted to draw a holistic picture of this evolving scenario, ascertaining the dimensions of ongoing slowdown and the outlook for the next few years.

RCA Insights: Identifying the areas of focus	• India enjoys RCA for six items at HS 6-digit level under the HS 87 group. These items constitute 71% of the total automobile exports from India by value. • Across the top ten export items by value globally, India enjoys RCA in just three product sub-groups when compared with Germany, Mexico, Japan and the USA.
Penetrating the used cars market in Africa	• The used vehicle market has been estimated at about US$ 60-70 billion in sales worldwide with some of the largest importers of used vehicles globally being in Africa. • Export of cost competitive hatchback cars from India to Africa can be mutually benfecial for both the regions.
Building on India's stronghold in developing economies	• India's exports of 2-wheelers in which it has an advantage reached a ten-year high of US$ 2.1 billion in 2018, growing at an AAGR of 20% during 2009-2018, with more than 35% of the total exports concentrated in Bangladesh, Sri Lanka and Nigeria. • The rapid surge in the demand for two-wheelers and four-wheelers across economies such as Bangladesh, Nigeria and Sri Lanka not only complements India's areas of core competence in such sprawling markets, but it also provides the avenue for sustained growth as the demand in domestic markets stagnate.
Reviving the FDI: Addressing the Gaps	• FDI equity inflow in the auto sector has registered an AAGR of 27.7% during the period 2000-01 to 2018-19. • Growing needs for customization coupled with incorporation, tech-upgradation and adherence to higher standards of safety makes FDI an essential factor for the future of Indian auto industry.
Trade Agreements	• India's trade surplus with ASEAN in auto industry, and Mexico's phenomenal rise as a leader in automobile manufacturing and exports, build the case for India to channelize the growth potential of automobile sector through preferential trade agreements with more nations. • Entering into FTAs is also likely to result in concentration of manufacturing of certain kinds of vehicles in hubs that are particularly suited for regional or global distribution.
Channelizing the growth of shared mobility	• The shared mobility fleet strength grew by 50% in 2018 compared to 2017. The market is expected to further grow at a CAGR of 9.7% during 2019-2025 to reach a strength 4.7 million. • Leading car manufacturers cannot solely rely on the sale of private automobiles and will have to innovate and improvise their business models to survive.
EV uptake	• There's a lot to learn from China's growth story for EVs including its the rolling out of EV policy and EV uptake in a phased manner. • Further, domestic battery manufacturing and enhancing charging infrastructure can take Indian EVs market to newer heights.

CHAPTER

INTRODUCTION

India continues to be counted amongst the major growing economies in the world, despite a slight moderation in its GDP growth projection to 6.1% in 2019, and subsequent anticipated pickup to 7% in 2020. This is amidst a revised downward projection for global growth to 3% in 2019, and 3.4% in 2020[1].

Even with an expected economic slowdown in the medium term, there are still plenty of opportunities of a stellar growth trajectory in the long term – this positivity essentially stems from a few facts, which includes - a favorable demographic dividend, increasing urbanization and rising levels of income and consumption. India's population between the age of 15 and 64 is slated to rise from 860 million in 2015 to about 1 billion over the next 20 years, i.e. its labor force would possibly rise by about 30%, making it bigger than that of China[2].

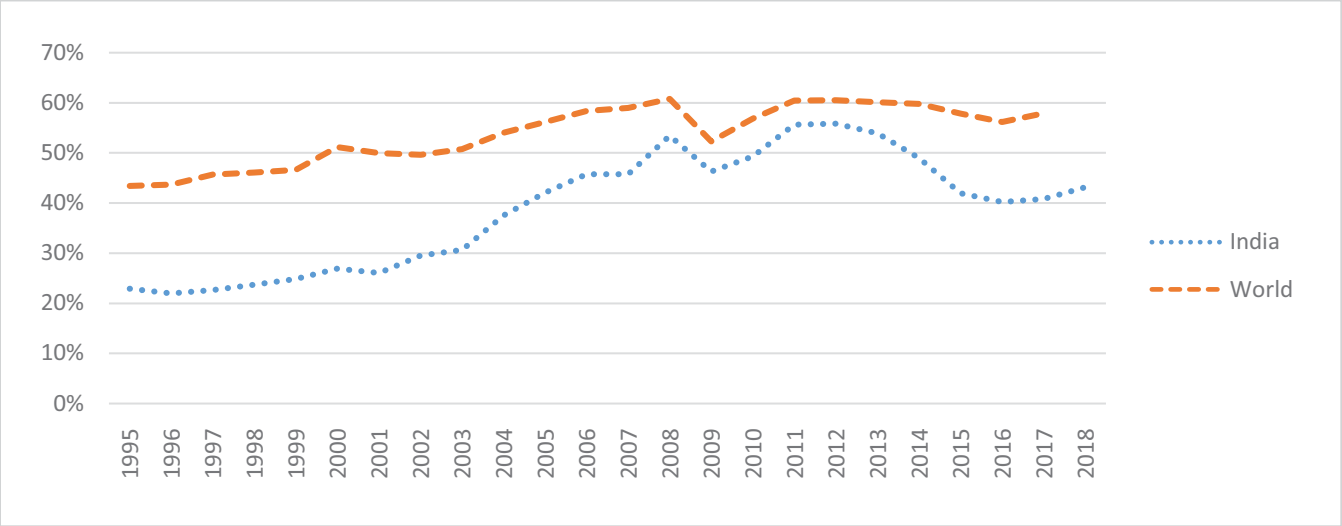
With respect to the performance in the global front in the last few years, India's position has been quite impressive in both the merchandize as well as services exports. India's exports, during 1995 to 2018, have increased from US$ 31 billion to US$ 326 billion, registering an AAGR of 11.8%. As a result, India's share in the global merchandize exports has increased from 0.6% in 1995 to 1.7% in 2018.

With respect to the services, India's exports have grown much faster at an average annual rate of 16.9% during 1995 to 2018, with exports increasing from US$ 7 billion in 1995 to US$ 205 billion in 2018. It may be interesting to note that the world exports of services during the same time, exhibited an AAGR of 7.3%. India's share in the global services exports was recorded at 3.5% in 2018.

India's integration with the world economy can also be ascertained by the fact that India's trade to GDP ratio has consistently increased during the last 25 years. Trade, as a percentage of GDP, which was approximately 23% in 1995, has almost doubled since then and was recorded at over 43% in 2018[3]. Although, India has significantly reduced the gaps with the world average in this context, it remains below the global trade-GDP ratio of over 57%, thereby exhibiting headroom for growth.

[1] IMF World Economic Outlook, October 2019
[2] United Nations Population Database
[3] World Bank Database

Figure 1: India's trade to GDP ratio vis-à-vis World



Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

Automobile Industry in India

The auto industry is organized in tiers with the presence of automakers (also called Original Equipment Manufacturers, or OEMs who are assemblers or the final customers in manufacturing) and suppliers moving from complex jobs to simpler ones along the value chain (also called Tier 1, Tier 2 and Tier 3 suppliers), similar to the pattern that is occurring elsewhere in the world[4].

Evolution

Potential of the automobile industry in India was envisaged early in 1940s with the setting up of Hindustan Motors' manufacturing capacities in Okha, Gujarat followed by Mahindra's production units for utility vehicles in the same decade.

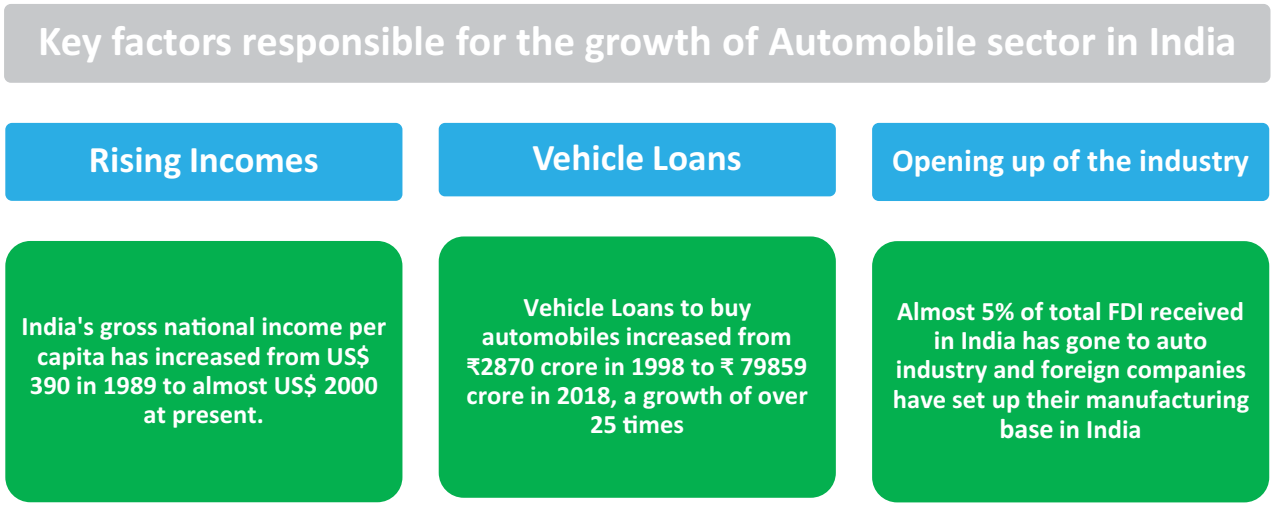
From 1960 to 1990s, the Indian passenger car market was dominated completely by Premier Motor's 'Padmini' and Hindustan Motors' 'Ambassador' donning Indian roads till the 1980s; when a joint venture between the Government of India (GOI) and Suzuki Motors, Maruti Udyog Ltd (MUL)came into being and shook the existing stable oligopoly.

Pre-liberalization, in 1982, the alliance between Maruti and Suzuki was the first automobile joint venture between an Indian company and foreign one. Slowly and steadily, the economic reforms of 1991 led to the entry of major foreign companies like Ford, Hyundai, Honda, to name a few, which expanded their base in India.

Over the decades, the Indian passenger car market has evolved and emerged as a hub for auto makers to set up their plants for manufacturing vehicles intended for domestic and international markets. The three prominent regions in which most of the Indian car industry is concentrated lies in south,

[4] What's holding back India's automotive sector? World Bank, 2017

Exhibit 1: Broad factors facilitating Automobile sector



Source: EXIM Bank Research

west and north of the country. In the southern region, Chennai remains the hub for manufacturing vehicles while Mumbai and Pune belt comes in second place. For the north, the NCR holds a fair share as far as concentration of production facilities is concerned.

In the present scenario, the market share of companies for the passenger vehicle segment is dominated by Maruti Suzuki India Ltd followed by Hyundai Motor India Ltd and Ford India Pvt Ltd. In terms of exports by model, Ford's EcoSport topped the list of car exports from India with 91,694 units being exported in 2018, which was followed by Chevrolet Beat.

As far as the commercial vehicles segment is concerned, India was the seventh largest producer in the world[5]. The industry has grown significantly since the turn of this millennium, which is evident from the fact that the industry could increase its sales by more than seven times to 1.1 million units in FY 19, compared to 150,452 units in FY 01. In terms of value, it stood at US$ 14 billion in FY 19.

While the domestic production is led by Tata Motors and Ashok Leyland, the key stakeholders for the commercial vehicle segment in India are the fleet owners and transporters. The growth in the CV industry has primarily been driven by increased industrial production as well as the growth in investments made in building infrastructure in the country.

With regards two wheelers, the genesis of the industry was marked by the arrival of 350 cc Bullet manufactured by the Royal Enfield Company of the United Kingdom in 1955 for the Indian Army. The motorcycle market further expanded in 70s with the entry of Yezdi and Rajdoot. Around the same time, Automobile Products of India (API) began manufacturing scooters and dominated the segment until 80s when it was overtaken by Bajaj. The advent of Chetak scooters, Bajaj's debut product, was the beginning of the scooter story in India. The product was so successful that there was a long waiting period involved.

The early 80s saw India's two-wheeler industry growing significantly especially in Tier 1 and Tier 2

[5] Commercial Vehicle Industry in India: An Investigation of the Innovation and Business Trends

cities, forging partnerships with foreign giants like Suzuki (with Maruti in 1981), Yamaha (with Escorts in 1983) and Honda (with Hero in 1984). Hero Honda's partnership made giant strides, with a slew of bikes that offering safer rides with better mileage.

Over the years, India's two-wheeler industry, as a major sub-segment of the automobile industry, has substantially evolved, and stands as one of the largest in the world. Accounting for 81% of the domestic demand for automobile in the country, the growth in sector was led by Hero MotoCorp and Honda with market shares of 38% and 31% respectively.

Economic significance of the industry

The automobile sector is a significant driver of a country's holistic socio-economic growth as it strengthens the upstream & downstream linkages. The significance of various sectoral linkages that the auto sector builds is enough to bring multiple sectors in disequilibrium with only the auto sector being the epicenter. For instance, production of vehicles would require steel, iron, aluminum, plastic, glass, textiles, computer chips, rubber, amongst others. Given its linkages with multiple industries in an economy, the auto industry becomes a barometer of economic growth in any economy. The growth of this industry, therefore, can bring inclusive growth and community development, other than just the economic growth.

As mentioned, with various linkages of auto sector in place with multiple industries, it has potential to generate huge employment opportunities, both direct and indirect. It is estimated that in India, a car generates 5.3 jobs, a commercial vehicle 13.3 jobs, a two-wheeler 0.5 jobs and a three-wheeler 3.9 jobs.

The indirect employments include employments in ancillary and component industries, automobile service stations, institutions financing purchase of vehicles and customers driving commercial and hired vehicles. Because of these widespread linkages, many developing countries' governments that aim to develop rapidly through industrialization give a huge importance to the automobile industry. During the period 2006-2016, the automotive industry achieved the target of incremental employment creation of 25 million jobs. Further, according to the Automotive Mission Plan 2016-2026, the potential for incremental number of both direct and indirect jobs to be created by the Indian automotive industry stands at nearly 65 million. This is over and above the 25 million created during 2006-2016.

Global Automobile Sector: The Recent Trends

With the recent slowdown in the Indian automobile industry, an effort is made towards taking cognizance of any similar impact elsewhere globally. This gets more pronounced as IMF's World Economic Outlook October 2019, mentions the auto sector contributing around 20% of the slowdown in GDP in 2018, and roughly 30% of the slowdown in global trade.

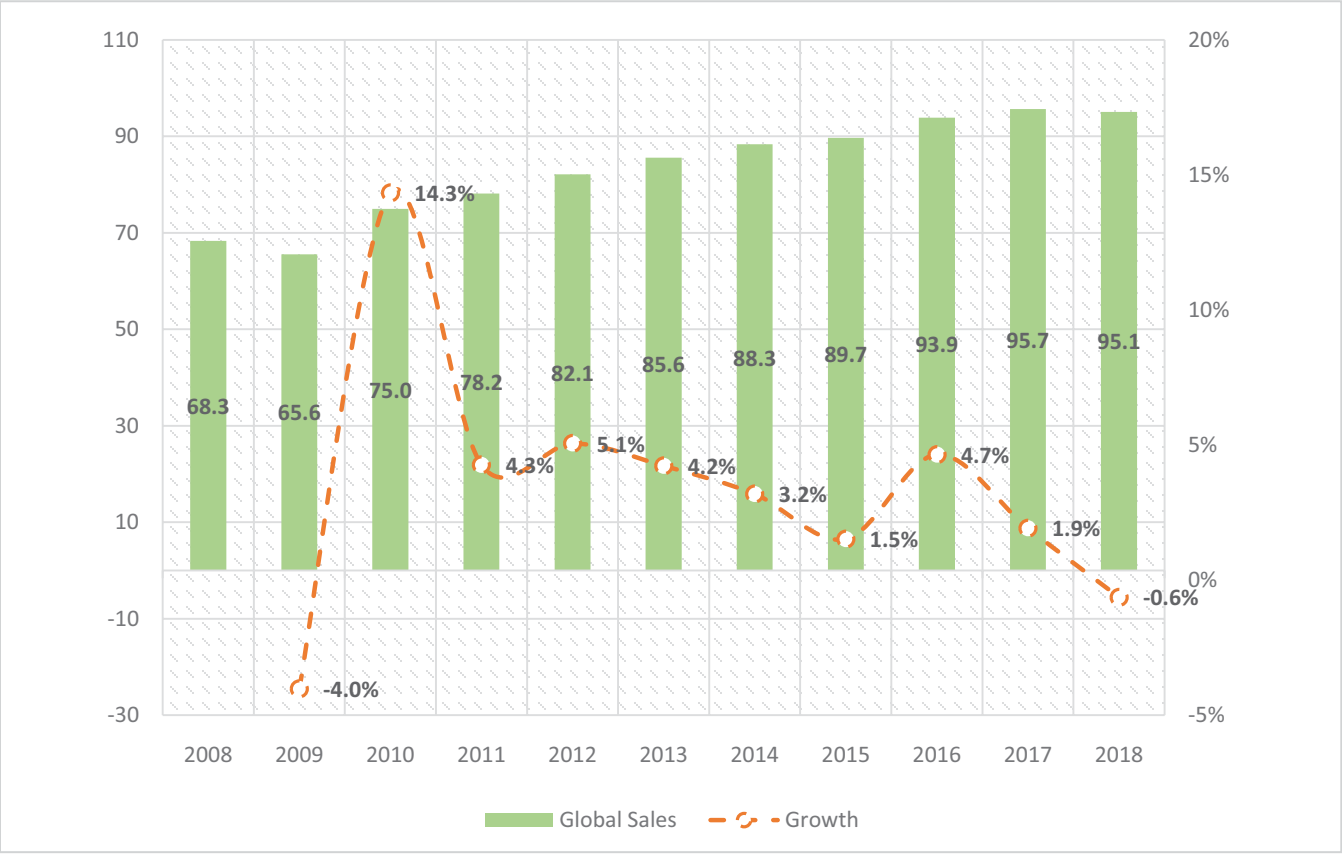
The global automobile sales were recorded at 95.1 million units in 2018, up from 68.3 million in 2008, registering an AAGR of 3.5% during this period. During this period, a negative growth was registered for only two years - 2009 (fall 4% over 2008); and 2018 (fall of 0.6% over 2017) – the 2018 decline is the first entry into the negative territory since the global financial crisis a decade back.

During 2008 to 2018, the automobile sales in Europe fell by (-) 0.4% on an average, annually, negative AAGRs were registered by countries such as (-) 0.3% in Finland, (-) 6.5% in Greece, (-) 0.6% in Italy, and (-) 0.4% in the Netherlands.

On year on year basis in 2018, countries like Austria (-2.2%), Denmark (-2.1%), Iceland (-15.1%), Ireland (-2.8%), Italy (-3.2%), Norway (-7.5%), Sweden (-5.6%), Switzerland (-3.5%), and UK (-6.1%) recorded negative growth rates in automobile sales.

In rest of the world, Canada (-2.6%), Mexico (-7.1%), Argentina (-10.3%), Peru (-9.3%), Australia (-5.7%), China (-2.8%), Hong Kong (-) 6.6%, Israel (-5.2%), amongst others, recorded fall in the automobile sales in 2018 vis-à-vis 2017.

Figure 2: Global Automobile Sales (in Million Units) : 2008 - 2018

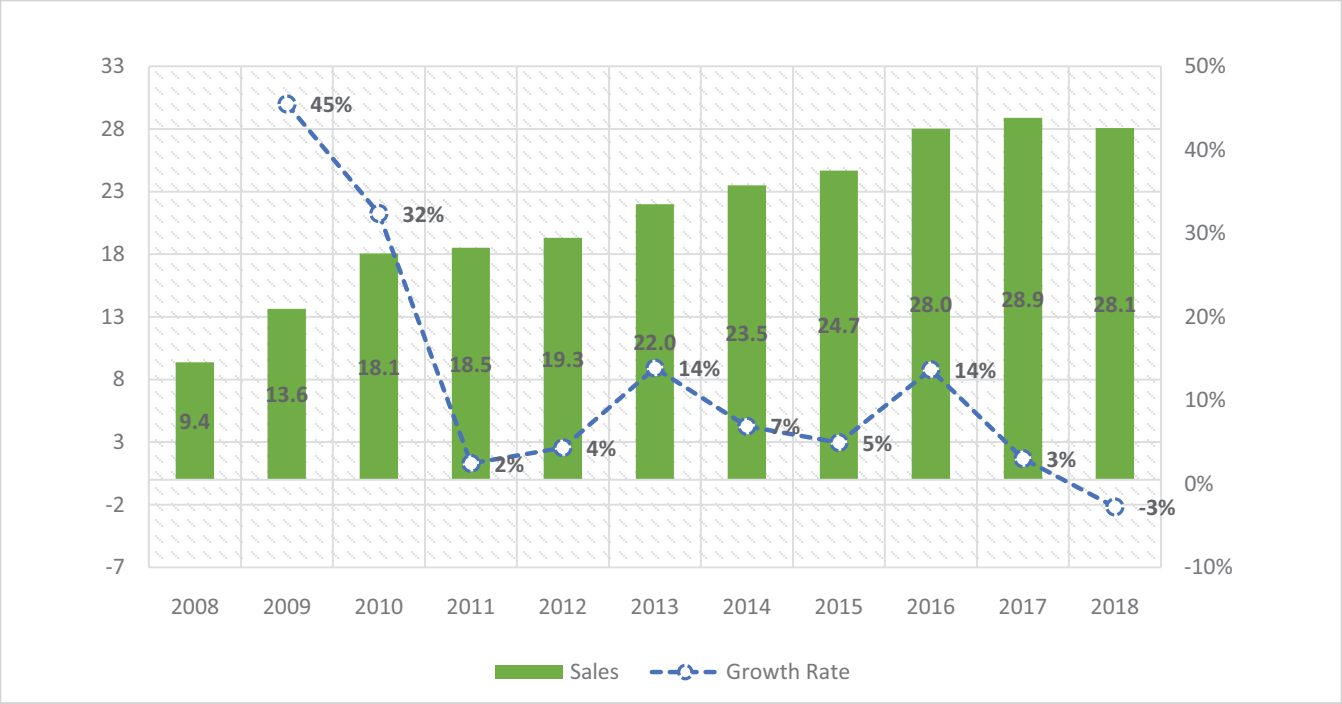


Source: International Organization of Motor Vehicle Manufacturers (OICA); EXIM Bank Research

Further, it is important to analyze the case of China, which is responsible for almost 30% of the global automobile sales, and 60% of the Asia, Oceania, and Middle East sales. The automobile sales from China were registered at 28.1 million in 2018, up from 9.4 million in 2008. While the AAGR registered Exhibit (Automobile Sales in China to come here) during this period was 12.4% for automobile sales in China, the growth turned negative (-) 2.8% in 2018.

The automobile sales' performance was even worse in 2019. During Jan-Oct 2018, all the months recorded negative y-o-y growth for automobile sales.

Figure 3: Automobile Sales in China (in Million Units) : 2008 - 2018



Source: International Organization of Motor Vehicle Manufacturers (OICA); EXIM Bank Research

Table 1: China's automobile sales (Jan-Oct 2019)

Month	Sales (Million Units)	Y-O-Y Growth
Jan-19	2.37	-16%
Feb-19	1.48	-14%
Mar-19	2.52	-5%
Apr-19	1.98	-15%
May-19	1.91	-16%
Jun-19	2.06	-10%
Jul-19	1.81	-4%
Aug-19	1.96	-7%
Sep-19	2.27	-5%
Oct-19	2.28	-4%

Source: Haver Analytics; EXIM Bank Research

Overall, the automobile industry slump reflects both supply disruptions and demand influences - a drop in demand after the expiration of tax incentives in China; production lines adjusting to comply with new emission standards in the Euro area (especially Germany) and China; and possible preference shifts as consumers adopt a wait-and-see attitude with technology and emission standards changing rapidly in many countries, as well as evolving car transportation and sharing options[6].

[6] IMF's World Economic Outlook, October 2019

Indian Automobile Sector: Stylised facts

Appropriately named as the 'Sunrise Sector' of the economy, the automobile sector's contribution to the GDP, rose from 2.8% in 1992-93 to over 7.1% at present, providing direct and indirect employment to over 39 million people.

The total domestic sales of the automobile industry were recorded at almost 26.3 million units in 2018-19, up from 12.3 million units, a decade ago, in 2009-10. The average annual growth rate in the domestic sales, during this period, was registered at 9%. In the last five years, that is, during 2014-15 to 2018-19, the average growth has been 7.5%. The exports displayed an even more impressive performance and recorded an AAGR of 11.6% during the last decade. In the light of recent downturn in domestic auto sales, diversification into promising export markets can emerge as a stronghold for India's automobile manufacturers.

An important role in the growth of the automobile industry in India in the last two decades has been played by the foreign investments that have come with technology transfer. The Automobile Industry in India is supported by factors such as the availability of skilled labor at relatively lower cost, robust R&D centers and low-cost steel production. Driven by these factors, the Indian Automobile industry has attracted Foreign Direct Investment (FDI) worth US$ 22.4 billion during the period April 2000 to June 2019[7].

The Study

The Study categorizes the Indian Automobile sector into three segments - commercial vehicles, passenger vehicles and two & three wheelers and seeks to address the questions surrounding the current slowdown in the Indian Automobile Industry and the induced spillover effects it has had on other industries such as iron and steel, aluminum, rubber, chemicals and more due to its extensive linkages.

In the light of ongoing challenges in the sector, it is also vital for ambitious policies such as Automotive Mission Plan 2026 to assume the center stage and effectively steer the sectoral growth towards the envisaged goals. The Study attempts to investigate trends in India's automobile production, domestic sales, exports and annual/monthly financials to analyze the root cause for the slowdown and identify the most volatile segments of the sector.

Indian Automobile Sector, currently, stands at a juncture where a strategically laid out roadmap is necessary for the growth in an era which could possibly be called Automobile 4.0, amidst new-age models, heavy technology interventions, artificial intelligence, amongst many others.

Exim Bank, in association with the Society of Indian Automobile Manufacturers (SIAM), reached out to the key players of the industry to understand the current situation of the sector, key factors

[7] Department for Promotion of Industry and Internal Trade (DPIIT)

influencing the sector, and expected developments in the automotive supply segment in India.

In order to address the various issues around the Electric Vehicle's (EV) space, the Study attempts to understand the dynamics of EVs market and lays down some success stories in this arena. Further, given a huge domestic automobile market, an attempt is made to understand the trends of foreign investments in the automobile industry in the last two decades.

The Study also dedicates a section on the export competitiveness of the Indian automobile industry. India has the opportunity to become a hub for the global automobile manufacturing in the new era, as foreign manufacturers are attracted by amenable policies of the Government of India and the huge market India offers. To conclude, the Study lists down some of the vital strategies which could be essential in reviving the automobile industry from its current crisis and at the same time, could also set out a clear path to drive growth of this industry.

CHAPTER

AUTOMOBILE INDUSTRY: RECENT TRENDS IN INDIA

India's automobile sector, accounted for 7.1% of the GDP and 49% of manufacturing GDP in 2018, becoming a focal point as India strives towards becoming a USD 5 trillion economy by 2024-25. While two decades of robust growth have propelled India from being a net importer of automobiles to a leading manufacturer, and exporter of motor vehicles, it is now experiencing a slump, a first in the last two decades - primarily driven by the lowered domestic demand coupled with regulatory changes,including a greater push to develop electric vehicles in India. This section of the Study, would attempt to represent a decadal trend of the automobile industry, highlighting stylized information of the more recent developments in India.

Production

In the last decade, that is, during FY 07 to FY 19, the automobile industry registered a promising growth. Domestic production grew at an AAGR of 9%. Across the segments, while the two and three wheelers registered an average annual growth of 10%, production of commercial vehicles and passenger vehicles grew at an AAGR of 8% and 9% respectively, during the same period. It may be noted that the period under consideration also includes the Global Financial Crisis - during which the industry experienced a phenomenal growth of 26% in FY 09 and 27% in FY 10 respectively.

As the auto industry evolves, the two most important factors that continues to be instrumental to India's automotive growth story are the emerging middle class in the country and the availability of cheap labor to the auto manufacturers.

In the Automotive Mission Plan 2026 announced in 2015, the government and industry set a target to triple industry revenues to US$ 300 billion, and expand exports to US$ 80 billion. To reduce dependency on oil imports, the government has been on the task to promote adoption of alternative fuels through FAME 2, which is an extension of the original FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) initiative. Where FAME 1 offered incentives to electric vehicles (EV) and hybrid EV buyers, FAME 2 is expected to incentivize electrification of the public-transport fleet of buses and taxis, as well as facilitate demand for all types of alternative fuel.

Recent trends

Broadly, in the last ten years, the production shares of two & three wheelers, passenger vehicles and commercial vehicles in the total automobile production have stood at 80%, 15% and 5% respectively.

With respect to FY 20, domestic production of automobile in India has shown a downward trend with total production recording a decline of almost (-) 14% during April 2019 to November 2019, over the corresponding period of the previous year. During the same period, while a double digit decline in production was registered for all three segments, commercial vehicles have been the worst hit with production falling down by 28%.

Table 2: Production of Automobile in India (Aug 2018 – Nov 2019)

	Production in units ('000)					Y-O-Y Growth (%)		
Month	Total Production	Commercial vehicles	Passenger Vehicles	Two & Three wheelers	Total Production	Commercial vehicles	Passenger Vehicles	Two & Three wheelers
Aug-18	2,816	95	368	2,354	7%	39%	5%	6%
Sep-18	2,944	102	341	2,501	8%	41%	-1%	8%
Oct-18	2,921	108	342	2,471	21%	43%	6%	22%
Nov-18	2,369	82	280	2,008	-1%	3%	-21%	3%
Dec-18	1,916	69	267	1,581	-1%	-8%	-11%	2%
Jan-19	2,405	97	364	1,944	-3%	5%	3%	-4%
Feb-19	2,474	92	336	2,046	-2%	-2%	-5%	-1%
Mar-19	2,180	106	336	1,739	18%	0%	-8%	-21%
Apr-19	2,363	82	321	1,960	11%	-10%	-7%	-11%
May-19	2,516	81	316	2,119	-8%	-10%	-12%	-7%
Jun-19	2,336	69	268	1,999	13%	-23%	-16%	-12%
Jul-19	2,509	67	311	2,131	11%	-26%	-16%	-10%
Aug-19	2,297	55	278	1,963	18%	-42%	-24%	-17%
Sept-19	2,407	55	280	2,072	18%	-46%	-18%	-17%
Oct-19	2,155	59	269	1,827	26%	-45%	-21%	-26%
Nov-19	2,336	68	291	1,977	-1%	-16%	4%	-1%

Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

In fact, in September 2019, the commercial vehicles segment, exhibited a negative Y-O-Y growth of over 46% during the same period, lowest after January 2009 fall of (-) 63%.

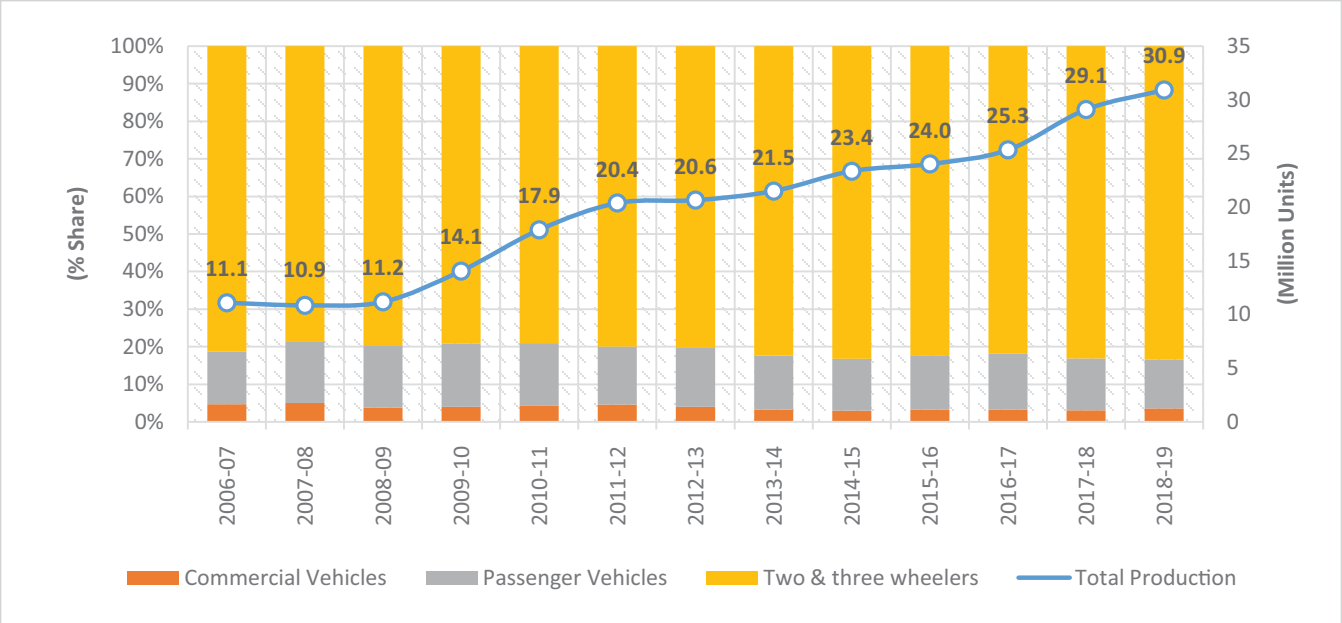
As can be seen from Table 1, total production of automobile could not sustain the positive growth in commercial vehicle and two & three-wheeler segment was pulled down by passenger vehicle segment, registering a negative y-o-y growth of 1% in November 2018. Visibly, the trend of negative growth was quick to spread across all segments.

The slowdown in commercial vehicle segment is expected to further continue in 2020 on account of implementation of various regulations including BS VI emission norms, fire suppression technology, reverse parking and fuel efficiency[8].

[8] SIAM

The decline in domestic production on a monthly basis surfaced in November 2018 and has continued ever since. At the end of FY 19, the total automobile production in India stood at 30.9 million units, up by 2 million units from FY 18. During FY 09 – FY 19, while the domestic production of automobile in India grew at an AAGR of 10%, the segment-wise annual average growth recorded for commercial vehicles, passenger vehicles and two & three wheelers stood at 8%, 8% and 10% respectively.

Figure 4: Total Production of Automobile in India (FY 07 - FY 19)



Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

Index for Industrial Production

The IIP Index for 'motor vehicles, trailers and semi-trailers' having registered a double digit growth rate since August 2017, came down to a negative y-o-y growth of (-) 6.4% at the onset of slowdown in November 2018 and has not only remained negative since then, but has aggravated, resulting in a cumulative double digit negative y-o-y change of (-) 16.8% for April - October 2019.

Box 1 : Case-in-Point: In retrospective - Automobile slowdown of 2007-09 in India and China

In February 2009, after citing an upcoming fall in the production numbers, the State Bank of India greatly reduced the interest rates applied to automotive loans. During the initial months of 2009, a widespread marketing campaign was conducted by Tata Motors involving the launch of the Tata Nano automobile. Described as a "people's car," Tata hoped that the consumers would be encouraged to buy this car at a time of severe financial crisis because of its lowprice tag, which was approximately USD 2100.

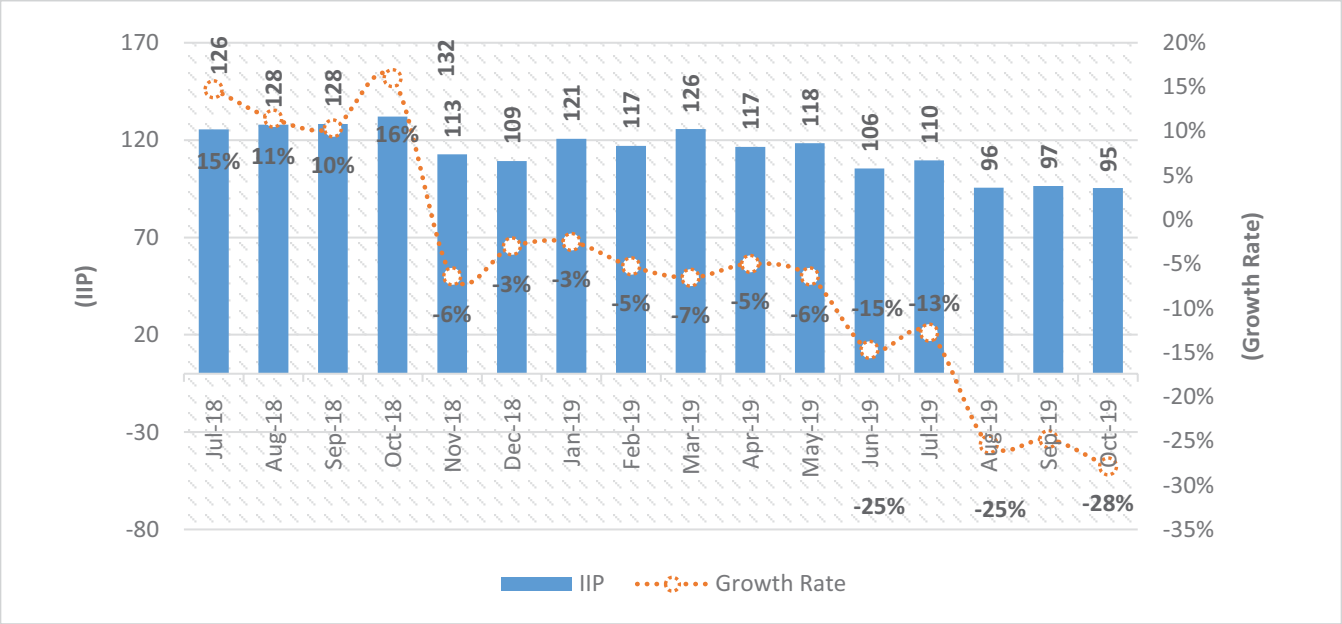
These and many attempts taken by the government to take control of the crisis or even to give advantage to the local manufacturers went on to help the local consumers as well as the manufacturers, and therefore the Indian automotive sector not only emerged from the crisis but continued going stronger on all terms such as manufacturing, attracting foreign investment, and so on. One of the main reasons for this rapid rise is the growing middle class in India, which prefers to buy cars rather than use the public transportation system.

During the global auto industry crisis of 2008, the Chinese auto industry was also affected. There was a sharp reduction in the profits of Chinese automobile manufacturers. In order to promote the development of Chinese automobile manufacturers during the financial crisis, the government introduced a massive stimulus package intended to help out the auto industry. From a technology standpoint, this was to be done through reducing the purchase tax of passenger automobiles with low emissions, supporting Chinese automobile manufacturers in developing independent innovation and technical reform, and driving the development of electric powered automobiles and its crucial accessories.

On the business end, the stimulus offered purchase subsidy policies to specific targets so as to promote automobile consumption, advanced mergers and acquisitions in the automobile industry, supported Chinese automobile manufacturers to develop independent brands, and sped up the export base construction of automobile and accessories.

Source: The Effects of the 2007-2009 Economic Crisis on Global Automobile Industry, Economics and Finance Department, State University of New York

Figure 5: Automobile Industry – Index for Industrial Production (July 2018-Oct 2019)

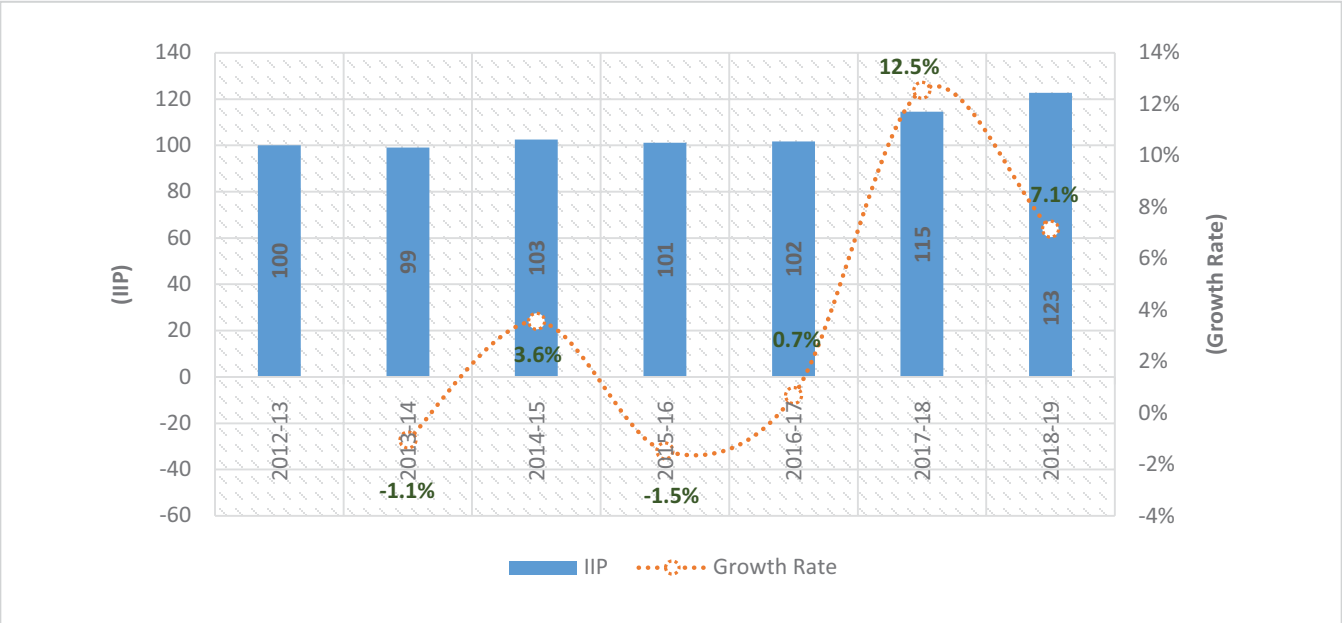


Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

It is to be noted that across the manufacturing IIP, 'motor vehicles, trailers and semi-trailers' registered the steepest decline on a y-o-y basis during April – October 2019 at (-) 16.9%.

The IIP Index for automobile reached a seven year high in FY 19 at 123. Having largely remained above 100, except in FY 14, the IIP Index for automobile grew at an AAGR of 4% during FY 13 - FY 19.

Figure 6: Automobile Industry – Index for Industrial Production (FY 13 - FY 19)



Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

Domestic Sales

Since the onset of slowdown in third quarter of FY 19, the total domestic automobile sales in India have shown a consistent decline, falling by an average of 9.3% every month, from October 2018 to November 2019. Amongst the three segments, passenger vehicle and commercial vehicle sales were the worst hit with sales coming down by an average of 10% every month while the two & three wheeler segment also registered an average fall of 9%, during the same period.

For the PV segment, Q2 FY20 is the fifth consecutive quarter of reduction, with the sales falling by (-) 28.7%, the worst in last two decades.

Table 3: Domestic Sales of Automobile in India (Aug 2018 - Nov 2019)

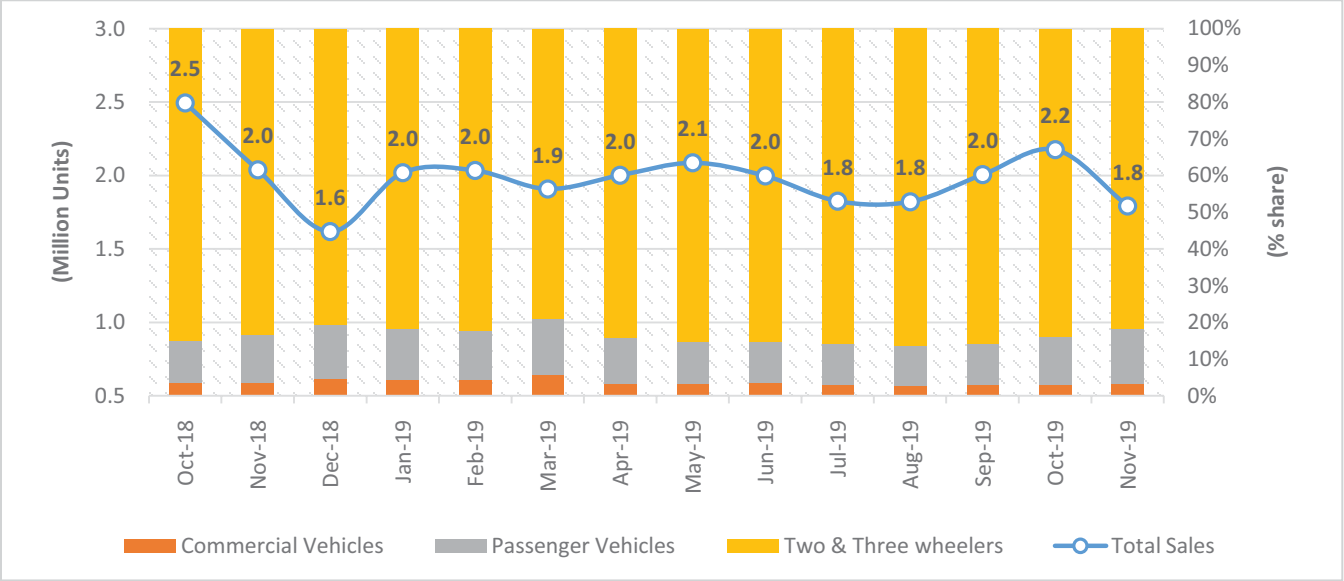
	Domestic Sales in units ('000)				Y-O-Y Growth (%)			
Month	Total Sales	Commercial vehicles	Passenger Vehicles	Two & Three wheelers	Total Sales	Commercial vehicles	Passenger Vehicles	Two & Three wheelers
Aug-18	2,382	85	287	2,011	3%	30%	-2%	3%
Sep-18	2,583	96	293	2,195	4%	24%	-6%	4%
Oct-18	2,493	87	284	2,122	15%	25%	2%	17%
Nov-18	2,037	73	266	1,698	5%	6%	-3%	6%
Dec-18	1,617	76	239	1,303	-3%	-8%	0%	-3%
Jan-19	2,019	88	280	1,652	-5%	2%	-2%	-5%
Feb-19	2,035	87	272	1,675	-4%	0%	-1%	-4%
Mar-19	1,908	109	292	1,507	-14%	0%	-3%	-17%
Apr-19	2,001	69	248	1,685	-16%	-6%	-17%	-16%
May-19	2,086	69	240	1,778	-9%	-10%	-20%	-7%
Jun-19	1,998	71	226	1,701	-12%	-12%	-18%	-12%
Jul-19	1,825	57	201	1,567	-19%	-26%	-31%	-17%
Aug-19	1,821	52	197	1,573	-24%	-39%	-32%	-22%
Sept-19	2,004	58	223	1,723	-22%	-39%	-23%	-21%
Oct-19	2,176	66	285	1,824	-12%	-23%	0%	-14%
Nov-19	1,792	61	263	1,466	-12%	-15%	0%	-13%

Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

A closer look at the monthly data on passenger vehicle sales of leading auto manufacturers shows a gradual but consistent decline since November 2018. The same has been reflected through auto-giants like Tata Motors, Maruti Suzuki India and Mahindra having announced 'no production' days for passenger vehicle segments in Q2 of FY 20 as a response to muted sales and subdued consumer sentiment. In fact, Maruti Suzuki India Ltd., which is the market leader in PV segment, reported a fall of (-) 36% in its domestic sales in August 2019 vis-à-vis August 2018.

It is worth noting that even during the festive season in October 2019, the domestic sales only marginally picked up but remained substantially lower than the corresponding period in 2018 and went further down in November 2019 on account of steep decline in two & three wheeler sales.

Figure 7: Domestic sales of Automobile in India (Oct 2018 - Nov 2019)

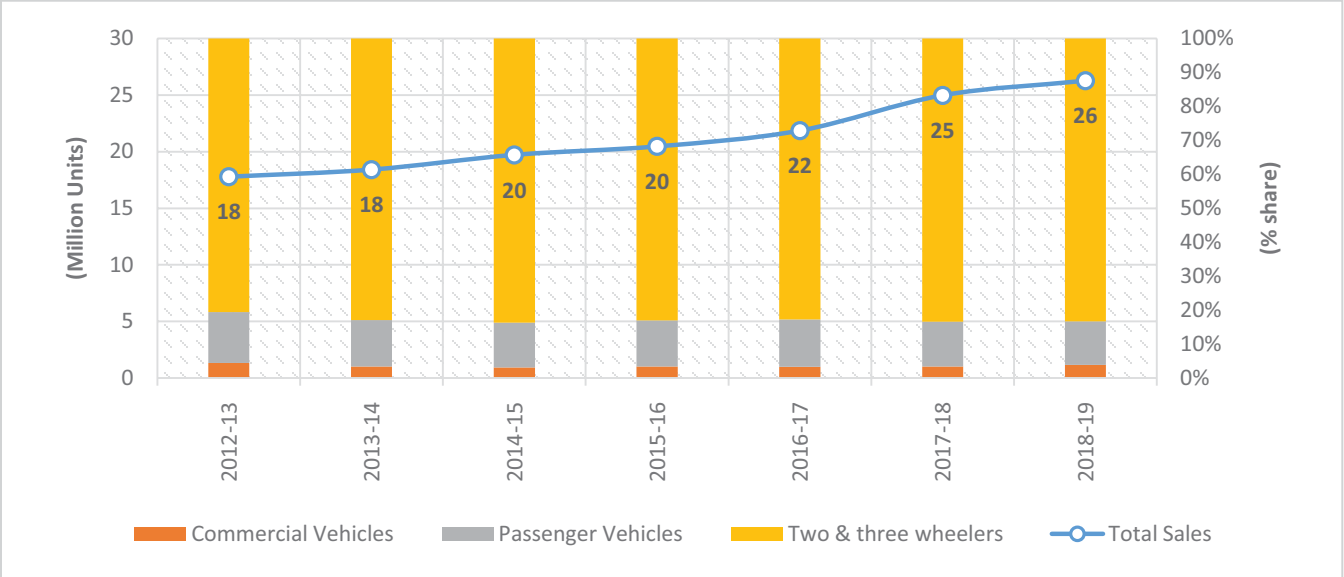


Source: Data accessed from CMIE Industry Outlook, August 2019; EXIM Bank Research

The share of sales two & three wheelers, passenger vehicles and commercial vehicles in the total domestic automobile sales in India, is similar to production, and has largely remained unchanged in the last decade at 83%, 13% and 4% respectively.

During FY 09 - FY 19, the total domestic sales of automobile in India registered an AAGR of around 10%. Across the three segments, the highest growth of 10.3% was recorded for two & three wheelers, followed by commercial vehicles at 8.3% and passenger vehicles at 7.7% during the same period.

Figure 8: Domestic sales of Automobile in India (FY 13 - FY 19)



Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

Historical patterns both across countries and time suggest that automobile ownership tends to rise with GDP per capita but in a non-linear way. At first, ownership rises slowly with income, then rapidly at middle income levels, before slowing at higher income levels as saturation levels are reached[9].

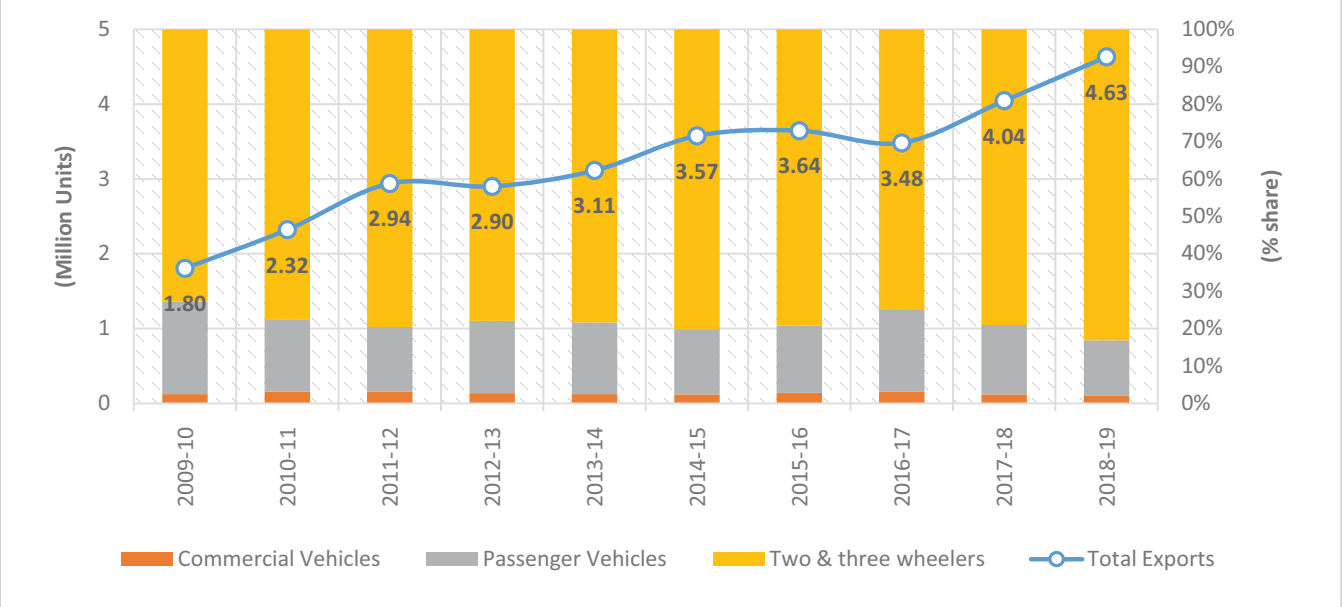
A strong positive correlation of 0.91[10] is arrived at for the data on domestic sales of automobile and India's total private consumption from 2010 to 2018, which suggests that for given policy measures and technology, rising per capita income will have a significant impact in increasing the automobile sales.

Exports

The total exports of the automobile sector were recorded at 4.6 million units in FY 19, up from 1.2 million units in FY 08, thereby registering an AAGR of 13.2% during this period. The growth has mainly been driven by the two and three wheeler segment, which has observed an impressive growth in its exports at over 14%.

In fact, the share of the two and three wheeler segment in the total automobile exports has increased from 77.6% in 2007-08 to 83% in 2018-19.

Figure 9: Total Exports of Automobile from India (FY 10-FY 19)



Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

[9] The Automobile Industry in and beyond the crisis, OECD https://www.oecd.org/eco/outlook/44089863.pdf
[10] World Bank Database, CMIE Industry Outlook, EXIM Bank Research

Amidst the slowdown, when both the production and domestic sales of automobile have declined, exports from the sector have increased by an average of 3% on a y-o-y basis during November 2018 to November 2019. While the two segments - passenger vehicles and commercial vehicles have not been able to showcase an impressive trend in exports (AAGR: (-) 3% for PVs and (-) 32% for CVs), the largest segment of two & three wheelers has recorded a growth rate of 6% during the same period.

Table 4: Export of Automobile from India (Aug 2018 – Nov 2019)

	Domestic Sales in units ('000)				Y-O-Y Growth (%)			
Month	Total Sales	Commercial vehicles	Passenger Vehicles	Two & Three wheelers	Total Sales	Commercial vehicles	Passenger Vehicles	Two & Three wheelers
Aug-18	411	9	61	340	24%	27%	8%	27%
Sep-18	414	10	58	345	17%	13%	0%	21%
Oct-18	385	8	51	325	23%	5%	-5%	29%
Nov-18	349	8	48	292	-1%	-19%	-23%	5%
Dec-18	377	7	60	309	3%	-32%	-23%	11%
Jan-19	344	7	47	290	1%	-23%	-17%	6%
Feb-19	373	6	51	315	4%	-22%	-17%	9%
Mar-19	379	10	68	299	4%	-4%	-6%	7%
Apr-19	400	2	57	339	0%	-54%	13%	-1%
May-19	396	3	59	333	0%	-56%	0%	1%
Jun-19	399	5	56	337	1%	-49%	0%	3%
Jul-19	414	5	61	347	4%	-33%	-4%	7%
Aug-19	421	6	70	344	2%	-34%	15%	1%
Sept-19	417	7	61	348	0%	-29%	5%	0%
Oct-19	396	4	50	340	3%	-40%	-2%	4%
Nov-19	411	5	58	346	17%	-29%	20%	18%

Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

With respect to the exports destinations, the top five exports destinations for Indian automobiles[11] account for 42% of the automobile exports from India, with Mexico and US contributing to almost one-fourth of the total exports. It is interesting to note that India was not exporting automobiles of a significant value to the USA until 2016. However, its share in India's automobile exports which was not even 1% until 2016, rose to 3.2% in 2017 and consequently to 11% in 2018. This growth in export to the USA came on the back of a single product from one carmaker, Ford. The company started exporting the EcoSport, the compact sport utility vehicle (SUV) manufactured at its Chennai plant, to the USA in 2017.

These numbers indicate how an export strategy focused on market and product diversification could be a strong forefront to weather the storms of temporary and prolonged slowdowns in the sector.

[11] HS 8703, HS 8711, HS 8704, HS 8702, HS 8705, and HS 8710

Across the aforementioned major export markets for India's automobile exports, following were the top three export items. It is to be noted that HS 870323, total exports of which stood at US$ 1.9 billion in 2018, was mostly exported to the major markets - with more than 67% of the exports concentrated in the USA and Mexico only.

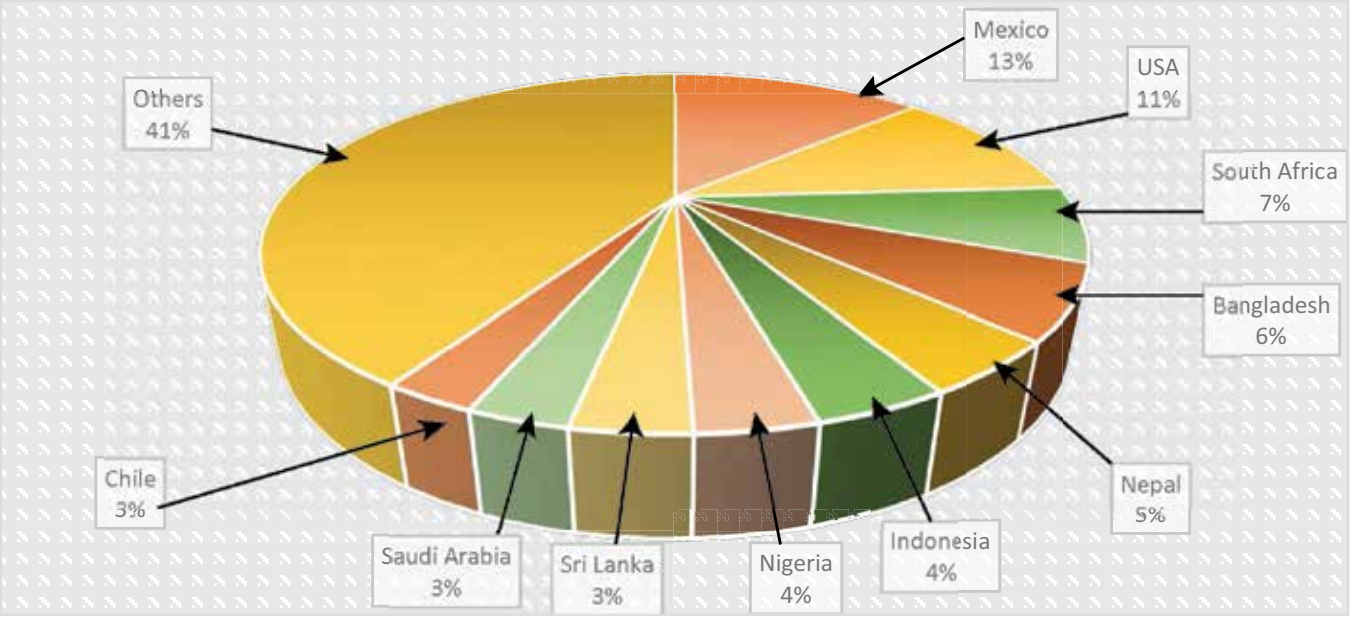
Table 5: Export of Automobile from India (Aug 2018 – Nov 2019)

MEXICO			
HS Code	**Description**	**Export (US$ Million)**	**% share in India's Total Auto Exports to Mexico**
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	732.8	51.0%
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	605.8	42.1%
871120	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm^3	50.4	3.5%
USA			
HS Code	**Description**	**Export (US$ Million)**	**% share in India's Total Auto Exports to USA**
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	709.8	60.1%
870321	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	450.5	38.1%
871130	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm^3	19.1	1.6%

SOUTH AFRICA			
HS Code	**Description**	**Export (US$ Million)**	**% share in India's Total Auto Exports to Mexico**
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	407.8	55.2%
870321	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	127.8	17.3%
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	58.6	7.9%

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Figure 10: Major exporting destinations for Indian automobiles: 2018



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Auto Industry's Fiscal Health

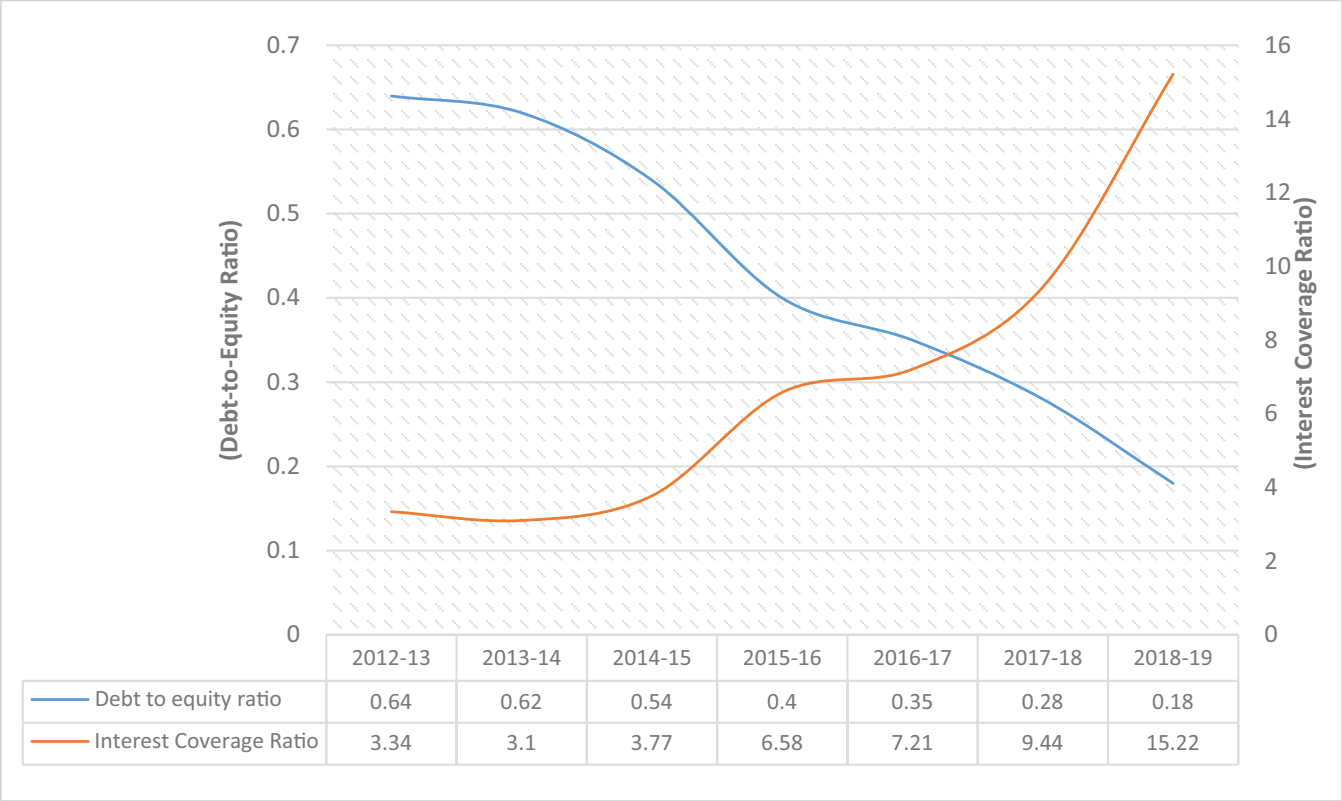
Debt-to-Equity ratio, which shows the extent to which shareholders equity can fulfill a company's obligations to creditors in the event of a liquidation is considered to be the closest proxy to ascertain a company's ability to repay its obligations. For the Indian automobile sector, the ratio has consistently declined from 2012 and has remained below 0.5, which is significantly lower than the global average of 2.5 for major auto manufacturers. An increasing debt to equity ratio indicates a company is being increasingly financed by creditors rather than by its own equity. The lower than global average ratio lays down a case for the Indian automobile sector to be an attractive space, from the perspective of lending and puts it in good stead from a holistic outlook of fiscal health.

The same is reinstated on a close look at the industry's interest coverage ratio (ICR) in the last seven years. The ratio, which is a measure of a company's ability to meet its interest payments, has been on a rise since FY 13. A lower ICR usually means that less earnings are available to meet interest payments and that the business is highly vulnerable to increases in interest rates. In the context of India's automobile sector, however, an ICR close to 16% vouches for creditworthiness and makes it easier for manufacturers to conveniently alter the debt-equity mix in the capital whenever needed.

Plausible Explanations for the fall in Domestic Demand

The recent derailment of crucial demand side parameters associated with the automobile sector has been a culmination of wide ranging factors – both structural and seasonal. Demand has continued to be impacted by the slowing down of the overall economy, which, along with tight credit conditions and delayed monsoon, has impacted consumer sentiment in both urban and rural India. Following have been the most prominent reasons that explain the extent and dynamics of this prolonged slowdown.

Figure 11: Debit to Equity Ratio, Interest Coverage Ratio : India's Automobile Serctor



	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Debt to equity ratio	0.64	0.62	0.54	0.4	0.35	0.28	0.18
Interest Coverage Ratio	3.34	3.1	3.77	6.58	7.21	9.44	15.22

Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

Weak Rural Growth

Growth in nominal rural wages, both for agricultural and non-agricultural laborers, remained subdued and sticky, hovering around 3.7% and 3.8%, respectively, during April - October 2019, significantly lower than the average 6% in the preceding two financials[12]. This had a noticeable impact in the declining sales of both two & three wheelers as well as the farm equipment, with domestic tractor sales declining by 11% in April - November 2019 on a y-o-y basis.

Axle load norms

Axle load norms were increased by 20-25% in November 2018 for the existing CVs, leading to the creation of excess capacity in trucks at a time, when goods movement and freight was falling due to overall lower economic growth.

Increase in supply capacity (owing to the new norms) on trunk routes would lead to a reduction in fleet utilization for large fleet operators, as they would need fewer trucks to carry the same amount of load[13]. Given this, these operators would halt fleet additions until utilization reaches an optimal level, hence impacting the sales of commercial vehicle segment significantly. The respondents to our Survey revealed that this policy move expanded excess capacity leading to shrinkage in new vehicle demand.

[12] RBI Monetary Policy Report, October 2019
[13] CRISIL Research https://www.crisil.com/content/dam/crisil/our-analysis/views-and-commentaries/impact-note/07/the-axle-effect.pdf

Bharat Stage VI norms

BS VI, the sixth mandate for vehicular emissions, is a move to controlling air pollution in the country. Bharat Stage norms are the automotive emission norms which the automotive manufacturers have to comply to sell their vehicles in India. These norms are applicable to all two wheelers, three wheelers, four wheelers and construction equipment vehicles. To curb growing menace of air pollution through the vehicles emission, the Government of India has decided to leapfrog from the exiting BS – IV norms to the BS- VI, thereby skipping the BS – V norms. Only those vehicles will be sold and registered in India from 1st April 2020 onwards, which comply with these norms. Even though such compliance is expected to put a dent on auto sales temporarily, there's a possibility that pre-buying before the BS-VI norms kick in could improve industry performance in the second half of the FY 20. The respondents to our Survey also perceived that the buyers of the automobiles are preferring to wait for attractive deals closer to BS-VI implementation.

Fuel Prices

On average, a 100 basis points (bps) growth in fuel prices today will decrease automobile sales growth (excluding two-wheelers) by 72 bps two months down the line[14]. Though extremely volatile, fuel prices are a strong determinant of automobile demand across both domestic and foreign markets.

Stricter Safety Norms

From April 2019, anti-lock braking systems/combined braking system (ABS/CBS) was made compulsory for cars and two-wheelers in India[15]. This development is expected to push the prices of two wheelers further up.

NBFC Crisis

As the Indian banking system was going through resolving the NPA issues, the credit crunch was more felt due to the NBFC crisis which has a significant presence in auto finance segment. Apart from this, the low demand from market load operators in commercial vehicles due to poor private consumption and lower finance availability (lesser loan to value) also played a major role.

Overall Economic Slowdown

The overall economic slowdown in India and abroad furthered negative sentiments, impacting businesses especially the commercial vehicles. The agrarian distress in the economy also contributed to decreased demand of two-wheelers & tractors. The respondents to our Survey also took cognizance of the changing consumer preferences wherein the new generation were increasingly preferring to share rides and carpooling, rather than owning vehicles.

[14] Reserve Bank of India, Mint Street Memo No. 18, What Drives Automobile Sales? It's not Credit https://rbidocs.rbi.org.in/rdocs/MintStreetMemos/MSM18_25042019.pdf
[15] Ministry of Road Transport and Highways

CHAPTER

EXPORT COMPETITIVENESS OF INDIAN AUTOMOBILE INDUSTRY

The previous chapters have exhibited the growth of automobile industry globally, which has apparently registered an AAGR of 2.5% during the five-year period, 2014 to 2018. During the same period, Indian automobile industry grew at a rate, more than double the global, at an AAGR of 5.3%.

This section essentially tries to capture the competitiveness of the Indian automobile industry at the global platform.

Table 6, herein, highlights the major exporters and importers of the automobiles globally. While the top ten exporters globally constitued 70.2% of the exports, the top ten importers had a global share of 63.2%, as in 2018. However, the interesting aspect to be observed amidst the major exporters is the presence of Mexico as the only emerging economy ranking third, ahead of many of the developed economies in the list. The major markets of Mexico in this case are the USA (77%), Germany (6%), and Canada (5%).

Table 6: Major Exporters and Importers for the Automobile Industry

Exporting Country	Export Value in 2018 (US$ Billion)	Share in Global Exports	Importing Country	Import Value in 2018 (US$ Billion)	Share in Global Imports
Germany	174.4	17.9%	USA	212.4	21.7%
Japan	113.9	11.7%	Germany	72.8	7.4%
Mexico	73.7	7.6%	UK	53.0	5.4%
USA	71.1	7.3%	China	50.8	5.2%
Canada	46.3	4.8%	France	49.3	5.0%
UK	44.6	4.6%	Canada	46.4	4.7%
Spain	43.1	4.4%	Belgium	44.9	4.6%
South Korea	40.8	4.2%	Italy	37.9	3.9%
Belgium	39.7	4.1%	Spain	26.4	2.7%
France	35.1	3.6%	Australia	25.5	2.6%

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

To obtain a comprehensive picture of competition by exporters and producers in the automobile industry, three indices are analyzed for 37 relevant HS codes (listed in Annexure) under the automobile industry. This chapter attempts to identify the products where India could focus on, to realize potentially higher values, given that the country already possesses manufacturing capabilities in these products. An attempt is also made to map the global demand for automobiles with India's

export competitiveness, in order to arrive at a market specific approach for both manufacturers and exporters.

Revealed Comparative Advantage (RCA) Index

The RCA index of country 'i' for product 'j' is measured by the product's share in the country's exports in relation to its share in world trade. It is used to identify categories of exports in which an economy has a comparative advantage by way of comparison of the country's trade scenario with the world scenario. As per Balassa's (1965) measure, index for country 'i', commodity 'j'; is

$$RCA_{ij} = (x_{ij}/X_{it}) / (x_{wj}/X_{wt})$$

Where,

x_{ij} : Total export value of good 'j' from country 'i'

X_{it} : Total exports from country 'i'

x_{wj} :Total export value of good 'j' in the world

X_{wt} : Total exports in the world

The RCA index ranges from 0 to infinity, with 1 as the break-even point. That is, an RCA value of less than 1 means that the product does not have a comparative advantage, while a value above 1 indicates that the product has a comparative advantage.

The Normalized Revealed Comparative Advantage (NRCA) index has been demonstrated capable of revealing the extent of comparative advantage that a country has in a commodity more precisely and consistently than other alternative RCA indices in the literature. NRCA can be defined in the following manner :

$$NRCA_{ij} = (RCA_{ij} - 1)/ (RCA_{ij} + 1)$$

NRCA ranges from -1 to 1 with 0 as the breakeven point. That is, an NRCA value of less than 0 means that the product has no export comparative advantage, while a value above 0 indicates that the product has a comparative advantage. The extent of comparative advantage/disadvantage can be gauged from the proximity of the NRCA values to the extreme data points, viz. +1 and -1.

Out of the 37 HS codes analyzed, only six of them have a positive NRCA (shaded in grey in the table) in India's case.

Table 7: NRCA Indices for 37 HS codes under automobile industry

Code	Product label	Exports in US$ Million			NRCA in 2018
		2008	2013	2018	
Auto 6-digit 37 codes	**Total**	**3367.7**	**8152.5**	**10871.3**	**-0.20**
870322	**Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)**	**1635.0**	**3540.1**	**3266.2**	**0.27**
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	58.7	540.6	1939.3	-0.43
871120	**Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm^3**	**381.3**	**1608.9**	**1932.0**	**0.84**
870321	**Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)**	**436.1**	**1162.4**	**1531.3**	**0.40**
870410	**Dumpers for off-highway use**	**154.7**	**167.6**	**505.5**	**0.61**
870422	**Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)**	**81.3**	**177.7**	**358.0**	**0.01**
870421	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	111.3	293.5	279.3	-0.56
870332	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 1.500 cm^3 but <= 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	39.4	51.3	275.7	-0.77

870423	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	1.9	68.0	182.9	-0.23
871130	**Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm^3**	**17.8**	**36.5**	**171.4**	**0.66**
870210	Motor vehicles for the transport of >= 10 persons, incl. driver, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine"	281.0	159.5	169.7	-0.19
870331	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	10.5	228.8	138.2	-0.42
871140	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 500 cm^3 but <= 800 cm^3	18.5	0.6	27.1	-0.09
870340	Motor cars and other motor vehicles principally designed for the transport of	0.0	0.0	17.9	-0.92
870590	Special purpose motor vehicles (other than those principally designed for the transport of persons or goods and excluding concrete-mixer lorries, fire fighting vehicles, mobile drilling derricks and crane lorries)	12.4	22.9	17.8	-0.73
870540	Concrete-mixer lorries	0.4	6.6	15.3	-0.04
870333	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	13.7	21.1	12.1	-0.96
871110	Motorcycles, incl. mopeds, and cycles fitted with an auxiliary motor, with reciprocating internal combustion piston engine of a cylinder capacity <= 50 cm^3	63.2	1.2	8.6	-0.29
870431	Motor vehicles for the transport of goods, with spark-ignition internal combustion piston engine, of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	1.8	5.0	7.4	-0.97
870380	Motor cars and other motor vehicles principally designed for the transport of	0.0	0.0	4.2	-0.96
870520	Mobile drilling derricks	0.1	5.4	2.0	-0.05
870290	Motor vehicles for the transport of >= 10 persons, incl. driver, not with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", of a cylinder capacity of > 2.500 cm^3, new	10.0	14.0	2.0	-0.86

870324	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	13.1	0.9	1.4	-1.00
870490	Motor vehicles for the transport of goods, with engines other than internal combustion piston engine (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	7.8	15.5	1.2	-0.86
870390	Motor cars and other vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with engines other than spark-ignition internal combustion reciprocating piston engine "diesel or semi-diesel engine" (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	10.9	11.3	1.0	-0.94
870240	Motor vehicles for the transport of >= 10 persons, incl. driver, with only electric motor for propulsion	0.0	0.0	0.9	-0.77
870310	Vehicles for the transport of persons on snow; golf cars and similar vehicles	2.2	0.1	0.7	-0.96
870530	Fire fighting vehicles (excluding vehicles for transporting persons)	0.4	10.9	0.7	-0.94
871160	Motorcycles, incl. mopeds, and cycles fitted with an auxiliary motor, with electric motor for propulsion	0.0	0.0	0.6	-0.99
871190	Motorcycles, incl. mopeds, and cycles fitted with an auxiliary motor and side cars for motorcycles (excluding with reciprocating internal combustion piston engine)	0.3	0.5	0.4	-0.86
870432	Motor vehicles for the transport of goods, with spark-ignition internal combustion piston engine, of a gross vehicle weight > 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	3.0	0.7	0.3	-0.96
870370	Motor cars and other motor vehicles principally designed for the transport of	0.0	0.0	0.2	-0.92
870510	Crane lorries (excluding breakdown lorries)	0.8	0.3	0.1	-1.00
870350	Motor cars and other motor vehicles principally designed for the transport of	0.0	0.0	0.0	-1.00
871150	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 800 cm^3	0.0	0.7	0.0	-1.00
870220	Motor vehicles for the transport of >= 10 persons, incl. driver, with both diesel engine and electric motor as motors for propulsion	0.0	0.0	0.0	-1.00
870360	Motor cars and other motor vehicles principally designed for the transport of	0.0	0.0	0.0	-1.00

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Further, mapping the NRCA of India and leading manufacturers of automobiles across the top ten export items by value globally, it is observed that India enjoys a relative comparative advantage in just three product sub-groups (HS 870321, HS 870322 and HS 870422 – highlighted in) when compared with Germany, Mexico, Japan and the USA. The combined value of India's exports of these three categories of products are US$ 5 billion which is 47% of India's total automobile exports. India's share globally in each of the HS Codes 870321, 870322 and 870422 stands at 4%, 3%, and 2%, respectively.

Table 8: Top ten automobile export items and the corresponding NRCA for the top exporters globally

HS Code	Description	NRCA Germany	NRCA Mexico	NRCA Japan	NRCA USA	NRCA India
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.46	0.65	0.63	-0.18	-0.43
870332	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 1.500 cm^3 but <= 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.58	0.14	-0.46	-0.57	-0.77
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.22	0.59	0.24	-0.62	0.27
870324	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.19	-0.26	0.71	0.36	-1.00
870421	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	0.14	0.41	-0.07	-0.57	-0.56

870321	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.24	0.21	-0.37	-0.64	0.40
870333	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.54	-0.63	0.51	0.19	-0.96
870431	Motor vehicles for the transport of goods, with spark-ignition internal combustion piston engine, of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	-0.98	0.91	-0.11	0.54	-0.97
870340	Motor cars and other motor vehicles principally designed for the transport of	-0.16	-1.00	0.83	-0.70	-0.92
870422	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	-0.04	0.77	0.68	-0.12	0.01

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Some other salient aspects are:

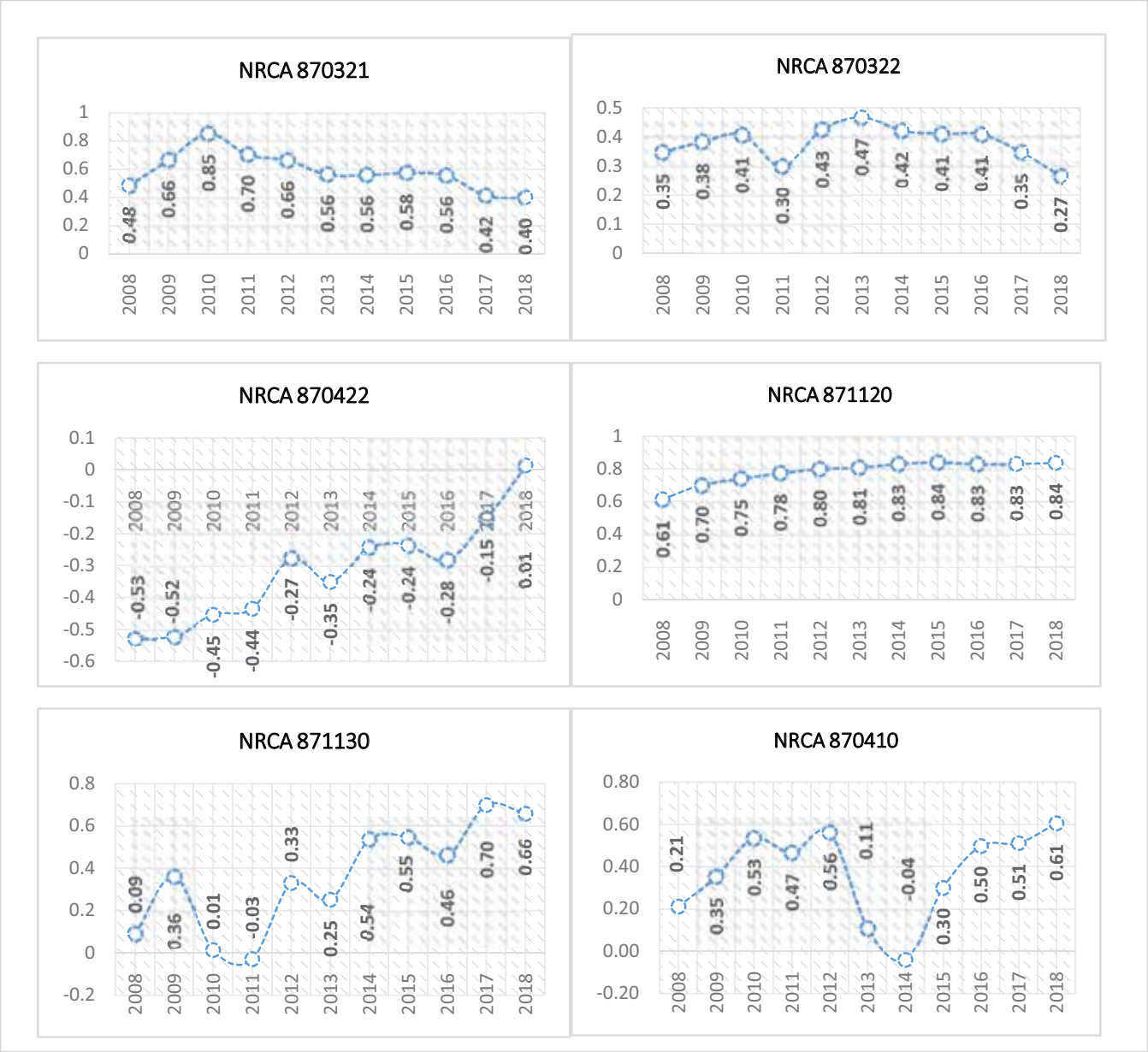
- Under the group of 37 HS codes where India enjoys a relative comparative advantage (in 6 product lines – 870321, 870322, 870422, 871120, 871130 and 870410), the NRCA index largely remained flat for the products 871120 and 870322[16].
- However, a different trend is noted for the NRCA of HS 870410 'dumpers for off-highway use' which underwent a steep decline during 2012-14 and has been steadily recovering after that.
- For the top ten export item out of the 37 items considered for the Study, auto manufacturing giants Mexico & Germany enjoy a relative comparative advantage.
- A noteworthy transition is also seen for the item Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t' (HS 870422), wherein India has moved from being at a relative comparative disadvantage to a relative comparative advantage after 2017.

[16] HS 871120 – Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm^3

HS 870322 - Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)

- The total export value of the six automotive products which exhibit a positive RCA in India's case stands at US$ 7 billion in 2018 and has increased from US$ 6 billion in 2014. India's combined share of these automobile products stands at 71% of India's overall automobile exports. The share of these, globally, has increased from 2% in 2008 to 4% in 2018.

Figure 12: Trends in NRCA of products in which India has a relative advantage



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Table 9: Trade Indicator for items with a positive NRCA : 2018

HS Code	HS Description	India's Export of the itemin 2018 (US$ million)	AAGR of India's Exports (2008-2018)	Top Importers of the product (2018)	India's Share in World Exports (2018)	Major Export Destinations for India
870321	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3	1531	7%	Germany (12%), France (10%), UK (10%), Italy (8%) and Belgium (7%)	3.90%	USA (29%), Nigeria 9%), South Africa (8%) and Egypt (7%)
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3	3266	1%	USA (18%), Germany (11%), UK (8%), France (8%) and Belgium (6%)	2.91%	Mexico (22%), South Africa (12%), Saudi Arabia (9%), Chile (5%) and the UK (5%)
870422	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t	357	19%	USA (21%), UK (8%), Canada (7%), France (7%) and Germany (4%)	1.72%	Bangladesh (53%), Nepal (18%), Sri Lanka (6%), South Africa (4%) and Bhutan (3%)
871120	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm^3	1932	3%	Philippines (9%), Nigeria (7%), Argentina (5%), USA (4%) and Bangladesh (4%)	19.38%	Bangladesh (15%), Sri Lanka (12%), Nigeria (11%), Colombia (10%) and Nepal (9%)
870410	Dumpers for off-highway use	505	32%	USA (13%), Indonesia (10%), Australia (8%), Russia (8%) and Canada (6%)	7%	Indonesia (53%), South Africa (8%), Belgium (6%), Ghana (4%) and Congo (3%)

871130	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm^3	171	39%	USA (22%), Italy (7%), France (7%), Spain (6%) and Germany (6%)	8.11%	USA (11%), Germany (10%), Austria (10%), Philippines (9%), and Mexico (8%)

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

For India's top ten automobile export items in 2018 listed in the table below, a cross-country analysis of competitiveness shows that while the country enjoys a relative comparative advantage for six items, it stands at a relative comparative disadvantage for four. As can be seen, most of the world's leading auto manufacturers stand at a relative comparative disadvantage for the India's top auto exports.

Table 10: Competitiveness of India's top ten automobile export items in 2018

HS Code	NRCA India	NRCA Germany	NRCA Japan	NRCA USA	NRCA China
870322	0.27	-0.47	-0.14	-0.50	-0.63
870323	-0.43	-0.85	-0.70	-0.86	-0.90
871120	0.84	0.40	0.66	0.37	0.19
870321	0.40	-0.35	0.01	-0.38	-0.54
870410	0.61	-0.08	0.28	-0.12	-0.31
870422	0.01	-0.65	-0.38	-0.67	-0.76
870421	-0.56	-0.89	-0.78	-0.90	-0.93
870332	-0.77	-0.95	-0.89	-0.95	-0.97
870423	-0.23	-0.77	-0.57	-0.78	-0.85
871130	0.66	0.00	0.36	-0.03	-0.23

Source: Data accessed from CMIE Industry Outlook, December 2019; EXIM Bank Research

Trade Intensity Index

Trade Intensity Index is used to determine whether the value of trade between two countries is greater or smaller than would be expected based on their importance in world trade. Defined as the share of one country's exports going to a partner divided by the share of world exports going to the same partner, the indicator shows whether or not a country exports more (as a percentage) to a given destination than the world does on an average.

$$T_{ij} = (x_{ij}/X_{it})/(x_{wj}/X_{wt})$$

Where x_{ij} and x_{wj} are the values of country i's exports and of world exports to country j and where X_{it} and X_{wt} are country i's total exports and total world exports, respectively. The index takes the values in between 0 and infinity. An index of more than one indicates that trade flow between countries is larger than expected given their importance in world trade.

India's trade intensity index for automobile industry, amongst its top ten export markets, stood the highest with Nepal at 64.68, followed by Bangladesh at 49.96, indicating that the bilateral trade flow is larger than expected. This explains the importance that Indian automobile exports hold in these two nations. Out of the top ten export destinations for the commodity group (37 HS codes) considered, India's trade intensity is the least with the USA at just 0.33.

It is, however, worth noting that the US's share in India's export of automobiles which was under 1% during the last two decades, increased to touch 3.2% in 2017 and 10.9% in 2018. The auto export growth is explained by the planned and focused expansion of export markets by leading automakers, viz., Ford and GM to the US. While Ford started exporting its EcoSport manufactured in the Chennai plant from India to the US, GM completely shut down domestic sales of Chevrolet Beat's sedan version, shifting the entire production capacity for exports to the US.

Table 11: India's Trade Intensity Index for Automobile industry in major export destinations

Partner Country	TI Index for Automobile
Mexico	6.48
USA	0.33
South Africa	9.09
Bangladesh	49.96
Nepal	64.68
Nigeria	13.43
Sri Lanka	17.78
Saudi Arabia	1.91
Chile	2.17
Algeria	7.78

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Intra-Industry Trade

One of the most distinguishing observations from the Table 11 is that seven out of the top ten exporters (Germany, US, Canada, UK, Spain, Belgium and France) are also amongst the top ten importers for the automobile industry, showing signs of intra-industry trade.

In this context, Grubel-Lloyd (GL) index is used to arrive at the level of intra-industry trade (IIT).

$$\text{GL-Index} = \{(X_i + M_i) - |X_i - M_i|\}/(X_i + M_i)$$

The GL-index takes values between 0 and 1, where 0 means that all trade is inter-industry while 1 means that all trade is intra-industry. Since the GL-index is calculated as IIT divided by total trade, the GL-index is interpreted as IIT's share in total trade.

A high IIT is likely to result in reallocation of resources from inefficient to efficient product lines within an industry. Taking into consideration the GL Index for the market leaders of products in which India enjoys a positive RCA, the Study notes that developed economies and rapidly industrializing developing economies tend to engage more in intra-industry trade when compared to the resource-rich developing economies and Least Developed Countries (LDCs). The Grubel-Lloyd Index, has been lower for the highly traded product group 'Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^{3}' (HS 870321).

For HS 870410, even though India's NRCA has steadily improved, the level on intra-industry trade has remained low, which indicates that the gains from trade for the product have remained low.

A clearer picture is obtained on calculating GL-Index for the cumulative export and import values of the select six product groups. Even though India enjoys a relative comparative advantage across all the products, the extent of intra-industry trade has remained low.

HS codes where India has advantage. At a granular level, this shows that Indian firms have not been able to take the advantage of economies of scale due to higher tariffs or weak foreign demand and the transportation costs have remained relatively higher.

Table 12: Intra-Industry Trade Index for select product groups, 2018

	Germany	US	Spain	Japan	India
870321	0.98	0.61	0.50	0.85	0.01
870333	0.75	0.23	0.33	0.16	0.43
871140	0.89	0.25	0.30	0.05	0.44
870432	0.30	0.60	0.26	0.04	0.22
870240	0.65	0.62	0.06	0.00	0.39
870410	0.96	0.83	0.85	0.07	0.18

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Table 13: Intra-Industry Trade Index for select product groups

	Germany	US	Spain	Japan	India
Select six groups	0.86	0.71	0.78	0.25	0.09

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Summary

Being appropriately known as the barometer of the economy, the auto sector in India is undergoing a severe slowdown. Albeit, domestic production and sales have declined at an average growth rate of (-) 9% and (-) 11% during November 2018-September 2019 on a y-o-y basis, a clear potential is seen in exports for reviving and sustaining the growth in this sector.

There is a need for Indian automobile industry to focus on both domestic sales as well exports. Currently, India's automobile production is significantly concentrated in states such as Tamil Nadu, Maharashtra, Haryana, etc. and in order to expand the export base holistically, attempts should be made to incorporate other states as well, in this growth story.

Whilst the exports have the potential to provide sustainable growth to the Indian automobile industry, it is also vital to cater to the international quality standards of the vehicles. In 2019, out of 31 "Made in India" car models considered for the global New Car Assessment Program (NCAP) crash test, 19 were deemed unsafe for driving. However, with new technologies coming up and at the same time, Indian Vehicles are adapting to these dynamics and there lies huge scope for them to up their scale and quality in order to cater to all markets abroad.

CHAPTER

ELECTRIC VEHICLES: AN ALTERNATIVE

INTRODUCTION

Over the past two centuries, greater access to energy has fostered economic growth as well as other indicators of human development. The same gets reinstated in the Economic Survey of India 2018-19 which identifies energy as the mainstay of development for any economy and focusses on the need to quadruple country's per-capita energy consumption for it to get into the upper middle-income country club. India currently has a per-capita energy consumption of only about one-third of the global average. Within this consumption, access to clean fuel is unevenly distributed when seen across income groups[17].

Amidst the ongoing global concerns on climate change, India's policy perspectives have evolved and undergone a paradigm shift, the most recent ones being guided primarily within the framework of 2030 Agenda for sustainable development and its 17 Sustainable Development Goals (SDGs). The external and internal dimensions to India's climate change policy have come into being by the National Action Plan on Climate Change (NPACC) with domestic focus and the Intended Nationally Determined Commitments (INDC) submitted to the UN Framework Convention on Climate Change (UNFCCC) with international focus, both of which acknowledge that climate change is a global phenomenon with local consequences and that it is crucial to address it along with other developmental imperatives. On the global front, Paris Agreement sets a roadmap for all nations in the world to take actions against climate change in the post-2020 period, underlying aim for which is to hold the increase in the global average temperature well below 2 degree celsius above pre-industrial levels and pursuing efforts to limit the temperature increase even further to 1.5 degree celsius above pre-industrial levels.

Further, according to the Economic Survey 2018-19, transport sector is the second largest contributor to CO_2 emissions after the industrial sector. With higher demand of fuels in future, it is expected that the contribution could rise from 138 in 2018 to 346 thousand million tonnes(TMT) by 2022 in a business-as-usual case, an increase of about 150%[18]. Road transport accounts for around 90% of the total emissions in the transport sector in India[19].

At present, India's transport sector accounts for about 6.7% of India's Gross Domestic Product (GDP). Around 72% of the transportation sector is diesel-based while petrol's share is 23%. The remaining usage comprises other fuels such as CNG, LPG etc.

[17] Economic Survey of India 2018-19
[18] SIAM White Paper on Alternative Fuels for Vehicles, March 2019
[19] Economic Survey of India 2018-19

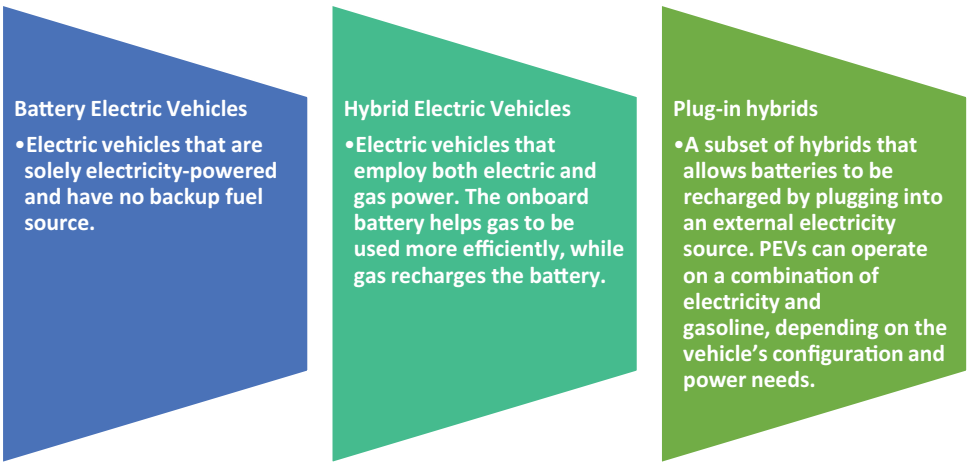
The automobile industry, globally, has underwent three revolutions: First, a craft based organization to a 'brown' integrated mass production industry (Fordism), then into a customized, but divisional organized and vertically integrated mass production industry (GM's productive model), and further on into a production system flexible specialization or lean manufacturing (Toyotism). Now it faces a fourth and 'green' revolution aiming to increase fuel efficiency and renewable energy, lowering emission and fuel insecurity, and pursuing complete recycling of scrap[20].

Given the large import dependence of the country for petroleum products, it is imperative that there be a shift of focus to alternative fuels to support our mobility in a sustainable manner. Even though historically, mobility and fossil fuels have been inextricably linked with electric vehicles being successful only in a few niche markets, over the last decade, the culminated impact of climate change, advancements in renewable energy and rapid urbanization have largely developed a case for electric mobility to enter the mass market, making electric vehicles the representative of the next generation in sustainable mobility.

Given that market share of electric cars in India's market is a meagre 0.06% compared to 2% in China and around 39% in Norway[21], the vehicle segment holds the potential to bring about substantial shifts in the way auto industry has operated in the last few decades.

Unlike the conventional Internal Combustion Engines (ICEs), wherein petrol or diesel fuels the engine, in EVs, batteries are not the fuel; electrons supplied by the battery fuel the vehicle. The battery is a device that stores electrons/energy which is sourced from electricity. Broadly, electric vehicles can be categorized into three variants – Battery Electric Vehicles, Hybrid Electric Vehicles and Plug-In Hybrid Electric Vehicles.

Exhibit 2: Electric Vehicle variants



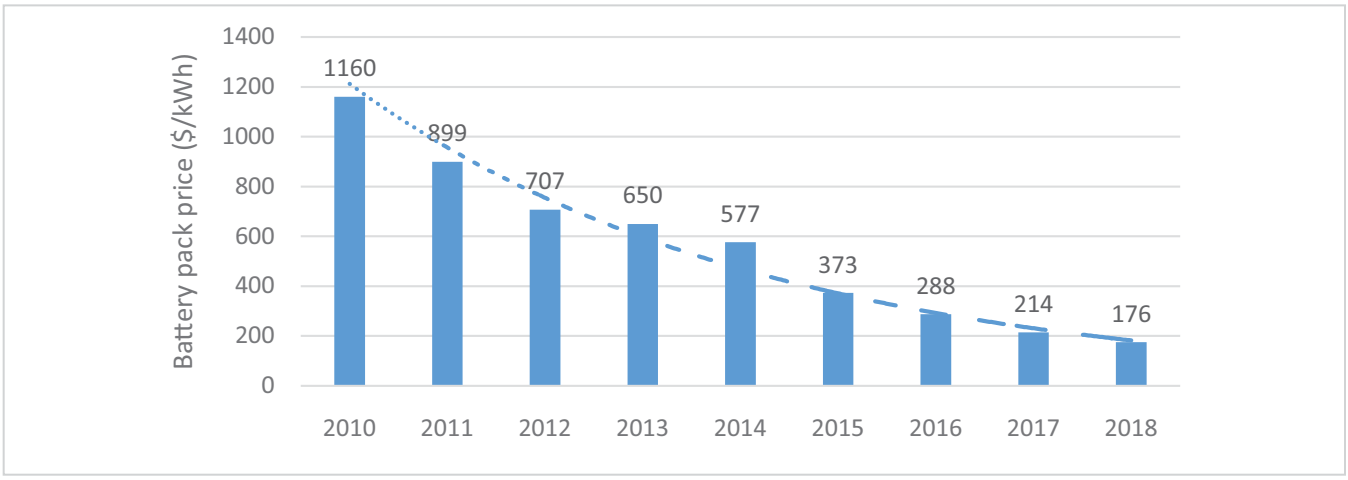
Source: EXIM Bank Research

[20] Impact of the Global Economic and Financial Crisis over the Automotive Industry in Developing Countries, UNIDO https://www.unido.org/api/opentext/documents/download/10081491/unido-file-10081491
[21] Economic Survey of India 2018-19

Batteries, which make up roughly one-third of the cost of today's electric vehicles[22], along with fuel costs will determine how quickly Plug-in Electric vehicles (PEVs) become the demonstrably cheaper option for personal transportation and, thus, how rapidly this market expands. The manufacturing costs will, as a result rise, on account of unique assembly lines for PEV batteries.

Lithium-ion batteries, which encompass a number of competing sub-technologies like Sodium-Ion (Na-ion), Lithium-Sulfur and Solid-State batteries are the most commonly used batteries for vehicle applications. A lithium ion battery with average range of 60-80 miles costs between US$10,000 and US$15,000, more than the price differential between PEVs and traditional vehicles, thereby making EVs an expensive alternative to switch to. Clearly, for any substantial reduction in the physical value of EVs, the cost of battery packs needs to reduce significantly.

Figure 13: Lithinum-ion battery pack price



Source: Bloomberg New Energy Finance Limited; EXIM Bank Research

It is observed that the price of these battery packs has consistently fallen over the past few years. This decrease is in part due to technological improvements, economies of scale and increased demand for lithium-ion batteries. Fierce competition between major manufacturers has also been instrumental in bringing down prices.

In EV batteries, power refers to the rate of energy transfer from the battery to the wheels, measured in kilowatts. Greater power equals better acceleration and performance. As a way to compare with an Internal Combustion Engine (ICE), 100 horsepower is equivalent to 75 kilowatts. Energy, measured in kilowatt-hours (kWh), is a measure of the storage capacity of an EV's battery. Hence, all else being equal, the higher the kWh capacity of a battery pack, the farther a vehicle can be driven between charges.

A revolutionary development carrying the potential to make a significant paradigm shift in the EV space is Vehicle-to-Grid or the V2G technology, wherein electric vehicles serve as a battery storage capacity which can discharge energy to buildings and, more generally, the power grid to maintain system stability. Vehicles, aggregated together and connected to the grid can provide enough reliable

[22] International Economic Development Council (IEDC) https://www.iedconline.org/clientuploads/Downloads/edrp/IEDC_Electric_Vehicle_Industry.pdf

capacity to be bid into energy markets. These capabilities could seamlessly overcome the inherent limitations of the broad EV design by including balancing renewable peaks and valleys, providing excess capacity and bulk storage, providing spinning reserves, and balancing frequencies. Apart from reducing carbon emission, this technology can help in reducing the cost associated with storage as the batteries will be planted in vehicle. This may also help the vehicle owner to get financial assistance for providing power back to the grid.

ELECTRIC VEHICLES – GLOBAL SCENARIO

The prospect of rapid global temperature increase has created the need for a reduction in the use of fossil fuels and the associated emissions. Electric mobility is expanding at a rapid pace. In 2018, the global electric car fleet exceeded 5.1 million, up by 2 million from the previous year and almost doubling the number of new electric car sales.

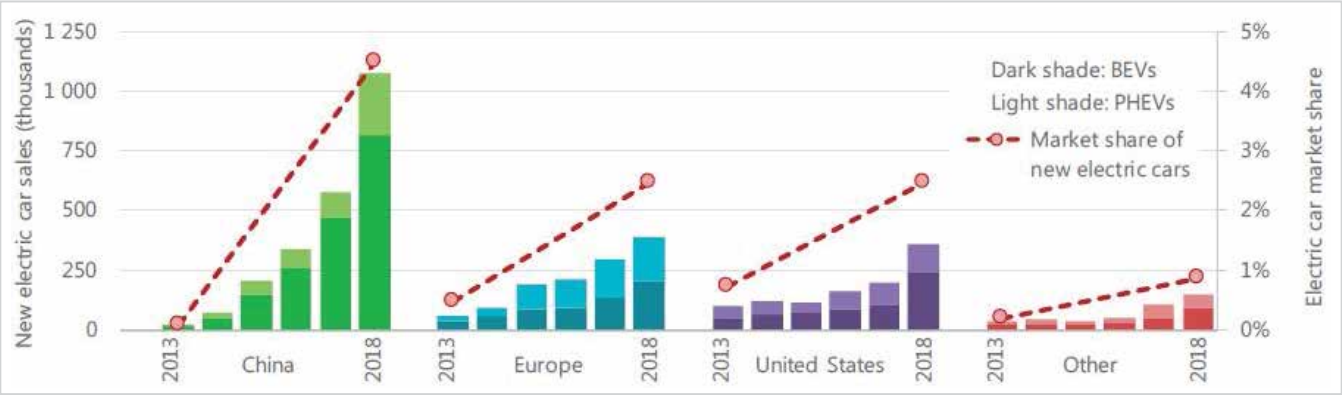
With regards to global market leaders, around 45% of the world's electric car fleet in 2018 was located in China, compared to 39% in 2017. In terms of sales and uptake, Norway has led the way with an electric car market share of 46% in 2018, followed by the Netherlands.

It is worth noting that policies continue to have a major influence on the development of electric mobility. EV uptake typically starts with the establishment of a set of targets, followed by the adoption of vehicle and charging standards. In China, the policy perspectives have differed slightly from the rest of the world. Restrictions were imposed on the investment in new ICE vehicle manufacturing plants and differentiated incentives for vehicles were used based on their battery characteristics.

Sales and Market Share

Global perspectives on EVs today have evolved on the broad outlines of the EV30@30 campaign launched by the Clean Energy Ministerial in June 2017, which aims to reach a 30% market share for EVs in all modes except two-wheelers by 2030[23]. The eleven countries that endorsed the campaign are Canada, China, Finland, France, India, Japan, Mexico, Netherlands, Norway, Sweden and the UK.

Exhibit 3: Global electric car sales and market share: 2013-2018



Source: Adapted from Global EV Outlook 2019, International Energy Agency

[23] Clean Energy Ministerial

One of the implementing actions of the EV30@30 Campaign has been the Global EV Pilot City Programme which aims to build a network of at least 100 cities over an initial period of five years, to work together on the promotion of electric mobility[24]. India's participant city for the programme is Pune.

The market for electric cars expanded most rapidly in China during 2013-2018 followed by Europe (led by Norway). In 2018, 45% of world's electric car fleet was located in China. In these emerging markets for electric cars, even though the share of Plug-In Hybrid Electric Vehicles (PHEVs) has risen over the years, Battery Electric vehicles (BEVs) continue to dominate. State policies have had a huge role to play in the growth witnessed by China, which included a restriction of investment in new ICE manufacturing plants and a proposal to tighten average fuel economy for passenger light-duty vehicle fleet in 2025.

The global stock in the segment for electric passenger cars in particular reached 5.1 million units in 2018, an increase of 63% from the previous year. This is similar to the year-on-year growth rate of 57% in 2017 and 60% in 2016. Battery electric vehicles (BEVs) account for 64% of the world's electric car fleet[25].

On the sales front, having reached the one million mark in 2017, close to two million electric car were sold globally in 2018, registering a y-o-y growth of almost 100%. Globally, more than two-thirds of electric car sales in 2018 were BEVs. This share has been steadily increasing from 50% in 2012 to 68% in 2018.

This is consistent with China's rapid electric car sales growth, as it is a BEV-dominated market (76%). Even though PHEV sales dominated the markets of Finland, Sweden and the UK, their share in total EV sales has been on a consistent decline in the markets of Japan and Netherlands.

ELECTRIC VEHICLES – INDIAN SCENARIO

India's current approach towards mobility transformation was first conceived by Niti Aayog with a view to build an ecosystem that would be "shared, connected and electric" and have the potential to cut country's energy demands by 64% and carbon emissions by 37% in 2030[26]. This is expected to result in an annual reduction of 156 Mtoe in diesel and petrol consumption for that year, saving ₹ 3.9 lakh crore or US$ 60 billion (at US$ 52/bbl of crude). Cumulative savings during 2017-2030 are expected to be 876 Mtoe for petrol and diesel, worth ₹ 22 lakh crore or US$ 330 billion, and one giga tonne for carbon-dioxide emissions. Not only does this supplement the country's major development goals to meet the climate obligations, it also paves the way to mitigate fuel security risks by departing from heavy dependence on crude oil imports to meet the mobility fuel needs.

The electric vehicles industry is at a nascent stage in India, constituting less than 1% of the total vehicle sales, envisaged to grow with purchase subsidies driving the initial uptake. At present, there are more than 4 lac electric two wheelers and few thousand electric cars on Indian roads. Two-wheelers in India

[24] Global EV Outlook 2019
[25] Global EV Outlook 2019
[26] India Leaps Ahead: Transformative Mobility Solutions for All,NITI Aayog https://niti.gov.in/writereaddata/files/document_publication/NITI-RMI_India_Report_web-v2.pdf
[27] NITI Aayog

have constituted a major part of EV sales with 54,800 vehicles being sold in 2018. Given the fact that 79% of vehicles on Indian roads are two-wheelers[27], the EV adoption is expected to be driven by it.

Table 14: Average Running Cost Analysis of Electric & Petrol Two-Wheelers

Model	(HSS)(Li-ion)	(LSS)(Lead Acid)	Petrol two wheeler
Ex showroom Price (₹)	87790	35490	60489
Fuel consumed in running 50 km/ day	1.5 units of electricity	1.5 units of electricity	1 litre of Petrol
Cost of fuelling for per 50 km run (₹)	11	11	60
Duration of Ownership (years)	5	5	5
Total running in 5 year (₹)	75000	75000	75000
Average Maintenance for 5 years (₹)	10000	10000	25000
Cost of Refuelling for 5 years (₹)	15750	15750	90000
Battery Cost for 5 years (₹)	0	30300	0
Cost of running for 5 year (₹)	113540	91540	175489
Saving in 5 years (₹)	61949	83949	-
CO_2 Reduction by using EVs in 5 year (Metric Tons)	1.9	1.9	-

Source: Society of Manufacturers of Electric Vehicles

A comparative advantage of benefits, explicit costs and opportunity costs, makes a case for electric two-wheelers which not only results in significant CO2 reductions and lower cost of fuelling but unlike the petrol two wheelers, also leaves the consumers with substantial savings in monetary terms at the end of five years.

SUCCESS STORIES IN ELECTRIC VEHICLES

Norway – Electric Cars

Norway has claimed its position as a global leader in electrification, with the largest electric car market share (46%) and obtaining the set goals faster than expected (the government's target of getting 50,000 EVs on Norwegian roads was achieved two years ahead of the planned schedule). Norway currently has the most ambitious aim to have only ZEV sales in the light-duty vehicle (LDV) and public bus segments by 2025, as laid down by the National Transport Plan 2018-29. The average CO2 emissions from new passenger cars decreased to 85 g/km in early 2017, with a rapid increase in electrification.

The Norwegian EV Initiative came into being in 1990 by the means of tax incentives resulting in Think Electric being the first domestically-produced electric vehicle. In the late 1990s and in the beginning of 2000s, major operators entered the market and Ford bought Think. It was then that the foundations of the most important tax incentives were made. In the last two decades, the Norwegian Electrical Vehicle (EV)-policy, with its many incentives and the establishment of Transnova, a body giving financial support to charging facilities, have reduced the barriers for E-mobility.

[27] NITI Aayog

To achieve the aforementioned goals, zero-emissions vehicles have been exempted from parking fees, road tolls and they have been granted free access on ferries. Since 2018, local authorities are authorized to apply fees that are up to 50% of those imposed on ICE cars. The national taxation has not changed and EVs remain exempt from purchase tax, value-added tax, annual tax and road user tax.

China – Electric Buses and Cars

Starting off with the electric two wheeler markets, China now accounts for 99% of the global market for electric buses too, 93% of which are battery electric vehicles. With regards to charging infrastructure, the number of bus chargers does not only stand out in comparison with any other country, but it also exceeds the level of publicly available fast chargers for passenger cars. Depot charging is the common regime in major electric bus operations in China; for instance the city of Shenzhen, where the entire fleet of 16,000 electric buses is now electric. Apart from majorly catering to the domestic demand in China, Chinese manufacturers such as BYD and Yutong have been active in Europe and Latin America to deploy electric buses as well.

China also remained the world's largest electric car market with nearly 1.1 million electric cars sold in 2018, and accounting for 55% of the global electric car market dominated by the share of BEVs (76%). Transition to electric cars (BEVs) was led by very small cars, which make up for 90% of total electric car sales in China.

China's EV policy is part of the government's ambition to combat air pollution and meet its climate change goals, as outlined in its 13th Five-year Plan for 2016-2020 and its nationally determined contribution. With the New Energy Vehicle (NEV) credit mandate coming into effect in 2018, China's policy demonstrates high ambition to promote all-electric battery electric vehicles (BEVs) over traditional vehicles, including over plug-in hybrid electric vehicles (PHEVs).

As per the mandate, a carmaker earns NEV credits equal to 10% of its fossil fuel vehicle (FFV) sales in 2019 and 12% in 2020. For example, if a carmaker sells 100,000 FFV in 2020, it will need 12,000 credits. Credits are earned by selling NEVs. A NEV is worth up to 2 credits for a long-range PHEV and up to 6 credits for a long-range BEV.

The USA – Electric Cars

World's second largest electric car market, after China, the United States had 1.1 million electric cars on road by the end of 2018, accounting for 22% of the global stock. The sales of electric car in the Unites States rose by 82% in 2018 on a y-o-y basis with an additional 134,000 BEVs sold with the release of Tesla Model 3. It is worth noting that with a total of 16 models, the expansion of BEV market has been accompanied by a falling market of PHEVs and that the ratio of electric cars to private chargers stands close to 1.

The overall EV uptake in the US has been uneven across the fifty states, with California leading the way towards electric mobility through the adoption of its landmark Zero Emission Vehicle (ZEV) mandate, which is now applicable to ten other states. The State aims to have 5 million EVs on road by 2030.

It is worth noting that the 30 California cities with the highest electric vehicle uptake have, on average, 5 times the public charging infrastructure per capita than the U.S. average. This clearly shows how the EV market grows with its charging infrastructure.

The Zero-Emission Vehicle (ZEV) regulation is designed to achieve the state's long-term emission reduction goals by requiring manufacturers to offer for sale specific numbers of the very cleanest cars available. These vehicle technologies include full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles.

Introduced as a part of California Air Resources Board's (CARB) Low Emission Vehicle regulation in 1990, the mandate assigned each automaker ZEV credits. Automakers were required to maintain ZEV credits equal to a set percentage of non-electric sales. Each car sold earns a number of credits based on the type of ZEV and its battery range. The credit requirement was set at 7% in 2019, which will require about 3% of sales to be ZEVs. Since 2010, more than 400,000 zero-emission vehicles and plug-in hybrids have been registered in California[28]. For instance, an automaker selling 100,000 cars in California in 2018 will need at least 7,000 ZEV credits, with at least 4,000 coming from battery-electric or fuel cell vehicle sales. However, this does not mean they'll need to sell 7,000 electric cars and trucks to comply, as most ZEVs generate more than one credit per vehicle. The electric vehicle market in the Unites States continues to grow where public and workplace charging infrastructure is the most extensive.

The Netherlands

With a fleet exceeding 200,000 vehicles and one of the densest networks of charging infrastructure, the Netherlands is currently the fifth largest EV market globally. The total number of Dutch electric passenger cars was about 143,000 by the end of December 2018, which is 1.7% of the Dutch passenger car stock. Of these EVs, 31.5% were BEVs and 68.4% PHEVs[29].

The increase in number of EVs goes hand in hand with an increase in the number of EV charging stations. By the end of December 2018, there were 35,894 public and semi-public charging points in the Netherlands, and about 100,000 private charging points.

The action plan for EV uptake in the Netherlands came into being with the National Action Plan for Electric Driving in 2009. The Dutch government aims at 50% of the new passenger cars sold being equipped with an electrical drive train in 2025, and 100% of all new passenger cars sold being zero-emission in 2030. Additionally, electric vehicles would be freed from value added and motor vehicle taxes starting in 2025 to reduce the upfront cost for a faster transition.

In addition, there are no registration taxes for pure electric cars. Registration tax is based on the CO2 emissions of a vehicle. By way of comparison, a petrol-powered vehicle with CO2 emissions of 100g/km is subject to a registration tax of € 2,355 for this tax alone. In addition, electric and hybrid vehicles are exempt from vehicle tax until 2020. For company car drivers who also use the vehicles privately,

[28] California Air Resources Board
[29] Flexibility of Electric Vehicle Demand, World Electric Vehicle Journal

only 4% of the sales value (maximum € 50,000) of an electric car is regarded as part of the driver's income tax. The rate for conventional vehicles is 22%.

In September 2019, the government also granted €5 million to 21 municipalities to support them in establishing 472 bi-directional charging network or the vehicle-to-grid (V2G) charging points for EVs. These V2G charging points are expected to be operational in 2020 and a system to pay drivers who make their electric-car battery available to supply energy back to the grid when electricity demand is high is also being worked upon.

Japan

One of the top ten EV markets, Japan has made the transition from conventional vehicles to clean transport mostly on account of Fuel-cell electric vehicles (FCEVs), which uses hydrogen as a fuel instead of electricity. Japan EV uptake has evolved largely on the government support with more battery charging points than petrol stations across the country. Even though the domestic market size for electric vehicles has been relatively small, Japan has successfully enabled a large scale uptake across the logistics industry. To date, logistics giant Yamato is the only provider in Japan to have pumped a large-scale investment — a new fleet of 500 electric vans, also known as StreetScooters — for commercial deliveries.

Japan's automotive strategy through a co-operative approach across industrial stakeholders, aims to reduce 80% of greenhouse gas (GHG) emissions from vehicles produced by domestic automakers (90% for passenger vehicles) – including exported vehicles – to be achieved by 2050 with a combination of hybrid electric vehicles (HEVs), BEVs, PHEVs and fuel cell electric vehicles (FCEVs). Since the domestic market for EVs remains relatively small, the underlying policy support is to reinforce export markets.

The policy drafted by the Ministry of Economy, Trade and Industry (METI) also delineates its goal to realise well-to-wheel zero emissions, thus linking the strategy to its efforts to fully decarbonise the energy supply (electricity and hydrogen). The strategy states the ambition to stimulate innovation in terms of "how vehicles are used", looking into concepts such as mobility as a service (MaaS), and connected and autonomous driving.

Apart from manufacturing of EVs, battery manufacturing in Japan by Panasonic has grown exponentially to cater to both domestic and foreign needs.

POLICY INITIATIVES IN INDIA

Automotive Mission Plan 2026

As per the plan, the government and industry have set a target to triple industry revenues, to US$ 300 billion, and expand exports sevenfold, to US$ 80 billion. In doing so, the sector has the potential to generate around 65 million jobs in the next decade, and the result could be improved manufacturing competitiveness and reduced emissions[30].

[30] Automotive Mission Plan 2016-26 (A Curtain Raiser)

The idea is to propel the Indian Automotive industry to become the engine of the "Make in India" programme and to promote safe, efficient and comfortable mobility for every person in the country, with an eye on environmental protection and affordability through both public and personal transport options.

National E-Mobility Programme

The National Electric Mobility Mission Plan (NEMMP) 2020 is a National Mission document providing the vision and the roadmap for the faster adoption of electric vehicles and their manufacturing in the country. Launched by the Ministry of Power, the programme aims to provide an impetus to the entire e-mobility ecosystem including vehicle manufacturers, charging infrastructure companies, fleet operators and service providers and will be implemented by Energy Efficiency Services Limited (EESL).

As part of the NEMMP 2020, Department of Heavy Industry formulated a Scheme viz. Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME India) Scheme in the year 2015 to promote manufacturing of electric and hybrid vehicle technology and to ensure sustainable growth of the same.

In the first phase of the scheme, about 2.78 lakh EVs were supported with a total demand incentives of ₹ 343 crore. In addition, 465 buses were sanctioned to various cities/states under this scheme. Based on the experience gained during Phase 1 of FAME Scheme and suggestions of various stakeholders including industry associations, the Department of Heavy Industry notified Phase-II of the Scheme with an outlay of ₹ 10,000 Crore for a period of three years commencing from 1st April 2019.

To tackle emissions, the government seeks to bring local standards at par with global standards, enabling India to move from BS-4 to BS-6 emissions (the Euro 6 equivalent) by 2020. Additionally, India has implemented Corporate Average Fuel Efficiency (CAFE) norms for improving the average fuel economy of vehicles which require OEMs to improve their fuel efficiency by 10% between 2017 and 2021 and by 30% or more from 2022[31].

In August 2019, the government sanctioned 5,595 electric buses in 64 cities for intra-city and intercity operations under the second phase of FAME India scheme in order to push for clean mobility in public transportation. These buses will run about 4 billion kilometres during their contract period and are expected to save cumulatively about 1.2 billion litres of fuel over the contract period, which will result into avoidance of 2.6 million tonnes of CO_2 emission.

National Mission on Transformative Mobility and Battery Storage

The batteries used in today's electric vehicles use lithium and are similar to the batteries that power a laptop computer. Broadly, the battery costs include: 1) Obtaining the lithium; 2) Building the battery pack to meet rigorous safety and reliability standards, and 3) Constructing the plant where the batteries are manufactured, the last part constituting for 30% of the cost of battery[32]. To propel faster adoption

[31] Department of Heavy Industry
[32] Handbook on Energy and Climate Change

of EVs in India by making them affordable to a wider consumer set and tap into the huge potential market, Japanese automobile major Suzuki Motors has partnered with Toshiba and Denso to set up a manufacturing unit for production of lithium-ion batteries and electrode in Hansalpur, Gujarat, which will also be the biggest lithium-ion battery manufacturing unit in the world. The initiative has been launched in March 2019 to push the transformation from internal combustion engine (ICE) vehicles to EVs. The Mission seeks to finalize and implement strategies for transformative mobility and Phased Manufacturing Programmes (PMP) for electric vehicles, their components, and batteries.

A phased roadmap to implement battery manufacturing at giga-scale will be an initial focus on large-scale module and pack assembly plants by 2019–2020, followed by integrated cell manufacturing by 2021–2022. To complement these efforts, Indian Oil Corporation (IOCL), with an aim to reduce future dependency on China for lithium procurement, will be setting up a 1 Giga Watt plant to make batteries used for running EVs using a non-lithium ion raw material that is locally available. One of the most noteworthy initiatives by the government to build capacity for electric mobility has been through the state-run Energy Efficiency Services Limited (EESL). The company plans to address the deficiencies in infrastructure by setting up nearly 1,000 charging stations, and is confident of deploying around 5,000 cars for various government departments by next year.

Tax Incentives

To enable immediate adoption of EVs, goods and services tax was reduced from 18% to 12% on battery electric vehicles in July 2019, compared with 31% to 48% for other vehicles.Those buying electric vehicles will get an additional income tax deduction of Rs 1.5 lakh on the interest paid on loans taken to buy EVs[33]. Tax regimes slightly differ across the states. The EV policy in Tamil Nadu gives 100% motor vehicle tax exemption to all electric motorcycles, buses, three-wheelers and other freight vehicles till 2022.

The state EV policy for Uttar Pradesh envisages to convert 70% of the public transport vehicles to EVs by 2030 along with a cent percent waiver of registration fee and road tax for the first 100 thousand purchasers of EVs. It also proposed to set up 200 thousand electric charging stations and putting 1 million EVs (including 1 thousand buses) on the road by 2024. To begin with, the state government has identified Varanasi, Lucknow, Gorakhpur, Agra, Prayagraj, Kanpur, Mathura, Ghaziabad, Meerut and Noida as 'model e-mobility cities'[34].

National Smart Grid Mission, Ministry of Power, in this regard, recommends that EV charging station should preferably be designed with rooftop solar generation to minimize dependence on fossil fuels in entire supply chain, hence shifting towards clean energy.

Use of dynamic pricing model and smart grid tools for charging stations to encourage charging at non peak timings hence aiding to Peak Load Management is also encouraged. Adoption of V2G technology by larger consumer groups will play amassive role in supplementing and effectively achieving the designated goals.

[33] Union Budget, 2019-20
[34] Nivesh Mitra, Government of Uttar Pradesh

Strategic partnerships with private players to build EV charging infrastructure

To set up the charging infrastructure for electric buses in India, Tata Motors Limited has joined hands with the state governments of West Bengal and Madhya Pradesh to set up 40 chargers along the route in Kolkata and two chargers in Indore for 40 vehicles. The FAME scheme's Phase II, in this regard, has set an indicative target of 2700 charging stations in cities above 4 million inhabitants, fast charging stations along major highways at an interval of about 25 km each and ultra-fast charging stations at every 100 kilometres. To supplement these plans, the Model Building By-Laws from 2016 were also updated to mandate 20% of parking space within residential and non-residential complexes and provision of EV charging infrastructure. A cap was also placed on the maximum tariff that can be asked by a public charging station, which is 15% above the average cost of supply.

Further, to reaffirm their commitment towards e-mobility in India, Tata Motors and Tata Power have also come forth with a partnership to set up 300 fast-charging stations across five key metro cities in India. With the first seven fast chargers set up in Pune, 45 more will come up across Mumbai, Delhi, Bengaluru and Hyderabad by the end of FY 20.

Box 2 : Electric Vehicles – Views from the Industry

Electric vehicles have assumed significant importance and many auto makers have started including a product or two in their portfolio. However, the respondents to the Survey unanimously concurred with the fact that, given that the EV industry is at a nascent stage it might be too early to give any substantial comment on it.

Most of the respondents agreed that while the cost of EVs is significant, there are also infrastructural and productivity challenges. State Governments are however taking the lead and are trying to introduce a few in their public transport systems.

The respondents are also of the opinion that the cost of new batteries, guarantees/reliability, charging infrastructure would play a pivotal role in the acceptance of EVs by the customers. The respondents further felt that there is limitation of riding range with one charge, and therefore, at present, some of the EVs are not feasible for intercity travels.

Lack of clarity on disposal of used batteries and availability of new batteries in retail also remains a concern according to the respondents.

CHAPTER

INDIAN AUTOMOBILE AT THE CROSSROADS

The automobile industry in India has gone through phases of phenomenal growth right from the early 80s with the first homegrown cars Ambassador, Standard, Premier, and Maruti 800 receiving overwhelming response from the growing middle class, to India today becoming a favoured destination in Asia for automobile companies to set up their manufacturing plants in the country.

Apart from establishing itself as a prime destination for manufacturing of automobiles, India has also moved up the ranks to emerge as an auto export hub for both passenger and commercial vehicles. The presence of this cost competitive manufacturing in India is evident with global giants which uses India as one of its few manufacturing bases to export abroad.

However, the industry stands at crossroads right now – with the growth mostly driven and sustained by the exports, as the structural changes in consumption patterns are leading to production patterns. Even though these growth prospects seem positive, the domestic capacities stand underutilized, leaving a substantial untapped potential in the export market.

The Automotive Mission Plan (AMP) 2016-26 envisages an export target of US$ 80 billion by 2025-26 for the automobile sector (both automobile and auto parts). However, it is to be noted that while the AMP's target include both the automobile and auto parts, only OEM exports are considered for the purpose of this Study.

Under the "Business" as Usual scenario, as specified by the Plan, the OEM exports will reach US$ 31.9 billion in 2025-26. To achieve this target, the OEM exports will have to register a CAGR of 10.73% from 2014-15 to 2025-26. Further, under an "Optimistic Scenario", for the exports to reach US$ 42.1 billion by 2025-26, a CAGR of 13.55% will be needed, during the same period. In order to attain the said targets – in both short and medium terms, a holistic strategy focused on the export of industry's core competencies is needed.

Table 15: India's Automobile Industry – Export Target 2026

	Year	Scenario	Export (US$ Billion)	Required CAGR
	2014-15	Observed*	10.4	-
	2025-26	Business as Usual**	31.9	10.73%
Export Target	2025-26	Optimistic Case**	42.1	13.55%

Source: SIAM; EXIM Bank Research
* The average exchange rate during 2014-15 was ₹60 per US$
** Assuming the average exchange rate to be ₹70 per US$

To achieve the envisaged goals for export growth and to keep the automobile sector stimulated domestically as well, following are a few action points that could to be worked on.

RCA Insights: Identifying the areas of focus

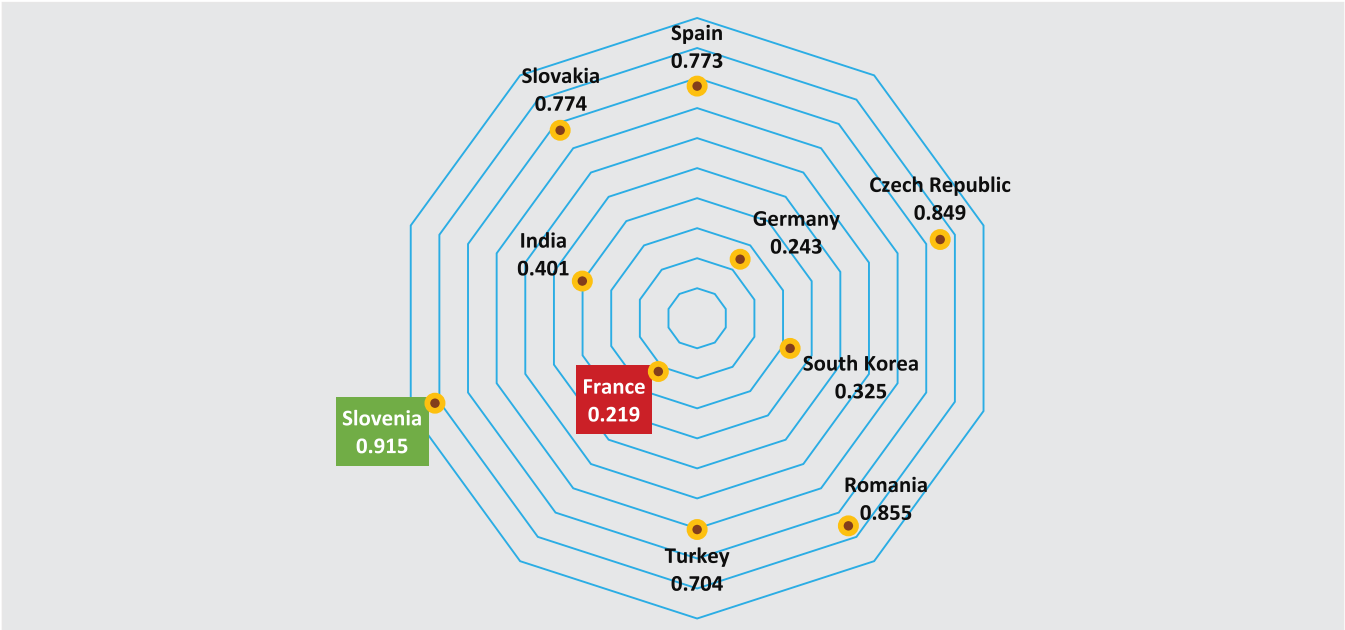
In the previous chapter, the Study identified six items at HS 6-digit level, under the HS 87 group, for which India currently enjoys a relative comparative advantage. It is worth noting that together these items constitute 71% of the total automobile exports from India by value.

To give a broader global outlook for the six items so identified, the NRCA values corresponding to the top ten exporters in 2018 for each commodity are plotted on the radar charts. The outermost value in each radar chart will correspond to the highest NRCA value amongst the peers (green), while the innermost value would reveal the lowest NRCA or even disadvantage, if negative (red). It should be noted the while the NRCA index for some countries across specific export items might be 1 (indicating an absolute comparative advantage), the same is a result of that item's share in the country's exports being equal to its share in world exports, even if the two are critically low.

HS 870321

The global exports for HS 870321[35] were recorded at US$ 39.1 billion in 2018, and were almost double from their exports of US$ 20.1 billion in 2014, driven largely by Spain (exports increased consistently from US$ 0.9 billion in 2014 to US$ 5 billion in 2018). The major exporters in 2018 were Spain (13.3%); Germany (13.3%); Czech Republic (12.8%); South Korea (6.2%); and Romania (5.3%). India was the 9th largest exporter with US$ 1.53 billion and its share was 3.9% globally in 2018.

Figure 14: NRCA for major exporters of HS 870321 (2018)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

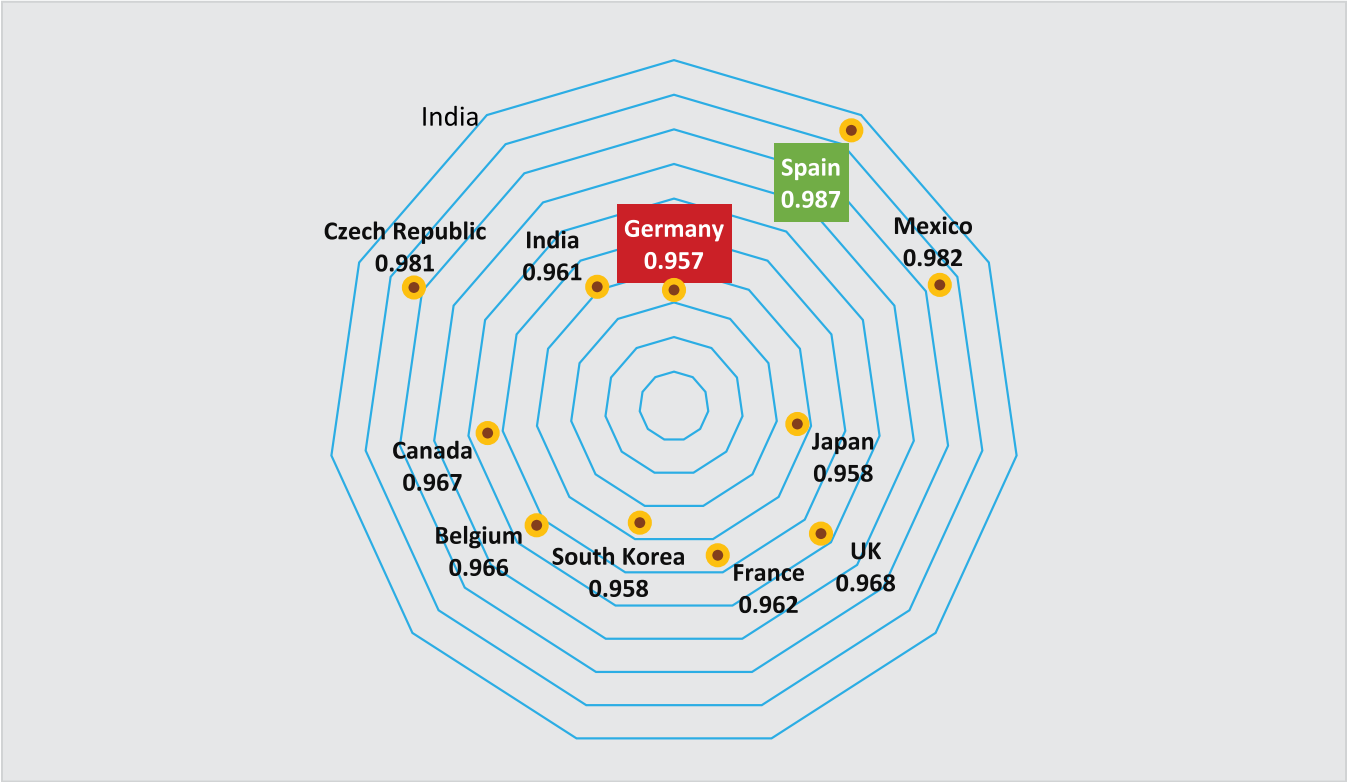
[35] Motor cars and other motor vehicles principally designed for the transport of persons, including station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm

With the NRCA index equal to 0.40, India's competitiveness for HS 870321 stood significantly ahead of the global auto giants like Germany (0.24), Japan (-0.37) and the USA (-0.64). However, while Germany's NRCA Index was significantly lower than India's for HS 870321, its exports were almost five times higher than India and were mostly concentrated in Europe. In short, while Germany might be exporting more of this item, India has a higher comparative advantage than Germany. Additionally, with majority of India's exports of HS 870321 concentrated in the USA, it is to be noted that the export trend indicates a growing demand for passenger cars with internal combustion engines.

HS 870322

The global exports of HS 870322[36] were recorded at US$ 112.6 billion in 2018 and registered an AAGR of 9.8% in the exports, during 2014 to 2018. The major exporters in 2018 for this product were Germany (12.7%); Spain (9.4%); Mexico (9.1%); Japan (6.2%); and UK (5.4%). India, with exports amounting to US$ 3.2 billion, was ranked 13th with a share of 2.9% in 2018, down from 4.1% in 2014. The NRCA Index for the top ten exporters of HS 870322 revealed that India's NRCA stood at 0.96 in 2018, with Spain having the highest comparative advantage at 0.99 amongst its peers.

Figure 15: NRCA for major exporters of HS 870322 (2018)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

[36] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm

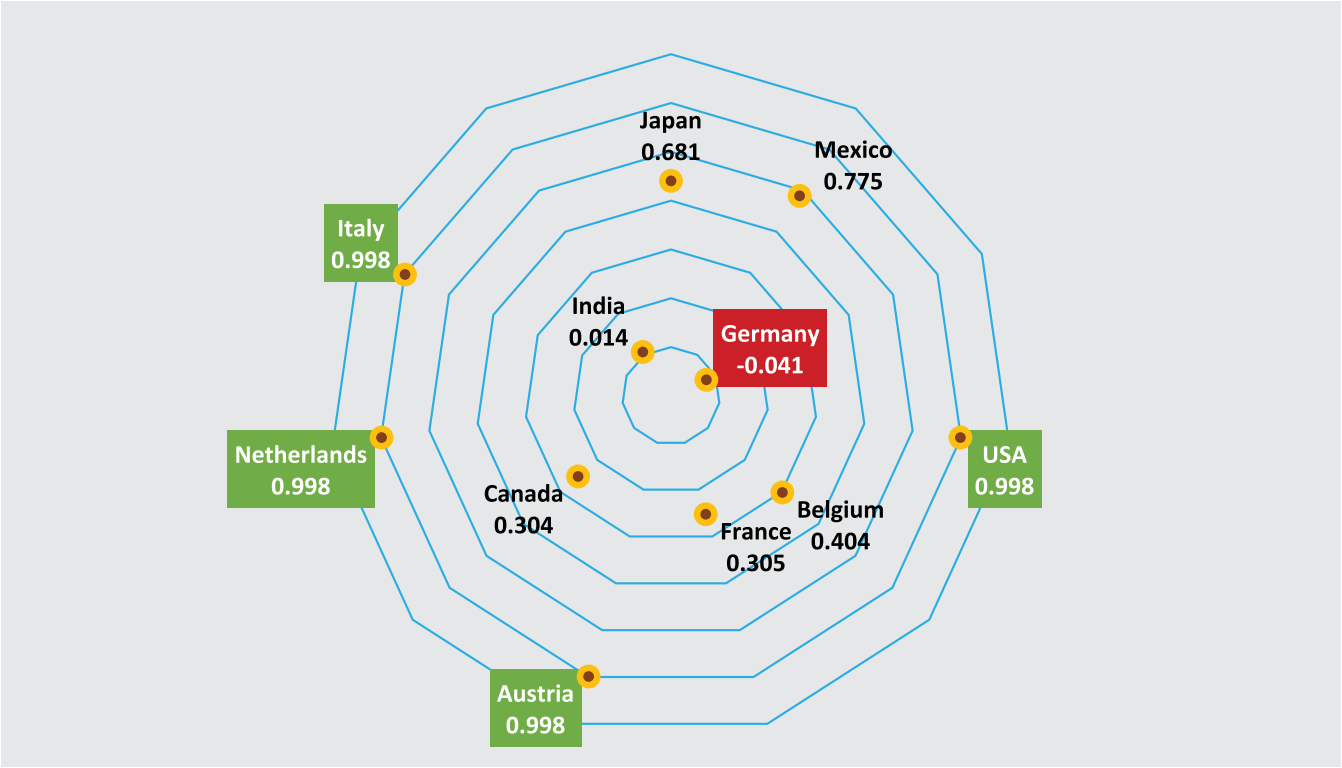
HS 870422

The export of HS 870422[37] globally have declined marginally from US$ 21.3 billion in 2014 to US$ 20.8 billion in 2018. The exports are majorly dominated by Japan (20.2%), and Mexico (18.4%).

India's rank was 14th in 2018 with a share of 1.7% in the world in this category of exports. With over 50% of the total exports of HS 870422 to Bangladesh, Indian exporters have not yet captured the markets that have highest import demand. The US with the highest share in import demand (20.8%) for HS 870422, has largely been catered to by Mexico (56.7%), Canada (20.7%), and Japan (15.2%).

With respect to NRCA, Germany, which was the third largest exporter of HS 870422, stood at a comparative disadvantage with the NRCA Index at (-) 0.04 in 2018, while India with NRCA of 0.01 was having a negligible comparative advantage.

Figure 16: NRCA for major exporters of HS 870422 (2018)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

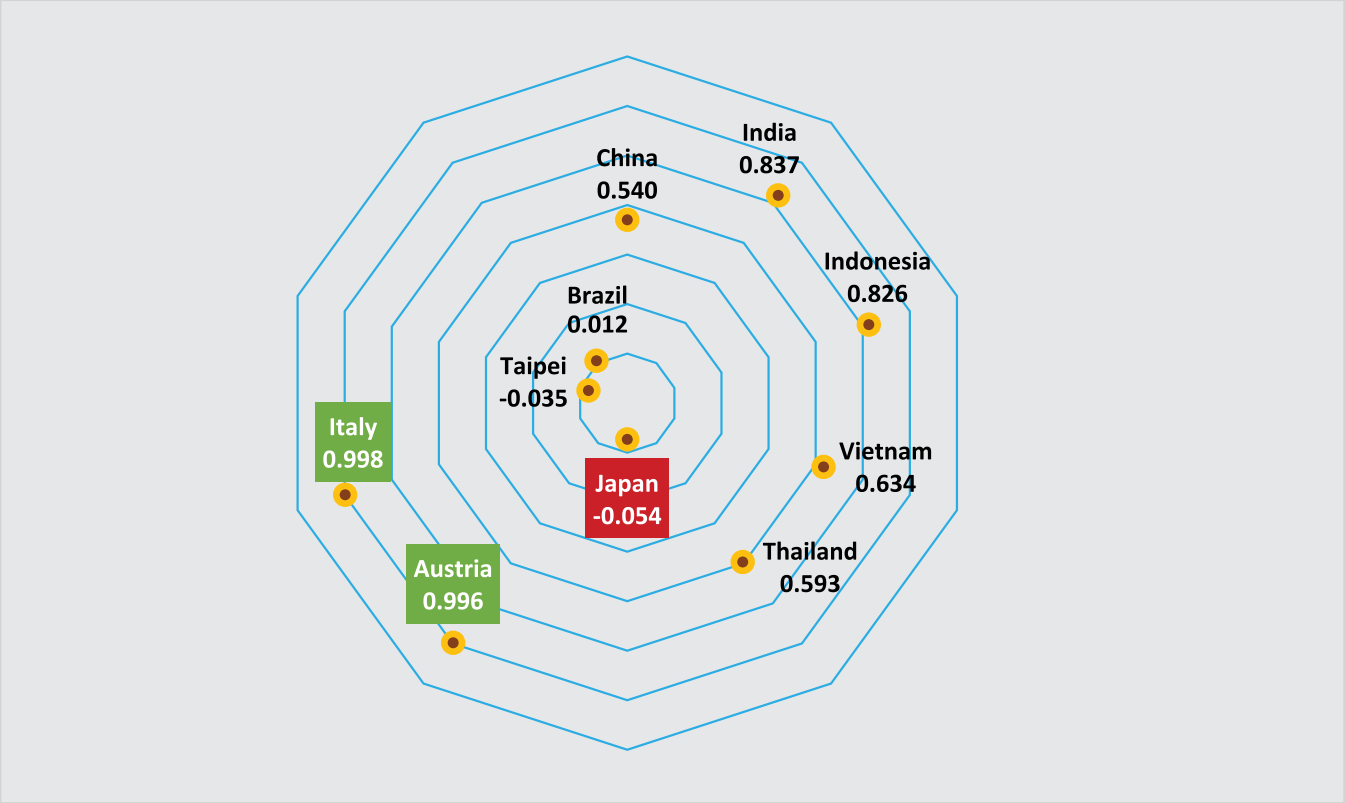
[37] Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t

HS 871120

The exports of HS 871120[38] are dominated by China (43.3%), and India (18.9%). Indian exports have grown at an AAGR of 19% during 2009-2018 for this item. The largest market for Indian exporters for HS 871120 is Bangladesh (14.6%), followed by Sri Lanka (11.7%), Nigeria (11.4%), and Colombia (10.2%)– forming 48% of India's total exports of the item in 2018. The demand surge has particularly been prominent in Bangladesh, with exports from India registering an AAGR of 22% during 2009-2018, making Hero MotoCorp and Bajaj Auto the biggest beneficiaries owing to the relatively cheaper logistics cost and easy access to a growing market.

India's NRCA Index was the third highest amongst the top ten exporters for HS 871120, significantly more than that of China, which happens to be the top exporter in 2018.

Figure 17: NRCA for major exporters of HS 871120 (2018)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

[38] Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm

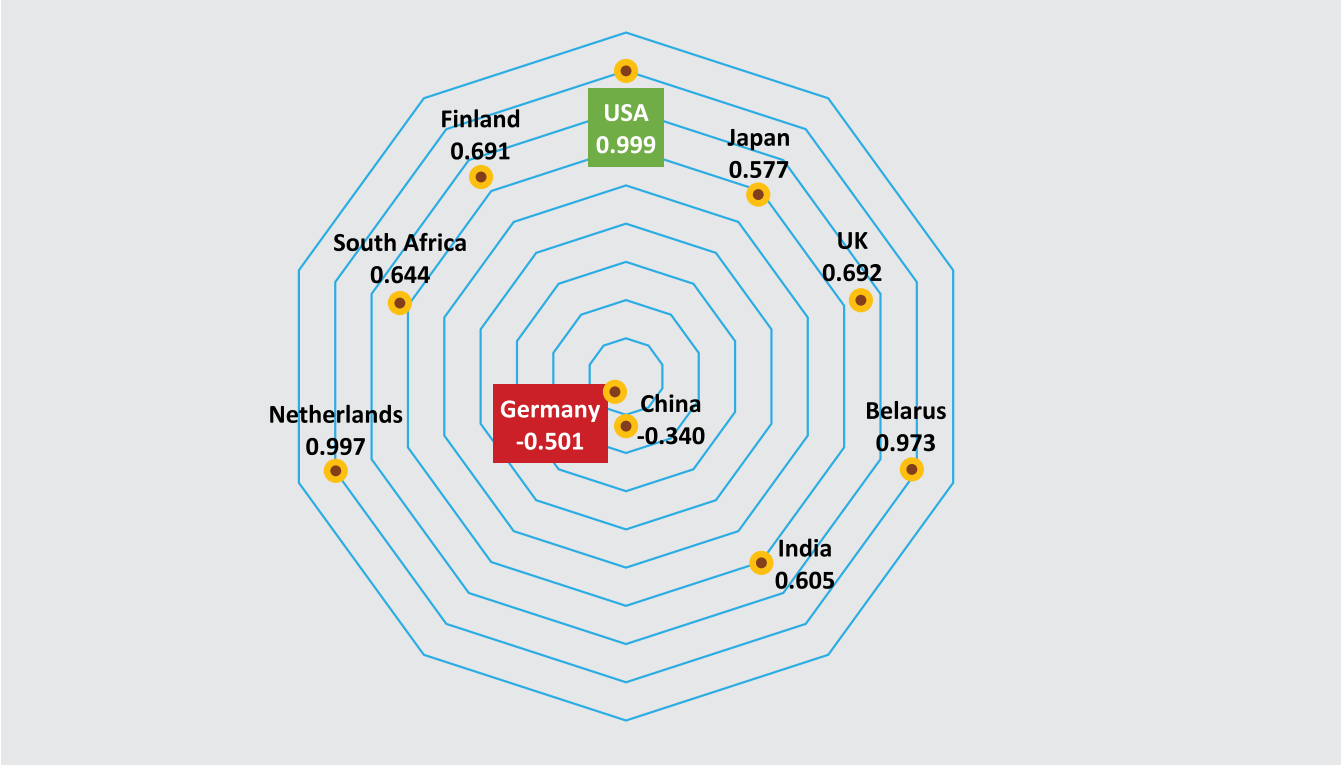
HS 870410

For HS 870410[39] the major exporters in 2018 were the USA (22.7%); Japan (14.3%); the UK (13.9%); Belarus (12.7); and India (6.8%).

Across the six items India enjoys a revealed comparative advantage in HS 870410, which has been amongst the ones recording a high AAGR (37%) for exports during 2009-2019, compared to the world import growth of 6%. In fact, India's share has increased in world exports of this item from 1.5% in 2014 to 6.8% in 2018. While domestic demand is mostly met through local production, India has established itself in recent years as a major exporter of dump trucks, with Caterpillar and Komatsu at the forefront. More than 50% of India's exports of this item were to Indonesia in 2018.

In the context of NRCA, the USA has an absolute comparative advantage in HS 870410 and it mostly exports to Australia (25.8%), and Canada (25.3%). China and Germany, featuring in the list of major exporters have comparative disadvantage with negative NRCA.

Figure 18: NRCA for major exporters of HS 870410 (2018)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

[39] Dumpers for off-highway use

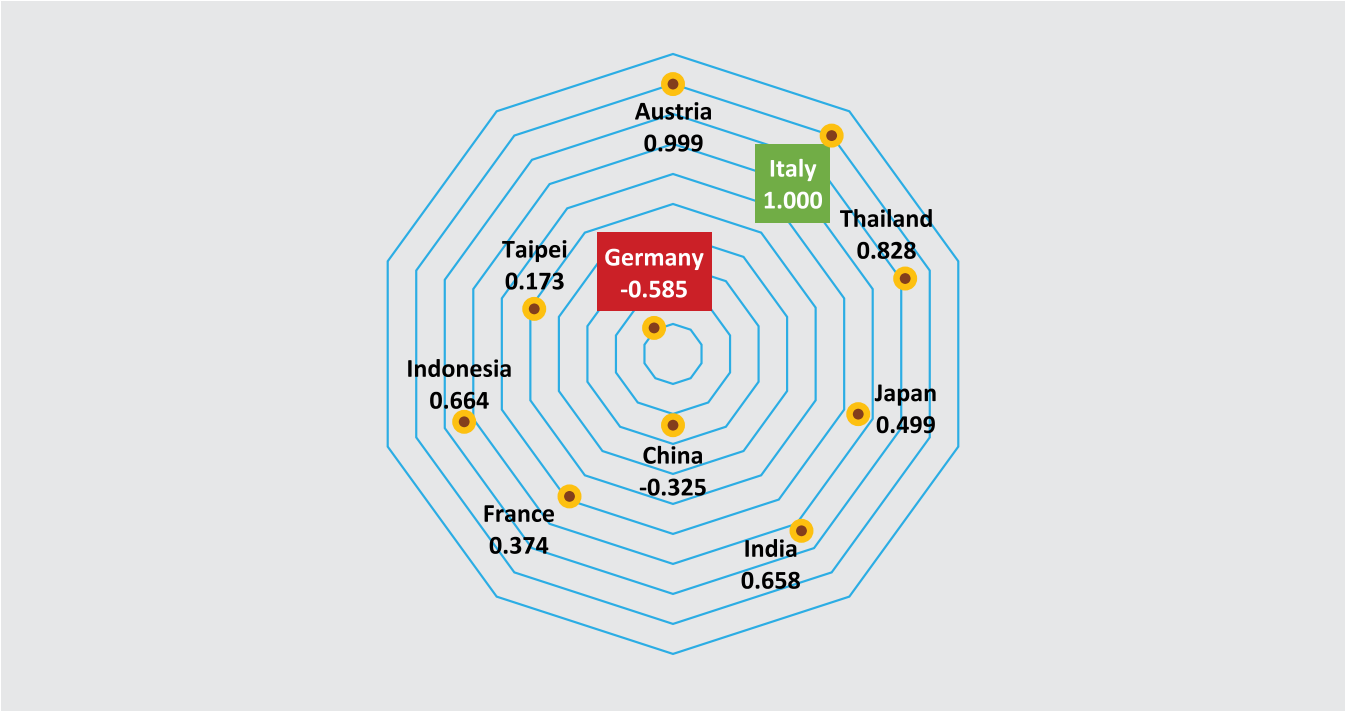
HS 871130

Across all the items from HS 87 for which India stood at a relative comparative advantage, exports of HS 871130[40] registered the highest AAGR of 39% during 2008-2018. Companies such as Bajaj Auto, Hero MotoCorp, TVS operate in this category.

The two-wheeler segment has historically been a stronghold of Indian auto industry including the export space. Two-wheelers have a share of almost 80% in India's total automobile exports and hence, India can utilize its comparative advantage in this category, even further.

With exports worth US$ 171 million (share of 8.1%) during 2018, India was amongst the top five exporters of HS 871130 globally. The countries with a higher share than India were Austria (19.3%); Italy (14%); Thailand (13.7%); and Japan (11.4 %).

Figure 19: NRCA for major exporters of HS 871130 (2018)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

[40] Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm

Penetrating the used cars market in Africa

The used vehicle market has been estimated at about US$ 60-70 billion in sales worldwide[41]. With some of the largest importers of used vehicles globally being in Africa, particularly Ethiopia and Nigeria. Even in Asia, the market for pre-owned vehicles is significant. For instance, Cambodia allows used cars to be imported and as a result, about 80% of the cars in the market in Cambodia are old and used, each charged a minimal rate at the border on the basis of their age, with tax rates dropping for every additional year of age on the car.

Box 3: Emerging export potential of used cars from China

While the world is increasingly moving to the electric vehicles category, there is also a huge market for the used cars. In developed economies, more than twice as many used cars are sold as new ones. For example, there were 17.3 million new vehicles sold in the U.S. during 2018 and 40.2 million used ones. The gap is forecast to widen in 2019, driven by the ever-escalating price of new cars and a flood of used vehicles coming off lease. Automakers may be forced to slash prices of new vehicles and eliminate incentives in order to prop up sales.

Rich countries from Japan to the U.S. have shipped at least some of their older vehicles to developing nations such as Mexico and Nigeria for decades now. At the same time, China is also showing the potential to join the US and Japan as a major exporter of second hand cars. This is due to various factors. First is the rising inventory of cars in China. In 2018, China sold 28 million new cars and nearly 14 million used ones. This ratio is expected to flip, with China being home to more than 300 million registered vehicles - the largest fleet in the world - and is expected to outgrow these numbers in years to come. The quality of Chinese cars has also improved to the point where many developing-world consumers may well choose them as a cheaper alternative to used Toyotas or Fords.

At the same time, given China's automobile industry is in a slump, used-car exports stimulate the vitality of the domestic automobile consumption market. This can increase competition and possibly trouble for the automotive sector globally. An increase in the supply of used cars will inevitably drive down prices, especially in the emerging markets such as Nigeria and Cambodia to which Chinese exporters will be marketing their vehicles.

While that's good news for prospective car buyers, over the long term it will impact new car sales and even manufacturing in developing countries, many of which are part of automakers' global supply chains. Likewise, as fewer cars are exported, say, from the US, the competition between new and used vehicles domestically will only stiffen.

China's secondhand car exports are starting modestly and the country will take time to catch up with more established players. However, ultimately, China will have more used cars to sell than any other country and its export business will inevitably grow into the World's biggest.

Source: China Will Be the World's Used Car Salesman
https://www.bloomberg.com/opinion/articles/2019-07-27/china-is-set-to-conquer-global-used-car-export-market

[41] UN Environment – Africa Used Vehicle Report, 2018

Our Survey respondents revealed that they face huge and aggressive competition in neighbouring countries like Sri Lanka and Bangladesh due to influx of reconditioned vehicles from Japan. It is also an accepted truth that the Japanese used car vehicles are thriving these markets due to superior technology. Japanese OEM products such as Pick-ups manufactured in Thailand (which is a low-cost manufacturing hub) also pose a strong challenge to Indian exports. Resellers (especially Japanese vehicles) are predominant in Sri Lanka and Bangladesh (primarily in PVs) as well as in Philippines, Myanmar and parts of Africa (for Pick-ups and LCVs).

The market is poised for further growth as Africa has the least motorized region globally with only 44 registered vehicles per 1,000 inhabitants compared to the global average of 180 vehicles per 1,000 inhabitants. The growing demand for used cars in Africa, in part, is also explained by the growing middle class and increasing level of disposable incomes.

It may however, be noted that four African countries- Egypt, Morocco, South Africa and Sudan-have banned used-vehicle imports which largely has presence of high end vehicle manufacturers.

Further, with Africa growing rapidly, there is a rising need of cars in various African nations. In Nigeria alone, which is one of the major economies of Africa, imports of HS 870333[42] and HS 871120[43] witnessed an AAGR of 72% and 23%, respectively during 2009-2019. It is important to note that while India's export of HS 871120 to Nigeria has increased by 17%, sufficiently catering to the import demand, the exports of HS 870333 have remained low at US$ 1.5 billion, constituting just 4% of world exports.

In order to combat the added burden of polluting fuels along with the inherent problems like smuggling of used cars, export of cost competitive hatchback cars from India to Africa may be towards mutual interest. This aligns well with the various policy moves (like age restriction) of the African nations as well as the aspirations of the African youth.

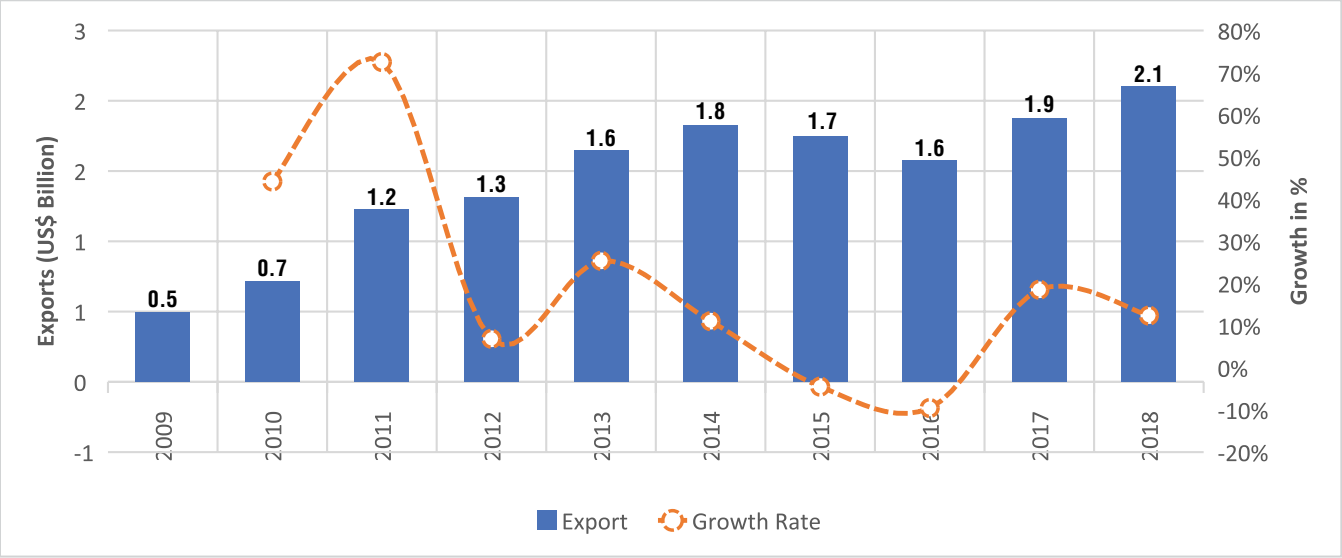
Building on India's stronghold in developing economies

India's exports of two wheelers in which it has an advantage (HS 871130[44] and HS 871120[45]) reached a ten-year high of US$ 2.1 billion in 2018, growing at an AAGR of 20% during 2009-2018, with more than 35% of the total exports concentrated in Bangladesh, Sri Lanka and Nigeria.

It is worth noting that this is clear case of a positive correlation between rising incomes and the demand for automobiles. As the middle class moves up the income brackets, the demand for automobiles, particularly for four wheelers, is expected to shoot up.

[42] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
[43] Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm
[44] Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm^3
[45] Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 ut <= 250 cm^3

Figure 20: India's Export of Two Wheelers (HS 871120 and HS 871130)



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

On similar lines as two wheelers, India's exports of four-wheelers (HS 870321[46] and HS 870322[47]) have also been penetrating into developing economies. The growth in shares of Mexico market in India's export of these two items (0.9% in 2009 to 15.7% in 2018); South Africa (3.3% in 2009 to 11.2% in 2018); Chile (0.8% in 2009 to 4.2% in 2018); Nigeria (0.8% in 2009 to 3% in 2018); and Indonesia (0.5% in 2009 to 3% in 2018) exhibits a concrete evidence of the same.

The rapid surge in the demand for two-wheelers and four-wheelers across economies such as Bangladesh, Nigeria and Sri Lanka not only complements India's areas of core competence in such sprawling markets, but it also provides the avenue for sustained growth as the demand in domestic markets stagnate.

As per the industry survey, the respondents are majorly exporting vehicles to developing countries such as Nepal, Bangladesh, Sri Lanka, Ghana, West Asia, South Africa, Peru and Chile. Some potential markets identified by them for export marketing of vehicles include Vietnam, Indonesia, Ukraine, Turkey, Tanzania, Zambia, Israel and select countries in Latin America. The players also viewed that the competition from China is strong in some of these countries – viz., in Chile, Peru, Australia New Zealand, and South Africa for personal vehicles; and Algeria, Bangladesh and select countries in Latin America for commercial vehicles.

Given this background, it becomes important to make sincere efforts towards exploring new markets, especially the developing ones, as the world is progressing.

[46] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)

[47] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)

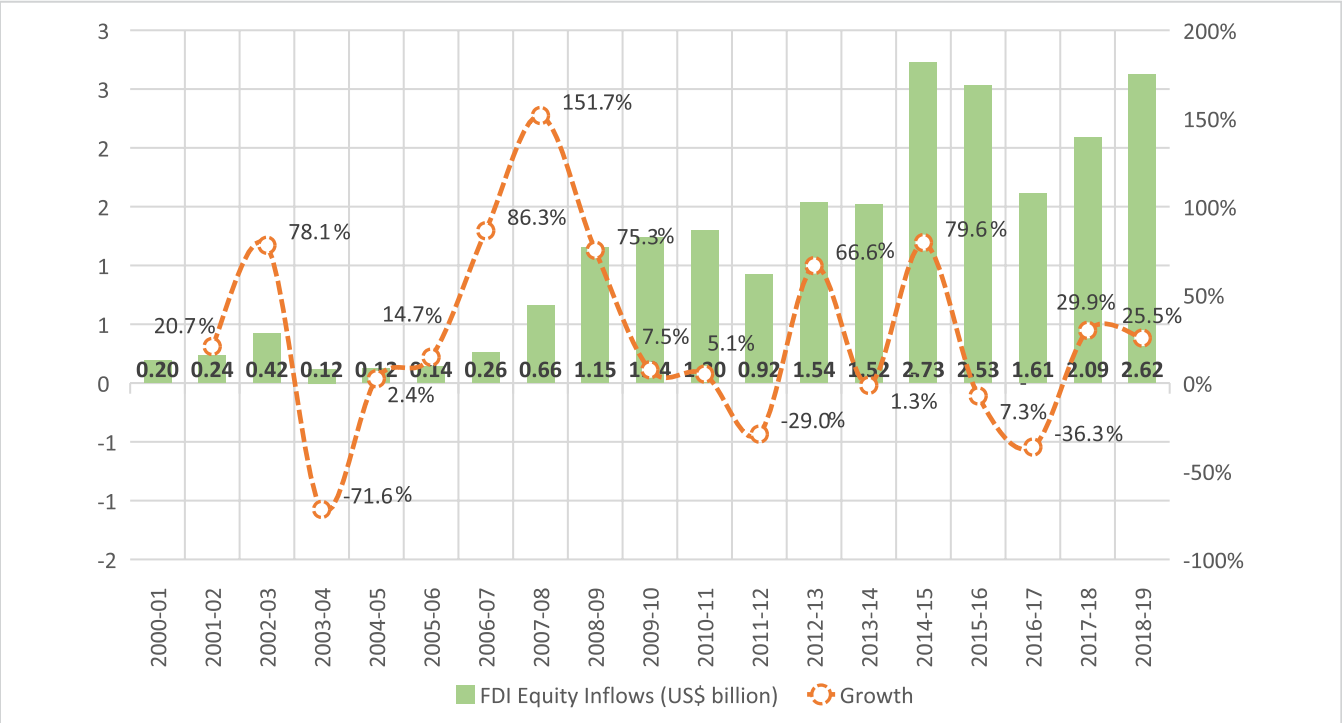
To accrue substantial and long-term benefits, overseas direct investments by Indian automakers would help them to penetrate these potential markets better, while catering to other nearshore destinations.

Reviving the FDI: Addressing the Gaps

As the automobile industry in India undergoes a paradigm shift – both, in terms of technology (electric vehicles and connected cars) and the usage patterns (rental cars and cab aggregating services), the need for FDI in the sector grows more than proportionately to adopt these changes and keep the industry stimulated.

The Government of India encourages foreign investment in the automobile sector and allows 100% FDI under the automatic route. As a result, the FDI equity inflow in the auto sector has registered an AAGR of 27.7% during the period 2000-01 to 2018-19. In 2018-19, the total FDI equity inflows in India's auto sector stood at US$ 2.6 billion, the highest after US$ 2.7 billion witnessed in 2014-15. However, the growing needs for customization coupled with incorporation, technological upgradation and adherence to higher standards of safety and quality not only strengthens the domestic market, but also caters to a wider export market.

Figure 21: FDI Equity Inflows in the Indian Automobile Sector (US$ Billion): FY 01 to FY 19



Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Addressing the Logistics Related Issues

Transportation and logistics assume a critical part of the automobile business – this may be including transfer of vehicles from factory to the market or to the port to send overseas.

The respondents to our Survey highlighted the fact that the logistics related challenges in India hinder the seamless movement of export consignment leading to increased cost and time. While the limitations of non-availability of direct shipping lines to export to Africa is cited as a major challenge, the respondents also highlighted the long delay to get clearance of export consignment from the Customs Department across the Bangladesh border as a major deterrent for exports to the neighbouring country.

Respondents also highlighted the high handling charges, space constraints and the potential damage to the vehicles as challenges specific to Mumbai Port. Poor road conditions and restrictions in movement of trucks during day time also lead to excess cost and delay in transportation and delivery.

Some of the suggestions given by the Survey respondents include; greater budget allocation for highways development, including rural connectivity; developing better connectivity between industrial hubs and ports, as also the port infrastructure; developing dry ports in the hinterlands with vehicle handling facilities to reduce transaction time and cost; creation of auto-hubs (including rail unloading, storage, customs etc) at major border posts (viz., Bangladesh, Nepal and Bhutan); among others.

However, it is to be noted that the envisaged capex, according to fDi markets, has mostly been concentrated in select regions across the country, like Manesar in the North, Pune in the West and Chennai in the South. Moving towards a more holistic growth of the sector, it is important for the FDI to be spread across more regions for it to harness the wide ranging opportunities and potential offered by the heterogeneous distribution of material and human resources in India.

Table 16: Automobile Industry – Envisaged Foreign Capex 2014-2019 (US$ Million): A Regional Analysis

Source countries	Chennai	Bangalore	Chakan	Oragadam	Sanand	Ranjangaon	Pune	Export (US$ Billion)	Others	Total
Japan	1023.4	2665		1769.7		1260		16.6	688	**7422.7**
Germany	280.7	342.7	2148.7					456.6	830.2	**4058.8**
South Korea	2408									**2408**
United States	928.4	287.9			647.3			471.3		**2334.8**
France	1139.7		191.9		871.1					**2202.7**
Italy							1015.7	59.3		**1075**
China		200.5								**200.5**
United Kingdom		2.9								**2.9**
Total	**5780.2**	**3499**	**2340.6**	**1769.7**	**1518.4**	**1260**	**1015.7**	**1003.8**	**1518.2**	**19705.4**

Source: Data accessed from FDI Markets; EXIM Bank Research

It is recommended that investment towards the development of an EV ecosystem, Li-ion battery manufacturing, reorientation of exports and upgradation to the latest technology through robust R&D facilities are crucial to position for a long-term structural competitive automobile manufacturing market.

It is also crucial to reorient the investments given the fact that the resulting spillovers, apart from capturing exports in developing countries, also opens doors to the markets of developed countries – particularly the ones where import demand for certain items (HS 870321[48] and HS 870322[49]) has gone up substantially in the last decade. The export potential to these markets expands with the improvement in safety standards and customization, which reinstates the rationale of more investments being a prerequisite to more exports.

Automobile Sector benefiting from Trade Agreements

Apart from making the business environment more dynamic for the trading partners, Preferential Trade Agreements have empirically[50] resulted in a seamless transfer of technology and expertise leading to increased economic growth. These agreements, by the means of withdrawing any government support in the form of subsidies, also reduce the overall government spending. A case in point in India is the Hero-Honda Joint Venture. Even after the dissolution of their 26-year old JV in 2011, licensing agreements were signed between Hero MotoCorp and Honda for the former to access technology from the Japanese firm for existing and future products till 2014.

While India faced widening trade deficits with some countries after entering the FTA with ASEAN, it can be argued that the results are not pervasive across all sectors. For instance, India's trade balance for HS 87 (Vehicles other than railway or tramway rolling stock, and parts and accessories thereof), with ASEAN after the signing of FTA in 2003 is a case-in-point highlighting the sector specific impact of FTAs in India. India's trade balance for HS 87 with ASEAN went up from US$ 620 million in 2002 to US$ 12 billion in 2018, almost ten times. A distinct growth in exports to the ASEAN countries was noted for HS 870210[51], HS 870322[52], HS 870490[53] and HS 870410[54] during the same time.

Our Survey respondents viewed that India still faces high import duties on passenger and commercial vehicles in Indonesia (Diesel), Thailand, Vietnam, Philippines, Malaysia in the ASEAN region, as also in Peru, Columbia, Uruguay, Algeria, Morocco and South Africa. It is also further viewed that EU countries such as Italy and Spain are almost impossible to access given that they face tough competition due to intra-EU trade, and preferential imports from South Korea and Mexico.

Entering FTAs is also likely to result in concentration of manufacturing of certain kinds of vehicles in

[48] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
[49] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
[50] Transfer of Technology and knowledge sharing for development: Science, technology and innovation issues for developing countries; https://unctad.org/en/PublicationsLibrary/dtlstict2013d8_en.pdf
[51] Motor vehicles for the transport of >= 10 persons, incl. driver, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine"
[52] Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark- ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
[53] Motor vehicles for the transport of goods, with engines other than internal combustion piston engine (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
[54] Dumpers for off-highway use

hubs that are particularly suited for regional or global distribution. This has again been reinforced through the cases of both Mexico and ASEAN in the auto sector.

Industry, during the Survey, conveyed that India need to enter into FTAs or such type of negotiations with other countries as well to help the Indian automobile industry to enter these markets. A case in point is Australia which is an attractive market. Due to FTA not in place with Australia, the market is dominated by imports from Thailand, Japan, South Korea and China, who benefit zero duty due to existence of bilateral FTAs. In some countries there are also mandatory localization conditions to avail import duty reduction which necessitates heavy investments. Industry players also viewed that in some markets they face differential duty structure for imports from China, Japan and India which make the competition tougher for Indian sellers. Such challenges could be tackled through FTA negotiations.

The respondents to the Survey also opined that during FTA negotiations, some of the non-tariff barriers imposed by the countries should be negotiated and resolved. The respondents have cited the new CO_2 emission norms for new passenger cars adopted by the EU (from 2020) with fleet-wide average emission target for new cars being set, resulting in drop of hatchback exports. Another example given was that of Vietnam, which has implemented Decree 116 which requires each batch of export vehicles to obtain Vehicle Type Approval (VTA) certification issued by authorities in the exporting country. The West Asian region does not have a uniform regulatory standard among the GCC countries, leading to huge compliance cost.

Table 17: India's trade balance in automobiles with ASEAN

HS Code	Description	Trade Balance (US$ 'million)				
		2002 (Pre-FTA period with ASEAN)	2006	2010	2014	2018
	All products	-304.0	-3931.3	-6681.7	-13000.0	-21135.8
	Automobile (Total HS 87)	620.7	2382.5	5334.3	9673.8	12015.4
	Automobile (38 HS-6 digit codes)	22.6	40.1	679.1	398.9	741.8
870410	Dumpers for off-highway use	0.02	13.2	160.2	13.8	284.6
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.7	-0.02	297.5	186.9	163.1
871120	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm^3	9.2	19.6	51.5	138.9	161.1
870321	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	9.5	0.4	159.3	51.7	77.5
871130	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm^3	0.4	0.0	0.3	8.6	27.8
870421	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	1.6	-0.2	0.8	1.8	14.7

870422	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	0.2	0.0	1.1	0.9	11.7
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	-0.5	0.0	-0.1	4.7	8.9
870332	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 1.500 cm^3 but <= 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)	0.3	0.0	0.1	1.7	7.5
870423	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)	0.5	0.0	2.5	1.7	7.0

Source: Data accessed from ITC Trade Map, December 2019; EXIM Bank Research

Box 4: Impact of NAFTA on Mexico's Automobile Exports

Implementation of NAFTA (North American Free Trade Agreement entered by the United States, Canada, and Mexico), which began in 1994, deepened the integration of Mexico into the North American economic space. It is worth noting that Mexico emerged as one of the world's leading producers and exporters of motor vehicles, without having any homegrown automobile brands. During the more than two decades existence under the NAFTA, Mexico's light vehicle production more than tripled—from 1.1 million units in 1994 to nearly 3.5 million units in 2016. Moreover, Mexico's light vehicle exports increased from 579,000 to 2.8 million units during the same period. The implementation of NAFTA, which began in 1994, removed most of Mexico's trade restrictions with the USA and Canada over a period of ten years. Key provisions that had a positive impact on Mexico's auto industry included the following:

- For every US$ 1 worth of imported vehicles, the required minimum value of exports declined from US$ 1.75 in 1993 to US$ 0.80 in 1994, US$ 0.55 in 2003, and zero dollars in 2004.
- The minimum requirement for Mexican content for duty-free export declined from 36% in 1993 to 34 % in 1994, 29% in 2003, and 0% in 2004.
- Import duties declined from 20% in 1993 to 10% in 1994 and 0% in 2004.
- Parts plants in Mexico were permitted to be 100% owned by foreigners after 1998

In reality, NAFTA negotiations stimulated a round of investment by the country's legacy carmakers, resulting in vehicle assembly plants in Mexico receiving state-of-the-art technology. In order to meet NAFTA's requirements that some production be located in Mexico in order to be able to import vehicles, Honda and Toyota for the first time began production in Mexico—at small-scale plants in El Salto (in 1995) and Tijuana (in 2004), respectively.

For Mexico, NAFTA also proved to be the trigger for negotiating trade agreements with many other countries. Through its free trade agreements, Mexico gained "tariff-free access to 47% of the global new vehicle market in 2015". As of 2016, Mexico had reached 14 agreements with 46 countries. Thus, under NAFTA, Mexico's auto industry not only became much more integrated with those of the United States and Canada, but also became much more international in nature.

To date, Mexico's rapid growth in auto output has not come at the expense of production within the U.S. corridor dubbed auto alley. However, the rise of Mexico's auto industry represents the emergence of a second vehicle production cluster within North America. The assembly plants within this cluster tend to specialize in making small cars and large pickups, and they are well positioned to export their vehicles throughout the Western Hemisphere.positioned to export their vehicles throughout the Western Hemisphere.

Source: Federal Reserve Bank of Chicago

Both experiences, viz., India's trade surplus with ASEAN in auto industry, and Mexico's phenomenal rise as a leader in automobile manufacturing and exports, build the case for India to channelize the growth potential of automobile sector through preferential trade agreements with more nations. In NAFTA, while Mexico had a geographical advantage in getting the access to a huge market like the USA, it also paved the way for Mexico to enter into agreements with other countries and reap the benefits of spillovers. India, similarly, taking a cue from ASEAN FTA must use the FTA negotiations with various nations to our advantage. It may be noted that amongst the top ten markets for India's automobile exports, there are many LDCs and EMEs such as Bangladesh, South Africa, Nepal and Sri Lanka. Apart from improving the access to foreign markets, this is also expected to narrow the investment gaps in the auto sector and reduce the input costs for automakers by relatively cheaper imports.

Entering into FTAs is also likely to result in concentration of manufacturing of certain kinds of vehicles in hubs that are particularly suited for regional or global distribution. This has again been reinforced through the cases of both Mexico and ASEAN in the auto sector.

Channelizing the growth of shared mobility

Even though the growth of shared mobility services has had a dampening effect on private car ownership, India offers all the right ingredients to be one of the largest shared mobility markets in the world with its large population clusters, a young demography that is well connected to the internet and rising real incomes. The shared mobility fleet has been growing significantly over the last few years. The market is expected to further grow at a CAGR of 9.7% during 2019-2025 to reach a strength 4.7 million. Total revenue from ride-hailing services is valued at US$ 22.4 billion, and is expected to grow at a CAGR of 13.7% over the 2019-2025 period[55].

In 2019, the second largest player in the car market Hyundai Motor Corp invested US$ 300 million in Ola and started offering a subscription service through the self-drive company Revv. Whereas third ranked Mahindra and Mahindra is expected to launch an electric ride sharing service called Glyd, and has invested between US$ 300 and US$ 400 million into Zoomcar, following a similar strategic tie-up taking place in the global arena, where the biggest car markets of Europe, the U.S., China are also being disrupted. The drastic and evident shift in consumer habits since 2013 is all the more reason for domestic car makers to invest in the shared mobility space.

As a major driving force, the Smart City Mission, is likely to entail heavy investments for the cities to upgrade their transport infrastructure, making shared mobility an even more preferred alternative to the commuters while the private investments enable technological advancements.

Overall, it builds a perfect case for the automobile companies across spectrum to keep track of the market along with the changing patterns in the needs of the consumers. In short, these companies, in the changing times, cannot solely rely on the sale of private automobiles and will have to innovate and improvise their business models to sustain.

[55] Frost & Sullivan

Electric Vehicle uptake

As the auto industry in India transitions and gears up for a sustainable future by increasing its reliance on renewable energy and reducing its carbon footprint, it is crucial to ensure that the existing growth and competitive edge is retained globally. While the benefits of electric vehicles are obvious, their adoption rate in India, at present, is minimal.

The Government of India has the ambitious target of ensuring that only electric vehicles are sold in the country by 2030. The Ministry of Heavy Industries has shortlisted 11 cities in the country for introduction of EVs in their public transport systems under the FAME scheme. The pilot project to launch the Multi-Modal Electric Public Transport will entail initiating and integrating the electric buses, taxis and three-wheelers in the cities of Delhi, Ahmedabad, Bangalore, Jaipur, Mumbai, Lucknow, Hyderabad, Indore and Kolkata, plus two cities- Jammu and Guwahati under special category.

While there's a lot to learn from China's growth story for EVs (Box 5), the most important takeaway is the rolling out of EV policy and EV uptake in a phased manner – starting with electric buses and shared mobility services supported by 100% electric corridors. With regards manufacturing, not only have the giants like BYD dominated the production of EVs in China, it has also facilitated a rapid EV uptake across commercial vehicle segment in Chile, contributing to 74% of the electric bus fleet.

It is important to take note of the fact that the Priority Sector Lending for Electric Vehicles and Electric Vehicle Supply Equipment (EVSEs) proposed by the Government of India is expected to significantly encourage the sales and uptake of electric vehicles by easy access to credit to the customers.

With an aim to reduce pollution and create large scale jobs, the Delhi government in December 2019 approved of a policy targeting 25% of all vehicles to be electric by 2024. The Delhi government intends to give 100% subsidy for the purchase of charging equipment up to ₹6,000 per charging point for the first 30,000 charging points at homes and workplaces. Due to their operational ease, the policy gives priority to two-wheelers and public transport. An incentive of ₹5,000 per kWh of battery capacity will be given for two-wheelers. For an average e-two wheeler with 2kWh battery, the applicable incentive would be approximately ₹10,000 compared to the ₹5,500 being offered by the Delhi Pollution Control Committee as subsidy for BEVs.

With regards battery manufacturing, even though an ambitious project for the manufacturing of Lithium-Ion batteries has come up in Hansalpur in Gujarat, a lot needs to be done for a faster uptake of Electric Vehicles in India. Given the fact that batteries make up for more than two-third of the total cost, import dependence on giants like China needs to be reduced gradually with homegrown cost competitive manufacturing facilities.

Enabling charging infrastructure to support the upcoming demand is the foremost area that needs to be addressed. This will require an adequate and constant supply of power along with a sufficiently wide network of charging points to support the EV ecosystem. Matching up to the global standards will require India to substantially increase the investments earmarked for building public charging points given that - in China, the average ratio of public charging points to EVs is 1:8; and the corresponding

Box 5: Evolution of New Energy Vehicles (NEVs) in China

Beginning

Starting in 1999, Beijing designated electric two-wheelers that can't go faster than 20 km per hour as "bicycles." That meant they could be used without a license or registration and ridden in bicycle lanes. Next, China restricted the ownership of gasoline-powered two-wheelers in the central parts of cities.

The Chinese government has stated that it wants new energy vehicles to account for 12% of all vehicle sales by 2020. To reach this goal, it has offered significant incentives for both consumers and producers to convert to NEVs. Starting in 2018, buyers of new energy vehicles in China can borrow up to 85% for their vehicles from banks, in addition to existing tax exemptions and subsidies. China has also ordered government organizations to buy NEVs. To keep pace with growing NEV sales, the State Grid Corporation of China said that it planned to build 120,000 public charging stations for electric cars by 2020.

On the producer side, companies, which cannot meet the government's demand that 12% of all vehicle sales must be new energy vehicles by 2020, must buy credits from their competitors to remain compliant with government policy. Currently, foreign car companies cannot own more than a 50% stake in their joint ventures with domestic partners, but the National Development and Reform Commission announced that it would remove this limit on companies making fully electric and plug-in hybrid vehicles in 2019, with similar liberalization occurring for commercial vehicle makers in 2020 and for the wider passenger vehicle market by 2022.

Electric Buses

The total cost of owning an electric bus—which is to say its upfront price along with its lifetime fuel and maintenance costs—is already lower than that of gasoline-powered buses in much of the world. Electric vehicles are much more efficient, which means that they require less energy to move the same distance than a gasoline-powered car. On top of that, for each unit of energy, electricity is almost always cheaper than gasoline. Thus, the more an electric vehicle runs, cheaper will be its overall cost. That makes fleet vehicles, like buses and taxis, the best candidates for buying electric versions. In fact, China currently makes 99% of the world's electric buses.

Subsidies

After a substantial uptake of NEVs in China, supported by subsidies from the Government, China plans to gradually phase out the subsidies entirely by 2020 as the business environment becomes increasingly competitive. It may be noted that the subsidies on NEVs in China were reduced by 20% in 2019.

The drop in direct subsidy is proposed to be replaced by a gradual expansion of a dual-credit scheme, which has been in place since 2017, requiring individual carmakers to produce a minimum number of EVs. Those failing to meet the minimum production targets will have to buy credits from competitors with surplus credits. Vehicles that meet range, or distance, targets will also earn credits.

Charging Network

The State Grid Corporation of China plans to build 120,000 public charging stations for electric cars by 2020. Without the grid (charging infrastructure), EVs sales cannot grow. And with grids in place, there are lesser reasons to move back to internal combustion engine.

Supply Chain

The most crucial and expensive of the components under EVs is the battery, and China now has a tight grip on the global supply of the elements needed to manufacture them. Batteries are made up of four components: anode, cathode, separator, and electrolyte. China currently controls between 50% and 77% of the global market for the raw materials of these components.

Source: Federal Reserve Bank of Chicago

ratio is 1:20 for Norway and 1:41 for India[56].

Development of charging infrastructure along some designated highways and routes in the beginning and its expansion to the country's vast and extensive road network is recommended to be taken up by a Build-Operate-Transfer (BOT) contract in a PPP model. To begin with some cities/towns which have adequate supply of electricity can become source of experiments for launching EVs.

CONCLUSION

The Indian automobile industry have evolved significantly and have become one of the hallmarks of Indian manufacturing. The India automobile industry, which was largely protected, emerged successful amidst competition after the liberalization of the Indian economy. Apart from home to almost all major auto car manufacturers, the country today is one of the largest exporters of two-wheelers.

While the growth of the industry in the last two decades particularly has been impressive, the industry today is at the crossroads. The emerging dynamics viz., increasing awareness towards having clean energy vehicles, implementation of Mass-Rapid Transport System, growing presence of transport aggregators, changing preference of owning vehicles, amongst many others, would change the landscape of Indian automobile industry, and thus the industry players and policy makers need to sit together and reorient the strategy, so that Indian players in the segment to continue to being in the driver seat.

Share of Indian automobiles in the global market was negligible in 2001, which stood at 1.1% in 2018 - thereby exhibiting a phenomenal headroom for growth. The ambitious target of US$ 80 billion of exports from the automobile sector, envisaged by the Automotive Mission Plan 2025-26 will require enhancing trade competitiveness, attracting substantial foreign investment, and most importantly identifying the right market with the right product mix at the right time.

[56] Global EV Outlook, 2019

ANNEXURE 1

HS Code	HS Description
870322	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.000 cm^3 but <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870323	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm^3 but <= 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
871120	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 50 cm^3 but <= 250 cm^3
870321	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870410	Dumpers for off-highway use
870422	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 5 t but <= 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
870421	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
870332	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 1.500 cm^3 but <= 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870423	Motor vehicles for the transport of goods, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a gross vehicle weight > 20 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
871130	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 250 cm^3 but <= 500 cm^3
870210	Motor vehicles for the transport of >= 10 persons, incl. driver, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine"
870331	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity <= 1.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
871140	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 500 cm^3 but <= 800 cm^3
870340	Motor cars and other motor vehicles principally designed for the transport of
870590	Special purpose motor vehicles (other than those principally designed for the transport of persons or goods and excluding concrete-mixer lorries, fire fighting vehicles, mobile drilling derricks and crane lorries)
870540	Concrete-mixer lorries

870333	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 2.500 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
871110	Motorcycles, incl. mopeds, and cycles fitted with an auxiliary motor, with reciprocating internal combustion piston engine of a cylinder capacity <= 50 cm^3
870431	Motor vehicles for the transport of goods, with spark-ignition internal combustion piston engine, of a gross vehicle weight <= 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
870380	Motor cars and other motor vehicles principally designed for the transport of
870520	Mobile drilling derricks
870290	Motor vehicles for the transport of >= 10 persons, incl. driver, not with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", of a cylinder capacity of > 2.500 cm^3, new
870324	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 3.000 cm^3 (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870490	Motor vehicles for the transport of goods, with engines other than internal combustion piston engine (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
870390	Motor cars and other vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with engines other than spark-ignition internal combustion reciprocating piston engine "diesel or semi-diesel engine" (excluding vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870240	Motor vehicles for the transport of >= 10 persons, incl. driver, with only electric motor for propulsion
870310	Vehicles for the transport of persons on snow; golf cars and similar vehicles
870530	Fire fighting vehicles (excluding vehicles for transporting persons)
871160	Motorcycles, incl. mopeds, and cycles fitted with an auxiliary motor, with electric motor for propulsion
871190	Motorcycles, incl. mopeds, and cycles fitted with an auxiliary motor and side cars for motorcycles (excluding with reciprocating internal combustion piston engine)
870432	Motor vehicles for the transport of goods, with spark-ignition internal combustion piston engine, of a gross vehicle weight > 5 t (excluding dumpers for off-highway use of subheading 8704.10 and special purpose motor vehicles of heading 8705)
870370	Motor cars and other motor vehicles principally designed for the transport of
870510	Crane lorries (excluding breakdown lorries)
870350	Motor cars and other motor vehicles principally designed for the transport of
871150	Motorcycles, incl. mopeds, with reciprocating internal combustion piston engine of a cylinder capacity > 800 cm^3
870220	Motor vehicles for the transport of >= 10 persons, incl. driver, with both diesel engine and electric motor as motors for propulsion
870360	Motor cars and other motor vehicles principally designed for the transport of

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