The role of FDI in fostering growth in the automobile sector in India

Saon Ray
Senior Fellow
Smita Miglani
Research Associate
Indian Council for Research on International Economic Relations (ICRIER)
Core 6A, 4th Floor
India Habitat Centre
Lodi Road, New Delhi – 110003, India
Tel: 91 (11) 43112400, 43112406 (D), 43112427 (D)
Fax: 91 (11) 24620180
E-mails: sray@icrier.res.in, smiglani@icrier.res.in

Abstract

This article examines the automobile industry in India and argues that FDI played a significant role in fostering growth of this industry. Two major waves of FDI occurred in this industry in the years 1983 and 1993. The impact of FDI in the auto industry is examined in terms of output, productivity, technology transfer, exports, R&D and spillovers. Through the three cases of Maruti-Suzuki, Hyundai and General Motors in the passenger car segment, the evolution of the firms in the country is examined. The role of FDI seen in the context of each of these firms will help in understanding how FDI has worked in the country.

Introduction

India's automobile industry is an important cog in the country's growth process. Automobile industry accounts for 7% of GDP, 4% of exports as well as foreign direct investment (FDI) inflows. The cumulative FDI to this sector between 2009 and 2013 was US$ 5.5 billion. This industry employs 2.2 million people directly and 17 million indirectly (Klink et al., 2014).

India's indigenous passenger car industry was launched in the 1940s with the establishment of Hindustan Motors (HM) and Premier Automobiles Limited (PAL). However, the industry saw a very slow paced growth from the 1940s till 1980s. In 1983, the government permitted Suzuki to enter the country in a joint venture with Maruti Suzuki, a state owned enterprise. Till that time, the auto sector in India was protected by high import tariffs and production catered to the demands of local automobile manufacturers. As part of the broader move to liberalise the economy, India opened up the sector to (FDI) in the 1990s and also progressively relaxed import barriers (McKinsey, 2006).

There is a vast literature examining the effect of FDI on a host economy [e.g. Caves (1974), Lipsey (1998)]. One of the major questions that this literature deals with is: What are the roles that FDI plays in development of economies? The socio economic impact of FDI on a given host economy has been examined through wealth creation, economic development, economic growth, improvement in standard of living, improvement in productivity and supply chain benefits in case of sectors like telecommunications and banking. The main conclusion that can be drawn from the literature is that while there are many benefits of FDI, certain preconditions seem necessary in host countries to enable them to reap the benefits. These preconditions range from infrastructure, to environment which includes the nature of human capital, domestic fixed capital formation, government spending, trade orientation of the region, and the legal environment. In the case of innovation, public infrastructure such as educational institutions and publicly funded R&D also add to the absorptive capacity.

This article examines the case of the Indian automobile industry through three cases in the passenger car segment and argues that FDI played a significant role in fostering growth of this industry. In this article we examine which of these channels of FDI worked in India's case and why?

The article is organized in the following way: the next section examines the automobile industry in India, starting from the beginning, followed by the two major waves of FDI in 1983 and 1993, upto the present. The second section examines the impact of FDI in the auto industry in terms of output, productivity, technology transfer and spillovers. The third section examines the three cases of Maruti-Suzuki, General Motors and Hyundai and discusses how that has shaped the evolution of the firms in the country. The fourth section discusses the technology requirements of the sector in future. Policy implications and conclusions are drawn in the final section.

The automobile industry in India

From a modest beginning in 1940s, India's automobile industry has grown considerably. Details are given in Table 1. All the automobile segments have witnessed double-digit cumulative average growth rate (CAGR) in the past decade, and the most has been in passenger vehicles/cars category. This segment has also been a major recipient of FDI inflows in the automobile industry for past few years.

In the passenger car segment, the market share of the various companies is shown in Table 2.

Table 3 shows the major components in systems in passenger cars.

Box 1 shows some of the processes involved in assembling a car.

FDI in auto assembly was allowed in two major waves: in 1983 and in 1993.

Table1: Automobile domestic sales trends (number of vehicles)

Category	1995-96	2000-01	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Passenger vehicles	4,49,6 00	7,17,6 72	15,52,703	19,51,333	25,01,542	26,29,839	26,65,015	25,03,685
Commercial vehicles	2,15,6 38	1,50,3 55	3,84,194	5,32,721	6,84,905	8,09,499	7,93,211	6,32,738
Three wheelers	1,77,0 55	1,98,1 62	3,49,727	4,40,392	5,26,024	5,13,281	5,38,290	4,79,634
Two wheelers	26,58,288	37,45,516	74,37,619	93,70,951	1,17,68,910	1,34,09,150	1,37,97,185	1,48,05,481
Grand total	35,00,581	4,811705	97,24,243	1,22,95,397	1,54,81,381	1,73,61,769	1,77,93,701	1,84,21,538

Table 2: Sales, the market share and models of the passenger car segment

Company	Sales (units)in FY14	Market share (%)	Models
Maruti Suzuki India Ltd.	1155041	37	**Alto** (8), **Swift** (6), Dzire (6), **Wagon R** (5), Omni (2), Ertiga (2), Eeco (1), **Ritz** (1), **M800** (1), **Celerio** (1), **Estilo**, **A-Star**, Sx4, Gypsy
Hyundai Motors India Ltd.	613513	20	**EON** (3), **i10 Grand** (2), **i10** (2), **i20** (2), Verna (1), **Santro** (1), Elantra, Xcent
Mahindra and Mahindra Ltd.	261029	8	Bolero (3), Scorpio (2), XUV500 (1), Xylo (1), Maxximo Max, Quanto, Verito, **Vibe** Rexton (SsangYong)
Tata Motors	205793	7	Innova (2), **Indica** (2), Indigo (1), **Nano** (1), Sumo (1), Safari, Venture
Toyota Kirloskar Ltd.	156087	5	Etios (1), **Liva** (1), Fortuner (1), Corrolla
Honda Siel Cars India Ltd.	139393	5	Amaze (3), Honda City (1), **Brio** (1), CR-V
Nissan Motor India Ltd.		5	Terrano, **Micra**, Sunny, Datsun Go
Ford India Ltd.	132534	4	Ecosport (1), Figo (1), **Fiesta**
Volkswagen	85116	3	**Polo** (1), Vento (1), Jetta
General Motors India Ltd.	80894	3	**Beat** (1), Sail (1), Enjoy (1), Tavera, **Spark**, Cruze
Renault	69131	2	Duster (2), Scala, **Pulse**
Skoda India Auto Pvt. Ltd.	19483	1	Rapid, Laura, **Fabia**, Superb
Fiat India Ltd.	12030	0	**Grande Punte**, Linea
Hindustan Motors	3759	0	Ambassador
Force Motors Ltd.	3493	0	Force Gurkha, Force One
Mitsubishi			Pajero
Total (Domestic + Exports)	3092783		

Source: Authors' compilation based on Edelweiss (2014)

Note: Figure in parentheses in column 4 indicate share of the model in FY14 which has been computed using data for each of the models from Edelweiss (2014). For others the share is less than 1%. Car models marked in bold are small cars, the share of which in the total was 40%. The definition of small cars varies considerably – In India, size of the car is based on the length (SIAM). Cars in this table have been classified as small if they are in the mini and compact category.

Both waves were market seeking – India with two million households that could afford cars was seen as a large and untapped country. In the period 1983-1993, restricted FDI investment occurred in the country. Although there was no formal requirement, most original equipment manufacturers (OEMs) chose to enter the country with a local partner. Suzuki was allowed to enter the country as a minority stakeholder in the government and an investment of US$ 260 million (McKinsey, 2006).

In 1993, the sector was opened to global companies and approximately US$1.6 billion was invested by OEMs till 2000. Despite the 1993 liberalization, the sector was highly regulated and required MNCs to achieve localization within a specific time period among other things.

In the period 1947-1983, the output growth remained limited. The models of cars sold were unchanged for decades and foreign models assembled in the country were primarily European. The number of models manufactured in the passenger car segment was two in 1982-83, this rose to eight in 1994-95 and 28 in 2001-02. Overall, the impact of FDI in the auto industry in India has to be seen in terms

of technology, capital and the managerial practices introduced, all of which could make the industry more competitive.

Output

The impact of FDI has been very positive in terms of output and productivity growth. Output by volume grew at 13% annually in 1983-1993, and 15% in 1993-2000. Currently, India's car penetration is lower compared with other global markets as only 14 people per 1000 persons own a passenger car (compared to 35 in Thailand, 60 in China etc. and over 450 in developed countries). By 2021, it is expected that production in the passenger car segment will reach 10 million units from the current 3 million units.

Productivity

Since FDI is widely believed to be a catalyst that promotes economic development and many countries compete to attract FDI, it becomes important for the policy makers in the country to understand this effect of FDI on productivity. Haddad and Harrison (1993) found that foreign firms exhibit higher levels of total factor productivity (TFP) but their rate of TFP growth was *lower* than that of domestic firms. As the authors note, while there was a *level effect* of foreign investment on the TFP of domestic firms, such an effect was missing for the growth rate of TFP of domestic firms. Studies such as these using micro data have not reached conclusive results that may be valid across countries.

In the case of the Indian auto industry, labour productivity has grown at an annual rate of 20% since 1983. This was partly achieved due to the exit of PAL, a low productivity producer and due to the productivity improvements in HM and Maruti-Suzuki.

Capital

In the two waves of FDI that occurred in the automobile sector in 1983 and 1993, significant amount of FDI flowed into the country. Maruti Suzuki's investment has been discussed before (and was chosen due to its willingness to invest capital). In 1994, Daewoo began production with an investment of US$ 1.3 million. Similarly, General Motors (GM) re-entered with an investment of US$ 223 million and Daimler Chrysler began with an investment of US$ 54 million. In 1995, Honda began with an investment of US$ 120 million, while Hyundai invested US$ 456 million in 1996. Fiat invested US$455 million in 1997 and Ford invested US$ 433 million in 1999. Hence FDI brought in sufficient capital to build modern plants.

Table 3: Major components in system in passenger cars

System	Major components in system
Body-in-white	Passenger compartment frame, cross and side beams roof structure, front-end structure, floor structure, panels
Powertrain	Engine, transmission, exhaust system, fuel tank
Chassis	Chassis, suspension, tires, wheels, steering, brakes
Interior	Seats, instrument panel, insulation, trim, airbags
Closure	Front and rear doors, hood, lift gate
Miscellaneous	Electrical, lighting, thermal, windows, glazing

Source: Edelweiss (2014)

Technology

The literature provides two competing arguments on the effect of FDI on the innovation in an economy (Saggi, 2002). One line of reasoning suggests that inward FDI leads to beneficial outcomes for local firms through knowledge spillovers and increased incentives to compete with the better-endowed foreign entrants. The other line of reasoning casts doubt on the ability of FDI to increase the level of innovation among local firms in the economy, suggesting that the increased competition that arises from the entry of new foreign firms relegates the domestic firms to less innovative market niches. Studies that have examined the impact of FDI on economic growth and absorption capacity of the host country have listed four channels that allow for technological spillovers from FDI to the host country. These are: (1) Transmission of technology through imitation, subject to the legal system, regulations, infrastructure and human capital endowments; (2) Positive spillovers generated through the training of local workers by foreign-owned companies; (3) Increased competition due to the presence of foreign firms, subject to the size of the technology gap between the foreign owned and domestic company, as well as the ease of entry into, and exit from the market; and (4) Vertical or backward spillovers resulting from the increased demand for intermediate goods manufactured by foreign owned companies by domestic companies in the host nation.

In case of the Indian automobile sector, significant infusion of global technology occurred (Tiwari and Herstatt, 2014). The first 192 cars to roll out of the Maruti Suzuki factory in December 1983 were almost entirely Japanese cars, with only tyres and batteries sourced from MRF and Chloride India respectively. This was possible due to the use of imported semi knocked down (SKD) kits, and indigenization was 2.76% and went up to 10% in 1984. However, Maruti Suzuki was committed to 95% indigenization in five years. This was achieved through the policy adopted by Maruti Suzuki towards its vendors which included introduction of a vendor rating system, payment to vendors within 15 days, and entering into JVs with vendors to ensure quality and stability. Maruti Suzuki had imported some SKD kits which were displayed in its premises. The components were divided into two groups, one, where vendors had the manufacturing capability (e.g. tyres, shock absorbers and bulbs). The other group was where the technology would be required and in many of these components Maruti Suzuki helped the vendor find the right collaborator. Localization was facilitated by 40 joint ventures (JVs) which were entered into by Indian vendors and Japanese collaborators (Bhargava, and Seetha, 2010).

Box 1: Major processes in the assembly of a car

High pressure die casting

This facility produces the cylinder block. Aluminium ingots are loaded into furnaces and melted. These furnaces are capable of melting 800kg of aluminium an hour and are unique as they combine both the melt and holding furnace. The dies are then forced together, at which point molten aluminium is poured into the shot cylinder and fired into the dies at around 2.7m/sec. Once casting is complete, the dies open and the cylinder block is transferred to the inspection platform before being passed to Machining.

Low pressure die casting

This is where cylinder heads are produced. The process starts with aluminium ingots being loaded into a furnace where they are melted. The molten aluminium is then fed into the base of a die using low pressure air. The dies are used in conjunction with sand core inserts, which make it possible to cast the complicated internal shapes within the cylinder head that could not be produced using dies alone. Once the cylinder heads are cooled, sand cores are removed and cylinder heads are transferred to a Heat Treatment process to harden. Once complete, the cylinder heads are deburred and inspected prior to being transferred to Machining.

Machining and tooling

Machining

Here the block and head cast components undergo various cutting, milling, drilling, boring, honing and reaming operations. The layout of the Machining Lines is extremely compact, with Computer Numerically Controlled (CNC) machines achieving consistent high-precision results. Although the machines have a number of automatic test features, associates still carry out manual checks at every stage to ensure a consistent level of quality is maintained.

Tooling

Associates maintain and control all the specialist cutting tools used within both head and block machining.

Engine assembly

This is where the machined engine blocks, cylinder heads and clutch and transmission cases meet with the other engine components for the final engine assembly process. First the engine blocks, clutch and cylinder heads are sub-assembled on separate lines. At this stage the pistons, crankshafts, con rods and oil pan are installed into the block and the springs and valves are built into the cylinder heads. Once the sub-assembly process is complete, modules are joined together to form the complete engine. The engine then undergoes a series of in-built process tests before being transferred by overhead conveyor to the Engine Control Centre. This houses a High Speed Server with a fully automated engine storage and retrieval facility.

There were 50 Greenfield investment projects in the automobile sector between 2000 and 2007. Maruti Suzuki paid US$ 397.7 million for royalty in 2010. Accounting for sourcing of raw materials, components and capital goods, the expenditure in terms of foreign exchange paid was US$ 1.3 billion in FY 2010-11 (Tiwari and Herstatt, 2014).

Overall, several studies have cast doubt on the view that FDI generates positive spillovers for local firms. But such findings need not imply that host countries have nothing significant to gain (or must lose) from FDI. The point is that reallocation of resources that accompanies the entry of foreign firms may not be immediate. Resources released in this process will be put to better use by either foreign firms with superior technologies, or efficient new entrants (both domestic and foreign), or by other sectors of the economy. Previous studies analyzing the inflow of FDI into a country are unanimous in that positive spillovers in the host country will occur if there is an environment conducive to the inflow of FDI. These conditions refer to an environment that is adequate in providing human capital, private and public infrastructure, legal protection, and public infrastructure such as educational institutions and publicly funded R&D. This research also discusses the host country factors that are likely to attract export oriented FDI, which involves fragmenting the production process geographically by different stages. The important location factors that are thought to influence this type of FDI are labor costs, infrastructure, trade barriers, exchange restriction and policies favorable to FDI.

The most prominent spillover impact of FDI in India's auto sector has been on the components industry, which more than tripled from 1992-93 to 2001-02. Productivity of the supplier industry increased significantly with FDI. This occurred in two ways: FDI-OEMs co-located suppliers and transferred best practices and FDI-OEMs required their home country suppliers to make FDI investments in India.

R&D

FDI has been a key source of rising R&D investments in developing countries (UNCTAD, 2005). The level of formal R&D

has been low in India's automobile industry. Bhattacharya *et al.* (2005) found that of the total 536 patents granted by US Patent Office to Indian inventors between 1998 and 2002, only four belonged to the motor vehicle category. In 2010, 28 of the 46 members of Society of Indian Automobile Manufacturers (SIAM) were engaged in R&D. In the passenger vehicle segment, 13 of the 20 had had registered R&D activity in India. Cumulative R&D expenditure of the automobile sector was approximately US$ 780 million in 2010-11, with an increase of 27.5% on year on year basis for the 4 wheeler segment (SIAM, 2012). The four wheeler segment accounts for 90% and engine manufacturers contribute 2% to the total R&D in the automobile segment (Tiwari and Herstatt, 2014). There has been a slight increase in the share of R&D done by auto components manufacturers in 2013 over 2003, though more than 50% of the patents filed were by Tier I suppliers.

Exports

The export of passenger cars in value terms increased from US$ 93.7 million to US$ 5.5 billion from 1999-2000 and 2010-11. The share of automobiles in India's merchandise trade increased from 0.25% to 2.2% over the same period (Tiwari and Herstatt, 2014). The major exporters in 2010-11 were Hyundai, Maruti Suzuki and Nissan and small cars formed the bulk of the exported passenger cars. Within the small cars, hatchbacks (A2 or compact) were the dominant export items.

Imports

As firms go through various stages of localization, the import dependence may come down. Prior to 2008, power train components like engine pistons, injectors as well as transmission drives and body components used to be imported. Also items such as glass mirrors, tyres, aluminium bars and electronic components were imported. Currently, galvanized and coated steel, engine component systems, gear boxes and vehicular knock-downs are imported. With improvements in casting capabilities, localized portion of an engine block may also be produced in India. Table 4 shows the various components imported by Indian OEMs.

Table 4: Components imported

Company	Current import content
Maruti Suzuki India Ltd.	Hot rolled/ Cold rolled coils, Galvanized and coated steel and Automotive components
Hyundai Motors India Ltd.	Gear boxes, Engines, Electronic automotive regulator
Tata Motors	Iron and steel
Toyota	Engines, Diesel engines, Gear boxes, other articles of Iron and Steel, Spark Ignition reciprocating or rotary internal combustion piston engines
Nissan Motor India Ltd.	Gear boxes, Engines, Electronic Automatic regulator
Honda Siel Cars India Ltd.	Compression ignition internal combustion piston engines, other Auto components, Automatic regulating or controlling instruments
Volkswagen	Hot rolled/ Cold rolled coils, Galvanized and coated steel and Automotive components
General Motors India Ltd.	Steel sheets and other Auto components

Source: Edelweiss (2014)

Till 2011, component vendors to Maruti Suzuki imported steel and machine tools, and dies from Japan. The firm's import content as a percentage of sales has come down from 23% in 2002 to 6% in 2014 (while its sales volume has increased approximately 2.75 times in this period). Maruti Suzuki's localization strategy involves asking its vendors to use more local materials like steel alloy, emphasis on using local machine tools and components and dies are being designed in India, wherever possible.

Three cases: Maruti Suzuki *versus* Hyundai and General Motors

Maruti Suzuki India Limited (MSIL) is the leader in the passenger car segment. As seen from Table 2, the share of MSIL was 37% in the fiscal year 2014. As discussed, Maruti Suzuki was set up as a joint venture between the Government of India and Suzuki Motor Corporation, with the government holding a majority stake of 74%. Maruti Suzuki has been instrumental in bringing in fresh technology (Narayanan, 1998). Suzuki has created significant R&D capacities in India, both through in-house R&D and also in active cooperation with its component suppliers. The small car for India as well as for global markets were designed and manufactured in India (Bhargava, 2010).

Hyundai Motor India Limited (HMIL) is a subsidiary of Republic of Korea's Hyundai Motor Company (HMC). Hyundai, in the early 1990s sought to globalize its production and selected India (along with China, Malaysia and Turkey) as a centre for diversification. HMC was the first foreign car manufacturer, which was allowed to establish a wholly owned subsidiary in India. HMIL was incorporated in 1996 and it commissioned its first manufacturing plant in 1998. HMIL has achieved the number two slot, behind Maruti Suzuki as seen also in Table 2. HMIL is one of the largest FDI projects in India in the automobile industry (SIAM, 2012). HMIL established a state-of-the art R&D facility, Hyundai Motor India Engineering Private Limited (HMEI) as a subsidiary of HMIL with an investment of US$ 3.18 million in 2009.

GM started its business in India in 1928, assembling Chevrolet cars, trucks and buses but ceased its operations in 1954. In 1994, General Motors India Private Limited (GMIPL) was formed as a 50-50 JV between Hindustan Motors and GM and in 1999, GM bought out the Hindustan Motors interest. In 2003, GMIPL started production of its Chevrolet vehicles from its Halol facility and opened a technical centre in Bangalore. This was for R&D and vehicle engineering activities and vehicle engine and transmission design and engineering activities and

a vehicle design studio were started in 2007. It has mainly specialized in production and assembly of premium and mid-size cars in India as compared to Maruti Suzuki and Hyundai Motors which have largely focused their resources on the small car segment.

Table 5 presents certain facts about the three firms.

As the Table 5 indicates, MSIL, HMIL and GMIPL have followed different paths to reach their current position. MSIL is still the undisputed market leader though HMIL is giving it a fair competition. GMIPL has had a chequered past, but has plans to make India an export hub for global markets. The company exported 984 units in 2014 to Chile and had an export target of 19,000 units in 2015.

Technology requirement going forward

In India, sales of auto components are dominated by power train. Indian vehicles currently lag their global counterparts in terms of power train technology, safety and infotainmnet content (visual safety indicators, electronic stability control, anti- lock brake system, front and side air-bags, snooze alert with hepatitic vibration of steering wheels, driving assist mirror indicators etc). Reducing the weight of a vehicle can help curb emissions and automobile design and use of certain materials/metals can help reducing the 'Curb' weight of a vehicle without compromising its size and performance attributes.

Increasing government stipulations have given rise to developments regarding emissions norms and vehicular safety. The emission regulatory programme in India is modeled on the European emission systems and Bharat Stage (BS) regulation lag Euro emission standards by 10 years. India has a two tier emission norm system with a phase in top 13 cities and a lagged phase for the rest of the nation. The country is expected to Bharat Stage IV emission norms by 2017. This will entail introduction of technology such as common rail system (CRDi) which has higher pressure fuel injection pump and higher pressure (piezzo) nozzle and injectors. Some of the advancement in technology has already occurred through the implementation of the BS emission norms: these include introduction of fuel injection through engine control unit (ECU), Exhaust Gas Recirculation (EGR), oxygen sensor and catalytic convertor. Going forward, ECU might be replaced with On Board Diagnostics (OBD), heated Oxygen sensor for cold start. Gasoline (petrol) engines are less complex than diesel ones and as commercialized share of gasoline direct injection (GDi) increases, the gap in fuel efficiency between diesel and gasoline will reduce (Edelweiss, 2014).

Automobile safety systems can be segregated into active safety systems and passive safety systems. Active safety systems include systems for collision avoidance such as blind spot detection and driver warning indicators as well as vehicle stability systems such as anti-lock braking systems (ABS) and electronic sta-

Table 5: Comparison of MSIL, HMIL and GMIPL in India

	Maruti Suzuki India Limited	Hyundai Motor India Limited	General Motors India Private Limited
Sales (FY14)	1155041	613513	80894
Capacity utilization	Around 80%	Around 80% or more	Around 25%
Average localization share	More than 90%	Upto 90% for volume models	50-60%
Market share	Around 37%	15%	1%
Sourcing strategy	Electronic control module and transmission parts	Electronic parts are imported	Critical components like air bags, ABS controllers/modules, engine controllers, certain relays and switches, electronic modules
Exports	Began in 1987; Exports cars to over 125 countries; 1,20,388 units	Began in 1999; 2,59,811 units	Began in 2014; 2,011 units
Number of models			
R&D (recent)	Yes Moving to 'vehicle design and development' stage from just 'vehicle customisation and manufacturing'	Yes; India is hub for small car R&D; Being upgraded from customisation clinic to a full product development centre	Yes
Employment	12,500	9,500	4,000

Source: Authors' compilation based on industry sources

Notes: (a) Figures pertain to FY 2014-15
(b) The localization percentage varies from model to model, according to cost advantage and flexibility in manufacturing schedules.
(c) Employment figures are approximate

bility control (ESC) systems. Passive driving safety systems protect the driver and the passenger from injury in case of an accident and include seat belts, airbags, whiplash protector etc. Globally, passive safety systems contribute to a larger proportion of the overall global auto safety systems industry since ABS is mandatory in most developed markets and ESC is progressively being made mandatory. In India, making airbags mandatory for all passenger vehicles has been proposed by 2017 by the technical standing committee of the Ministry of Shipping, Road and Transport Highways (Edelweiss, 2014).

Other technologies which are being developed for commercialization in future include automatic manual transmission systems, and other systems for hybrid and electric cars.

Conclusion

India is expected to become the third largest car market in the world by 2025 with 7.4 million vehicles (Goldman Sachs, 2015). FDI has played a crucial role in the growth of this sector in India till now. It will be interesting to see how it plays out in the coming years in light of the factors and trends discussed in this paper. The industry is continually innovating itself to the changing requirements and markets. The automobile are progressing to production of commercial vehicles as the next stage for various reasons. It will be interesting to see whether and to what extent India plays the role of a hub in the passenger vehicle segment.

As part of efforts to reduce emission output, auto makers are working to make their internal combustion engines more efficient and also use lighter and stronger materials such as aluminum and high tensile steel. More R&D will be needed in future to achieve this. The Government and the industry must ensure that FDI transfers result in win-win situations in terms of as many parameters and all stakeholders concerned.

References

✓Caves, R. 1974. "Multinational Firms, Competition, and Productivity in Host-Country Markets." *Economica,* Vol. 41, No. 162, pp. 176–93.

✓Bhargava, R.C. and Seetha, (2010) *The Maruti Story*, Collins Business, New Delhi.

✓Bhattacharya, S., Garg, K. C., Sharma, S. C., Dutt, B., Gupta, R. K., & Das, P., (2005). *Indian patenting activity in international and domestic patent system: Contemporary scenario*. (New Delhi, National Institute of Science, Technology and Development Studies).

✓Edelweiss (2014), *Auto Components: The Future "Mega Trends, Mega Factors"*. Edel Invest Research.

✓Haddad, M. and A. Harrison (1993). "Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco", *Journal of Development Economics*, Vol. 42, pp. 51–74.

✓Klink, G., Mathur, M., Kidambi, R., and K. Sen (2014). *The Contribution of the Automobile Industry to Technology and Value Creation*, ATKearney.

✓Lipsey, R. E. (1998). 'The internationalization of US MNEs and its impact in developing countries',in Kumar, N., J. H. Dunning, R. E. Lipsey, J. P. Agarwal and S. Urata, eds. *Globalization, Foreign Direct Investment and Technology Transfers: Impacts on and prospects for developing countries,(London,* Routledge).

✓McKinsey Global Institute (2006), *New Horizons: Multinational Company Investment in Developing Economies*. New York: McKinsey and Company.

✓Narayanan, K. (1998). Technology acquisition, de-regulation and competitiveness: A study of Indian automobile industry. *Research Policy*, Vol. 27, No. 2, pp. 215–228.

✓Saggi, K. (2002), 'Trade, Foreign Direct Investment, and International Technology Transfer: A Survey', *World Bank Research Observer,* Vol. 17, pp. 191–235.

✓Tiwari R. and C.¬ Herstatt (2014). *Aiming Big with Small Cars: Emergence of a Lead Market in India*. (Switzerland, Springer International Publishing).

✓UNCTAD (2005). World investment report 2005: Transnational corporations and the internationalization of R&D. (New York, United Nations Conference on Trade and Development).

Websites

http://dipp.nic.in/
www.business.gov.in
www.investindia.gov.in
http://www.siamindia.com/
http://www.goldmansachs.com/our-thinking/pages/cars-2025-change-in-the-fast-lane.html ■

Asia-Pacific Trade and Investment Report 2015

The report highlights the challenges posed by slowing regional trade growth and outlines how changing dynamics in the global economy call for a renewed effort to enhance the prospects of export-led growth, both of merchandise trade and in commercial services. The 2015 report also provides analysis on the spread of Global Value Chains (GVCs) in the Asia-Pacific region and evaluates policies that contribute to developing countries participation in GVCs. The Report is aimed at policymakers as well as practitioners and experts, academia, business, international agencies and non-governmental organizations working or interested in these issues in the Asia-Pacific region.

For more information, access:

http://www.unescap.org/resources/asia-pacific-trade-and-investment-report-2015-supporting-participation-value-chains