

Prof. Michael Porter

Microeconomics of  
Competitiveness

# Automotive Cluster in the State of Maharashtra in India



## Final Report

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Hiroaki Kuwajima  
Liliana Rivera  
Ravinder Saroop  
Jun Takai  
Daisuke Ueda

## EXECUTIVE SUMMARY

India has recorded a consistent 7-8% growth rate in the last few years, as a result of the policies of liberalization and reform pursued in the last two decades. The automobile industry is among the sectors which have registered remarkable progress during this period. Today, India has risen to be the second largest two-wheeler manufacturer in the world, seventh in global production in motor vehicles, and every major automobile manufacturer in the world has manufacturing facilities in India. The automobile cluster in Maharashtra developed, *inter alia*, due to the state's good factor conditions (strong human capital, geographical advantage with access to ports, well-developed financial institutions), good demand in the western region, and presence of two of the oldest and big industrial houses (Tata and Bajaj). Moreover, during the liberalization process, the state government provided a favorable investment climate and supporting infrastructure, which attracted higher investment and industries to this state, including many automobile and component manufacturers.

In our analysis, we found that while this cluster has developed well, there is an urgent need to remove the constraints in its further development and upgradation. There also exists an opportunity for India to emerge as a global automobile cluster. But this requires certain specific initiatives at the industry and firm level, as well as supporting policies of the central and state governments. We believe that our recommendations will address the key issues and challenges that the cluster and the industry face today. Key recommendations are as follow:

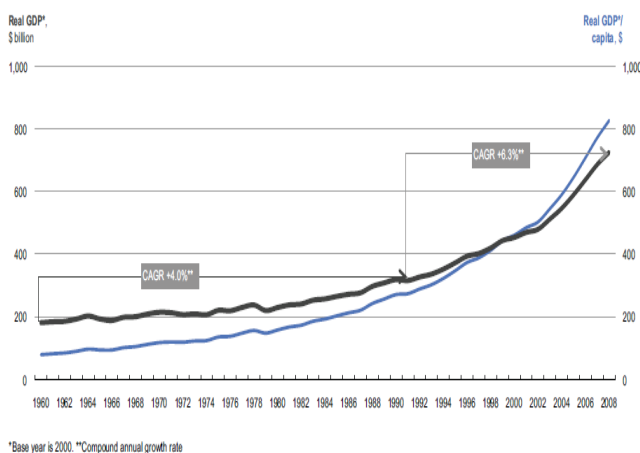
Firms	(1) Enhance design and innovation capacity to achieve international competitiveness; Penetrate into rural market in India; Promote entering of overseas vendors into the cluster
State Government	(2) Improve administrative procedures (investor friendliness); Remove cost disadvantages (Octroi tax, electricity tax); Improve infrastructure (power, roads, ports)
State & National Gov.	(3) Development of export specialized port and hub; Create incentive mechanism to modernize vehicle fleet (regulation on emission & depreciation year)
National Government	(4) [General] Improve the macroeconomic policy (deregulate FDI & tariff/non-tariff, better manage inflation & deficit); Improve business environment (reduce red tape, corruption and improve the ease in doing business); Improve human capital; Improve infrastructure (electricity, road & communications); Invest in R&D and increase patents
	(5) [Auto Cluster] Reduce import tariff (on finished vehicles); policies to ensure stable import supply of raw materials (e.g. steel, aluminum); consistent policy on taxes and emission regulation
Institute for Collaboration	(6) Build institutional linkages between industry and academics for research and innovation on green technologies and forecast trends; achieve harmonization with global regulations

# I. India Country Analysis

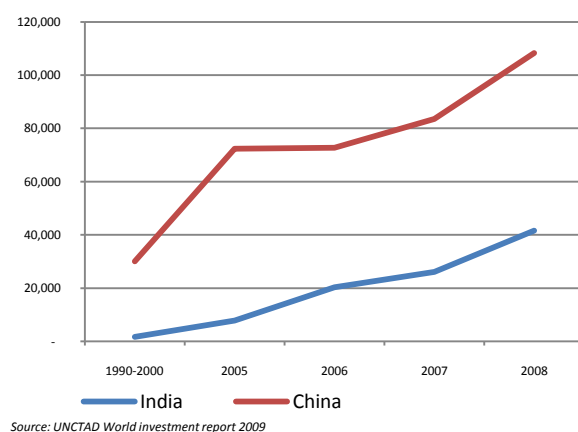
## 1. Overall Country Conditions

**(1) GDP Growth & FDI:** With a population of over 1.2 billion, India is the second most populous country and the largest democracy in the world. After the economic reforms initiated in 1991 it has shown considerable growth. Average from 2004 to 2008 was 8.7% in real GDP (World Bank 2010). Inflow of foreign direct investment also grew reaching \$42 billion (UNCTAD 2009). FDI growth however, has been constantly lagging behind China as shown in Figure 2. Low infrastructure development, stringent labor regulations, and limitation of foreign ownership are constraints for FDI.

*[Figure 1] GDP growth of India*



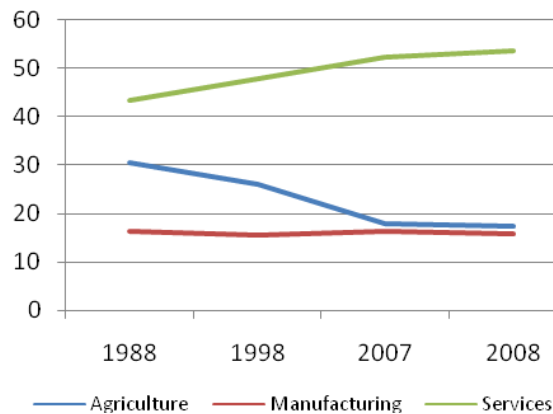
*[Figure 2] FDI growth of India and China*



**(2) Composition of Economy:** India's growth has been mainly driven by the services sector. India has also become one of the world leaders in technology and business outsourcing. The service sector constituted 54 % of the Indian GDP in 2008 up from 43% in 1988 while the manufacturing sector<sup>1</sup> constituted 15.8% and the agriculture sector constituted 17.5% (Figure 3). India's export portfolio is shown in Figure 4. Among all clusters, communications services cluster has shown an exceptional strength in its growth rate and world export share.

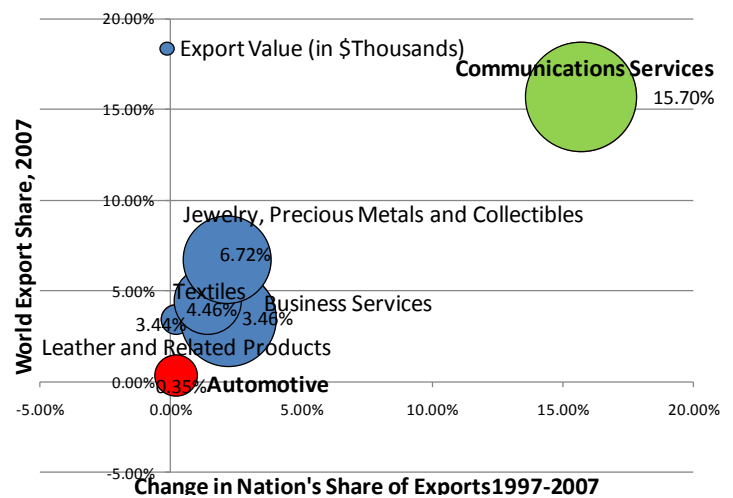
<sup>1</sup> Core manufacturing sector comprise metals, textile and garments, electronics hardware, chemical, automobiles, auto components, gems and jewelry, and food products.

**[Figure 3]**  
Annual sector contribution to growth



Source: World Bank

**[Figure 4]**  
India Export Portfolio by cluster 1997-2007



Source: Cluster Mapping Project (5 biggest cluster by share+auto)

Low productivity, higher input and material cost, cumbersome regular environment, stringent labor law, and insufficient development in infrastructure have been the major bottlenecks for growth of the manufacturing sector. However recent trends have indicated that manufacturing is showing promising signs. Manufacturing growth has contributed significantly to the overall recovery of the economy in 2009 (ADB 2010). Also, 42% of Indian CEOs stated in a recent survey that they believed that the manufacturing sector has improved its competitiveness (PWC 2009). The automotive manufacturing, particularly in small cars, and the manufacture of pharmaceuticals are expected to play major role in the growth of the sector (World Economic Forum 2009).

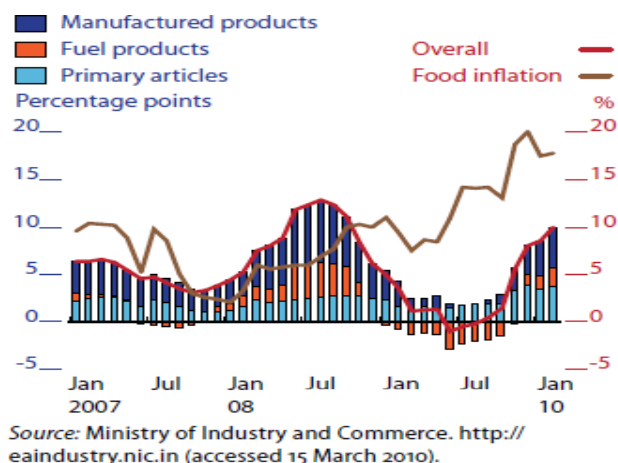
**(3) Bottlenecks for Growth:** Productivity in India had been a challenge in the early years of India's development. From 1960 to 2000, annual total factor productivity (TFP) growth averaged a mere 0.25% (Goldman Sachs 2007). Although productivity of the country has been improving steadily since 1991, it is still much lower than China especially in the manufacturing sector<sup>2</sup>.

India's macroeconomic policy environment has not been very strong. The country ranked 68 out of 74 countries (GCI 2009) in this area, especially owing to its poor fiscal deficit management. The high rates of fiscal deficit make it harder for the government to invest in infrastructure, a key

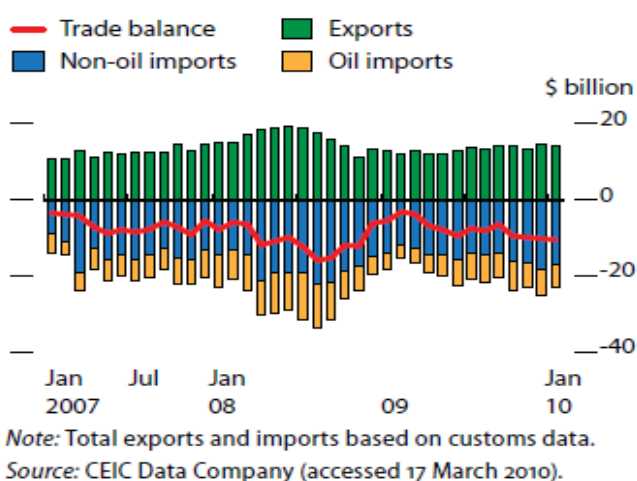
<sup>2</sup>Annual growth in productivity marked 4% for China while it was 2.3% for India between 1993-2004

component for the growth of the manufacturing sector.<sup>3</sup> India's relatively low savings rate, as compared to its Asian neighbors, is also constraining its investment. Inflation has been managed well by the government in the past but recent spikes, especially in food inflation (20%-Figure 5) have caused concerns, due to its negative effects on consumption. Exports have been growing but India is still a net importer (Figure 6).

*[Figure 5] Inflation*



*[Figure 6] Trade in India*

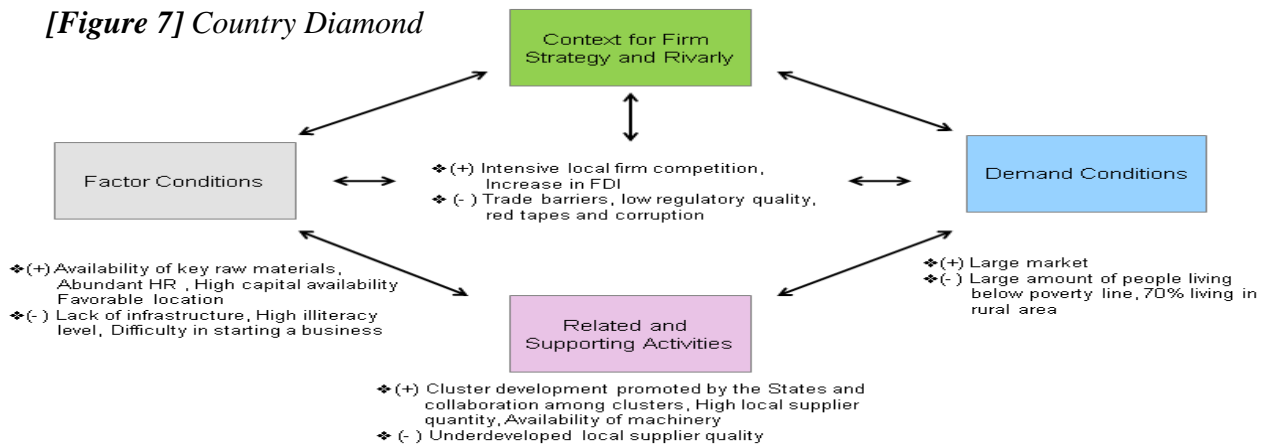


India faces a huge challenge in human development. While a part of India is growing very quickly, about 300 million people still live below the poverty line. India's enrolment rates in primary and secondary education remain low at 89% and 55% respectively, as compared to China which is at 98% and 75% respectively (UNESCO, 2007). More than 70 % of the population still lives in suburbs (CIA, 2010). Lack of adequately educated work force also constrains the development of capital intensive industries. The government is taking steps to increase social spending. In FY 2009, it increased the allocation of budget for education and health sector by 16% and 14% respectively.

<sup>3</sup> In order to decrease deficit the government committed to the Fiscal Responsibility and Budget Management Bill in 2000 and implemented the value added tax (VAT) in 2005 and committed to the Fiscal Responsibility and Budget Management Bill in 2000. Government deficit has come down from 10.1% in FY 2001 to 6.7% in FY 2009 (ADB 2010).

## 2. Country Diamond Analysis

[Figure 7] Country Diamond



(1) **Factor conditions:** India is relatively well endowed in some factor conditions. It has availability of ores and minerals, and built production capacities for metals- iron/steel, aluminium etc (primary raw materials for manufacturing sector) in the period of public sector led industrialization in 60s and 70s. Sophistication of its financial markets, and availability of cheap and skilled labor force, as well as scientists and engineers, also give India a competitive advantage in factor conditions.

However, India has a lot to improve in other factor conditions. The government has not been able to keep pace with the huge increase in the demand for power, roads, railways, and ports etc. required for the economic development of the country<sup>4</sup>. The lack of adequate infrastructure is a serious bottleneck for the manufacturing and the automotive sectors which rely heavily on electricity and other material inputs for their production. The business environment in India is also an area of concern. There is considerable red tape in starting a business, and enforcing a contract is considered very difficult (World Bank, 2010). Protective labor laws make it hard to fire employees. Despite the high quality of tertiary education and the availability of scientists and engineers, India ranks among the lowest patent propensity of the world, with fewer than 0.3 triadic patent families per million populations<sup>5</sup>.

<sup>4</sup> The power industry has been dominated by public sector firms and demand consistently exceeded supply (World Economic Forum, 2009). 50% of the roads which transported 65% of freight and 85% of passenger traffic were unpaved and congested.

<sup>5</sup> Patent increase as India's patent registration has been growing by 33% on average between 1995 and 2005 (OECD 2008). The government spending on R&D had never exceeded 1% of GDP (WB 2007). The government has pledged to increase R&D spending to 2% of GDP by 2012 under the 11<sup>th</sup> Five-Year Plan.

**(2) Context for Strategy and rivalry:** India has a relatively positive context with an abundant FDI flow, a stable democratic polity. The manufacturing sector has high rivalry among local competitors. However, prevalence of corruption<sup>6</sup> and high tariff rates pose challenges. India has progressively reduced its tariffs since 1991, but the average applied tariff on industrial goods remains high especially on passenger cars, two-wheelers, and natural rubber (USTR, 2009). India also maintains a negative list of products subject to various forms of non-tariff barriers<sup>7</sup>.

**(3) Demand conditions/ Related and Supporting Industry:** The demand conditions are robust as India's market is growing, with a shift in population from the lower class to the middle class. Related and supporting industry is strong in India. Availability of local suppliers in India is high but there is room of improvement in the local suppliers' quality. Presence of numerous clusters in each region promotes healthy competition and development of technology.

### **3. Recommendations for the Country**

In order to increase FDI inflow into India and to promote growth of the manufacturing sector, it is necessary to take steps such as increasing productivity and improving infrastructure. Following are the specific recommendations-

(1) India should increase investment in education, and particularly in primary and secondary education. At the same time investments should be channelized to rural India, and in agriculture, to improve the condition of life of the people at the base of the pyramid. This would increase social stability, and create an environment conducive to FDI, and induce people to move to the manufacturing and services sectors, enhancing productivity in the long term.

(2) One of the biggest challenges of India is infrastructure. India should substantially increase its investment in infrastructure to keep up with the rising demand. To help develop the manufacturing

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<sup>6</sup> According to Transparency international, India ranked 85<sup>th</sup> out of 180 countries. (TI 2009)

<sup>7</sup> Non tariff barrier includes import policy barriers; standards, testing, labeling and certification requirements; antidumping and countervailing measures; export subsidies and domestic support; Government procurement; service barriers; lack of adequate protection to intellectual property rights

sector, it should particularly focus on improving the country's roads and electricity supply. To contain budget deficit while increasing investments in infrastructure, the government should cut subsidies. Increased public-private partnerships would be a way to address this.

(3) Remaining tariff rates should be lowered and non tariff barriers need to be decreased to facilitate flow of trade and investments.

(4) India needs to improve its national business environment. Procedures needed to start and close a business as well as the time needed to enforce contracts need to be reduced through business process re-engineering, and increased computerization of procedures. Besides, improvement in transparency of the government by implementing more stringent anti-corruption laws is needed.

(5) India has to relax its labor laws and lower the cost of severance to help the manufacturing sector's access to human resources.

(6) Finally, to move forward, India should invest in R&D to help Indian companies increase their patent level and thereby improve their technology level.

## II. Maharashtra State Analysis

### 1. Maharashtra Overall Conditions

**(1) Basic Facts:** Maharashtra is the second largest state in India both in terms of population (9.4% of India's population) and geographical area (10% of India's total area). 42% of the population lives in urban areas and 67% are less than 34 years old. The state has four of the biggest cities in the country Mumbai (12 million people), Pune (2.5 million), Nagpur (2 million) and Nashik (1.1 million). The state has been politically stable and has been investor friendly.

**(2) Role of State Government:** Policy decision-making is shared among federal and state levels. As shown before the federal government is in charge of policies regarding central taxes, and major ports, highways, and airways, while the state government manages infrastructure provision, land



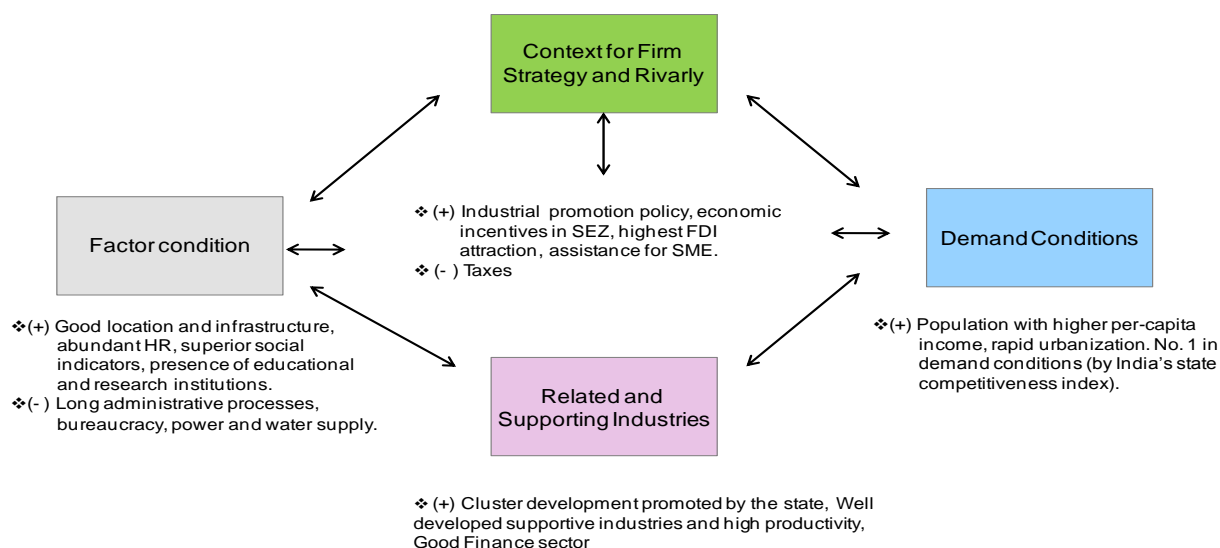
distribution, energy and water supply, local taxes like octroi<sup>8</sup> and sales. Some matters like education and health are joint responsibility.

**(3) State Economy at Glance:** Maharashtra has the highest GDP among all states, reaching USD 131 billion<sup>9</sup> in 2008, which was 15% of national GDP. The State's GDP per capita in 2008 (Rs. 38,785) is higher than the national average (Rs. 30,097) and ranks third after Delhi (Rs. 65,156) and Goa (Rs. 38,785) (Directorate of Economics & Statistics, 2010). Although Maharashtra's income highly depends on services (60%), the State has been recognized as the industrial state of India, and a pioneer in small-scale industries. Maharashtra has also become a leading automobile production hub and a major IT growth centre. It has the largest number of special export promotion zones being set up in the country. The agriculture & allied activities sector contributes 11% to the State income<sup>10</sup>.

## 2. Maharashtra State Diamond

The State Competitiveness Report 2010 ranks Maharashtra second (after Delhi) among 29 states in India. Maharashtra's strengths are in factor and demand conditions (figure 8).

**[Figure 8]** *Maharashtra competitiveness diamond*



<sup>8</sup> Octroi tax is a local tax on entry of goods for use and consumption within areas of the districts.

<sup>9</sup> USD base 2000.

<sup>10</sup> However, about 55% of the population depends on this sector.

[Figure 9] Comparison with other states

State's place among 29 states		Maharashtra	Delhi	Goa	Tamil Nadu
State Index		2	1	3	4
Factor Conditions	Financial	1	5	3	14
	Physical	4	1	3	5
	Administrative	26	3	21	12
	Human capacity	5	19	23	11
	Innovation	9	11	6	1
Demand conditions	Demographics	2	17	27	8
	Income and consumption	3	1	2	10
Strategic content	CI and diversity of firms	5	4	1	2
	Business incentives	4	1	3	2
Supporting conditions	Supplier sophistication	4	9	2	1
	Institutional support	5	15	4	8

Source: Institute for Competitiveness, 2010

**(1) Factor Conditions:** There are many factor conditions which have attracted investment to the state. Mumbai, the capital of Maharashtra and the financial capital of India, houses the headquarters of almost all major financial institutions, insurance companies and mutual funds<sup>11</sup>.

The State has a strong human capital, high literacy rate (77%), HDI (0.67) and low infant mortality rate (34 per 1,000 live births) than the country's indicators of 65%, 0.59 and 53 respectively. Maharashtra has a strong network of educational institutions with 12% of the country's universities, 13% of engineering colleges (594 institutions) and 19% of management institutions. Annual student intake in professional, technical and related institutions is over 200,000. Also technical education supply has been recently updated to match clusters in the State, for example automobile design and manufacturing, e-supply chain management, insurance services, among others (MIDC, 2009).

Maharashtra's infrastructure is better than all other regions. It has well-developed road and train networks, especially around special economic zones (SEZ) in big cities and the two biggest ports in India, including JNPT<sup>12</sup>. It also has two international airports and handles 34% of international passengers and cargo in India (MIDC 2009). The state has over 250 industrial Parks with

<sup>11</sup> India's main stock exchanges & capital market and commodity exchanges are located in Mumbai.

<sup>12</sup> Jawaharlal Nehru Port Trust (JNPT) ranks 32nd in the world top container ports, handling 58% of the country's container traffic.

accompanying amenities and incentives, which have attracted companies, especially after liberalization policy in the 1990s. However, a power deficit of 22% (4,500 MW) is the main bottleneck the State faces. Although Maharashtra has focused on supplying better electricity for commercial use, it is more expensive than in other states<sup>13</sup>.

Administrative performance is another challenging area for India, but more for Maharashtra. In administrative processes the state ranks 26 among 29 states studied as shown in figure 9. The project clearance pipeline and the ability to do business with the government is not an easy task in Maharashtra as many investors have learnt to their dismay.<sup>14</sup>

**(2) Demand Conditions:** The state population enjoys a higher per-capita income, which represents higher purchasing power. Early industrialization has made Maharashtra one of the most urbanized states with 42% of people living in urban areas, just behind Tamil Nadu. However, with seven of Maharashtra's cities having more than one million inhabitants each, the state has one of the highest urban densities in the country, which currently generates congestion problems. Projections suggest the country's urban population will be over 50% by 2013. This rapid urbanization represents a challenge for the state to meet related infrastructure and services needs<sup>15</sup>. Demand conditions shape new products and innovations. That is why; this is an opportunity for companies to innovate and focus on more efficient and green technologies, for example smaller and fuel-efficient vehicles in automotive industries.

**(3) Context for Firm Strategy and Rivalry:** Among India's States, Maharashtra has attracted the highest amount of FDI, 20.6% of total national FDI (figure 10). The most favored sectors are IT industry 20%, Services 17%, Infrastructure 7%, and Automobiles 6%.

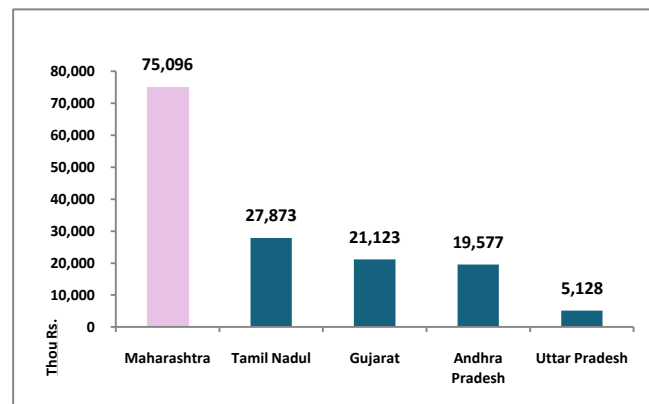
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<sup>13</sup> For example the cost in Maharashtra is Rs. 408.6 per unit, while in Goa it is Rs. 272.

<sup>14</sup> For example, it takes 35 days to start a business in the state, while in India it takes 30 days.

<sup>15</sup> In this field, the state has launched a portfolio of urban infrastructure projects, while being the largest recipient of funds (Rs. 55 billion) under the Jawaharlal Nehru National Urban Renewal Mission (JNNRU) mission.

**[Figure 10]** *FDI in major States (Aug 1991 – March 2008)*



*Source: National Informatics Centre Government of India, 2010*

The state has an industrial promotion policy to develop Maharashtra as Asia's most competitive manufacturing hub, led by a government established entity, Maharashtra Industrial Development Corporation (MIDC). MIDC promotes the establishment of SEZs, which provides economic incentives (tax exemptions), power and water supply, more diligence in land and administrative processes. There are 72 SEZ in Maharashtra 80% of them located in the Golden Quadrilateral, formed by Mumbai-Pune-Nasik-Aurangabad, which contributes 80% of Maharashtra's GDP and focuses on manufacturing & services industries. SEZs have been used as a means to attract companies to the State. However, recently other states have offered more attracting incentives and some companies and moving there. As the Institute for competitiveness (2010) mentions Maharashtra was only number 4 among 29 states in offering business incentives when it should have been at the top. Although tax incentives in free zones could work in the short term, this is not a sustainable policy in the long term, and the state needs to focus on differentiating and providing other advantages for firms to locate there.

Maharashtra is one of the two states in India that have octroi taxes, and the only one among the major auto producing states in the country. Thus, firms in this state find it expensive to procure

components from other states. In an attempt to develop its backward districts, the State government is providing few incentives to industrial units that are set up in these districts<sup>16</sup>.

**(4) *Related & Supporting Industries*:** As mentioned before, Maharashtra has a strong financial sector. Firms in Maharashtra are 30% more productive than those in the rest of the country. The state also has a cluster policy, for developing infrastructure based on needs of specific industries, provide optimum utilities and common facilities, and attracting the right kind of talent. Clusters are developed on the basis of identified thrust areas and the available resources in the region. The MIDC reserves some areas for specific industries and their ancillaries and promotes SME development especially in the field of light engineering, textiles, biotech and IT<sup>17</sup> (Government of Maharashtra, 2007).

Among Maharashtra's industrial clusters, auto and auto components (represents 38% of national output), apparel and textile (10.4%), and pharmaceuticals and petrochemicals (40%) (MIDC 2009) deserve mention. Regarding IFCs, Maharashtra has the Bombay Productivity Council, the Kolhapur Productivity Council and the Poona Division Productivity Council, which collaborate in training and communicate best practices in productivity.

### **3. Recommendations for State Government**

**(1) *Remove Cost Disadvantages of Locating in the State*:** There is a need to remove cost disadvantages of locating in the state on account of octroi<sup>18</sup> and electricity duty. Octroi is likely to be phased out with the implementation of Goods and Services Tax in 2011, but the problem of ensuring consistent electricity supply at competitive cost will need to be addressed soon. Companies identify it as one of the most critical problems in Maharashtra. This problem could be addressed in the short-

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<sup>16</sup> These incentives include exemption from the electricity duty for 10 years, stamp duty and registration fees for 5 years. There is octroi refund to the industries in these places.

<sup>17</sup> The SME policy includes setting up of a special institution for the SME and incentives to promote quality competitiveness, research and development and technology up gradation, such as 5% subsidy on capital equipment for technology up gradation, 50% subsidy on the expenses incurred for quality certification, 25% subsidy on cleaner production, 50% subsidy on the expenses incurred for patent registration (specific limits apply) (Government of Maharashtra, 2007)

<sup>18</sup> In Pune, a 3% octroi tax nets the Pune Municipal Corporation a whopping Rs.7 billion annually while the collections in Mumbai and Thane are even more.

term by facilitating use of captive power generation by industrial units, and in the long-term through building new generation capacity.

**(2) *Improve Administrative Processes in the State:*** The state government needs to improve the administrative procedures related to obtaining approvals by industries (e.g. registration for land acquisition, power and water connection, environmental clearances etc), tax filing and tax refund procedures, inter-state movement of goods. The state government should decrease the time for starting a business below the country average. They should create an expeditious single window for all companies, as done for those in the SEZs. Reduction of transaction costs and improvement in ease of doing business will facilitate cluster growth.

**(3) *Improve infrastructure:*** The state government is the primary agency for providing land and supporting infrastructure (road network, port facilities, power etc). This has become a major constraint in recent years<sup>19</sup>. The state government needs to prioritize infrastructure development, and channelize investments in this area to remove bottlenecks. The state government should also incentive PPP to enhance private participation in expansion and maintenance.

### III. The global and India automotive industry

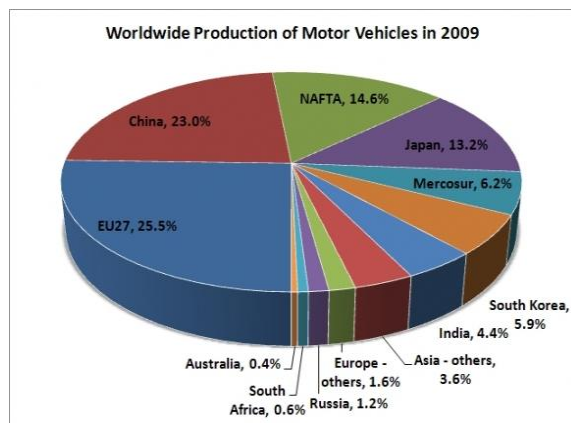
As of 2009, the automotive production in India ranks 7<sup>th</sup> globally (Figure 11). India's automotive production is showing robust growth in all segments (figure 12). In production volume terms, 75% of total production is of two-wheelers. However, the passenger vehicle segment is showing the strongest growth in the past 5 years (figure 12). Especially after the liberalization policy started in 1991, most global automotive manufacturers entered India and established local manufacturing bases through joint ventures with local partners. Foreign manufacturers and local players formed multiple clusters attracting component suppliers all over India (figure 13), where they could obtain better infrastructure

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<sup>19</sup> In 2007, when Tata Motors was required to relocate its proposed Nano plant from the state of West Bengal (due to resistance of farmers and local politicians), it preferred the neighboring state of Gujarat to establish the plant, over its home base of Maharashtra, because Maharashtra cluster did not have adequate land with supporting infrastructure.

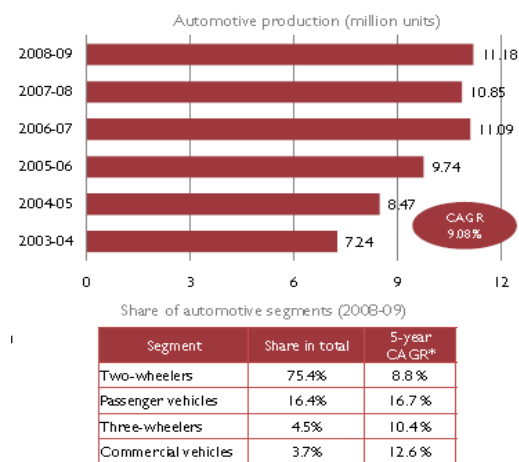
facilities and strong support from local governments. Though most of the passenger vehicle production is concentrated in the small/basic segment reflecting India's demand condition for cheaper models, passenger car exports from India are showing exponential growth (figure 14), led by Maruti Suzuki and Hyundai Motors. These phenomena indicate that Indian automotive industry is transitioning to a global automotive hub, fulfilling international quality requirements.

[Figure11] Worldwide Production of Motor Vehicles



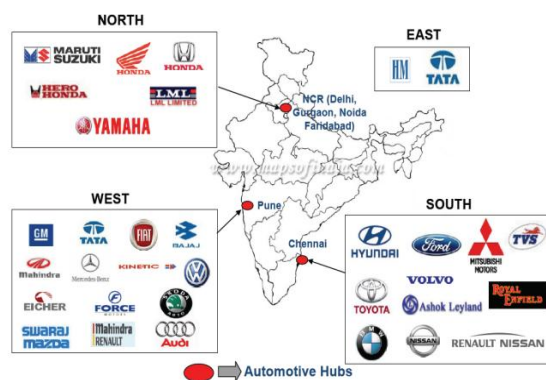
Source: ACEA

[Figure 12] Automotive Production in India



Source: IBEF 2009

[Figure13] Automotive Clusters in India



Source: Frost & Sullivan 2009

[Figure 14] Car Exports from India



Source: IBEF 2009

Cost comparison with those in competing nations (Brazil, China, Thailand) indicates that India is especially behind in taxation incidence and power costs (figure 15 and 16). High import tariffs on passenger cars and two-wheelers force global automotive manufacturers to produce in India. Indian government has initiated tax reforms to provide a level playing field for its manufacturing sector, as

well as focused on infrastructure investment for upgrading power and road supply, because India is still significantly behind in infrastructure development compared to China or Thailand. In terms of labor cost and productivity, India is almost at the same level with China and Thailand (figure 16), though in terms of talent availability (number of annual graduating engineers, etc.) India is still in a leading position.

**[Figure 15] Comparison of Tax and Duties**

	India	Brazil	China	Thailand
Excise	8-16%	-	-	-
VAT	12.5%	17%	17%	7%
Other taxes		15%*		
Corporate tax	34%	34%	25%	30%
Exemptions	Specific packages provided by states for large investments	Tax incentives for companies in export processing zones	Preferential corporate tax policies for foreign investment enterprises	Tax incentives for investments outside central zone
Import duty	13%	16%	8%	Free
on rubber				
Import duty on steel	5%	12% <sup>a</sup>	2%	10%

**[Figure 16] Comparison of Other Costs**

Country	Power Cost (US\$ per kWh)	Interest Rate (annual lending)	Labour Cost (US\$/day)	Productivity Index
India	0.14	10-11%	6	1.00
Brazil	0.05	13-14%	33.6	2.00
China	0.03	5-6%	6	1.00
Thailand	0.11	7-8%	6.4	1.20

Source: IBEF 2009 (for Figure 15&16)

## IV. Maharashtra Automotive Cluster

### 1. Importance in Maharashtra's Economy

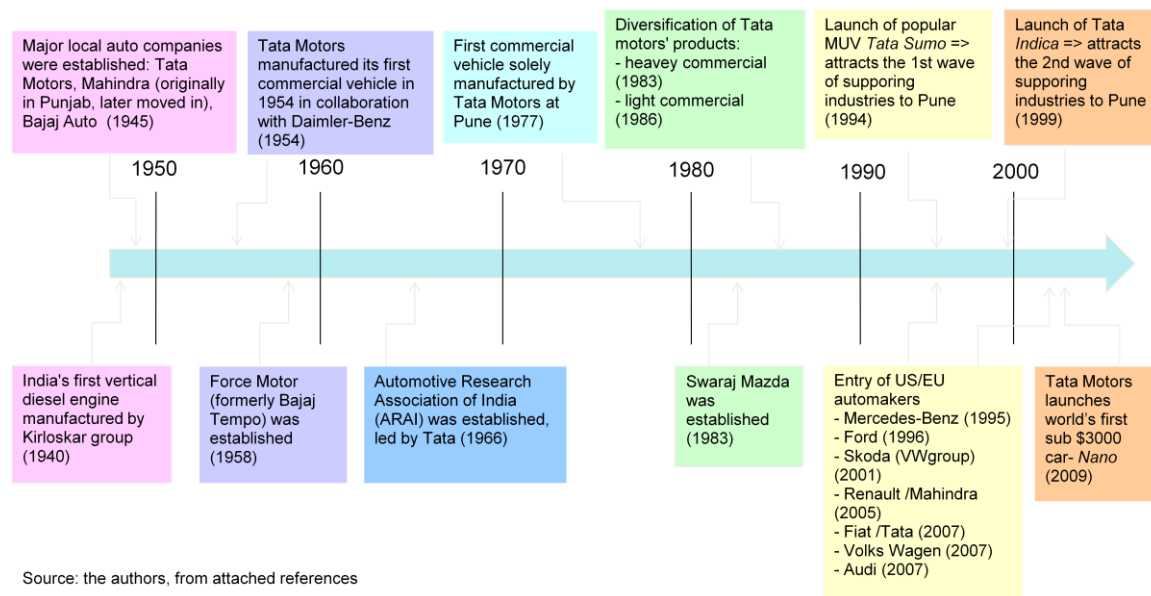
The automotive cluster in the Maharashtra is one of the largest and promising clusters in the State. For example, in terms of the share in India, the cluster accounts for 50.9% in net added value, and 35.1% in output, which are higher than any other clusters in Maharashtra. The cluster also contributes to 10.4% of total employment in the State, making it one of the largest contributors in employment (the top being basic metal industry at 13.7%). It is also one of the fastest growing clusters at CAGR 3.2% during 1991-2007, following wood related cluster (6.79%) and other manufacturing (6.42%). (Maharashtra State Government, 2009)



## 2. History and Evolution of Maharashtra Automotive Cluster

The automotive cluster in the State of Maharashtra has a relatively long history (figure 17) As the cluster is the largest of its kind in India, its evolution generally coincides with the development of the whole automotive cluster in India which was shown in the previous section. The origin of the cluster date back to as early as 1940s. Many of the major domestic automakers, such as Tata Motors, Bajaj Motors, Force Motors were established in the State (Mahindra & Mahindra was originally founded in Punjab, but later moved to the State).

**Figure 17. Maharashtra Automotive Cluster: History (1940s – 2010)**

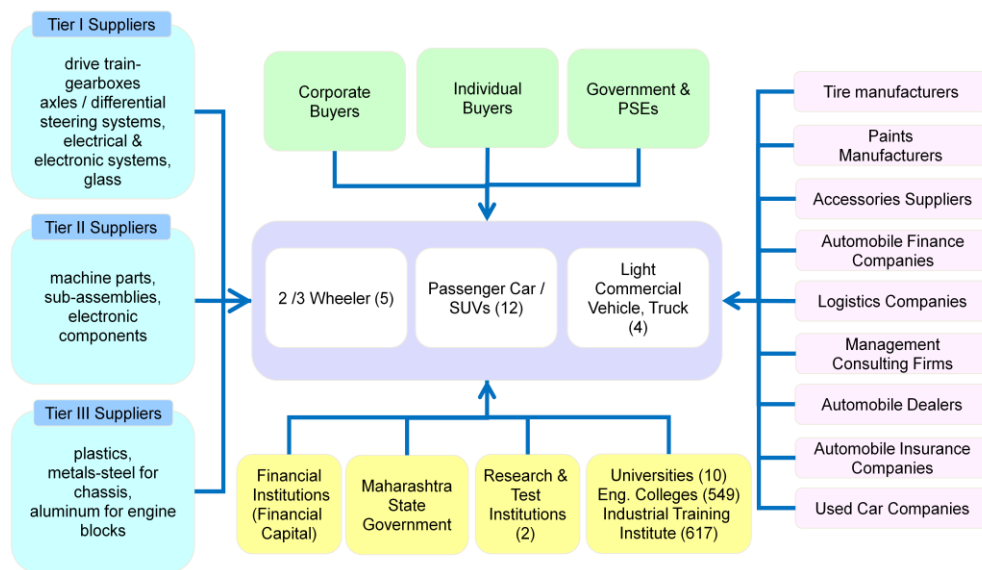


1980s saw the first major leap of the cluster. In response to the deregulation (*de-licensing*) by the National government, joint ventures with Japanese automakers began. In Maharashtra, Swaraj Mazda was created in 1983, and this led to growth of supporting industries in the State. The major development of the cluster came in 1990s to 2000s. Tata Motors had launched a series of popular cars which attracted waves of entries of supporting industries in the State. Rapid establishment of major foreign automakers' assembly plants within the State. This facilitated technological transfer and further development of local supporting industries.

### 3. Composition of Cluster (Cluster Map)

Figure 18 shows the current cluster map. It clearly shows that all the necessary segments are present in the State. At the center of the map, there are automobile manufacturers. 21 domestic manufacturers exist in the cluster, including 2 of the 4 top manufacturers in India: Tata Motors (1<sup>st</sup>) and Mahindra & Mahindra (4<sup>th</sup>) for 4 wheel vehicle segment, and the 2<sup>nd</sup> largest manufacturer in 2 & 3 wheelers (i.e. Bajaj Auto). In addition, 9 out of the 18 international major automotive manufacturers operating in India locate in Maharashtra, indicating that Maharashtra become a favorite location to invest. Furthermore, these companies are supported by a large number (more than 150 companies) of supporting industries from Tier I (component specialists) to tier III (commodity suppliers). The existing strong manufacturing industry in the State contributes to this favorable condition. Strength of the related industries is also noteworthy.

**Figure 18 : Maharashtra Automotive Cluster (cluster map)**



Source: the authors

### 4. Cluster Performance & Relative Positioning

#### *(1) Competitive Advantage in Domestic Market*

The automotive cluster in Maharashtra (the West cluster) is the strongest in many aspects in comparison with other automotive clusters in India, i.e., the North cluster (around Delhi) and the

South cluster (around Chennai) (figure 19). For instance, in terms of the all segments combined, the West cluster (around Maharashtra) enjoys a lions' share of for 43.6 % of gross turnover, 81 % of R&D expenditure, and 53% of cumulative investment in 2008-09. The cluster is especially strong in the 4 wheel vehicles segment (including passenger vehicles and commercial vehicles), with 46.6% of gross turnover, 46% of installed capacity, 84% of R&D expenditure and 53.2% of investment. In contrast, the North cluster has strength in motorcycles (2 & 3 wheelers) segment, while the South cluster is the third position in total as well as in the two segments.

Figure 19: Comparison of Automotive Clusters in India (2008-09)

	Clusters	Gross Turnover (Rs.mil) (%)		Installed Capacity (in numbers) (%)		R&D (Rs.mil) (%)		Investment (Rs.mil) (%)	
A. Cars									
	North	283,866	(24.9%)	1,056,500	(27.2%)	1,159	(4.3%)	59,692	(11.3%)
	South	323,810	(28.4%)	1,041,700	(26.8%)	3,114	(11.7%)	186,524	(35.4%)
	West	530,640	(46.6%)	1,784,305	(46.0%)	22,393	(84.0%)	280,438	(53.2%)
	Sub Total	1,138,316	(100.0%)	3,882,505	(100.0%)	26,666	(100.0%)	526,654	(100.0%)
B. Motorcycles (2 & 3 Wheelers)									
	North	182,507	(53.5%)	6,891,500	(48.2%)	327	(13.6%)	18,337	(25.8%)
	South	44,144	(12.9%)	2,980,000	(20.8%)	861	(35.7%)	16,410	(23.1%)
	West	114,731	(33.6%)	4,435,000	(31.0%)	1,226	(50.8%)	36,355	(51.1%)
	Sub Total	341,382	(100.0%)	14,306,500	(100.0%)	2,414	(100.0%)	71,101	(100.0%)
C. Grand Total (A+B)									
	North	466,374	(31.5%)	7,948,000	(43.7%)	1,487	(5.1%)	78,029	(13.1%)
	South	367,953	(24.9%)	4,021,700	(22.1%)	3,975	(13.7%)	202,934	(33.9%)
	West	645,371	(43.6%)	6,219,305	(34.2%)	23,619	(81.2%)	316,793	(53.0%)

Source: Society of Indian Automotive Manufacturers (SIAM), Automotive Industry in India 2008-09

## ***(2) Competitive Advantage in International Market***

Since Maharashtra is the leading cluster in Indian automotive cluster, the advantage and challenges are basically the same with the international comparison with Brazil, China and Thailand in the previous section: taxation and power costs. As a peculiar condition to Maharashtra, regional octroi tax can become additional disadvantage. However, the higher percentage of R&D expenditure concentrated on this cluster can give the cluster advantages of higher productivity, lower costs, and advanced technology.

## **5. Role of National and State Government**

### ***(1) Role of National Government***

Following the rapid development of the cluster subsequent to introduction of the liberalization policy, Indian government formulated “Auto Policy 2002” in order to accelerate the growth by providing higher fiscal incentives for R&D, and automatically approving 100 % FDI. This policy promoted technological advancement of domestic automakers, as well as rush of major international automakers to Indian automotive market.

### ***(2) Role of Maharashtra State Government***

Proactive industrial policy of State Government has set the foundation of automotive cluster development in the state. Specific to the cluster, “Industrial, Investment & Infrastructure Policy of Maharashtra 2006” specified the automotive cluster as one of the target policy areas, and has been providing incentives (industry promotion subsidy) to eligible companies.

## **V. CLUSTER ANALYSIS**

### **1. Cluster Diamond Analysis**

***(1) Factor Conditions:*** As mentioned in the previous sections, this cluster enjoys certain inherent advantages (infrastructure, finance, human resources, labor conditions) which bestow a natural edge for all industries in this state. Specific to the automobile sector also, this sector has some advantages. Firstly, the presence of a number of engineering colleges and technical institutions ensured a steady supply of engineering and technical manpower, and a strong industrial legacy. Secondly, this cluster had the presence of the two big industrial houses of India- the House of Tatas<sup>20</sup>, and the Bajaj group, who made an early start (in 1940s, as compared to the later start of the northern auto cluster in 1980s, and of the southern cluster in 1990s), and diversification of operations by them, which accelerated in

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<sup>20</sup> Tata group is one of the largest conglomerates in India, with presence in several industries, including steel production. They also have captive iron ore mines, and thus, have strength in the supply chain.

the 1990s and led to influx of tier I and tier II industries. Thirdly, the setting up of the premier automobile testing, research and homologation facility-the 'Automobile Research Association of India' in Pune in the 60s conferred an advantage to automobile manufacturers setting up facilities in the state.

But there remain some constraints in factor conditions, primarily in the area of infrastructure (roads) and taxes. Chakan area in Pune, which is home to many big auto manufacturers, has only a 2-lane highway, which is perceived to be a major disadvantage<sup>21</sup>. In general, road length in the state is better than other states, but the roads are poorly maintained. Moreover, since this region is prone to heavy seasonal rains (monsoons) for 3 months every year, most roads develop cracks and potholes after rains, and this causes serious disruptions to movement of containers carrying raw materials and finished goods. Another constraint is the cost disadvantage of Maharashtra-based industries on account of additional taxes (octroi and an electricity tax) (Narayanan et al. 2008)

**(2) *Related and Support Industries:*** There has been a robust growth of tier-I, tier-II and tier-III industries in the state. Because this industry has a high requirement of customized technological integration, suppliers in entire value chain have set up manufacturing and business facilities in Maharashtra, so as to have assured sales to OEMs through long-term relationships. Proximity to the OEMs helps the manufacturers of parts/ components (plastic molded parts, steering systems, electronic systems etc) and accessories (air-conditioning units, audio/video systems). However, because of the inability of domestic manufacturers to achieve economies of scale and technological innovation commensurate with rapid entry and scaling up of manufacturers in the region, part of the supply chain is still met through imports<sup>22</sup>. The region has also seen a proliferation of support industries- automobile finance and insurance companies, and auto dealerships, due to the synergistic dependence with the OEMs.

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<sup>21</sup> Interview with Director General, SIAM.

<sup>22</sup> Component Imports have increased after signing of the Indo—Thailand FTA and phased reduction of tariff levels- ACMA data.

There are no significant cluster-specific institutes for collaboration, but the OEMs as well as auto-component manufacturers collaborate through two pan-India institutes of collaboration namely, the 'Society of Indian Automobile Manufacturers (SIAM)', and the 'Auto Component Manufacturers Association of India (ACMA)'. These organizations serve as umbrella bodies with almost complete representation from major OEM and component manufacturers respectively. They organize training and support programs for their members, organize annual promotional events (AUTO-EXPO<sup>23</sup>), and have also developed considerable persuasion with policy makers in the central and state Governments<sup>24</sup>.

**(3) Context for Firm Strategy & Rivalry:** This has been guided by the all-India policy and industry environment, since firms located here (OEMs and component manufacturers) compete across clusters, in the competing market segment<sup>25</sup>. As regards policy environment, Indian passenger car and two-wheeler manufacturers enjoy protection of high tariffs. Though this inhibited innovation till 1990s, with lowering of tariffs on 'completely knocked down' imports in the 90s, foreign manufacturers, who wanted to gain access to the large Indian market, started setting up manufacturing facilities in India. This instilled rivalry, and forced local OEMs to diversify their product range<sup>26</sup>. Government's policy also imposed aggressive indigenization<sup>27</sup> targets for entering firms. Increased and sophisticated demand for parts/ components resulted in rapid growth of ancillary industries in each cluster. Maharashtra was among the first states to seize the opportunity provided by the policies of central government, and provided conducive business environment facilitating entry of foreign OEMs<sup>28</sup> and component manufacturers<sup>29</sup>. Thus, entry of foreign firms enhanced cluster

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<sup>23</sup> This is a hugely popular event held annually, which showcases latest technologies and vehicle models, and brings OEMs, auto component manufacturers, and buyers together.

<sup>24</sup> The 'Automotive Mission Plan 2006-16 was a result of the collaborative efforts of these IFCs and the Department of Heavy Industry in Government of India

<sup>25</sup> For instance, Tata Motors competes with Hyundai and Maruti-Suzuki in the small and medium car segments, and with Toyota, and General Motors in the SUV segment, which are located in other clusters in north and south India.

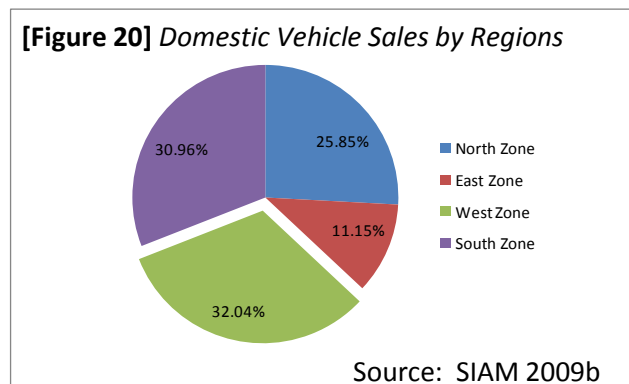
<sup>26</sup> Till the 90s, India only had Hindustan Motors (Ambassador cars), and Fiat, and Maruti-Suzuki which made its entry in mid-80s.

<sup>27</sup> Policy required that entering firms should progressively increase sourcing of parts/ components from indigenous manufacturers, say up to 90% of value, in 5 years time.

<sup>28</sup> Mercedes-Benz in 1995, Ford in 1996, Skoda in 2001

externalities and productivity, and their activities contributed directly to generation of local employment and investment<sup>30</sup>. Simultaneously, competition shifted from imitation to innovation and from low investment to high investment<sup>31</sup>. But competition is yet to transition to intangibles such as skills and technology enhancement.

**(4) Demand Conditions:** The western region in India accounts for a robust demand, about 32 % of the total all-India sales (Figure 20).



In all-India sales figures, Maharashtra ranks 1<sup>st</sup> in the passenger vehicles segment, and 2<sup>nd</sup> in the commercial vehicles, three wheelers and two wheelers segments. However, the major reason for good demand condition in this cluster is owing to the big manufacturers Tata Motors and Mahindra Motors (in the four-wheeler segment), and Bajaj Motors (in the two-wheeler segment).

## 2. The way forward: Challenges for Maharashtra Auto Cluster

The Cluster analysis shows that the development of this cluster was a result of robust development of various parts of the diamond in a self-reinforcing manner. We believe that, in line with Prof. Porter's concept, it is now crucial to recognize this cluster's potential to upgrade by identifying and removing the obstacles, constraints and inefficiencies that impede productivity and innovation.

<sup>29</sup> SKF (bearings), Bosch (chassis and brake systems), Hitachi (ferrite cores), and tire manufacturer Bridgestone.

<sup>30</sup> In line with the concept of "On Competitiveness", by Prof Michael Porter, p 265

<sup>31</sup> In line with the concept of "On Competitiveness", by Prof Michael Porter, p 228

We also believe that there is an opportunity for the Indian automotive cluster, as a whole, to emerge as a globally competitive cluster, by overcoming the sources of competitive disadvantage (such as higher tax incidence, infrastructure, regulation) over competing locations. This brings us to what we believe are some key issues facing this cluster and the automobile industry in India.

### **3. Key Issues Facing the Cluster**

#### ***(1) State Level***

***(i) Infrastructure Bottlenecks:*** Though Maharashtra had an edge in attracting new investments in the automobile cluster earlier, recently, because of its inability to overcome its infrastructure bottlenecks (land, with good road connectivity and adequate/ cheap power), it is rapidly losing the edge it provided to incoming automobile manufacturers, to other clusters- mainly the southern states of Tamilnadu and Karnataka<sup>32</sup>.

***(ii) Tax Incentives in Other Regions:*** There is increased diversion of investment to new regions in India because of tax and other incentives. In recent years, Government of India has pursued a policy of incentivizing development of regional tax-free zones, primarily to promote industrial development in remote and backward regions. While this had a positive result in these areas by way of new investment, industrial development and employment generation, it also caused a shift in investment from existing clusters in states such as Maharashtra and Tamilnadu.

***(iii) Law and Order:*** Since 2008, there have been incidents of violence between the migrant population, and a section of the local people of Maharashtra, who feel that employment opportunities and civic amenities available to them are constrained on account of increased population influx. If this tension continues, it will be a big risk for further growth of the cluster.

#### ***(2) National Level***

At the **national level**, the inconsistent policy environment is a major issue, primarily in two areas- tax incidence on automobiles, and environmental/emission regulations:-

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<sup>32</sup> These states have improved their infrastructure strength, and are home to big players such as Hyundai, Toyota, Volvo trucks, and most recently Renault-Nissan (Chennai, in 2010).



**(i) Inconsistent Tax Policy:** In 2006, Government of India announced a policy of making the country a manufacturing and export hub for small, fuel-efficient cars. In pursuance of this policy, a differential excise duty rate was introduced in favor of small cars<sup>33</sup>. Following this, OEMs made investments in launching small cars in the domestic market. However, since 2008, the excise duty rates on small as well as large cars have been modified frequently<sup>34</sup>. Such frequent changes in tax incidence influence buying decisions of customers, and consequently distort the cost calculations and investment decisions of OEMs<sup>35</sup>.

**(ii) Inconsistent Environmental/Emission Regulations:** India resorted to implementation of emission regulations in a phased manner in different regions, due to the non-availability of compatible fuel which meets the prescribed standards. This poses a problem to OEMs and their suppliers in anticipating demand.<sup>36</sup>

### **(3) Industry and Firm Level**

**(i) Investment in R&D for Product and Process innovation:** Investment in R&D for technology development will be one of the most important aspects of future strength of this industry. Given India's strength in the skills set required for technological development, the industry needs to invest in research and development to increase innovative breakthroughs for vehicle design as well as in manufacturing technology. Incentivisation of such investments will be needed on the part of the government.

**(ii) Promoting exports:** Indian companies have gained strength in the small car segment, which is already being leveraged by OEMs like Hyundai, Suzuki and Tata Motors, and component

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<sup>33</sup> Excise duty is the domestic tax on all manufactured goods @10-20%. Small cars (with prescribed engine capacity and length), attract a lower excise duty as compared to large cars and SUVs.

<sup>34</sup> This has been done for different reasons each time- as a means to reduce gasoline consumption and combat inflation (in early 2008, when international crude prices registered a sharp increase, and gasoline consumption went up in India), to provide relief to industry from recession (in end 2008-early 2009), and again recently (in early 2010).

<sup>35</sup> Industry sources have pointed out that a consistent tax policy regime in the short and medium term is a sine qua non for this industry which has a high innovation, production and inventory cost.

<sup>36</sup> An illustrative case is that of component-suppliers of a MUV major based in Maharashtra who had adopted Bharat-II technologies in anticipation of implementation of the same in the remote North-eastern states of India. However, the same could not be implemented since it was found that fuel that is consistent with Bharat-II norms was not available in sufficient quantities in this region. As a result, some of the suppliers had to close down their operations partly or fully.

manufacturers. But there is tremendous opportunity for capture of market share in other categories such as multi-utility vehicles, two-wheelers, hybrid vehicles<sup>37</sup> and electric cars<sup>38</sup>. This will need to be driven by strategies of individual companies, and policy support from government (R&D and export incentives), but also by encouraging competitiveness of tier-I suppliers, and establishing a ‘made-in-India’ brand.

*(iii) Development of auto component industry:* Indian auto component manufacturing is currently constrained by lack of large capacities. Greater variety in vehicle launches by OEMs in recent years and increased export demand are offering newer challenges to manufacturing capabilities and economies of scale of component manufacturers. The component industry needs to increasingly maintain lean and efficient manufacturing systems to be ahead of cheaper imports from countries such as Thailand (under the Indo-Thai FTA).

#### **4. Recommendations**

Our recommendations are focused on two objectives, first to further develop and upgrade of the Maharashtra cluster, and second, to increase inter-cluster synergies among the different auto clusters in India, so as to rapidly develop India as a globally competitive automobile cluster.

##### *(1) Recommendations at Industry & Firm level*

*(i) Build Design & Innovation Capability:* The automotive industry in India needs to rapidly move to a “design and innovation” industry to achieve global competitiveness. Tata Motors has shown the way by developing the first sub \$2500 car in the world (Nano). The auto component sector and the basic/ small car segment are steadily increasing their share in global markets by meeting global quality standards. But India still lags in building product and process development capabilities in the value chain in most vehicle segments. The way forward for firms is to **increase investments for**

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<sup>37</sup> Bi-fuel vehicles have already been built by Mahindra Motors and are running on Indian roads.

<sup>38</sup> India is one of the few countries which is exporting electric cars (built by Reva Electric Company, Bangalore)

**research in cost-saving technologies, product and process improvement, but also green technologies such as hybrid cars and hydrogen fuels.**

*(ii) Penetration to Rural Market:* One of India's strengths is its significant domestic demand<sup>39</sup>. Rural India offers a huge market for motor vehicles, which is yet to be explored. Multi-utility vehicles have been popular in rural areas, but a constraining factor is the inadequate after-sales service in these areas. With a **strategic focus on rural market demand for multi-utility vehicles**, OEMs could significantly enhance demand and market share.

*(iii) Foreign manufacturers in India should bring their research and design capabilities, as well as their overseas vendors into the cluster*, so that the entire ecosystem of commonalities and complementarities in the cluster grows further. The central and state governments need to identify this as a priority, and facilitate this process. Entry of overseas vendors may increase rivalry with domestic manufacturers, and may cause some distress to the latter in the short-term, but is likely to result in enhanced competitiveness, and cluster development in the long-term.

## ***(2) Recommendations for State Government***

As already stated in the states' recommendation section, Maharashtra needs to **remove its infrastructure bottlenecks, its administrative procedures, and remove cost disadvantages** on account of octroi and electricity duty.

## ***(3) Recommendations for National Government***

(i) The Central government needs to provide a stable and conducive policy environment. The key ingredients of this would be:-

- **A modest tax incidence on all categories of vehicles** domestically produced, primarily to remove the competitive disadvantage with other international locations. It is expected that this will be substantially achieved in 2011, when Government of India implement the integrated 'goods and services tax' (GST, akin to VAT in developed countries) w.e.f 1.4.2010. In

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<sup>39</sup> The Director General, SIAM in his interview with us said- "the next global market leader in passenger cars would be one who can capture the Indian market's huge demand".

addition, it is necessary to maintain a **consistent policy**, so that firms can make long-term investment decisions based on stable ground rules.

- **Long-term emission roadmap, and ensure availability of required fuel in all retail outlets** at least one year ahead of the introduction of emission norms, which would help the entire value chain in India to adopt the relevant technologies in advance.

(ii) The Central government also needs to promote policies to ensure **adequate quantities of primary raw materials** such as steel (hot-rolled coils, the primary raw material), and aluminium (for engine blocks) used by OEMs, as well as specific inputs such as special grade rubber and plastics for components, since domestic capacities for these materials are not adequate, and shortage is met through imports (Narayanan et al. 2008). Similar is the situation for tier-I, II and III suppliers (natural rubber for tires, for instance)<sup>40</sup>. Apart from the automobile industry, the central government needs to **promote input industries (such as plastics, chemicals) to build cluster strength, through suitable policies**.

(iii) The Central Government, which determines the import tariff levels, should **bring down the high import duties on fully-built cars and two-wheelers**. The policy of continued high protection is likely to inhibit competitiveness growth of OEMs in the long run. With the present robust health of this sector in India, the time may have come for opening of market to imports that would promote local efficiency, upgrade local demand, and stimulate rivalry (Porter 1998)

#### ***(4) Recommendations for Centre and State Together***

(i) The national and state governments need to collaborate actively is to **build capabilities for export-led growth. Creation of specialized port infrastructure for handing vehicle exports** is crucial for India to emerge as a global automotive hub. One specific measure would be creation of

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<sup>40</sup> Industry sources said that manufacturers prefer to avoid high inventory costs, and they often suffer supply constraints when international prices of these materials go up on account of supply shortages (as in early 2008).

three automobile export hubs near Mumbai, Chennai and Kolkatta, each equipped to handle output of 500,000 vehicles annually, and parking space for at least 20,000 vehicles at a time<sup>41</sup>.

**(ii) Incentivizing Modernization of Vehicle Fleet:** India suffers from the presence of a large number of old and poorly maintained, polluting vehicles. Industry has been arguing for retiring old vehicles of more than 15 years of age by providing certain **incentives and concessions for replacement through a single window program** for modernization of vehicle fleet. This would help address pollution concerns, but also improve demand conditions. This can be achieved through joint efforts of the two governments.

#### ***(5) Institutes for Collaboration***

By focusing on the following areas, IFCs, such as SIAM and ACMA, could contribute better to accelerate growth of automobile clusters: 1) Build **institutional linkages between industry and academic institutions- for research and innovation in green technologies**; and for **cluster studies of global automotive industry**, to forecast trends and building competitiveness; 2) Drawing out OEMs in a collaborative effort towards **road safety**; 3) Achieving **harmonization with global regulations**. UNECE WP 29<sup>42</sup> offers the opportunity for India to participate in the standards making process.

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<sup>41</sup> Estimate by Department of Heavy Industry, Government of India

<sup>42</sup> The United Nations Economic Commission for Europe and the World Forum for Harmonization of Vehicle Regulations (WP 29) are striving to provide a framework for globally harmonized regulations on vehicles, for achieving road safety, environmental protection and increased trade.

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