

# Microeconomics of Competitiveness

## Tamil Nadu Automotive Cluster

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## 1.0 Executive Summary

India is one of the world's most populous nations, and in recent years has attracted widespread attention for its rapidly growing economy. In addition to national clusters such as IT and Business Services, India boasts an evolving auto cluster. India produces more than 10 million vehicles annually, raking it in the top seven automobile producing nations. Nearly every major OEM has set up operations in India, and thousands of local firms have sprouted up to serve the industry.

Tamil Nadu is one of India's leading manufacturing states, and is home to one of the top auto clusters in the nation. Tamil Nadu is home to six foreign OEM's, two domestic OEM's, and over 100 local suppliers. The cluster benefits from favorable diamond conditions and has seen rapid expansion in the years since economic liberalization. Although Tamil Nadu is currently a leader in the Indian auto industry it risks losing its competitive advantage due to a significant power shortage and congested ports. While these actions are required to sustain Tamil Nadu's competitiveness, they are not sufficient to upgrade the cluster and achieve the state's goal of becoming the "Detroit of India." In order to achieve this goal, both India and the Tamil Nadu government must create policies to encourage R&D and attract more talent to the region. Finally, India must continue to liberalize its financial sector and reduce automotive import tariffs. Our key recommendations are summarized below:

India	<ul style="list-style-type: none"><li>• Continue to build Automotive Centers of Excellence across India.</li><li>• Continue to liberalize financial sector.</li><li>• Reduce Automotive Import Tariffs.</li></ul>
Tamil Nadu	<ul style="list-style-type: none"><li>• Invest in infrastructure to solve power deficit and port congestions problems.</li><li>• Encourage formation of local IFC's.</li></ul>

## 2.0 India and its Competitive Position

### 2.1 Country Overview

India is the largest democracy in the world with a population of 1.2 billion. Moreover, with GDP in PPP terms at \$4.5 trillion, India has the third largest economy in the World.<sup>1</sup> However, the per capita income (in PPP terms) is low at \$3300. (EIU) Delhi (population: 11 mm) is the political capital of the country and Mumbai (population: 12 mm) is the financial and industrial capital.

***Location & Endowments:*** India is located in South Asia, one of the least developed regions of the world. India has hostile relations with its largest neighbor, Pakistan. Due to tense relations between countries in the region, intra-region trade is fairly low. India has the fourth largest coal reserves in the world and is the fourth largest producer of iron ore. The country has rich reserves of bauxite, copper, alumina and limestone, and has the second largest arable landmass in the world. However, India has only moderate proven reserves of oil and gas and the country has to fulfill 80% of its oil and gas demand through imports.

### 2.2 Macroeconomic competitiveness and Economic Growth

For the first 45 years since independence (1947 to 1992), India adopted a Soviet style command and control economy with a focus on import substitution. Severe restrictions on FDI, over regulation and a license-quota regime handicapped India's competitiveness during this period. GDP per capita grew at a sluggish pace of 1.5% between 1947 and 1992. After the oil-

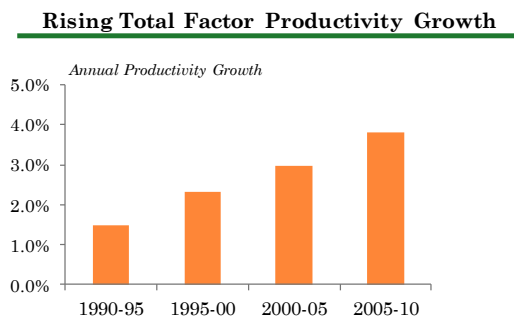
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<sup>1</sup> IMF, [www.imf.org](http://www.imf.org), May 2012.

shock of the late 1980s, India's current account deficit ballooned and this led to a severe Balance of Payment crisis in 1991.

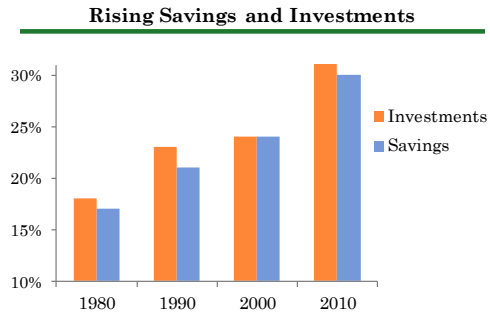
In 1992 the Finance Minister began the process of liberalizing India's economy by reducing taxes and tariffs, eliminating the license-quota regime, and encouraging FDI. After the reforms, there has been a significant increase in growth with GDP per capita growing at a 4.8% CAGR between 1992 and 2004. A second set of reforms was implemented in the 2001/2002 period. Between 2003 and 2007, GDP per capita grew at an 8.2% CAGR driven by a robust global economy, rise in FDI and a substantial increase in savings and investment. India weathered the global financial crisis well with GDP per capita growing at 6.4% between 2007 and 2011. However, a lot of this growth was driven by increases in government spending and the fiscal deficit increased from 3% in 2008 to 6% in 2011. There has been a lack of reforms in the last seven years (2004-2011) and there is growing recognition that a new set of reforms needs to be implemented to keep GDP growing at an 8% plus rate. (EIU)

**Figure 1: Total Factor Productivity Growth**



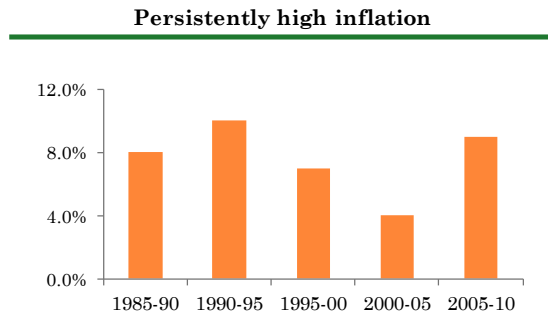
**Source: (EIU)**

**Figure 2: Rising Savings and Investments**



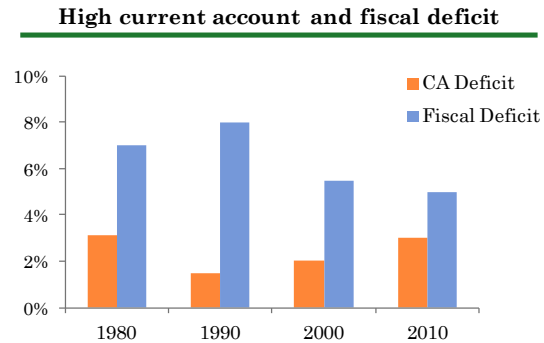
**Source: EIU**

**Figure 3: Persistently High Inflation**



Source: EIU

**Figure 4: High Current Account and Fiscal Deficit**



Source: EIU

**Political Institutions:** When India gained independence from Britain in 1947, it inherited British common law and a relatively well-developed administrative system. After independence, India adopted a parliamentary form of government.

India was divided into different states on linguistic lines just after Independence. Today, the country is divided into 28 states and 7 union territories with each state and union territory having its own local government. Areas like education, health, law and order, and certain types of taxes fall under the purview of the state governments. There is a large income disparity between states in India.

The Congress Party ran the government for 42 years (1947-1989). The late 1980s saw the rise of the BJP and many regional/state parties. Since 1989, the central government has been ruled by a coalition led by Congress or BJP. Over the last 20 years, regional parties have gained significant strength as these parties run governments in many states in the country and both Congress and BJP need their support to form the coalition government at the center. A key positive for economic development is that the two main political parties, BJP and Congress, broadly agree on the need for economic reforms.

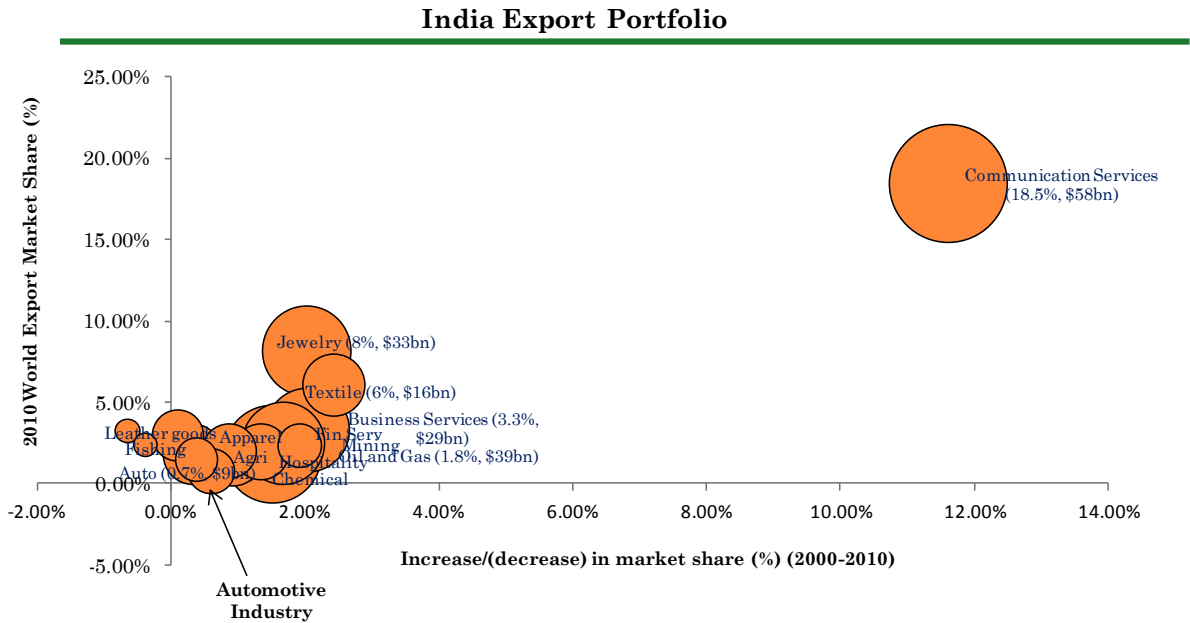
***Social Development:*** According to the United Nation's Human Development Report (2011), India has contributed to the large reduction in global poverty. In India, poverty rates are projected to fall from 51% to about 22% in 2015. However, India still ranks 119th out of 169 countries (30 spots below China) on the United Nations' Human Development Index (HDI), a comparative measure of life expectancy, literacy, education, and standard of living.

### 2.3 Economic Composition

India's rapid growth in the last couple of decades has been primarily driven by services sectors like technology and business process outsourcing. The services sector contributes 57% to the GDP with industry and agriculture contributing 27% and 16% only, respectively. The manufacturing sector has been hindered by poor infrastructure, a cumbersome regulatory and tax environment, and stringent labor laws. Due to slow growth in labor-intensive manufacturing, 52% of the population is still dependent on agriculture with only 34% and 14% of the work force employed by services and industry. (EIU)

Exports have grown at a CAGR of 16% between 1992 and 2011 and the share of exports has gone up from 9% in 1992 to 26% of GDP in 2011. Indian exports are dominated by Communication Services (\$58bn) and Business Services (\$29bn). Unlike China, India has not been able to gain significant market share in labor-intensive manufacturing sectors. Automotive exports constitute \$9bn in 2010 with 0.7% of world market share (0.64% share increase in the last decade). (EIU)

**Figure 5: Export Portfolio**



Source: Cluster Mapping Project 2012

## 2.4 Microeconomic competitiveness and National Diamond

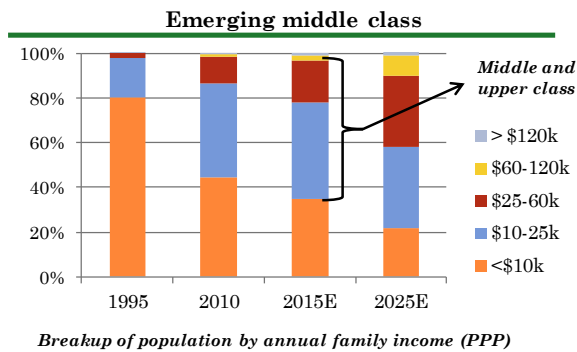
**Factor Conditions:** India has availability of ores and minerals, and has built production capacities for iron and steel (raw material for the auto sector). Due to an above average higher education system the country has a good base of engineering talent. The country has inexpensive manufacturing labor, but the quality of labor is not adequate due to the poor condition of primary education and healthcare. The government has not been able to keep pace with the huge increase in the demand for power, roads, railways, and ports. Lack of adequate infrastructure is a serious bottleneck for the manufacturing and automotive sectors which rely heavily on electricity and other material inputs for production.

**Demand conditions:** A growing middle class and a young aspirational population have resulted in strong demand conditions for the automotive sector. Demand for automobiles is



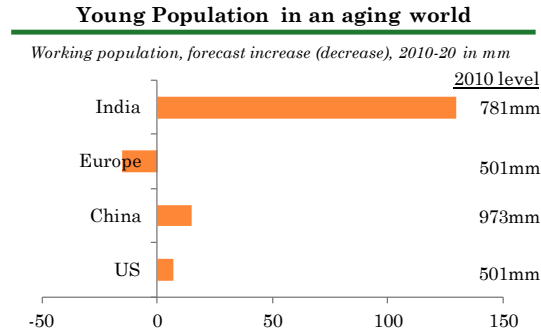
growing at 10%. (Tamil Nadu 2009) However, due to the low per capita income of the population, most consumers are obsessed with cost and focus less on quality. Also, high domestic petroleum prices due to high taxes have a negative impact on automobile demand.

**Figure 6: Emerging Middle Class**



Source: McKinsey, Bird of Gold, 2007

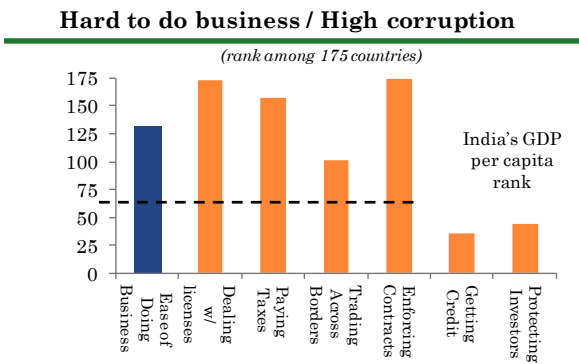
**Figure 7: Young Population in Aging World**



Source: IMF, Morgan Stanley

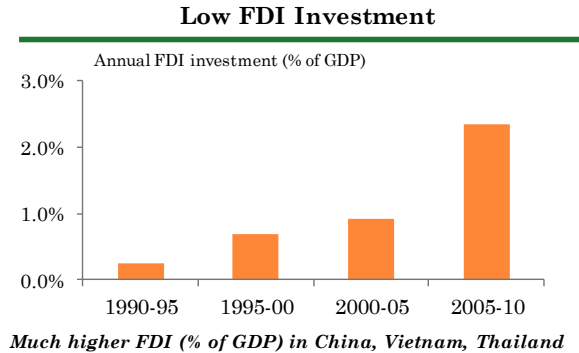
**Context for Firm Strategy and Rivalry:** Even after the 1992/93 reforms, it is still very hard to do business in India. According to the World Bank, India currently ranks 132nd out of 183 countries in terms of ease of doing business. In numerous important categories, India lags behind its current GDP per capita ranking of 70. The legal system is widely considered to be too slow and labor laws are too rigid. These issues also adversely affect the auto industry in India. A next set of reforms is urgently needed to address these issues. Government has opened up many sectors (including the auto sector) to FDI but due to the issues discussed above FDI remains low. Import tariffs on cars and auto-parts have been reduced but they still remain quite high (more details in cluster and recommendations section).

**Figure 8: Hard to do Business / High Corruption**



Source: [www.doingbusiness.org/rankings](http://www.doingbusiness.org/rankings)

**Figure 9: Low FDI**



Source: EIU

**Related and Supporting Industries:** India has a healthy steel sector, thriving automotive components and engineering services sectors, and an IT services sector (IT-enabled systems for OEMs). India also has been able to develop a relatively healthy financial sector, but there is a need to liberalize this sector further so that the cost and access to financing for the SME (Small and Medium Enterprise) sector can be improved.

## 3.0 Tamil Nadu Competitive Position

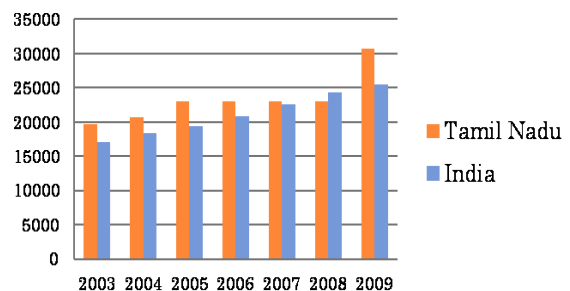
### 3.1 State Overview

Tamil Nadu is the most southern state in India and its capital city is Chennai. The state population is 72 million, representing 5.96% of total population in India. The Gross State Domestic Product (GSDP) in 2011 was \$97.7 billion, which ranks 3<sup>rd</sup> among all Indian states. The state has one of the highest levels of urbanization, with 49% of residents living in urban areas and accounting for 9.6% of the total Indian urban population.<sup>2</sup> Tamil Nadu has a high literacy rate (80%) as well as an established healthcare system with 323 hospitals.<sup>3</sup>

### 3.2 Economic Overview

GSDP per capita in Tamil Nadu has grown at a CAGR of 14.1%, consistently higher than the Indian average. (Tamil Nadu 2009) GSDP has grown at a 14.9% CAGR, with the percentage concentrated in the service sector increasing from 57% in 2005 to 61% in 2010. FDI inflow in 2011 was \$7.3 billion, among the highest of all states, though most of the investments went into the power sector.<sup>4</sup> According to the Department of Economics and Statistics of Tamil Nadu, exports from the states' ports and airports reached \$19.7 billion in 2009.<sup>5</sup> The cost of doing business is

**Figure 10: GSDP vs. India**



**Source: Tamil Nadu 2009**

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<sup>2</sup> Tamil Nadu state presentation, November 2011: [www.ibef.org](http://www.ibef.org)

<sup>3</sup>Ibid.

<sup>4</sup> Center for Monitoring Indian Economy: [cmie.com](http://cmie.com)

<sup>5</sup> Tamil Nadu Department of Economics and Statistics, [www.tn.gov.in/deptst/](http://www.tn.gov.in/deptst/), accessed April 2012.

relatively low, and a 2009 Mercer study on the cost of living in 143 cities revealed that Chennai ranked 135.<sup>6</sup> The state has 21,256 factories, employing a total of 1,114,421 workers, which ranks first in the number of workers employed in factories.<sup>7</sup>

Aside from the automotive cluster, textiles and engineering are the two main clusters in Tamil Nadu. The textile sector is next only to agriculture with regards to labor employed in the state. Tamil Nadu's yarn cluster accounts for 60% of India's yarn exports.<sup>8</sup> The engineering sector produced \$4.7 billion in products in 2010 and employs over 250,000 people.

### 3.3 Diamond Analysis

**Factor Conditions**-Tamil Nadu has some of the best academic institutions in India producing English-speaking engineers, researchers and skilled workers for the state's clusters. As of 2010, the state had 33,326 primary schools, 9,966 middle schools and almost 5,000 high schools for its 72 million people. The school dropout rate is only 1.23% at the primary level and 1.9% at the upper-primary level. The state has ample hospitals and other health care facilities. The population's average life expectancy is 65 for males, and 67.4 for females.<sup>9</sup>

With regards to physical infrastructure, roads and railroads have been developed rapidly over the past decade; reaching 5,958km of railroads covering 536 stations, as well as almost 90% of roads being surfaced roads as opposed to previously non-surfaced roads. However, motor vehicle congestion remains a challenge, as the growth of vehicles per square km dramatically

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<sup>6</sup> Investintamilnadu.com

<sup>7</sup> Presentation of government of Tamil Nadu:

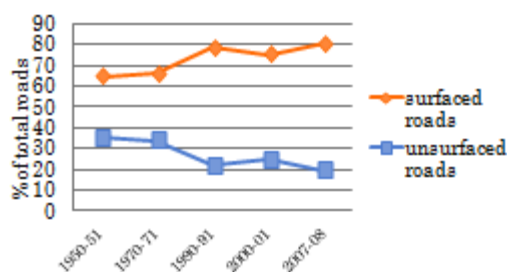
[http://www.investingtamilnadu.com/tamilnadu/sector\\_presentation/presentation\\_tamilnadu.php?mode=03](http://www.investingtamilnadu.com/tamilnadu/sector_presentation/presentation_tamilnadu.php?mode=03)

<sup>8</sup> Tamil Nadu state presentation, November 2011

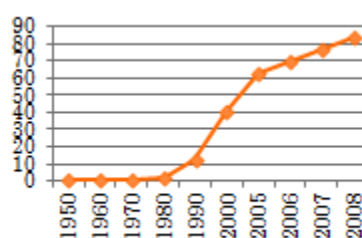
<sup>9</sup> Tamil Nadu Socio Economic Indicators, State Planning Commission, Government of Tamil Nadu

exceeds the rate of growth for roads.<sup>10</sup> In addition, the state has four domestic and two international airports, with Chennai international airport being the 3<sup>rd</sup> busiest in India. While infrastructure is an asset for Tamil Nadu, as exports through its ports and airports grow, physical infrastructure improvement is a key opportunity for Tamil Nadu.<sup>11</sup>

**Figure 11: Surfaced vs. Un-surfaced Roads**



**Figure 12: Motor Vehicles per Sq Km**



**Source: Tamil Nadu Department of Evaluation and Applied Research**

Power and communications infrastructure remains a major challenge for doing business in Tamil Nadu. There is a 4000 MW shortage of power in the state, despite the growth in installed capacity and 37% of FDI inflows going into the electricity sector.<sup>12</sup>

**Context for Firm and Strategy**-Despite strong investor protection laws, investors still find it difficult to start a business due to complicated procedures and the slow legal system. In addition, protection for intellectual property is weak, and the tax rate is relatively high. Tamil Nadu is among the highest FDI attracting states in India, with the cost of doing business generally lower than competing states.

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<sup>10</sup> Ministry of Road Transport & Highways, Annual Report 2010-11, Highways and Minor Ports Department, Government of Tamil Nadu

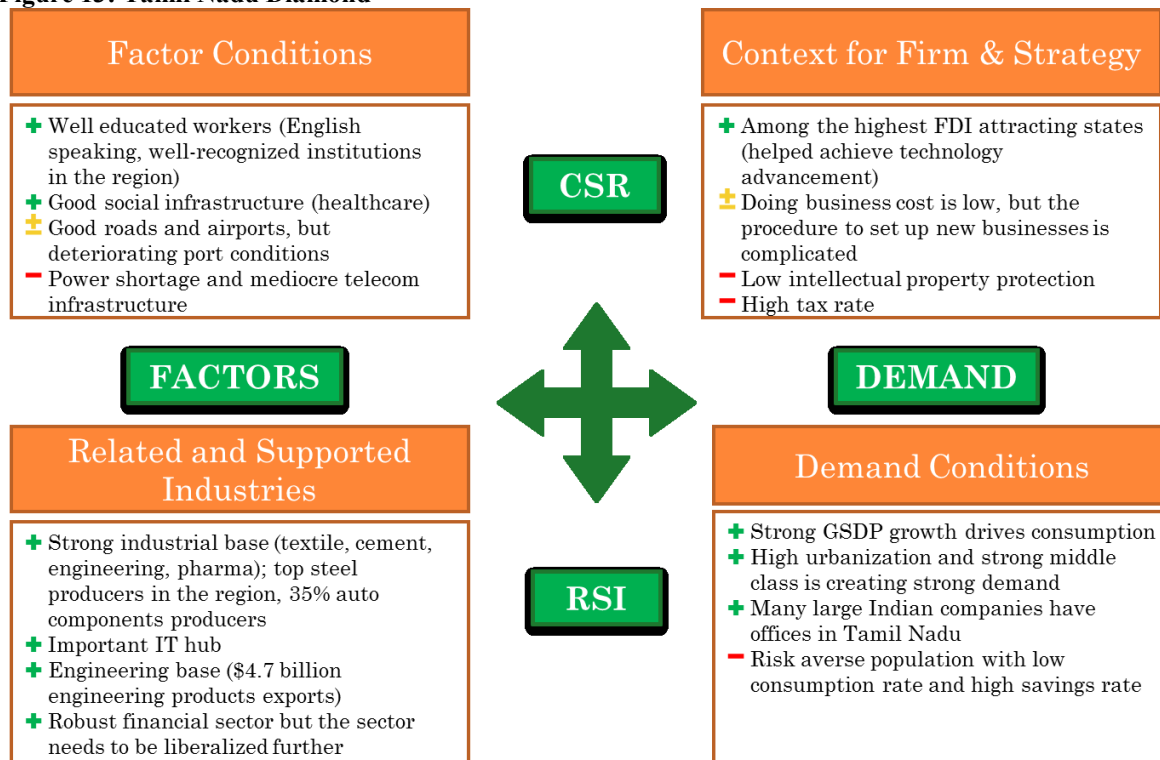
<sup>11</sup> Indian Ports Association Department of Evaluation and Applied Research, Tamil Nadu

<sup>12</sup> Central Electricity Authority, <http://www.cea.nic.in/>, April 2012.

**Related and Supporting Industries**-Tamil Nadu has a strong industrial and engineering base (see cluster section); it has several top steel producers as well as a significant base of auto component suppliers. In addition, the financial sector is robust, though further liberalization efforts are needed in order to provide good financing options for business in Tamil Nadu.

**Demand Conditions**-Strong growth of GSDP and the middle-income class provides drivers for consumption growth. The 49% urbanization rate is creating sophisticated demand for goods such as autos. On the other hand, the majority of the population is still risk-averse; and as a result the state has a high savings rate, which potentially slows down consumption especially in uncertain economic times.

**Figure 13: Tamil Nadu Diamond**



## 4.0 The Automotive Industry

### 4.1 Global Automotive Industry

The global automotive industry is currently dominated by seven large automobile producing countries. India is one of the seven largest global automobile manufacturers, producing 10.7 million vehicles per year. India trails behind China and Japan (the two largest producers), and is followed by Germany, US, South Korea, and Brazil.

### 4.2 Indian Automotive Industry

India is home to four major automotive clusters. (See Figure 18: Map of India with Various Automotive Clusters). Each of India's four major clusters specializes in specific types / classes of vehicles. Most of the domestic production is produced by JVs between Indian manufacturers and foreign (primarily Japanese, American, Korean, and German) OEMs.

Figure 14: Map of India with Various Automotive Clusters



Source: Frost & Sullivan: Strategic Analysis of the Indian Auto Industry, 2009

**Northern Automotive Cluster:** India's Northern Automotive Cluster is centered around the New Delhi National Capital Region (NCR). The Northern Automotive Cluster has a large population and the highest per capital income in the country. Delhi's strong related and supporting industries (RSI) and components industries are also major advantages to the region. However, the NCR is the only landlocked cluster in India, with no immediate port access. High population and income levels drive high land costs. Delhi's labor is notoriously militant, and the region depends primarily on Maruti Suzuki, its largest OEM.

**Southern Automotive Cluster:** The Southern Automotive Cluster is located in the state of Tamil Nadu. The Southern Automotive Cluster has direct access to a major port, a large population, and strong RSI. Tamil Nadu has the largest pool of engineering graduates and boasts the second best demand conditions in the country. However, Tamil Nadu has weakening port infrastructure and a severe power shortage. The region is facing deteriorating labor conditions and challenges related to its distance from other demand centers within the country.

**Western Automotive Cluster:** The Western Automotive Cluster is primarily located in the state of Maharashtra (home to Mumbai), and the nearby state of Gujarat as an emerging cluster. The Western Automotive Cluster has direct access to the best ports in the country. The region boasts healthy financial services and other RSI. Additionally, the region has a strong higher education system and the highest GSDP in the country. However, Maharashtra has very high land costs. The area is notorious for high corruption and a power shortage.



### 4.3 History

In order to understand the current Indian landscape, one must first understand the history of the automotive sector in the country.

**1950s** In the 1950s nearly all of India's automobile demand was met by imports from abroad.

The Indian government decided to discourage imports and encourage manufacturing of automobiles and spare parts in India. Big industrial groups like Tata, (Maharashtra), Birla (Maharashtra), TVS (Tamil Nadu), and Ashok Leyland (Tamil Nadu) started domestic production. Auto clusters emerge in Mumbai and Chennai.

**1960s** Large domestic companies, including Tata and TVS, began to produce 2-wheel and commercial vehicles in Maharashtra, Chennai, and Calcutta. During this time, the government also implemented the Monopolies and Restrictive Trade Practices (MRTP) policy, which introduced an extensive licensing regime. This restricted the growth of the clusters.

**1970s** In the 1970s, the government restricted the inflow of FDI in the automobile sector, reducing competitiveness in the industry.

**1980s** The government gradually lifted the restrictive policies, and entered into a JV with Suzuki Motors (Maruti Suzuki). Maruti Suzuki began to produce cars in the Delhi NCR and foster cluster development in the region.

**1990s** In the 1990s, there were sweeping economic reforms in India and the global OEM companies slowly entered the Indian market. Tamil Nadu emerges as an automotive hub

primarily driven by global OEMs, while Maharashtra continues to attract domestic investment.

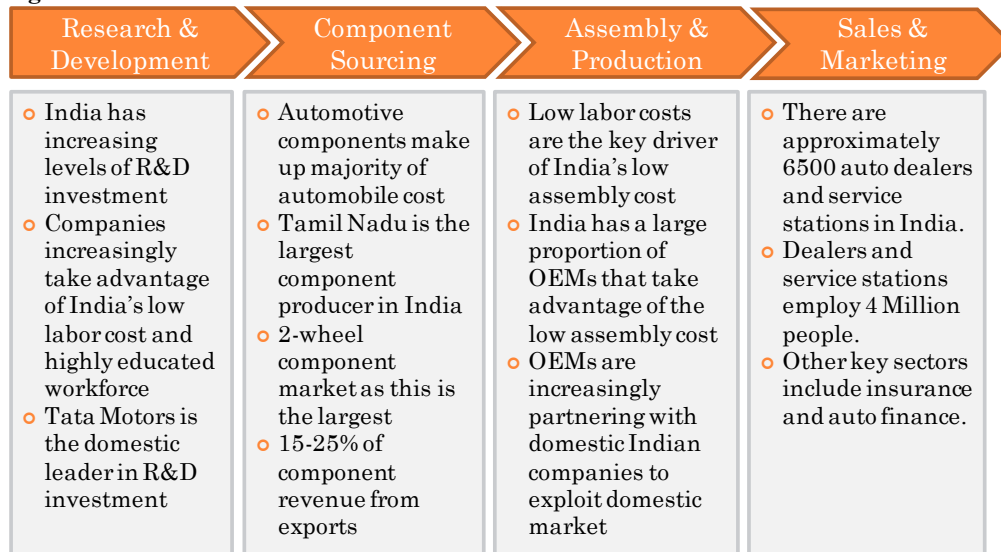
**2000s** The 2000s introduced the National Automotive Testing and R&D Infrastructure project (NATRiP) to create testing, validation and R&D Infrastructure.

**2010s** Gujarat emerged as an automotive hub with investments from Tata Motors (driven by the Tata Nano), Suzuki, and Ford. In 2011, vehicle exports from India reach \$3 billion and India emerges as a “compact car” export hub.

#### 4.4 Value Chain

The motor vehicle value chain is very similar to those found in other manufacturing industries. Figure 15: Indian Automotive Value Chain shows the value chain within the Indian marketplace.

**Figure 15: Indian Automotive Value Chain**

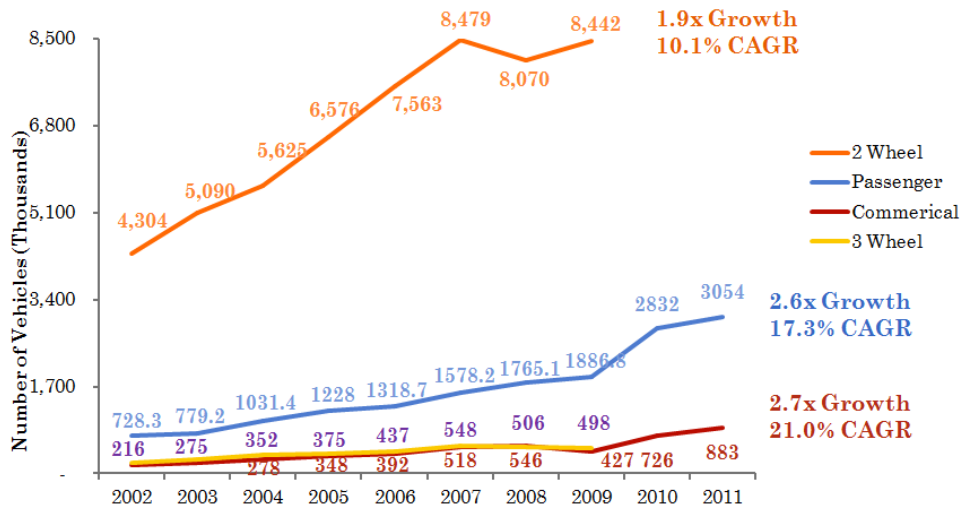


**Source: Automotive Mission Plan, Ministry of Heavy Industries & Public Enterprises, 2006**

#### 4.5 Trends

India boasts the third largest production figures in the world (just behind China and Japan). India’s vehicle production nearly doubled in the ten years between 2001 and 2011. While Japan leads the world in high quality cars and China produces low cost 4-wheel vehicles, the Indian automotive industry is overwhelmingly dominated (about 70%) by the production of 2-wheel vehicles (motorcycles, scooters, and mopeds). Passenger cars represent about 25% of vehicle production for the country. Three-wheel and commercial vehicles make up the remainder of the vehicles produced. (See Figure 16: Vehicle Production in India)

**Figure 16: Vehicle Production in India**

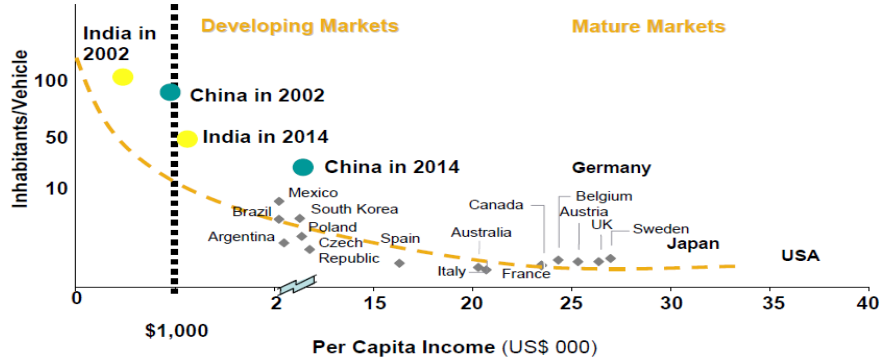


Source: OICA 2011 Production Statistics, <http://oica.net/category/production-statistics/>

While India has historically focused its production efforts on 2-wheel motorcycles and mopeds, the industry is beginning to see a surge in the number of 4-wheel cars and other small vehicles. As per capita income increases the number of inhabitants per vehicle is expected to decrease sharply. While countries like Japan and Germany have vehicle density rates of about 2.5 inhabitants per vehicle, India’s current number of inhabitants per vehicle currently stands

around 50. As per capita income continues to increase, vehicle density is expected to continue to increase. (See Figure 17: Vehicle Density vs. Per Capita Income)

Figure 17: Vehicle Density vs. Per Capita Income



Source: Frost &Sullivan: Strategic Analysis of the Indian Auto Industry, 2009

## 5.0 Tamil Nadu Automotive Cluster

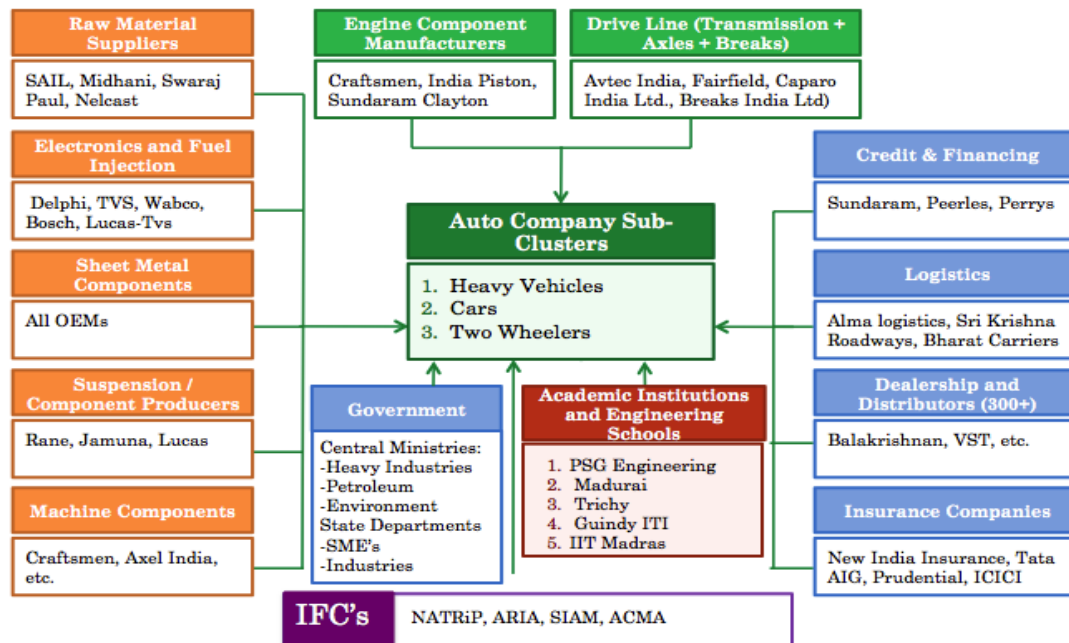
### 5.1 Cluster History and Evolution

Post independence, the state government emphasized primary and secondary education. In the 1960s, the government put in significant effort to improve technical education, building technical institutes to train technicians and mechanics. The state government also involved the private sector in worker training. As a result, today, Tamil Nadu produces the largest number of technical graduates. In the 1990s, the state government played an active role in attracting FDI and created government agencies to attract the automobile industry.

### 5.2 Cluster Map

The Tamil Nadu cluster exhibits a medium degree of sophistication as shown in Figure 18. Presence of a wide range of suppliers, Institutes of Collaboration and linked services, all make the cluster highly competitive.

**Figure 18: Tamil Nadu Auto Cluster Map**



### 5.3 Specific Activities in the Tamil Nadu Cluster

A wide range of products are made in the Tamil Nadu auto cluster, which likes to call itself the “Detroit of India” because it manufactures a disproportionate share of the automotive market. Domestically, the firm is lead by firms like Ashok Leyland, TVS Group, and Brakes India. Figure 19 below gives a description of the various types of manufacturing taking place in the cluster.

**Figure 19: Tamil Nadu Local Market Segmentation**

	<b>Commercial Vehicles and Agricultural Equipment</b>	<b>Cars and Two Wheelers</b>	<b>Auto Parts and Components</b>
<b>Market Share in India</b>	33%	27%	35%
<b>Domestic Leaders</b>	Ashok Leyland	TVS Group	No Clear Leader
<b>Other Firms</b>	Tafe India Volvo Same Deutz Fahr Hindustan Motors Daimler-Benz Caterpillar	Ford Hyundai Mitsubishi Hindustan Motors Nissan BMW Royal Enfield	Rane Group Wheels (TVS-Dunlop) Lucas-TVS Brakes India Sundaram Clayton Ltd.

### 5.4 Quantitative Analysis of Relative Cluster Performance

From a financial perspective, the Tamil Nadu cluster is a relative outperformer in the component sector, but an under-performer in the OEM sector. When compared to the OEM sector of the other major clusters, West and North India, Tamil Nadu either underperforms or has no advantage on all profitability metrics. When compared to the to the Component sectors, Tamil Nadu is among the most competitive. See Figure 20 below for performance and cost drivers.

**Figure 20: Comparative Cluster Performance Data.**

Performance Drivers in OEM Sector by Cluster			
	Tamil Nadu	West India	North India
Gross Margin	32.2%	39.0%	31.4%
EBITDA	20.5%	26.9%	23.2%
Profit	4.8%	9.1%	5.5%
Salary Expense	8.2%	5.8%	5.9%
Tax Expense	13.3%	15.4%	14.7%
R&D Expense	1.7%	1.5%	0.7%

Performance Drivers in Component Sector by Cluster				
	Tamil Nadu	West India	North India	Bangalore
Gross Margin	50.3%	26.0%	41.8%	53.0%
EBITDA	24.8%	12.0%	28.3%	18.4%
Profit	4.6%	3.5%	3.9%	7.5%
Salary Expense	10.1%	6.0%	8.8%	10.8%
Tax Expense	14.7%	5.5%	16.9%	4.2%
R&D Expense	1.4%	0.0%	0.0%	0.4%

Source: Vashisht, Determinants of Competitiveness of the Indian Auto Industry, 2008.

Salary expenses are a major driver of EBITDA performance in both the OEM and Component businesses with Tamil Nadu tending towards the high end of the range. High salary expenses could pose a threat to competitiveness if they are not complemented with improvements in productivity. In both businesses Tamil Nadu spends more on R&D than its rival clusters. While Tamil Nadu's R&D numbers are encouraging from a relative standpoint, they are no where near the amount spent by major global firms. For example in 2011, General Motors spent 5.4% of revenues on R&D; while Delphi a global components firm spent 7.5%.<sup>13 14</sup>

## 5.5 Cluster Diamond

### Tamil Nadu Auto Cluster Diamond

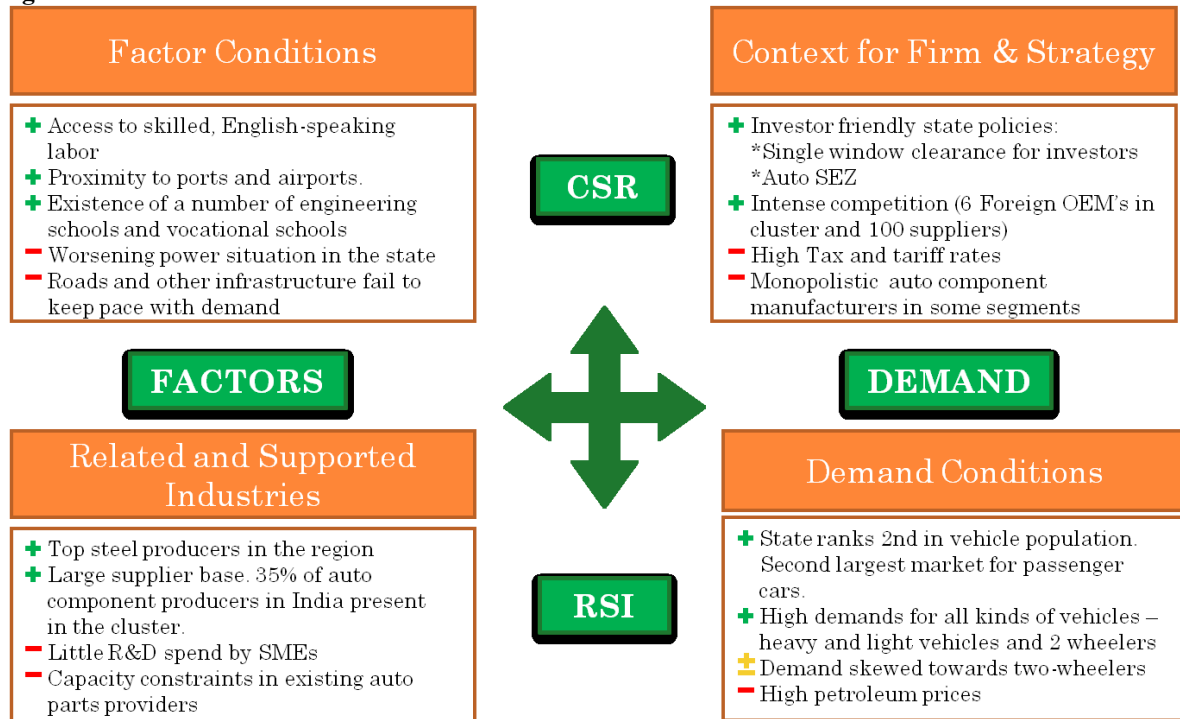
The Tamil Nadu Auto Cluster is below (Figure 21).

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<sup>13</sup> General Motors, 2011 Form 10-K, 2/27/12.

<sup>14</sup> Delphi, 2011 Form 10-K, 2/17/12.

**Figure 21: Tamil Nadu Auto Diamond**



**Factor Conditions:** Tamil Nadu has a few key advantages from a factor conditions standpoint. Due to its early history, as discussed above, there is an abundance of English speaking skilled labor. In fact, Tamil Nadu produces the highest number of engineering and technical graduates of any state in India. This is largely due to the many technical schools located in the area, including IIT Madras, and the PSG Engineering School. The city of Chennai, which is host to much of Tamil Nadu’s industrial activity, is also one of the bigger ports in India, but it is quite clogged and requires expansion and improvements in logistics. In August of 2011, congestion was so great that officials suggested that shippers reroute their containers to other ports in the south of India.<sup>15</sup> The central government called for several interventions to improve

<sup>15</sup> JOCSAILINGS, <http://www.jocsailings.com/MaritimeNews/NewsArticleDetail/tabid/74/ArticleId/11189/Congestion-Worsens-at-Port-of-Chennai.aspx>, August 11, 2011.



the situation. Among the key recommendations was the creation of a specialized port infrastructure designed specifically for vehicle exports capable of handling 500,000 vehicles per year, while providing temporary parking space for 20,000 vehicles at a time. (AMP 2006) Adding to congestion of goods and ships is congestion of people. Known as the “last mile” problem, traffic congestion near the port makes loading and unloading extremely difficult.<sup>16</sup> To rectify this problem, the Port Trust proposed a multi-level parking facility in 2006. As of 2012, it has not become a reality.

By far the greatest and most immediate problem facing the Tamil Nadu auto sector is a massive power deficit. Some estimates believe that demand in Tamil Nadu is currently about 4,000 MW greater than the installed supply of 10,237 MW.

The local utility company, TANGEDCO, had planned to add up to 4,640 MW of capacity in 2012, but these additions have been delayed, likely for political reasons. (Tamil Nadu Government 2012). The power deficit has led the local utility to implement “power consumption holidays” depriving many retail and commercial consumers of electricity one day per week.<sup>17</sup> It is widely speculated that Ford recently chose Gujarat, a power surplus state, as its location for its newest plant due to concerns about access to electricity.<sup>18</sup> For Tamil Nadu to remain competitive in the auto sector, as well as manufacturing in general, the power deficit must be addressed immediately.

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<sup>16</sup> The Hindu, Port Trust to Set up Multi-Level Parking Facility, <http://www.thehindu.com/news/cities/chennai/article2886502.ece>, February 13, 2012.

<sup>17</sup> NDTV, <http://www.ndtv.com/article/tamil-nadu/> February 25, 2012.

<sup>18</sup> Business Today, Why Ford chose Sanand in Gujarat to set up its 2<sup>nd</sup> plant over Chennai, <http://businesstoday.intoday.in/storyprint/17433>, July 29, 2011.

**Context for Firm Strategy and Rivalry:** There are several competitors in the Tamil Nadu cluster including six foreign OEM's, two Domestic OEM's, and over 100 suppliers. Pro-business state policies such as a single-window clearance for new businesses and the creation of special economic zones (SEZs) have contributed to the large number of players in the space. India also has very high import tariffs compared to its competitors, encouraging domestic production over imports and discouraging competition within the market. (Figure 22)

**Figure 22: Comparative Import Tariff Percentages**

	China	EU	India	S. Africa	USA
Cars	29.99	9.99	60.00	25.13	2.50
Commercial Vehicles	13.85	12.67	10.00	9.59	22.50
Components	13.39	3.70	10.00	13.15	1.34

Source: Narayanan, Determinants of Competitiveness of the India Auto Industry, 2008.

Some clear winners have emerged such as Brakes India and Wheels India. To prevent these firms from getting too powerful, more financing for SME's is required.

**High Quality Local Demand Conditions:** Tamil Nadu is the largest domestic market for two-wheelers and the second largest domestic market for passenger cars. Demand for two-wheelers far outpaces demand for any other type of motor vehicle. Over the period from 2003 to 2009, the region saw double digit growth in demand for all types of vehicles. (Tamil Nadu 2009) While this is encouraging, local demand conditions could be vastly improved by a greater demand for passenger vehicles. There are two main obstacles to greater adoption of passenger vehicles which will be addressed in the recommendations section: vehicle cost and fuel cost. Driving is cost prohibitive for many Indians. Not only are passenger cars expensive, but Indians currently pay some of the highest petroleum prices in the world, mostly due to taxes. This makes driving a passenger car uneconomical.

***Related and Supporting Industries:*** The Tamil Nadu cluster has a rich base of suppliers to support OEM's in auto production. Suppliers in Tamil Nadu produce 35% of all components made in India. 60% of exports go to the US and Europe and 70% of all exports are to OEM's or Tier I suppliers representing very high quality demand. (AMP 2006) The Tamil Nadu component cluster has a few key areas of focus. Within India, Tamil Nadu has a 50% market share of simple mechanical assemblies such as: fuel pumps, thermostats, starter motors, wiper motors and brake assemblies. It has between a 30% and a 50% share of simple mechanical equipment such as: dashboard instruments, voltage regulators, flywheel magnetos, and electric horns. Finally, it has between a 10% and 30% share of more complex mechanical equipment such as clutch assemblies, crankshafts, and radiators. Clearly the lower market share of more advanced products presents a significant opportunity for upgrading the cluster. (Okada and Siddharthan 2007)

***Institutes for Collaboration:*** There are several IFC's in India that actively work to promote India's emerging auto cluster. Perhaps the most important is the National Automotive Testing and R&D Infrastructure Project (NATRiP). NATRiP is a collaborative effort between several central government agencies, state governments, and industry associations with the vision of creating a "state-of-art research and testing infrastructure to drive India into the future of global automotive excellence."<sup>19</sup> NATRIP resulted from the Ministry of Heavy Industries' Automotive Mission Plan launched in 2006. Among the government partners comprising NATRiP are the ministries of: Heavy Industries, Shipping and Highways, Petroleum and Natural Gas, and Environment and Forests. Some of the industry associations include the: Automotive

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<sup>19</sup> NATRiP, [www.natrip.in](http://www.natrip.in)

Research Association of India (ARAI), Society for Indian Automobile Manufacturers (SIAM), and the Automotive Component Manufacturers Association of India (ACMA).

The Key to the NATRiP program is the building of local facilities in each of the major auto clusters called “Centers of Excellence.” The 2006 proposals included building a Center of Excellence in Manesar, Pune, Indore, and Chennai. Specifically, the government proposed Automotive Infotronics and Crash Testing Centers for the city of Chennai.

Soon the proposals were expanded, as the popularity of the idea grew. By 2011, NATRiP planned to build a passive safety lab, a power train lab, an EMC lab, a fatigue & certification lab, and test tracks all in Chennai. (NATRiP 2010) It appears that these projects have been slow to be completed, but would go a very long way towards upgrading the auto sector in India. The vision is to create a central repository of data collected at each of the Centers of Excellence that could be made available to researchers working in the automotive sector. This would facilitate the collaboration of research in the industry with leading research universities like IIT and research intuitions like CSIR (Council for Scientific and Industrial Research).

Another key IFC, mentioned above is the Automotive Research Association of India, ARAI. The ARAI was formed out of the Ministry of Heavy Industries and is essentially a consortium of Auto Manufacturers, including: Mercedes Benz, General Motors, Brakes India, Ashok Leyland, Tata, Volkswagen, Volvo and a list of 80 other firms.<sup>20</sup> ARAI participates in a large variety of R&D and certification programs, which NATRiP hopes to build upon.

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<sup>20</sup> ARAI website, [https://www.araiindia.com/member\\_company.aspx](https://www.araiindia.com/member_company.aspx).

## 5.6 Recommendations for Tamil Nadu Automotive Cluster

		Current State	Challenge	Recommendation	Action Owner	Rank
Demand Conditions	A	High petroleum prices stymies demand for consumers with limited spending power.	Heavy taxes on petrol (to subsidize kerosene)	Reform taxes at national and state level	State/ Country	2
	B	Demand skewed toward two-wheelers	Relatively low per capita income	Grants to encourage research for cheaper passenger cars.	State/ Country	3
Factor Conditions	C	Basic infrastructure – roads, ports etc. can be improved.	Limited infrastructure budget	Use PPP model for better economic and operational effectiveness of Ports.	Sta te	2
	D	State reeling under continuous shortage of power.	Power capacity expansion did not keep pace with increased consumption	Seek higher power allocation from newly constructed power plant and involve private sector in power production.	State/ Country	1
	E	Inability to compete with other sectors for high R&D talent	Little incentive for world class talent to enter auto sector	Build Centers of Excellence in collaboration with foreign institutes to attract talent.	State/ Country	2
CSR	F	Large monopolistic suppliers in some segments	Lack of financing for SMEs and poorly enforced anti-trust laws	State government and auto industry should collaborate to improve financing for SMEs	Auto/ State	2
	G	High taxes and tariffs relative to other states in India	Government funds populist programs with high taxes	Reform taxes at the state and local levels of the government and reduce automotive import tariffs	Country	2
RSI	H	SMEs spend very little on R&D	SMEs have very little capital to invest in R&D.	Complete the NATRiP centers of excellence	Auto/ State	1
	I	Capacity constraints during up cycle	Financing available at a very high interest rates. SMEs don't have a big risk appetite.	Further liberalize the financial sector to increase competition among banks so that they provide cheaper financing; classify SME financing as priority sector lending	Country/ State/ Auto	2

**Demand Conditions (A & B)**

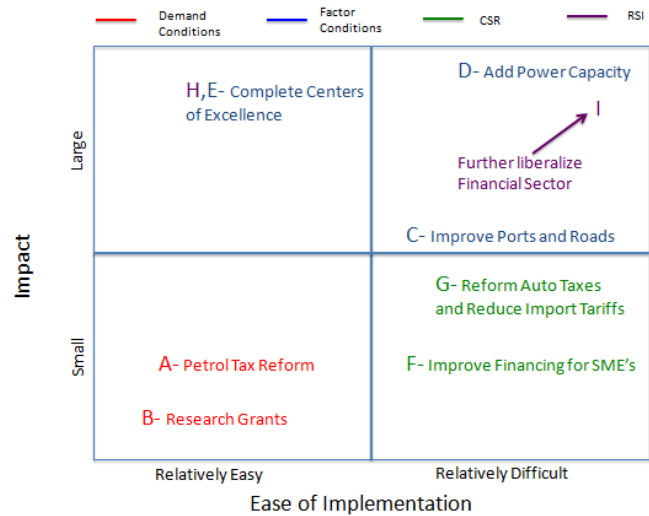
As discussed elsewhere in this paper, demand conditions in both India and Tamil Nadu are quite good. To upgrade the cluster, however, it would be very useful to shift local demand from two-wheelers to passenger cars. We see two main policies to help accomplish this goal. Petrol taxes in India are among the highest in the world. If both the state and central government could

work together to lower these taxes, consumers would feel that passenger cars were more affordable to operate and thus provide an immediate stimulus to demand. To promote long-term affordability of passenger cars, both the National and State governments should promote research into the production of small economical cars. Tata has led the way in this field in the private sector with the production of its Nano vehicle. More government action could spur private companies to take greater action.

**Factor Conditions (C, D, E)**

Factor conditions will be much more difficult to improve, both in India and in Tamil Nadu. By far the most important recommendation in this space is to address the massive power deficit in Tamil Nadu. The Tamil Nadu government must take two concurrent steps. First it must lobby the National government for a greater share of central generating capacity to serve as a short term fix to the problem. But within the next year, the government must bring online the

**Figure 23: Recommendations Feasibility**



additional 4,000 MW it has planned including a planned nuclear project. If the government fails to do this, the results will be catastrophic for all of the state's manufacturing clusters, not just auto. Tamil Nadu already lost a new Ford plant, and it cannot afford to lose any more. One possibility would be to promote private sector involvement in power production. Currently 12% of generating capacity in Tamil Nadu is from Independent Power Producers and 2% is captive (meaning that the output of a plant is captive to a certain use).

Similarly the state must improve its port congestion problem as outlined earlier in this paper. We recommend using the PPP model (Public Private Partnership) to finance improvements to the port including building the long overdue parking structure as well as advanced automotive handling facilities. It is also imperative that India's advantage in IT be utilized to improve connectivity among the major auto exporting hubs.

Finally, there is one relatively easy recommendation that will yield a high payoff in factor conditions. Tamil Nadu must work with NATRiP to finish the Centers of Excellence in Chennai. These new facilities, some of which are currently empty shells of buildings will attract more talent to the area.

### ***CSR Conditions (F & G)***

Both India and Tamil Nadu have relatively good CSR conditions so we only have two recommendations. To curb the influence of some of the larger suppliers in the cluster, we recommend improving financing options for SME's as well as lowering taxes for smaller component manufacturers. If SME's are able to have access to cheaper capital, they will be able to better compete with big firms such as Brakes India.

High taxes and tariffs in the automotive sector are currently discouraging competition within the cluster. We recommend that the government consider reducing taxes to encourage consumption of automobiles and reduce import tariffs to allow domestic producers to compete with foreign imports.

***RSI (H & I)***

According to the Reserve Bank of India, as many as 93% of SME's are self financed.<sup>21</sup> Lack of financing makes it hard for SME's to scale their businesses. We recommend further liberalization of the financial sector to allow more foreign banks to enter the country and therefore increase credit availability. Current regulations allow for only 12 new foreign branches to be opened per year.<sup>22</sup> We recommend increasing this number to promote competition in the lending space.

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<sup>21</sup> Reserve Bank of India, [www.rei.org/in](http://www.rei.org/in)

<sup>22</sup> Wall Street Journal, India Weighs Wider Door for Foreign Banks, May 26, 2011.



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Disclosure: Two members of the team are Indian nationals. No travel was conducted for research purposes.

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