

# The Development of Auto Component Industry in India

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As domestic demand for motorcycles and passenger cars expanded since the 1980s, small and medium enterprises (SMEs) entered into the rapidly expanding market of auto components.<sup>1</sup> Although large enterprise with foreign and technical collaboration with foreign companies have maintained major share of critical components, SMEs which started business in the 1980s and 1990s, have grown. Some of them graduated from SMEs and became large enterprises. In the 2000s, new entry decelerated. Necessity of high technology raised initial investment amount and hiked entry barrier. Exports of auto components to replacement market increased in 2000s. Many SMEs concentrates on only exports. In addition to SMEs, tiny enterprises undertaking the machining of components and catering to domestic replacement market are facing severe price competition. In fact, number of establishments in the unorganized sector, which is employing less than ten workers declined. Competition might have excluded the tiny enterprises. Pune and Chnnai were traditionally clusters of auto component industry. After Maruti factory was set up, industrial area was developed for its suppliers. Delhi National Capital Region (NCR) became another cluster. Multi-national enterprises (MNEs) established their factories in the clusters to utilize cluster network. The purpose of this paper is to analyze change of industrial structure in auto component industry in the 2000s.

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<sup>1</sup> In accordance with the provision of Micro, Small & Medium Enterprises Development (MSMED) Act, 2006, the micro, small and medium manufacturing enterprises are defined in terms of investment in plant and machinery. But in this paper, tiny, small, medium, and large enterprises are defined as those employing below 11 employees, from 11 to 100, from 101 to 300, and above 300.

Categories	Investment Amount (Rs million)
Micro Enterprises	Does not exceed 2.5
Small Enterprises	More than 2.5 but does not exceed 50
Medium Enterprises	More than 50 but does not exceed 100

## 1. Entry of SMEs into Auto Component Industry

In the market of passenger car, 1983 was a turning point of Indian automobile industry. Before the turning point, there was a tendency for assemblers of automobile (Original equipment manufacturers) to produce parts and components in house. As volume of production was not large, economies of scale were not working in this period. Marginal parts and components were outsourced from many small enterprises (Kumar 2010). A few groups of auto component manufacturers such as TVS group and Kalyani group introduced advanced technology through foreign and technical collaboration in the 1960s. The groups consolidated their base by import substitution and accumulated capital and technology to become MNEs in the 2000s.<sup>2</sup> Besides, foreign companies such as Motor Industries Company Limited (Bosch) and Federal-Mogul Goetze have produced critical components and supplied to assemblers. But technology in the auto component industry did not develop fast due to less competition and slow growth of market.

In 1983 Maruti started operation from complete knock down of imported components and increased production rapidly. As it had to raise local contents, following phased manufacturing programme, it procured from local suppliers. Suzuki brought its subcontractors in Japan to India. Some joint ventures between Japanese and Indian companies were established to supply critical parts and components to it. Procurement from joint venture was counted as local contents. Major existing Indian and foreign auto component manufacturers also got chance to supply to Maruti. It had to procure suppliers all over India to meet the target of local contents. These suppliers procured parts and components from other subcontractors, which worked as tier two suppliers. Tierisation of subcontracting spread from operation of Maruti. Monopolistic condition in passenger cars allowed Maruti to develop its suppliers. It was keen to develop subcontractors to develop its supply chain, giving technical and financial assistance (Okada 2004). Subcontractors were evaluated regularly from the viewpoints of cost reduction, quality of products and delivery time. It changed allotment of order to their

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<sup>2</sup> Sundram Fasteners in TVS group acquired a British company in 2003. At present, it is operating in five countries. Bharat Forge in Kalyani group acquired Germany companies in 2004 and American company in 2005. At present, it is operating factories in six countries. A main reason of acquisition of enterprises in developed countries is to absorb advanced technology. R. Nagraj (2006) pointed out that although outward flow of FDI from developing countries was increasing, India had two unique points. India's are going for mainly developed countries and concentrated in the manufacturing sector: pharmaceutical and automobile industries.

subcontractors, depending on the results. Suppliers tried to improve their performance to get more order.

In two wheelers market, some joint ventures were set up and some Indian firms entered into technical collaboration in the 1980s. These companies got large share of two wheelers market and they are Hero-Honda and Bajaj As suppliers to them increased sales, tierisation of subcontracting progressed in two wheelers industry. Large production volume is a necessary condition for subcontracting to develop. Although some joint ventures were set up in commercial vehicles during the 1980s, subcontracting did not develop due to low production volume. Finally, some of foreign collaborators withdrew because of low growth of production.

After economic reforms from 1991, foreign direct investment was liberalized and industrial licensing was abolished. More domestic and foreign automobile manufacturers entered into passenger car market and auto component market. Some foreign automobile manufacturers brought their subcontractors to India to supply critical components to them. Hyundai set up an assembly factory in 1996. While it brought 17 subcontractors from Korea, it started procurement from local firms (Park 2004). On the other hand, two auto manufacturers went bankrupt. Although domestic market was expanding, competition became tough in auto and auto component industries.

Under the competition, Maruti changed procurement strategy. It had procured parts and components from 400 subcontractors in the 1980s. After economic reforms, its subcontractors started to supply their products to other assemblers. As it could not monopolize the market due to entry of other assemblers, the costs to assist all subcontractors were too high to bear by a company. As a result, it reduced number of subcontractors from 400 during the 1980s to 220 during 2000s (SMRJ 2007).

In spite of competition, a few large enterprises maintained high market share. Bharat Forge accounted for more than 50 per cent in crankshafts, Motor Industries more than 70 per cent in spark plugs, and Goetze India more than 40 per cent in piston rings between 1991-92 and 1996-97. Gokarn and Vaidya (2004) ascribed the reason to the reliability between assemblers and suppliers. While assemblers demand high quality and reliability, suppliers try to meet the standard imposed by customers. Mutually reinforcing relationships is a significant entry barrier to potential suppliers. But the situation changed in the 2000s. Some new comers established in 1980s rose and gained share.

Annual number of production of passenger cars doubled from 264,000 in 1994-95 to 574,000 in 1999-2000. In the 2000s, expansion of domestic market for passenger cars has accelerated. Annual number of production rose from 609,000 in 2002-03 to 1,620,000 in 2008-09. Domestic demand for motorcycle also increased constantly from 648,000 in 1994-95 to 6,802,000 in 2008-09. Consequently, annual production of auto components rose from 4,470 million US dollar in 2001-02 to 18,000 million US dollar in 2007-08.

Such rapid growth of automobile and auto component industries can be observed in official statistics. In official statistics, the manufacturing sector is categorized into two groups. The organized (registered) sector is defined as those factories employing 10 or more workers using power; and those employing 20 or more workers without using power. *Annual Survey of Industries* (ASI) covers the sector. The unorganized (unregistered) sector includes smaller factories than the organized sector. Moreover, the unorganized sector is categorized to three parts: (1) own-account manufacturing enterprise (OAME) being run without any hired worker employed on a fairly regular basis, (2) non-directory manufacturing establishment (NDME) employing less than six workers, and (3) directory manufacturing establishments (DME) employing six or more workers including household workers. *National Sample Survey* (NSS) covers the sector. The national industrial classification (NIC) was revised dramatically in 1998. In this paper, data on motor vehicles before 1997-98 are arranged to be comparable at the two-digit level on the basis of the NIC-98. However, as motorcycles were classified at four digit level after 1998-99 onwards, data are not available from NSS because it has only two digit data. Table 1 shows number of establishment and gross value added (GVA) in the unorganized sector of manufacture of motor vehicles, trailers, and semi-trailers (Division 34 of NIC-98) in 2005-06. DME accounted for 80.7 per cent of total GVA in the unorganized sector. DME is the most important in the unorganized sector. Moreover, Table 2 indicates growth rates of number of establishment and gross value added of

Table 1 Number of Establishments and Gross Value Added in the Unorganized Sector of Manufacture of Motor Vehicles and Their Components in 2005-06

	OAME	NDME	DME
Number of establishments	1,558 (10.2)	6,769 (44.4)	6,924 (45.4)
Gross Value Added (Rs millions)	81 (1.5)	977 (17.8)	4,414 (80.7)

Notes: OAME is own-account manufacturing enterprise.  
 NDME is non-directory manufacturing establishment.  
 DME is directory manufacturing establishments.

Figures in parenthesis indicate percentage.

Source: NSSO, *National Sample Survey: Unorganised Manufacturing Sector in India-Input, Output and Value Added* (Report No. 526)

Table 2 Growth Rates of Establishment Number and Gross Value Added (%)

		1989-90 to 1994-95	1994-95 to 2000-01	2000-01 to 2005-06
Organized sector	Number of establishments	2.9	9.0	2.8
	GVA at 1993-94 prices	7.7	4.8	24.3
Directory establishments	Number of establishments	-8.8	29.9	-2.4
	GVA at 1993-94 prices	-14.7	29.4	6.0

Source: The organized sector, CSO, *Annual Survey of Industries* (various issues).  
The unorganized sector, NSSO, *National Sample Survey: Unorganized Manufacturing Sector in India*, 45th, 51st, 56th, and 62nd rounds.

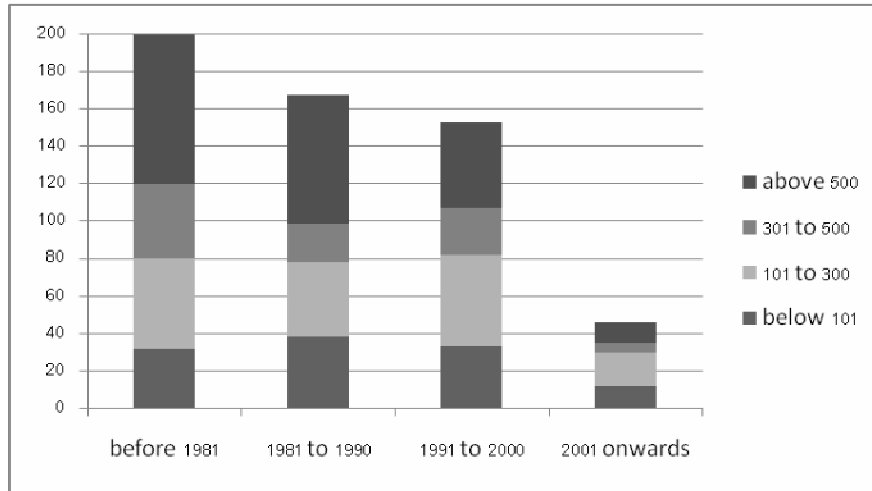
motor vehicles and their components at 1993-94 prices in the organized sector and DME. The trends of the organized sector are different from those of DME. Number of establishments rose between 1994-95 and 2000-01 due to reclassification of industries. Establishment of repairing service has been included into Division 34 of NIC-98 after 1998-99 onwards. In fact, number of establishments in the organized sector jumped from 1,915 in 1997-98 to 2,833 in 1998-99. Sudden rise of GVA and number of establishments in directory establishments might have been caused by the reason. While GVA of the organized sector rose by 24.3 per cent between 2000-01 and 2005-06, that of directory establishments grew by only 6.0 per cent during the same period. Directory establishments could not enjoy benefits of rapid expansion of domestic market. Number of establishments declined from 7,802 in 2000-01 to 6,924 in 2005-06 in directory establishments. Competition might have excluded them.

Some auto component units are categorized in other industrial groups such as fabricated metal products and electrical machinery other than Division 34. 2010 Buyers Guide published by Automotive Component Manufacturers Association of India (ACMA) has data of year of commencing production and number of employees.<sup>3</sup> Both data on 567 companies are available. Figure 1 shows that enterprises commencing production in the 1980s and the 1990s accounted for 56.6 percent of total companies. Only 46 among 567 (only 8.1 per cent) started after 2001 onwards. In spite of rapid growth of production, new entry into auto component industry declined clearly in the 2000s. Moreover, only 12

<sup>3</sup> Members of ACMA are producing parts and components for tractors, two wheelers and four wheelers.

companies among 46 are employing less than 101 employees. It suggests that small enterprises face difficulty to compete with existing companies. Size employing more

Figure 1 Year of Commencing Production and Number of Employees of Companies Operating in 2010



Source: ACMA, *2010 Buyers Guide*, 2010

Table 3 Size-wise Distribution of Companies Increased Number of Employees by 20 Percent between 2005 and 2010

Category of Enterprises	Small	Medium	Large	Large
Number of Employees	below 101	101 to 300	301 to 500	above 500
Number of Companies	49	69	32	57
Share in Total Companies	59.0	62.7	55.2	56.4

Source: ACMA, *Buyers Guide 2005 and 2010*

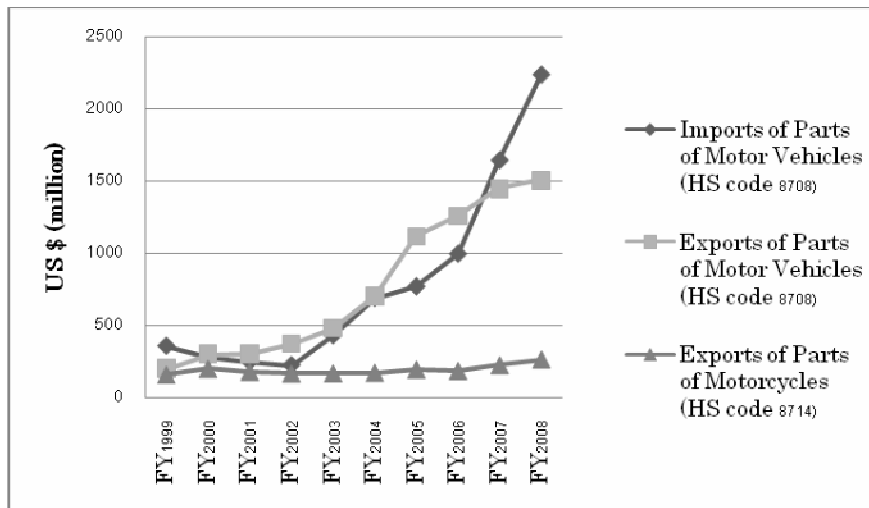
than 100 employees and sufficient capital are required to enter into auto component industry. Existing companies expanded capacity by setting up new establishments in different places which located near new customers. Since ASI counts number of establishments, if a company sets up new establishments, the addition is reflected in statistics. According to ASI, number of establishments increased from 2,833 in 1998-99 to 3,310 in 2007-8.

Comparing number of employees in 2010 with data on the same companies in ACMA's 2005 Buyers Guide, change of size can be observed. Data on 352 companies are comparable between 2005 and 2010. Although 29 companies decreased number of employees, 55 to 63 per cent companies in four categories of size increased number of employees by more than 20 per cent (Table 3). Not only large enterprises but also SMEs

increased number of employees. Some small enterprises graduated and joined medium enterprises in the second half of 2000s. As a result, the share of small enterprises in total members of ACMA decreased from 27.4 per cent in 2005 to 20.3 per cent in 2010. Existing SMEs could enjoy benefits growing demand.

Assemblers in developing countries procure parts and components from four sources and select the most efficient method. First, they produce parts and components in their own factories using their own staff or resources. Second, they purchase parts and components from the market. The transactions with suppliers depend on market prices and are usually short term in nature. Third, they purchase parts and components from subcontractors based on long-term commitments. Fourth, multi-national enterprises (MNEs) import parts and components from their home countries and other countries. In many case, MNEs bring existing model from other countries to Indian market with little modification to save R & D costs and investment costs. In the starting point of introducing new models in Indian market, they tend to assemble imported parts and components.

Figure 2 Imports and Exports of Auto Parts



Source: Homepage of Ministry of Commerce and Industry, Export and Import Data Bank (<http://commerce.nic.in/eidb/default.asp>)

Foreign Direct Investment induced increase of imports of auto components. In the 2000s, imports of parts of motor vehicles rose rapidly (Figure 2). On the other hand, exports also rose dramatically during the same period. Indian auto components manufacturers regard exports as alternative outlet. Some of auto component manufacturers are exporting their products to foreign assemblers and foreign tier one

suppliers as subcontractors. Foreign assemblers and tier one suppliers are procuring parts and components mainly from suppliers in the clusters near their factories. But they are producing specific models at low quantity. Indian SMEs have chance to fill up the niche market, in which large auto component manufacturers in foreign countries do not have interest due to low volume. In 2010 among 585 ACMA members, 226 and 197 are exporting to foreign assemblers and foreign tier one suppliers respectively. Moreover, 181 are exporting to replacement markets in foreign countries. Foreign buyers visit factories to examine production process. Exporting companies are keen to acquire quality system standard. To survive in international market, improvement of quality of products is inevitable.

## 2. Development of Subcontracting

In this paper, subcontracting is defined as long-term commitments to supply parts and components or job service with and without documents of agreement. Subcontracting does not necessarily entail a rigid and exclusive contract. Assemblers produce some models and change models regularly. Specifications for each part of the new model as well as the price thereof are determined during the development period prior to the model change. In the case of critical components, assemblers and component suppliers co-develop them. Once a subcontractor receives an order for a part (when the commercial production of a new model is launched), the order is normally renewed or continued. There is a tendency for assemblers of automobile to assign the responsibility for supplying a part for a specific model to a single subcontractor to avoid duplicate investment. But, when the life of a given model comes to an end, there is no guarantee that a subcontractor that has been supplying a part for that model will receive an order for the same kind of part for the new model.

Subcontractors must meet the demands of a parent company at three critical points: (i) price reduction by some targeted percentage within a certain time span, reflecting efforts to reduce costs; (ii) high reliability in quality assurance; and (iii) high reliability in keeping up with the delivery schedule. On the other hand, parent companies support improvements in production efficiency by subcontractors through technical assistance, such as training subcontractors' employees and dispatching engineers to subcontractors' factories. Moreover, learning through repeated interactions with a particular parent company results in new skills being developed in addition to the basic technological capability that subcontractors accumulate. Asanuma (1989)



referred to this accumulated learning as a relation-specific skill and noted that the effect could be expected from competitive spot bidding if the transaction was repeated for certain period.

Foreign and domestic assemblers utilize subcontracting when local suppliers meet the demand on price, quality and delivery. There are three necessary conditions for development of subcontracting in developing countries. First, expected production volume of an item of part or component must reach minimum volume for local suppliers to secure economies of scale. Foreign assemblers compare import prices of parts and components with their procurement prices from local suppliers. Local assemblers compare procurement prices of outsourcing with production costs in-house. Quality control and production management is easier to do in-house. Economies of scale are a determinant factor to reduce production costs to the level that meet demand of assemblers. Local content regulation had forced foreign assemblers to procure part and component from local suppliers in spite of higher prices than imported prices of parts and components before WTO prohibited such regulation. Even after the regulation was withdrawn, local suppliers were equally competing with imports. Local supplier has competitiveness in domestic market due to economies of scale and lower transportation costs than imports. Second, R & D is necessary to meet demand on quality of products from foreign and local assemblers. Suppliers in developing countries must reduce defects and improve accuracy. R & D is a function to develop the suppliers' ability to identify, assimilate, exploit outside knowledge. R & D depends on investment and human resources. High skilled persons are indispensable for R & D. Third, management skills are important to maintain punctual delivery. Suppliers must manage well not only production in house but also procurement from the tier two suppliers. Tier one subcontractors start outsourcing to tier two suppliers after their production volume rise. Tier two suppliers specialize in specific processes and produce parts. Tier one suppliers play the role of coordinator of tier two suppliers. As they can control the quality and delivery of components and, therefore, can reduce total production costs, assemblers benefit from subcontracting by saving on overhead costs associated with controlling and coordinating supply chain.

In the 1990s, as production of two wheelers and four wheelers rose, subcontracting spread between automobile assemblers and tier one suppliers and between tier one and tier two suppliers. A character of subcontracting in India is that there is no difference of size between first tier suppliers and second tier suppliers in

2010 (Table 4). Among 363 tier two companies, 309 are supplying to tier one suppliers as well as automobile assemblers. A company are supplying to several companies in tier

Table 4 Number of Employees' wise Distribution of Tier One and Two Suppliers in 2010

Category of Enterprises	Small	Medium	Large	Large	
Number of Employees	below 101	101 to 300	301 to 500	above 500	Total
Tier one suppliers	86 (17.4)	126 (25.6)	84 (17.0)	197 (40.0)	493 (100)
Tier two suppliers	72 (19.8)	94 (25.9)	60 (16.5)	137 (37.8)	363 (100)

Source: Same as Figure 1

Table 5 Customers of Large Enterprises

Name of company	Year of commencing production	Number of employees in India	Foreign collaboration	Main customers		Acquisition of foreign companies
				Assemblers	Tier one	
Amtek Auto	1987	4,100	TC	○	○	○
Bharat Forge (Kalyani group)	1966	4,568	TC	○	○	○
Bosch India	1952	10,108	FC (Germany)	○		
Brakes India (TVS group)	1962	4,249	FC (UK)	○	○	
Caparo Engineering India	1994	5,800	FC (UK)	○	○	
Federal Mogul Goetze	1954	7,290	FC (Germany)	○	○	
Rico Auto Industries	1986	4,400	TC	○	○	

Notes: FC and TC indicates foreign collaboration and technical collaboration respectively.

Source: Same as Figure 1

one and two. Table 5 picks up only cases of large enterprises employing more than 4,000 employees. Even large enterprises are supplying to not only assemblers but also tier one suppliers. Besides, all seven enterprises are exporting components to foreign assemblers and tier one suppliers. The tiers are not a frozen categorization in the sense the role structures of suppliers change by the changing distribution of value chain made by the assemblers. Hence if an assembler decides to purchase a fully finished component, the respective component producer would be playing the role of a tier one supplier. But if the assembler makes such a component, the forging unit who might be supplying the

intermediate product would be playing the role of tier one, that had been considered in lower tiers according to the earlier case. Hence, the role of suppliers changes depending on at which stage of value addition they are called for to play their role.

The tier one and two subcontractors and exporting manufactures are outsourcing to various sizes of manufacturers. Tiny enterprises in the unorganized sector to large enterprises employing more than 1,000 workers are included in source of procurement. To find out conditions of outsourcing, factory survey was conducted in April and May 2010 in Delhi National Capital Region. The target of survey was companies employing less than 400. Many managers pointed out technological gap between small companies and tier one and two suppliers in the interview. The tier one and two suppliers are keen to improve productivity and actively interact with customer to receive suggestions. On the other hand, tiny enterprises are not keen to invest in equipment and acquire quality system standard. Although the latter are sending employees to the former for technical assistance, the technological gap between them is expanding. An exporter of auto components who was buying products from tiny and small size enterprises started manufacturing in its own house to maintain quality of products.

Most of tiny enterprises are catering to domestic replacement market. Products in domestic replacement market are heterogeneous. Low prices were preferred to durability. As importance of quality and durability is recognized, demand shifts from low price products with low quality to high prices with high quality. Tier one and tier two suppliers started to supply high quality products to domestic replacement market.

The technological gap between tier one and two suppliers and small size enterprises is pointed out by other studies. Awasthi, Pal and Yagnik (2010) conducted survey in Punjab in the late 2000s. Among 183 tiny and SMEs enterprises, 49 are engaged in supply to automobile assemblers and tier one and two suppliers in domestic and foreign markets and exporting to foreign replacement market. 134 companies are catering to the domestic replacement market. Among 134 companies, 106 belong to the unorganized sector. Technological gap is clear from difference of investment in plant and machinery as of 2006. While investment in only 19 companies exceeded Rs 5 million, that in 79 were less than Rs 0.5. Low investment leads to low quality of products. Although the rejection rate in tier one and two subcontractors and exporting manufacturers was 0.35 per cent, that in companies catering to domestic market was 10.5 per cent. This study points out that tier one and two suppliers are supplying 35 percent of production to domestic replacement market too.

Kumar (2010) categorized auto component manufacturers in Chennai into three groups: (1) large enterprises supplying to automobile assemblers as tier one suppliers, (2) vendors to large enterprises as tier two suppliers, and (3) tiny and small enterprises catering to domestic replacement markets. Although tiny and small enterprises had taken advantage of excise duty concession, severe competition forced them to reduce sales prices to the level which did not guarantee entrepreneur's interest in the long term. In addition to the three groups, there are job shops, foundries, heat treatment units and forging units, which catering to auto component industry as well as other industries.

Figure 3 Structure of Auto Component Industry

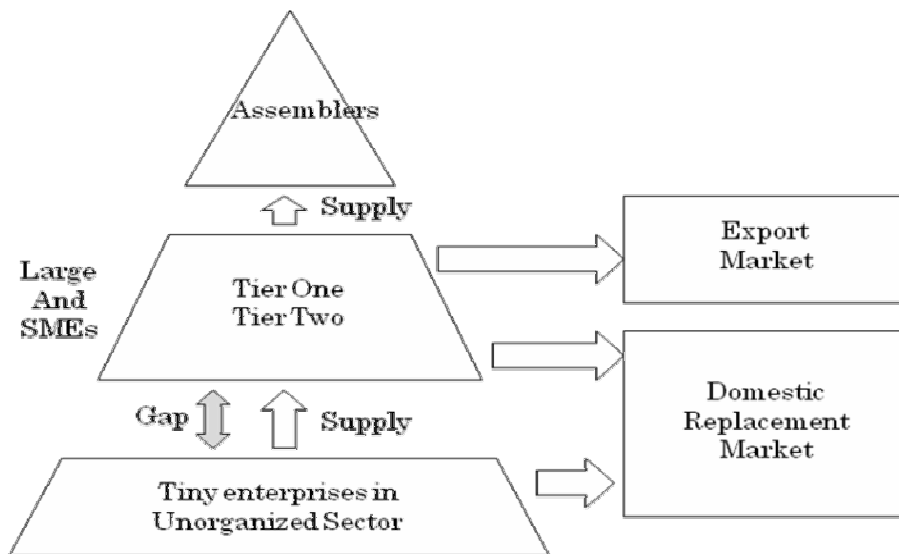


Figure 3 shows industrial structure of auto component industry. Tiny enterprises commencing production before 1980 could grow to medium and large enterprises. Many auto component companies in tier one and two are run by families. 5 companies among 14 samples surveyed by author started from tiny enterprises employing less than ten persons. At present, second or third generation of owner family is managing companies in tier one and two. New generation has good educational background, engineering knowledge, and enough experience. Present conditions of tiny enterprises in the unorganized sector are different. It is very difficult to secure accuracy demanded by tier one and two suppliers. Low end replacement market is shrinking. Tiny enterprises will be phased out in the future. As mentioned earlier, number of establishment in the unorganized sector is declining.

### 3. Technological Development of Auto Component Industry

Large enterprises have four main sources of information to improve productivity and quality of products: (1) Co-development with assemblers, (2) learning through repeated interactions with a particular parent company (3) R & D in house, (4) foreign collaboration and technical collaboration, and (5) acquisition of foreign companies.

Co-development with MNE assemblers is the good opportunity to absorb technology of international standard. But the chance is limited to a few suppliers which produce critical components. A merit of subcontracting with assemblers is learning through repeated interactions. Suggestions from them improve the basic technological capability that subcontractors accumulate. R & D is inevitable to develop the suppliers' ability to identify, assimilate, exploit outside knowledge. Most of large enterprises entered into technical or foreign collaboration in past or are still maintaining it. Technology in the world market is changing very rapidly. Indian enterprises want to introduce advanced technology in Indian context but diffused technology in developed countries to gain an advantage in domestic market. Technical and foreign collaboration is efficient way to introduce advance technology for short period because own R & D takes more time. In some cases, Indian component manufacturers started exports through the channel of counterparts of foreign collaboration. But collaboration with foreign companies is not always stable. Foreign companies change strategy, depending on market conditions. There is an example. An Indian company entered into technical collaboration with a foreign component manufacturer because the assembler introduced its subcontractor in home country as a collaborator. But the collaborator wanted to set up its own factory in India to supply to expanding market. After the collaborator set up factory in India, the parent company gave order of new models to it. Indian company got only order of old model. The assembler gave a preference to relation in home country. Finally, order to the Indian company shrunk rapidly. In the 2000s, large Indian auto component companies acquired foreign companies in developed countries. The Indian companies could take over not only capital and market but also manpower from foreign companies. The manpower means ability to develop new products in the future in addition to accumulation of R & D in the foreign companies.

Medium enterprises in auto component industry have six sources of information to improve productivity and quality of products: (1) R & D mainly through reverse engineering, (2) suggestion from customers, (3) training of engineers provided by

suppliers of machinery, (4) cluster development programme organized by ACMA or assemblers, (5) advice from consultants, and (6) technical and foreign collaboration. The sources were pointed out by managers of the 16 samples of survey.

Medium enterprises cannot spend enough money to develop their product by themselves. Reverse engineering is common method particularly for exporters to the replacement market. If they maintain quality, they may get opportunity to supply to foreign assemblers and component manufacturers as tier one and two suppliers. Suggestion from customers is useful to improve productivity and reduce defect ratio. Engineers of assemblers and large auto component manufacturers visit factories of subcontractors regularly and provide advice to them to control quality in supply chain. Many managers in the sample companies appreciated suggestions from customers. Subcontractors are actively implementing suggestions to renew orders in the future. ACMA organizes cluster development programme. In the programmes, managers of medium enterprises visit factories each other and give comments on production management and quality control. Some assemblers have similar programme and invite their suppliers in tier one and two. The development of computer control shrunk the rooms of skills of workers. Once engineers set programme, semi-skilled workers can operate computer numeric control (CNC) machines. Machine suppliers give training to engineers how to make programme after medium enterprises buy machine from them. Some medium enterprises in the sample employ consultants. Medium enterprises are looking for counterparts of technical and foreign collaboration to introduce advanced technology although most of them have difficulty to find out their counterparts. In general, medium enterprises in tier one and two have channels to improve productivity and quality of products and are catching up technological development in Indian market.

Tiny enterprises in the unorganized sector and small enterprises are trying to improve productivity. Unni and Rani (2008) conducted survey in Delhi NCR, Chennai, Pune and Ahmedabad-Rajkot in 2004 and 2005. Among 101 companies surveyed by them, tiny and small enterprises accounted for 24.8 percent and 62.5 per cent respectively. Tiny enterprises in the samples do not generally produce the full part or component but undertake the machining of components, which could involve turning, tapping, milling or grinding operations or making press components. Although a large proportion of owner-managers were educated below the higher secondary level or were graduates, without any technical degree, they attained skills through working experience in auto components and machine tool companies. Most of them established their contracts from their previous companies. Unni and Rani found effective and

positive correlation between growth of sales turnover and relationship with customers and concluded that “small and tiny firms have a huge potential to grow if they are linked with large firms” (p.125). But the linkage with tier two suppliers is not stable. Tier two supplier may stop outsourcing or change subcontractors when present conditions change. As competition reduce profit margin of tiny and small enterprises, they cannot invest in machinery. Tiny and small enterprises are required to meet two points to maintain linkage with customers under difficult conditions. First, they must deal with fluctuation of demand flexibly. Second, they must accumulate special skills which make them different from others.

Many tiny enterprises are supplying to domestic replacement market. Replacement parts are categorized into four groups: original equipment supplier (OES) part, branded parts, non-OE branded parts and imported parts. OES parts are produced tier one supplier and sold by assemblers. Branded parts are sold under brand names by assemblers and tier one and two suppliers. Non-OE branded parts are manufactured by smaller suppliers and sold under manufacturer’s own branded name. In 2006, OES parts, branded parts, non-OE branded parts and imported parts accounted for 34 per cent, 39 per cent 18 per cent and 3 percent of market share respectively (IMaCS 2010). While share of OES parts is increasing, the share of non-OE branded parts is declining. In other words, demand of replacement parts for tiny enterprises is shrinking. Tiny and small enterprises undertaking the machining of components and catering to domestic replacement market are facing difficulty to survive. As a result, number of establishments in the unorganized sector of motor vehicle industry as mentioned earlier. Tiny enterprises are facing severe competition and shrinkage of demand.

#### 4. Development of Clusters

Auto component industry has developed in three clusters: Delhi NCR, Pune, and Chennai. Pune and Chennai are traditional cluster. Tata Motors and Bharat Forge are located in Pune. Ashok Leyland and TVS group are located in Chennai. Delhi NCR came up after Murli was established. Table 6 indicates State-wise GVA of Motor Vehicle (Division 34 of NIC-98) between 1998-99 and 2001-02. Each state accounted for 20 to 30 per cent.

Table 6 State-wise Gross Value Added of Motor Vehicles  
(Rs million)

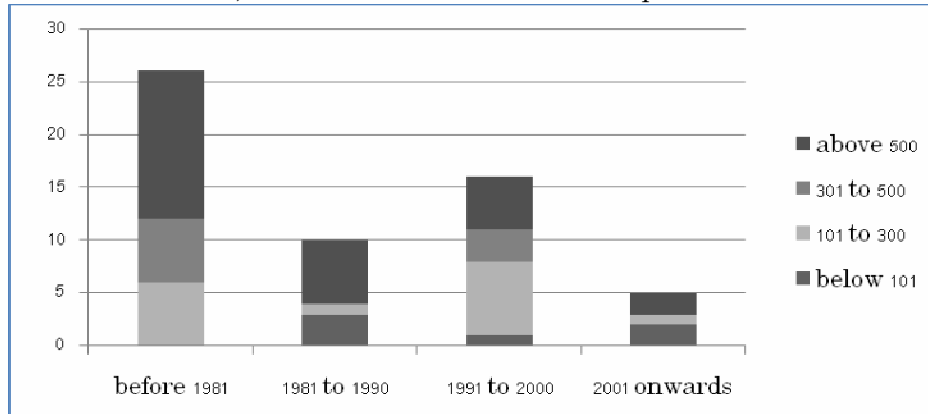
	1998-99	1999-2000	2000-01	2001-02
Delhi and Haryana	15,935 (21.6)	18,185 (19.0)	11,426 (14.6)	17,863 (21.1)
Maharashtra	22,781 (30.9)	28,307 (29.5)	20,041 (25.6)	18,833 (22.2)
Tamil Nadu	13,794 (18.7)	18,480 (19.3)	25,100 (32.1)	20,681 (24.4)

Note: Figures in parenthesis indicate percentage.

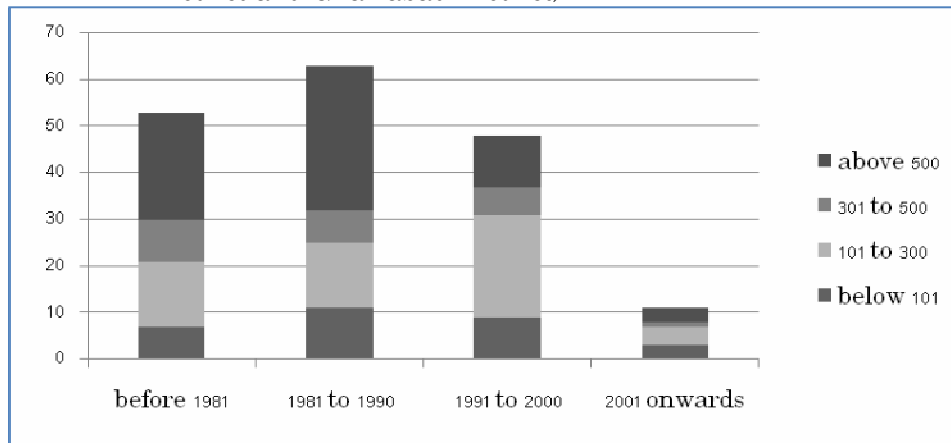
Source: Central Statistics Office, *Annul Survey of Industries*,  
([http://mospi.gov.in/asi\\_2\\_digit\\_nic\\_2001\\_02.htm](http://mospi.gov.in/asi_2_digit_nic_2001_02.htm))

Figure 4: Year of Commencing Production and Number of Employees of Companies Operating in 2010 in Three Clusters

Chennai (Chennai, Tiruvallur District and Kanchipuram District)

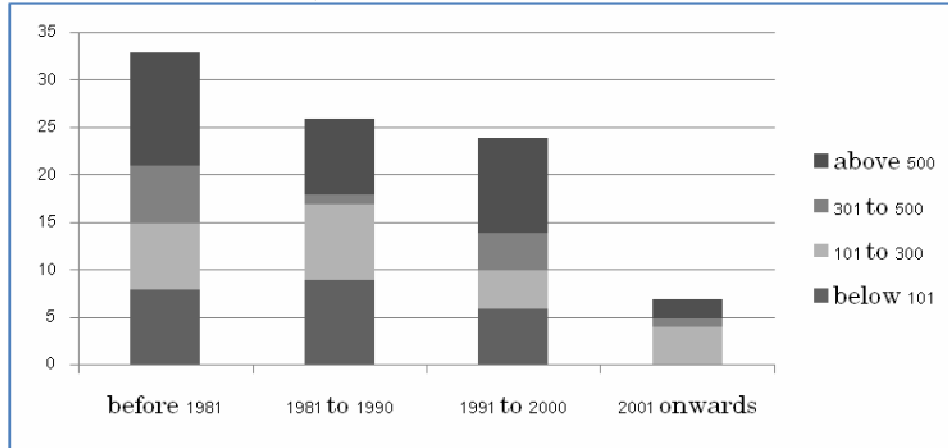


Delhi NCR (Delhi, Gurgaon District, Faridabad District, Gautam Budh Nagar District and Ghaziabad District)





Mumbai-Pune (Mumbai, Pune District and Thane District)



Source: Same as Figure 1

Figure 4 expresses year of commencing production and number of employees of companies in three clusters: Chennai, Delhi NCR and Mumbai-Pune. Categorization of location depends on address of main plants. Chennai include Chennai, Tiruvallur and Kanchipuram districts. Delhi NCR does Delhi, Gurgaon, Faridabad, Gautam Budh Nagar and Ghaziabad districts. Mumbai-Pune does Mumbai, Pune and Thane districts. Some futures make appearance from Figure 4. First, large enterprises established before 1981 are playing important role in Chennai. TVS and Rane groups are main players. Second, liberalization encouraged entry of SME in Chennai region in the 1990s. In 2010 most of them became medium enterprises. Third, large enterprises was mainly set up in the 1980s and medium enterprises followed in the 1990s in Delhi NCR. When Maruti was established, industrial area beside its plant was developed for tier one supplier.<sup>4</sup> Other joint ventures, which Suzuki brought from Japan, set up their plants in Delhi NCR. Later many SMEs were established to supply to Maruti and its tier one suppliers. Fourth, share of SME is higher than 50 per cent in Mumbai-Pune. Tata Motors procured marginal parts and components from many small enterprises before liberalization. Some of them are still continuing operation.

Number of companies in Delhi is much more than that in Chennai and Mumbai-Pune. This is contrast with results of Table 6. Four reasons can be estimated. First, companies in Mumbai-Pune and Chennai are not keen to join ACMA. As ACMA is located in Delhi, it is more active in Delhi than other cities. Second, industrial licensing forced large enterprises to set up factories in the rural area before 1993. Main plants of

<sup>4</sup> Maruti has power plants to supply power to not only itself but also its suppliers nearby. Suppliers can save costs of generators.

some companies are located out of clusters. After Maruti, when MNEs set up factories, many of them created industrial area for subcontractor, which they brought from home countries. Three, there are other clusters: Nashik and Aurangabad in Maharashtra and Coimbatore and Krishnagiri in Tamil Nadu. Four, some companies have many units, which are close to their customers. Location is decided by address of main plants in Figure 4.

New phenomenon is observed in Pune region by field survey. Technology development is becoming active. The Automobile Research Association of India plays a key role in coordinating research in technology and also industries are increasingly having training programmes in collaboration with technology and designing institutions. In that way a synergy is taking place between industry, public and private educational institutions. Several new business models are coming up in this scenario striking collaborations at multilevel operations in manufacturing, technology as well as in business in the global market. On the other hand the increasing content of engineering services in the production process makes a clear case of rising agglomeration between various knowledge intensive activities. Research and development in the field of manufacturing as well as in the field of application engineering is at present highly dependent on software development. Pune envisages such change with software centres coming up to cater to the needs of manufacturing and engineering in the automobile segment.

## Conclusion

Auto component industry has rapidly grown after 1980s, catering to expanding domestic market and exporting to external replacement market. Number of SMEs in auto component industry increased due to new entry. Not only large enterprises but also SMEs increased number of employees. Tiny enterprises commencing production before 1980 could grow to medium and large enterprises. Some small enterprises graduated and joined the medium enterprises in the second half of 2000s. But new entry into auto component industry particularly companies employing less than 101 employees declined clearly in the 2000s. Competition in auto component industry became severe in the 2000s. Small enterprises face difficulty to compete with existing companies. Size employing more than 100 employees and sufficient capital are required to enter into auto component industry.

Medium enterprises in auto component industry have six sources of information to improve productivity and quality of products: (1) R & D mainly through reverse engineering, (2) suggestion from customers, (3) training of engineers provided by suppliers of machinery, (4) cluster development programme organized by ACMA or assemblers, (5) advice from consultants, and (6) technical and foreign collaboration.

But tiny and small enterprises are facing difficulty to survive. They are catering to domestic replacement market and undertaking the machining of components. As share of OES part is increasing in domestic replacement market, market for tiny and small enterprises is shrinking. The severe competition forced them to reduce sales price to the level which did not guarantee entrepreneur's interest in the long term. Although even tiny enterprises are improving productivity and quality of products, technological gap with medium enterprises in tier one and two are expanding. Some tiny and small enterprises are accumulating skills through linkage with medium enterprises in tier one and two. But the linkage with tier two suppliers is not stable. Tier two supplier may stop outsourcing or change subcontractors when present conditions change. As competition reduce profit margin of tiny and small enterprises, they cannot invest in machinery.

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