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GLOBAL AUTO COMPANIES AND THEIR SUPPLIER RELATIONS IN INDIA

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Following economic liberalization in 1991, India witnessed a rushed entry of global carmakers and part suppliers in the auto industry. With ten of the world's leading auto companies having set up new production facilities around the country, India's passenger car industry has experienced in the past decade a substantial increase in production, a wave of new models, and unprecedented marketing wars among auto companies. Fundamental changes have also occurred in the commercial vehicle industry and the auto component industry, as the auto component manufacturers that followed their assemblers to India have introduced a series of new technologies and buyer-supplier relations.

This paper examines the restructuring of the Indian auto industry since the 1991 liberalization, with a particular focus on auto companies' product policies and their supplier relations. While India has been able to attract a large amount of automotive capital in the past decade, its market has not grown as fast as many expected. The country's small, stagnant market has forced auto companies to scramble for the right models to meet Indian consumers' needs and to look for exporting markets to shore up efficiency in production. While the export of cars from India is still minimal, that of auto components has increased dramatically since liberalization. Thanks to numerous collaborations and joint ventures with global companies, the Indian auto component industry has been greatly upgraded in both technology and finance and gained competitiveness in global markets. Auto companies have become highly creative in running the just-in-time system and overcoming the country's business-unfriendly transportation infrastructures. The buyer-supplier relationships have been characterized by carmakers' single sourcing and suppliers' multiple supplying, both reflecting India's market conditions, government's auto policies and, in general, history of the auto industry.

In what follows, I briefly review the restructuring history of the Indian auto industry, which had been highly regulated by its government until liberalization in 1991. The changes that liberalization and the subsequent influx of global companies have generated in the Indian auto industry are detailed. The next section examines the efforts that auto companies have put in to boost their sales in India and overseas. Particular attention is paid to auto companies' product

policies in India's passenger car market. In the following section, I take a closer look at the buyer-supplier relations that have been developed between car assemblers and auto component manufacturers in India, a country with a regulative government, a small market, and underdeveloped transportation infrastructures. I then conclude with the summary of research findings and implications for future studies.

The research draws primarily on the statistical data of the Indian auto industry and personal interviews with auto companies, auto component manufacturers and the Indian government (Department of Heavy Industries). Time-series data on the Indian auto industry were collected from the Automotive Component Manufacturers Association of India (ACMA) and Society of Indian Automobile Manufacturers (SIAM). Personal interviews were conducted from 2000 and 2003 with general managers of marketing and purchase departments in Fiat India at Mumbai, Honda SIEL India at Delhi, and Ford India and Hyundai India at Chennai. In-depth interviews with sales managers in six auto component manufacturers were conducted in 2001 and 2003.

THE AUTO INDUSTRY IN INDIA: GRADUAL SHIFT FROM ISOLATION TOWARD GLOBALIZATION

The auto industry in India dates back to the 1920s when foreign companies, namely General Motors and Ford, set up assembly plants in Mumbai (Bombay), Kolkata(Calcutta) and Chennai (Madras). Several local companies, including Hindustan Motors, Premier Automobiles, Mahindra & Mahindra, and Standard Motor Products, later entered the industry to replace the foreign assemblers. After more than two decades of assembly, the Indian auto industry, heralded by Hindustan Motors and Premier Automobiles, finally started indigenous production in the early 1950s. These two companies, with Hindustan accounting for a bigger share, split the passenger car market for the next three decades, although Standard Motor Products and Sipani Automobiles each produced a small number of cars (Narayana, 1989). Mahindra & Mahindra was dominant in the multi-utility segment, while Ashok Leyland and Tata Engineering produced commercial vehicles.

During this period, the Indian auto industry made little progress in production volume and technology. New models were hardly seen on the street either, as each of the aforementioned auto companies manufactured no more than one basic model. For example, Hindustan and Premier stuck to their 1950 models, the Ambassador and the Padmini respectively, over thirty years. The lack of dynamics in the auto industry was attributed mainly to the Indian government's auto policies[1], such as capacity licensing, entry restriction, foreign exchange allocation, restriction on foreign collaboration both in technology and finance, and price control (Mohanty et al., 1994; Narayana, 1989). These extraordinarily regulative policies were justified by the Industrial Policy Resolution implemented in 1948, which classified cars as luxury goods. The Indian auto industry in the 1950 – 1980 period is well summed up in the phrase of "a low volume, high cost, high price enterprise, mired in technological stagnation" (Venkataramani, 1990, 11).

[1] The Indian auto industry was closely controlled by the Tariff Commission (1953 and 1956) and the Monopolies and Restrictive Trade Practices Commission (1970) (Kathuria, 1996).

Following the three-decade long isolation, the Indian auto industry finally started contacting foreign companies for capital and technologies in the early 1980s when the Indian government introduced a series of liberalization measures. The commercial vehicle sector saw the entrance of four new manufacturers, including DCM in collaboration with Toyota, Eicher with Mitsubishi, Swaraj with Mazda and Allwyn with Nissan (Kathuria, 1996). In the passenger car industry, Maruti Udyog was founded as a joint venture between the Indian government and Suzuki Motor Company of Japan.[2] The company was helped greatly from the government's preferential treatments, such as allowing technical and financial collaborations with Japanese companies, while foreign collaboration was still restricted for other passenger car manufacturers. Given India's underdeveloped supplier base, Maruti imported most of essential components at the beginning of its operation. In an effort to meet the government's local content requirements, however, the company brought in the second half of the 1980s a number of Japanese suppliers to India and arranged to form joint ventures in which Maruti as well as Japanese suppliers and Indian firms participated. Such examples included, among others, Ashahi Glass India, Bharat Seats, Denso India, Jay Bharat Maruti, Krishna Maruti, Machino Plastics, and Sona Steering Systems. As most of Murit suppliers set up their production facilities near the Maruti plant in Gurgaon, an industrial town in close proximity to Delhi, the Delhi area, including the City of Delhi, Faridabad and Gurgaon in Haryana, Ghaziabad and Noida in Uttar Pradesh, emerged as a major center of the Indian automobile industry. These joint ventures introduced new technologies, designs, management systems and supplier relations to the Indian auto industry, and Maruti has been "credited with having catalyzed and led the modernization of the Indian passenger car industry" (Gulyani, 2001, 21).

Helped by Suzuki's advanced technologies, fresh designs, innovative localization strategies and effective management of supplier relations, Maruti captured greater than half the passenger car market in the second half of the 1980s (Chatterjee, 1990; Gulyani, 2001; Khare, 1997). Maruti's role in changing the landscape of the Indian automobile industry and its components industry in the 1980s was considered a "revolution" (Venkataramani, 1990). Accordingly, the history of the passenger car industry in India has often been divided into the period before Maruti and that after Maruti (Dasgupta, 2000). Maruti's phenomenal success predictably coincided with the demoralizing decline of local manufacturers, which long had symbolized the downside of India's import substituting industrialization policies. As Figure 1 shows, India's passenger car production started showing signs of growth in 1984 when Maruti began its production. And, it was the time when the Indian auto industry shifted from commercial vehicles oriented toward passenger car oriented. The passenger car industry's production volume grew by 265 percent in the 1983 – 1993 period, and most of this growth was achieved by Maruti. The Maruti 800, a super-mini model with 0.8 litre engine, became an immediate hit in the market where new models had hardly ever been introduced for decades.

While Maruti continued its dominance to near monopoly over the passenger car market, the Indian economy faced a very serious economic crisis in the early 1990s. The economic slump that this almost self-sufficient system had endured for decades finally led to a massive balance-of-payment crisis in 1991. After the International Monetary Fund (IMF) bailed it out, the Indian government had to take a course of expedient actions toward liberalization and deregulation

[2] Suzuki's equity participation in the joint venture started from 26 percent, but it gradually grew to 40 percent in 1989, to 50 percent in 1992 and to 54 percent in 2002.

under the guidance of the IMF and World Bank (Jenkins, 1999; Joshi and Little, 1996; Pedersen, 2000; World Bank, 1996).

The New Industrial Policy was drafted to deregulate market entrance, production capacity and plant location in a wide range of industries, and it was applied to the auto components sector in 1991 and the automotive vehicles sector in 1993 (Mohnot, 2001; Ohri, 1997). These newly implemented liberalization measures allowed two local firms that had been specialized in light commercial vehicles, namely Tata Engineering and Bajaj Tempo, to enter the passenger car industry. In addition, the government lifted the notorious licensing procedures which had long been used to deny foreign auto companies' access to local markets and direct investment in India. Given the merits of market potential, India attracted ten of the world's major carmakers in the first five years following liberalization. They included Daewoo, Mercedes-Benz (later changed to DaimlerChrysler), Fiat, General Motors Opel, Ford, Honda, Hyundai, Mitsubishi, PSA Peugeot Citroën and Toyota. Volvo jumped into the commercial vehicle industry, where local manufacturers, such as Tata Engineering, Ashok Leyland and Bajaj Tempo, had been dominant.

Most of these newly-entered global auto companies had their plants located close to traditional auto manufacturing centers, namely Delhi, Mumbai (including Pune and Nashik), Chennai, and, in lesser degree, Bangalore. Daewoo and Honda joined Maruti in the Delhi area, while Fiat, Mercedes and Peugeot chose Mumbai where Mahindra & Mahindra and Tata Engineering had been located for decades. In South India, Chennai, where local companies including Ashok Leyland and Hindustan Motors had developed their supplier bases, attracted Ford, Hyundai and Mitsubish, while Bangalore welcomed investment from Toyota and Volvo. GM was very exceptional in that it decided to renovate Hindustan Motors' facilities in Halol, Gujarat.

Although the Indian government did not require foreign auto companies to associate with local partners, most of them formed joint ventures with Indian firms at the beginning. Hyundai Motor Company was the only company that started its Indian operation as a wholly owned subsidiary. However, most other companies seem to have followed Hyundai India's ownership model by increasing their shares of joint ventures over the years, as numerous managerial tensions between foreign and local partners in the joint venture have emerged (interview data, 2001). The total number of carmakers in the passenger car industry, foreign and local ones combined, peaked at sixteen in the late 1990s, but with three companies (Daewoo India, PAL Peugeot and Premier Automobiles) having closed down, thirteen companies are currently competing in the Indian passenger car market.[3] These global companies' local operations have significantly elevated India's passenger car production volume in the past decade (Figure 1). In 2001, thirteen carmakers together produced 676,246 units that grew from 243,869 units in 1993 when the passenger car sector was deregulated for the first time. Meanwhile, production in the commercial vehicle industry has not increased as much since deregulation. Tata Engineering has been able to maintain its dominance both in the light commercial vehicle sector and the bus and truck sector, while several new entrants, such as Volvo India and Daewoo India, have suffered from the sluggish market.

[3] PAL Peugeot and Premier Automobiles stopped their production lines late in 1999, while Daewoo Motors India closed down in 2001. Meanwhile, Skoda, Volkswagen's Czech operation, started exporting a limited number of passenger cars to the Indian market late in 2001.

A dramatic increase in passenger car production that India has witnessed since deregulation has led to massive changes in the country's auto component industry, which was deregulated in 1991. Figure 2 shows that the auto component industry has achieved a great deal of increase both in production and exports. Indeed, the auto component industry has been the primary beneficiary of deregulation, as its production has been doubled since financial year 1995-1996, while its exports has been tripled since then. The gradual rise of auto component exports from India is such a positive news for the industry, as made-in-India auto components have gained competitiveness in international markets. After having exported around 800 million dollar worth of auto components in the financial year 2002-2003, predicts the ACMA, it will reach the one billion dollar mark by 2005. Considering a modest increase in passenger car exports in the past decade, the success of India-based auto component manufacturers in overseas markets is even more impressive.

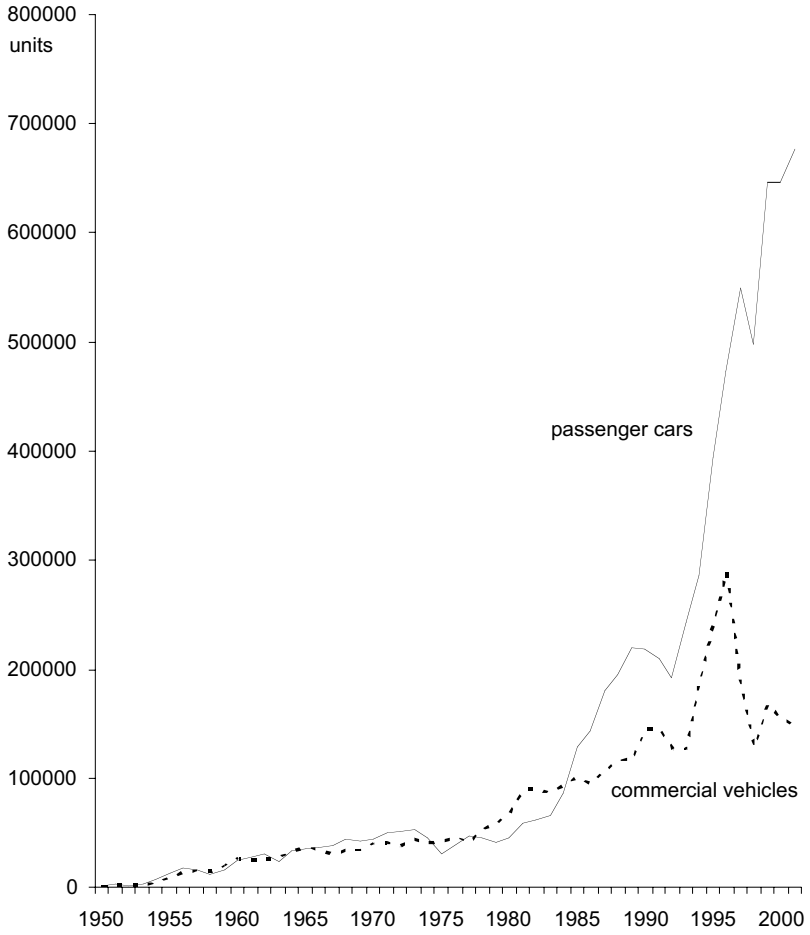

Figure 1. *Auto production in India, 1950-2001*

Sources: Association of Indian Automobile Manufacturers (1985)

Automotive Component Manufacturers Association of India (2002)

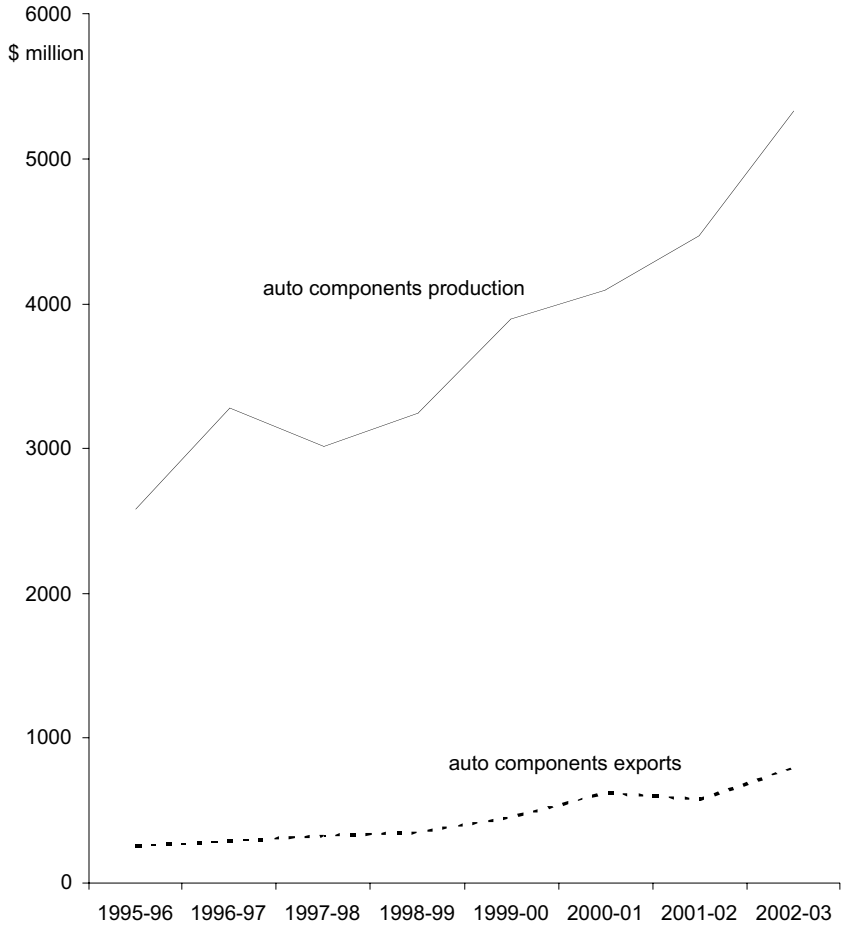

Figure 2. *India's auto component production and exports, 1995-1996 and 2002-2003*

Source: ACMA (2002)

GLOBAL AUTO FIRMS' PRODUCT POLICIES IN INDIA

It has been known that emerging markets offer auto companies different conditions for sourcing, manufacturing, marketing and driving cars than developed countries, and auto companies make serious adjustments in their operations to conform with these often business unfriendly conditions (Humphrey et al., 2000). India, a country with very low living standards, has not been an exception to this. Although the country has more than one billion populations, its passenger car market has been selling around 700,000 cars a year. This number is much smaller than that many expected India to have by now, as the country's economy seemed growing fast in the 1990s, and ten of the world's leading carmakers jumped in it. India's small, stagnant,

overcrowded passenger car market is examined in my other paper (Kim, forthcoming). In this section, the global auto companies' product policies in India are detailed.

Table 1 lists the models that the newly entered global auto firms have introduced to Indian consumers so far. The auto firms' product policies in India can be divided into two groups. One is to introduce a small-sized model that has been designed particularly for emerging markets. Such examples include Ford India's IKON, Honda SIEL's City, and Fiat India's Palio. These models might have been simplified from some existing models that have been sold in developed countries, but they were developed as "Third World Cars" in their headquarters, and introduced in many emerging markets around the world. In a slightly different context, two South Korean carmakers, namely Daewoo India and Hyundai India, introduced very entry level models, and indeed they have been able to sell much more cars than the aforementioned ones have in India. Hyundai India's Santro, which has been the second best seller to the Maruti 800 in India, was introduced to Korean consumers under the brand name of the Atoz. Hyundai Motor Company in Seoul is planning to specialize Hyundai India's Chennai plant in assembling the Santro for global markets (interview data, 2003). The Matiz, introduced by the now defunct Daewoo India, was brought to India after its success in the South Korean market. In the case of Toyota Kirloskar's Qualis, similar models under different brand names have been introduced in Southeast Asian markets, South Africa and Taiwan.

The other product policy adopted by auto firms in India is to introduce well-known, market-proven models that might have been too expensive for the majority of Indian consumers, but auto components for these models are relatively easy to be supplied through follow sources or imports. Among the models brought directly from developed countries are Ford India's Escort, GM India's Opel Astra and Corsa, Honda's Accord, Hyundai's Accent and Sonata, and Toyota Kirloskar's Camry and Corolla. However, these models have not achieved much success in the passenger car market that has been skewed towards small cars, such as the Maruti 800 (engine size 800cc), the Hyundai India Santro (1000cc), and the Tata Indica (1400cc).

Table 1. *Global auto companies' car models in India*

	Models introduced at the beginning	Models introduced afterwards
Daewoo	Matiz Cielo	Nexia
Fiat India	Siena Uno	Palio
Ford	Escort IKON	Mondeo
General Motors Opel	Astra	Corsa, Vectra
Honda SIEL	City	Accord
Hyundai	Accent Santro	Sonata
Mercedes-Benz	E-Class	C-Class, S-Class
Mitsubishi	Lancer	
PAL Peugeot	Peugeot 309	
Toyota Kirloskar	Qualis	Camry, Corolla

Source: SIAM

Indian consumers' preference for subcompact cars has allowed many of the global firms' initial product policies to be second-guessed. For example, GM India, with their German Opel models, has been selling no more than 20,000 cars a year since it started its Indian operation in 1996. The company is now retooling its production facilities to produce A- and B-segment models developed by GM Daewoo, a newly acquired South Korean operation. In the cases of Ford India and Honda India, since they do not have any smaller-engine models than they already introduced, they rather wait for Indian consumers to upgrade their consumption patterns.

In a desperate effort to expand markets for their products, the global auto companies in India have pushed for exporting cars, CKDs and/or parts to regional, global markets. The search for exporting cars was mandated initially by the Indian government's Export/Import policy and Export Promotion Capital Goods Scheme, which both obligated auto companies to generate the same amount of or more foreign currency that was used for imported materials or components. Although these policies were abolished in 2001, the year that India's traded-related investment

measures was scheduled to be eliminated by the World Trade Organization, the country's limited market size and skewed demand for small cars together have pressured auto companies to expand their markets overseas.

Ford India has been the most impressive case so far by exporting a large number of CKDs to Mexico and South Africa. Indeed, the company have accounted for greater than half of India's passenger car exports. Ford India was able to sell less than 20,000 cars in India, but it exports more than 30,000 CKDs for the IKON a year. It just announced a plan to export the same to the Chinese market. Honda SIEL and Toyota Kirloskar are rather planning to make up for their mediocre sales volumes in India by exporting parts than CKDs or CBUs. Toyota announced its plan to expand its Bangalore-based production line in India so that it could supply auto transmission systems from India to its operations around the world. In contrast, Hyundai India, which has been a best performer of the ten new entrants in the mid 1990s mainly thanks to the success of the Santro, will be the production site for Hyundai's compact car models. In the case of Fiat India, future plans are not clear at the moment, as its parent company in Italy is in the middle of management turmoil.

GLOBAL AUTO COMPANIES' SUPPLIER RELATIONS IN INDIA

The entrance of global assemblers in the Indian auto industry has led that of global auto component manufacturers in the country. The recent restructuring of the country's auto component industry has been enabled by two prominent trends: foreign collaborations and geographical concentrations. Each is examined in turn.

According to the ACMA, 95.5 percent of its members (401 of 420 companies) are currently in collaboration with foreign companies through technical, financial collaboration or joint venture. The prevalence of partnerships between local companies and foreign companies in India reflects various causes, such as local suppliers' needs for technical, financial improvement, global suppliers' needs to supply their assemblers' Indian operations, and/or India as a relatively cheap production site. The growing presence of global suppliers in the Indian auto component industry has coincided with a significant increase in localization in auto production. Fiat India, for example, imported around 70 percent of needed auto components in 1999, but its dependence on imported ones declined to 42 percent in 2000, to 20 percent in 2001, and to 15 percent in 2002.

The rapid growth of local contents in car production reflects the way that auto companies have responded to both the Indian government's local content requirement and the country's competitive market situations in which cost reduction in production has been essential. The auto component industry in India has been significantly upgraded through collaborations and joint ventures with global suppliers. Therefore, it is fair to say that the growing presence of global suppliers in the Indian auto component industry has been an outcome of auto companies' localization efforts, and, at the same time, it has enabled auto companies to raise their local content ratios as high as they are now. While Maruti in the 1980s had to produce certain components in-house, few companies are now dependent on in-house manufacturing. While auto companies' localization rates range from 75 percent to greater than 90 percent, they source auto components from their suppliers.

As presented in Table 2, many Indian auto component manufacturers have collaborations with Japanese companies which started investing in the 1970s when India's commercial vehicle companies formed technical tie-ups with Toyota, Mitsubishi, and Nissan. In addition, Maruti's partnership with Suzuki in the early 1980s played a critical role in allowing Japanese suppliers to establish strong presence in India. After Japanese companies, parts suppliers from Germany, US, South Korea, Italy and other European countries have invested in India.

Table 2. *Foreign collaborations in the Indian auto component industry**

Origins of foreign collaborators	Indian firms in collaboration with foreign companies
Japan	145
Germany	86
USA	60
South Korea	47
Italy	39
United Kingdom	37
France	21
Spain	5
Taiwan	5
Others	37
Total	482

* Since some auto component manufacturers have developed multiple collaborations with companies from different countries, the total number of collaborations exceeds 401.

Source: ACMA

The geographical concentration of auto component manufacturers is critical to a better understanding of buyer-supplier relations in India where auto companies' just-in-time system has been hampered by inadequate infrastructures. The Indian auto industry has developed around a few major cities, notably Delhi, Mumbai, Chennai, and, in lesser degree, Bangalore, as the vast majority of the carmakers and their suppliers invested after deregulation have located their plants in these cities or their neighboring towns. Table 3 shows that 324 of 447 parts suppliers are currently located in one of these four cities. In the North, the City of Delhi and its vicinity have emerged as the primary site for auto component manufacturers in India since the early 1980s when Maruti located its plant in Gurgaon, Haryana. As presented in Table 3, the Delhi area houses more than a third of auto component firms that are currently operating in India. Mumbai has been the leading auto center of West India since Premier, Mahindra & Mahindra and Tata Engineering were established decades ago. Mumbai has benefited from its locational advantages, such as having the largest sea port in India and being close to emerging industrial cities, including Pune and Nashik.

Table 3. *Major centers of the auto component industry in India**

City	No. of auto component manufacturers
Delhi	148
Mumbai	98
Chennai	58
Bangalore	20
Total for the top four cities	324
Total**	447

* Delhi consists of the City of Delhi and its vicinity including Faridabad and Gurgaon in Haryana, Ghaziabad and Noida in Uttar Pradesh, and Bhiwadi in Rajahstan; Mumbai includes Mumbai, Nashik, Pune, and Thane in Maharashtra; and Chennai includes Chennai and Chengalpattu in Tamil Nadu

** Alongside 420 companies that are currently members of the ACMA, 27 non-members are counted in this table.

Source: ACMA

Chennai in South India has a smaller number of firms than the above two cities, but it has housed several prominent conglomerates including The TVS Group and The Amalgamations Group. Each owns a number of companies specialized in auto components, farm equipments and other manufacturing industries. For example, The TVS Group owns six of the top 20 auto component manufacturers in India, including Brakes India, Lucas-TVS, Sundram Fasteners, Wheels India, Sundaram –Clayton (Table 4). The presence of these supply giants was a major attraction to Ford India and Hyundai India when they decided to locate their plants in the Chennai area. Although Bangalore has established its reputation as the foremost high-tech city in India, it has been the site for Motor Industries, commonly called MICO among Indians. The company is a subsidiary of Germany-based Robert Bosch, and it has developed near monopoly in diesel fuel and multiple point injection system and spark plugs in India. Once Toyota located its Indian operation in Bangalore, an increasing number of Japanese parts suppliers have formed joint ventures with local companies or set up their wholly owned companies around this city.

Table 4. *Major auto component manufacturers in India, 2001 - 2002*

Rank	Company	Parent company or collaborator	Location*	Turnover ($ Mil)	Exports ($ Mil)
1	Motor Industries (MICO)	Robert Bosch	Bangalore	341.8	41.0
2	The Supreme Industries	Wavin	Mumbai	143.5	8.2
3	Brakes India	TRW	Chennai	120.8	18.0
4	Subros	Denso, Suzuki Motor	Delhi	101.6	0.2
5	Lucas-TVS	Lucas	Chennai	101.1	3.9
6	Bharat Forge	Metalart	Mumbai	100.4	23.5
7	Delphi Automotive Systems India	Delphi	Delhi	100.0	16.8
8	Visteon Automotive Systems India	Visteon	Chennai	100.0	56.1
9	Rico Auto Industries	FCC	Delhi	95.8	1.8
10	Sundram Fasteners	Dura Automotive	Chennai	92.2	17.4
11	Omax Autos	Honda Motors	Delhi	79.0	-
12	Munjal Showa	Showa	Delhi	78.2	-
13	Wheels India	Titan Europe	Chennai	66.5	8.8
14	Jay Bharat Maruti	Hamamatsu	Delhi	58.4	-
15	Motherson Sumi Systems	Sumitomo Wiring	Delhi	57.7	9.3
16	Gabriel India	Arvin Industries	Delhi	56.3	3.0
17	Fenner India	Fenner	Chennai	54.9	8.0
18	Premier Instruments & Controls	Denso, Nippon Seiki	Coimbatore	53.7	4.0
19	Sundaram-Clayton	WABCO, Air Brake System	Chennai	52.5	1.6
20	Denso India	Denso	Delhi	50.5	-

* The location data are based on Table 1.
Source: ACMA

The managerially, geographically restructured auto component industry has developed three characteristics that reflect, among others, the Indian government's auto policies and market conditions: single sourcing relations, export growth, and just-in-time system. Each is examined in turn.

A single sourcing relation between assemblers and their suppliers has been very common in India. Companies like Ford India, Honda SIEL and Hyundai India have developed single-sourcing practices with all of their suppliers but tire manufacturers. The main reason for this purchasing strategy is the limited scale of production. Since Maruti and Tata Engineering have been the only companies in India that produce more than 100,000 units a year, other than these two companies and their suppliers have suffered from the lack of efficiency in production. Under this circumstance, assemblers are not practically in position to apply free market principles to their supplier relationships. Assemblers, notes a general manager of the procurement division in

an auto company, "can not afford the luxury of multiple-sourcing practices, when they produce less than 20,000 cars a year" (interview data, 2003).

The limited size of domestic market has forced both auto companies and their suppliers to look for exporting markets. As mentioned in Section 2, India has become an emerging production site of auto components for global markets since deregulation. Table 5 demonstrates some important changes in the Indian auto component industry in the past decade. First of all, the industry's export earnings increased more than 12 times between 1990-1991 and 2001-2002. This rapid export growth reflects not only auto component manufacturers' need to expand markets but also their improved competitiveness in global markets. The fact that a significant amount of auto components are exported American, European and Japanese markets proves that the Indian auto component industry in general has been upgraded. Another noticeable change can be seen in the direction of export since deregulation. While the US, Germany and the UK are still major export destinations of made-in-India auto components, new destinations have emerged in the past decade including Mexico, Italy, Nepal, South Africa, Netherlands, Belgium, France, and Japan. In contrast, some African and Asian countries, such as Sudan, Iran, Jordan, Thailand, Tanzania, Kenya, and Iraq, which have been importing components for agricultural equipments, mopeds, and scooters, have dropped out of the top 20 list. The US alone accounts for 21.5 percent of auto component exports from India – US and Mexico combined for 27.3 percent , while six European countries, namely Germany, UK, Italy, Netherlands, Belgium, France, combined to account for another 24.3 percent.

A dramatic increase in exports to the US and European countries has been attributed to global auto component manufacturers' use of their Indian operations for cheaper production sites. A number of global firms that entered India since deregulation have specialized their local operations in a limited number of parts for global supply. For example, Visteon India, which followed Ford to India in 1998, is a global supplier of alternators and starter motors to Ford operations located in US, Mexico, Europe and Latin America. The company has become the largest exporter in the Indian auto component industry by exporting mainly these two items (see Table 4). In the case of Motor Industries, the Indian unit of Robert Bosch GmbH, diesel engine systems has been exported throughout the world including its parent company in Germany. Sundram Fasteners, a Chennai-based company in collaboration with Dura Automotive, has become a global supplier of radiator caps to General Motors. Meanwhile, some of Ford India's suppliers, namely Rico Auto Industries and Wheels India, have been chosen to supply to Ford subsidiaries in Mexico, South Africa and China. Ford India is helping some more suppliers earn a quality certification, named Q1, which makes them eligible to supply to Ford's operations worldwide (Kaushik, 2003).[4]

[4] A Q1 supplier meets a series of parameters ranging from manufacturing capability, training of employees, the actual quality of the products, ability to deliver on time and the long term durability of the output (Krishnamoorthy and Singh, 2003).

Table 5. *Major export destinations of Indian auto components in 1990-1991 and 2001-2002 (in Indian Rupees 000s)*

Rank	1990-91		2001-02	
	Country	Exports	Country	Exports
1	USA	311,386	USA	5,976,770
2	UK	238,954	Germany	2,312,353
3	Singapore	193,448	UK	1,939,965
4	Germany	154,645	Mexico	1,615,222
5	Sri Lanka	102,215	Bangladesh	1,141,347
6	Nigeria	77,255	UAE*	1,125,892
7	Egypt	75,778	Italy	1,011,662
8	Malaysia	72,180	Nepal	985,733
9	Australia	61,226	Sri Lanka	816,426
10	Saudi Arabia	60,454	Nigeria	778,985
11	Sudan	54,000	South Africa	644,114
12	Iran	52,742	Netherlands	592,778
13	UAE*	50,403	Australia	533,063
14	Bangladesh	44,043	Belgium	519,564
15	Jordan	38,658	Egypt	514,673
16	Thailand	33,166	Singapore	458,660
17	Tanzania	31,975	France	357,793
18	Kenya	30,680	Malaysia	344,249
19	Iraq	27,123	Japan	300,972
20	Greece	21,821	Saudi Arabia	282,239
	Top 20 total	1,732,152		22,252,460
	Total	2,341,417		27,745,721

* United Arab Emirates
Source: ACMA

Along with the rapid growth of exports, the prevalence of the just-in-time system is another promising sign of the bright future for the Indian auto component industry. Given the dismal road conditions in India, the just-in-time system would be very difficult to be implemented effectively (Gulyani, 2001). As a matter of fact, India does not have interstate highways that would connect major cities around the country. The National Highways Development Project was launched in 1998 to construct two highways, namely the Golden Quadrilateral, which is to connect Delhi, Kolkata, Chennai, (Bangalore), and Mumbai, and the North-South and East-West Corridors. The whole construction project is expected to be complete by 2007, with much of the project is yet to be implemented. It is true that logistics has

been hampered by the lack of national highways at many different levels, such as between suppliers and assemblers, assemblers and dealers, and assemblers and service centers.

However, it is also true that geographical proximity between assemblers and suppliers has contributed to the reduction of potential logistical troubles in buyer-supplier relations. Many of the auto component manufacturers that entered India in the 1990s have located their local operations close to their primary buyer. When they grew to supply multiple assemblers at different cities, they set up a warehouse near each of them. By doing this, they are still able to supply their products on the hourly basis and swiftly respond to unpredictable demands. These warehouses are also called final forward plants, since some of them are equipped with for the final stage of manufacturing in auto component production. Final forward plants are also used by auto component manufacturers to be waived from interstate sales taxes that apply to only out-of-state businesses. Suppliers, who can not afford their own warehouses but need to adopt the just-in-time system, lease transporters' warehouses. There are at least several warehouses run by transporters in each of the major auto centers. Although many auto companies have developed single sourcing relations with most of their suppliers, auto component manufacturers are increasingly supplying to multiple assemblers. This buyer-supplier relation has been a byproduct of small-scaled auto production in which suppliers found a hard time to survive by being associated with only one assembler. Maruti was initially discouraging its suppliers to supply to the global auto companies' local operations that started in the second half of the 1990s, but the number of suppliers that are exclusive to one assembler has become minimal over the years. This multiple-supplying system has allowed the gradual emergence of monopoly in the markets for certain components. It is understandable to see that the top 20 companies in Table 4 control the markets for the products that they manufacture. However, the fact that mid-sized companies, such as Federal Mogul India (75% of spark plugs market) and Asahi India Glass (95% of glass market) , account for greater than 70 percent of their market is very characteristic to the Indian auto industry.

CONCLUSION

This paper has examined changes in the Indian auto industry after liberalization in 1991. The deregulation of the auto component industry in 1991 and the auto industry in 1993 has increased dramatically the presence of global carmakers and component manufacturers in India. Although India was hailed in the mid 1990s as one of the fastest growing car markets in the developing world, its domestic market has been stagnant causing auto companies and their suppliers numerous troubles, particularly inefficiency in production. Indian consumers' preference for super mini cars has also created confusions in auto companies' product policies.

In order to overcome this problem, auto companies and auto component manufacturers

alike have intensified their efforts to look for exporting markets. While few auto companies have been able to export cars to regional markets and beyond, auto component manufacturers have been very successful in selling made-in-India parts to OEMs and replacement markets throughout the world, particularly the US and European countries. The success of auto component manufacturers could be seen in their relationships with assemblers. Due to the limited size of domestic market, most assemblers have developed a single sourcing practice with their suppliers, but suppliers have not been bound to their primary buyer but been free to supply multiple assemblers.

REFERENCES

Abo, Tetsue, ed., 1994, *Hybrid Factory: The Japanese Production System in the United States*, New York: Oxford University Press.

Association of Indian Automobile Manufacturers (AIAM), 1999, *The WTO Regime and Its Implications for the Indian Automobile Industry*, Delhi: AIAM.

Automotive Component Manufacturers Association of India (ACMA), various years, *Facts and Figures: Automotive Industry of India*, New Delhi: ACMA.

Automotive News, 1995, "Top 10 stories of the year," December 25th, p.3.

_____, 1998, "Adjusting to India's market realities" June 1st, p.26.

Boyer, Robert, Elsie Charron, Ulrich Jürgens and Steven Tolliday, eds., 1998, *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*, Oxford: Oxford University Press.

Chatterjee, Bhaskar, 1990, *Japanese Management: Maruti and the Indian Experience*, New Delhi: Sterling.

Chrysler, M., 1995, "Asia/Pacific outlook: hot, hot, hot," *Ward's Auto World*, December, pp. 89-91.

D'Costa, Anthony P, 1995, "The restructuring of the Indian automobile industry: Indian state and Japanese capital," *World Development*, 23 (3), pp.485-502.

Dasgupta, Rajashri, 2000, "The dowager's last days," *HIMAL*, July, 20-27.

Economist Intelligence Unit, 1994, "The Indian motor industry: liberalisation takes effect," *International Motor Business*, 3rd Quarter, pp.119-136.

Economist Intelligence Unit, 1995, "A review of the automotive sector in India," *International Motor Business*, 3rd Quarter, pp.68-88.

Gulyani, Sumila, 2001, *Innovating with Infrastructure: The Automobile Industry in India*, New York: Palgrave.

Humphrey, John, forthcoming, "Globalization and the supply chain networks: the auto industry in Brazil and India," *Global Networks*.

Humphrey, John, Yveline Lecler and Mario Sergio Salerno, eds., 2000, *Global Strategies and Local Realities: The Auto Industry in Emerging Markets*, London: Macmillan.

Kaushik, Neha, 2003, "India to become component sourcing base for Ford," The Hindu Business Line, January 28th (http://www.blonnet.com)

Khare, Anshuman, 1997, "Strategic advantages of good supplier relations in the Indian automobile industry," *Technovation*, 17 (10), pp.557-568.

Kim, Yeong-Hyun, 2002, "More difficult than expected: Global auto firms' local adaptations in India," Colloquium, Department of Geography, Miami University.

_____, forthcoming, "Global auto companies' struggle for survival, "GERPISA.

Krishnamoorthy, Anand and Sangeeta singh, 2003, "Changing lanes on global highway," Financial Express, October 5th (http://www.financialexpress.com).

Lung, Yanick, Jean-Jacques Chanaron, Takahiro Fujomoto and Daniel Raff, eds., 1999, *Coping with Variety: Flexible Productive Systems for Product Variety in the Auto Industry*, Aldershot: Ashgate.

Mainstream Publication, 1977, *Maruti to Mafia: The Sanjay Gandhi Story*, New Delhi: Shaheed Prakashan Press.

Maruti Suzuki, 2003, "About us: international" (http://www.marutiudyog.com)

Mohanty, A. K., P. K. Sahu and S. C. Pati, 1994, *Technology Transfer in Indian Automobile Industry*, New Delhi: Ashish Publishing House.

Mohnot, S.R., 2001, *Automobile Industry 2001 and Beyond*, New Delhi: Centre for Industrial & Economic Research, Industrial Techno-Economic Services.

Narayana, D., 1989, *The Motor Vehicle Industry in India: Growth within a Regulatory Policy Environment*, New Delhi: Oxford and IBH Publishing Co.

Pingle, Vibha, 1999, *Rethinking the Developmental State: India's Industry in Comparative Perspective*, New York: St. Martin's Press (Chapter 4: The Automobile Industry, pp.85-120).

Sandhya, G.D. and N. Mrinalini, 2002, "Changing buyer-supplier relationships: reflections of dynamism and innovation in the automotive industry in India," International Journal of Technology management, 23 (1/2/3), pp.155-171.

Siddharthan, N.S., 1998, "Differential behaviour of the Japanese affiliates in the Indian automobile sector," Japan and the World Economy, 10, pp.97-109.

Venkataramani, Raja, 1990, *Japan Enters Indian Industry: The Maruti-Suzuki Joint Venture*, New Delhi: Radiant.