

Production Networks, Trade and Investment Policies, and Asian Regional Cooperation: The Thai Automotive Industry Case

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I. INTRODUCTION

Thailand's automotive industry is changing, thanks to several key developments. First, the global geography of the industry is being transformed by the rapid growth of automotive production and consumption in emerging markets, particularly China, India, and the ASEAN. Second, relationships between assemblers and suppliers are being restructured and globalized, as leading component producers are centralizing design and core operations while concurrently decentralizing production activities around the world. Third, economic liberalization policies pursued by the Thai government in cooperation with the Thai Automobile Industry Association (TAIA) since 1991 have facilitated the automotive sector's integration into international production-consumption networks; capital inflows, moreover, have enabled firms to expand production capacity and participate in regional brand-to-brand exchange projects. Finally, financial assistance extended by major assemblers to subsidiaries and part-makers in Thailand kept the industry operating through the 1991 recession and the Asian financial crisis.

This paper intends to examine the transformation of Thailand's automotive industry in view of these trends, and is organized with the following objectives: (i) to examine the evolution of the Thai automotive production network; (ii) to investigate the changing pattern of intra-Asian trade and investment; (iii) to analyze changes in the global automotive industry, with special focus on the shift of production to Thailand and the country envisioning itself as the "Detroit of Asia"; and (iv) to analyze automotive clustering policy and its implications for part and component suppliers, trade, and investments in the region.

The work is organized as follows. Section 2 provides an overview of the Thai automotive industry. Section 3 explains the concept of a production network, and outlines the historical development of the country's automobile sectors, with an emphasis on public policy responses and the liberalization period between 1992 to 1996. Section 4 analyzes current supply and demand for the industry. Section 5 lists recent, important trends shaping manufacturers around the world and discusses their relevance to the Thai and ASEAN automobile sectors. Section 6 revisits government actions with respect to the industry over the years, as well as the Thailand as "Detroit of Asia" objective. Finally, Section 7 summarizes key information in the preceding sections.

II. Structure of Thai Automotive Industry

A. Auto Assemblers and Their Production Capacity

The automotive industry in Thailand emerged from the import substitution policies adopted by the Thai government in 1960—part of which provided incentives for the establishment of local automobile plants. As a result, the first automotive assembly plant, under the Anglo-Thai Motor Company, began operations a year later.

Today, there are 12 assembly plants in the country, mostly Japanese (80%). These auto assemblers, with a combined annual production capacity of 1.37 million units, represent various global brands. Details of production capacity as of 2005 are in Table 1.

Table 1: Production Capacity of the Thai Automotive Industry in 2005

Item	PC	1 Ton P/V	CV	Total
1. Toyota	200,000	200,000	50,000	450,000
2. Isuzu	-	180,000	20,000	200,000
3. Mitsubishi	50,000	100,000	20,200	170,200
4. Auto Alliance (Ford and Mazda)	2,700	132,300	-	135,000
5. Honea	120,000	-	-	120,000
6. General Motor	20,000	95,000	-	115,000
7. Nissan	33,200	66,400	2,400	102,000
8. Hino	-	-	28,800	28,800
9. Daimlerchrysler	16,300	-	-	16,300
10. YMC Assembly	12,000	-	-	12,000
11. BMW	10,000	-	-	10,000
12. Volvo	10,000	-	-	10,000
TOTAL	474,200	773,700	121,200	1,369,100

PC-passenger car CV - commercial vehicle

1 ton P/V = 1 ton pick-up truck

Source: Thailand Automotive Industry Association.

B. Parts and Components Industry

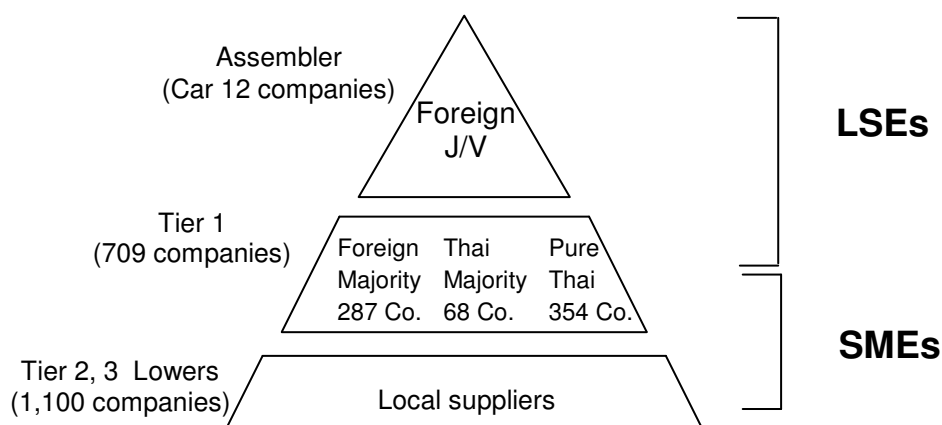
In 1971, a series of government announcements resulted in a boom in auto parts and components production by Japanese and local subcontractors. However, this policy of localization was not effective due to inadequate tariff incentives for completely knocked down units (CKD) assembly to compete with completely built unit (CBU) imports. Moreover, too many car models made the local assemblers run plants at production levels below what is required to achieve economies of scale.

Hence, in order for local production to attain economies of scale, the government prohibited the establishment of new assembly plants for passenger vehicles, imposed a ban on imports and reduced the number of models for passenger cars, raised the import duty on CKD kits from 50 to 80%, and revised local content requirement ratios upward (54% for passenger cars and 62% for commercial vehicles).

C. Structure of the Thai Auto Parts and Components Industry

The structure of the Thai auto parts and components industry is illustrated in Figure 1. Of the 709 companies in the first-tier, 40% are majority-owned by foreign companies, and the rest are either majority or entirely owned by Thais.

Figure 1: Structure of Relationship between Auto-Assemblers and Part Component Suppliers



Source: Thailand Automotive Industry Association.

Table 2 shows the number and percentage share of first-tier suppliers categorized by output and nationality of equity owners. It is interesting to note that the value of first-tier contract works extended to Thai companies was limited only to a maximum of 10% of the total, which reflects lower technical capacities on the part of Thai subcontractors. Local subcontractors, in addition, are also in a commercially disadvantageous position, as they are locked in exclusive contracts with auto assemblers' parent companies. This relationship, which interferes with production cost details and demands cost cutting, has fostered competition among subcontractors. On the other hand, second-tier suppliers are mainly Thai companies, totaling 1,000. They are mostly family-owned and inward-looking, and are now being pressured by local assemblers to cut prices.

Table 2: First Tier Suppliers Categorized by Parts Functions
(%)

Group	Pure Thai	Thai majority	Foreign majority	Total	Total number
1) Engine parts	33	13	55	100	63
2) Electrical parts	29	19	52	100	52
3) Drive, transmission and steering parts	33	12	55	100	52
4) Suspension and Brake part	37	3	60	100	35
5) Body parts	48	14	38	100	119
6) Accessories	46	5	49	100	39
7) Mould & Die	36	5	59	100	22
8) Other	63	7	30	100	327
Average 1-7	39	12	49	100	382
Average 1-8	46	10	44	100	1,091

Source: Thailand Automotive Institute.

C. Locations of Automotive Industrial Networks in Thailand

Investment privileges and relocation incentives provided by the government, coupled with considerations for firms' production and procurement systems, are responsible for the locations of the Thai automotive production bases. According to the mapping of locations, automotive assembly plants, parts and components are highly concentrated in the provincial areas within the 70 kilometers radius of the Bangkok.

One area in Samutprakarn serves as the production network of leading Japanese auto-assemblers, and is called by some logistics experts as the “Automotive Industry cluster of Thailand.” After 1997, newly promoted automotive assemblers invested in new industrial estates in the eastern provinces of Thailand, which are around 230 to 250 kilometers from Bangkok.

D. Employment in the Automotive Industry

The entire industry—inclusive of automotive assembly plants, parts and components producers, motorcycle assemblers, and related sub-sectors—currently employs 113,512 workers. Small and medium enterprises, which are mainly second-tier parts and components suppliers, account for 36.2% of the industry’s total employment.

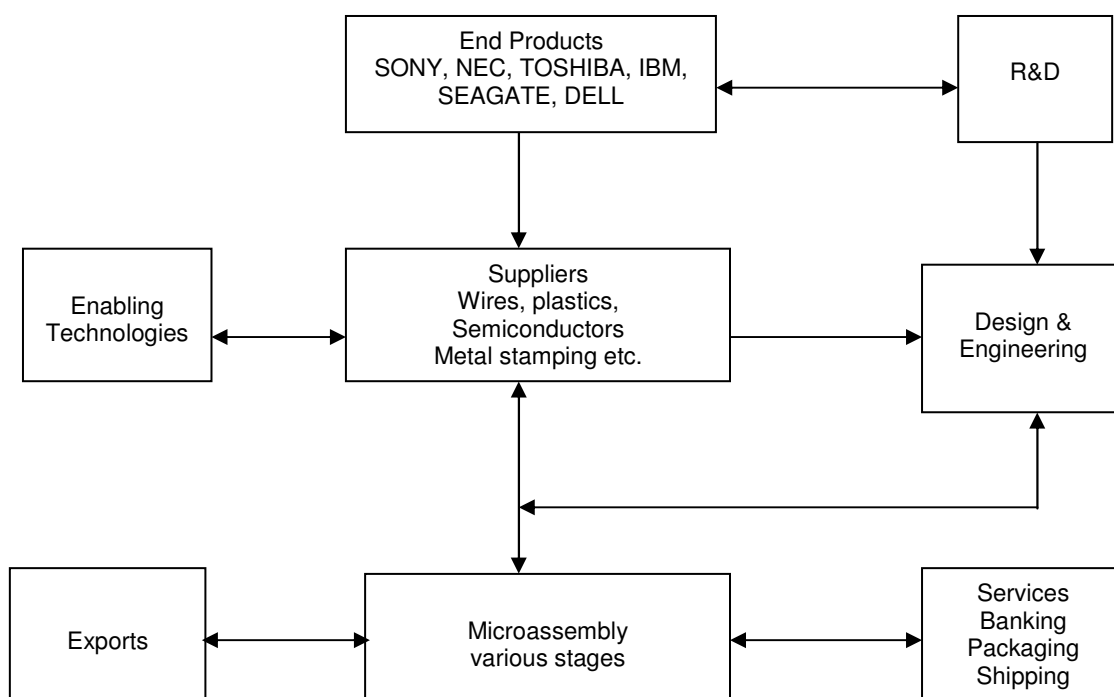
III. CHANGING PRODUCTION NETWORKS IN THE THAI AUTOMOTIVE INDUSTRY

The term “industrial network” refers to relationships between assemblers and parts and components makers such that production units among them are integrated either vertically or horizontally. Among Asian manufacturers, this is known as “clustering,” and is characterized by (MOI, 2003):

- i) Specialization by each participant (which means both competition and cooperation);
- ii) High connectivity (trust and geographically concentration);
- iii) Customer-oriented marketing (supporting activities are prevalent);
- iv) Effective absorption and transfer of technology (government offices and educational institutions play important roles);

To many manufacturers, industrial networking means improved competitiveness through effectiveness in production, delivery, and cost efficiency; to support these relationships, companies have adopted complementary strategic measures in procurement, financial assistance, and logistics. In terms of equity participation, assemblers start as strategic partners, after which they could later agree to set up a joint venture. In Thailand, there are also industrial networks for electrical appliances, electronics, and textiles. The organization of a typical industrial network is depicted in Figure 2 (Koike, 1998).

Figure 2: Networking in the Electronics Industry



A. The Creation of the Auto Industry Production Network in Thailand

1. Early Stages of the Thai Production Network (Pre-1991)

The Thai automotive industry emerged as a result of the 1960 Industrial Promotion Act, which aimed at promoting import substitution. This led to the establishment of the first automotive assembly in Thailand in 1961. (During the industry's first decade, high tariff rates on CBU and CKD passenger cars to help ease the country's balance of payments deficit. Rates went from 80 to 150% and 50 to 80% for CBU and CKD, respectively.) By 1971, the industry had assembled 9,017 passenger cars, representing half of the domestic market. The Automobile Industry Development Committee (AIDC) was also set up in the same year, setting minimum local content requirements, effective on December 31, 1973, at 25% for assemblers. An import ban on small CBU passenger cars with engine sizes smaller than 2300 CC was also put in place in 1978.

The production of peripheral auto parts (e.g. starters and radiators) increased rapidly. In addition, the production of auto parts based on casting process, such as brake drums crankshaft pulleys and flywheels also increased (IFCT, 1993). The production of small-pressed body parts also increased significantly in the early 1970s, which marked the real beginning of the Thai auto industry's development. Large-scaled part makers were established to produce pressed parts, diesel engine pistons, ball joints, plastic parts, and rubber parts (BOI, 1995). Production networks during the period were organized to develop technical capabilities of Thai firms and workers, and local content requirements were especially important in facilitating their formation.

To promote economies of scale in automotive parts production, car models were limited to two types of engine sizes and transmissions. Parts and components jointly manufactured by local and foreign companies were limited by market size and uncompetitive prices owing to high tariff rates (which were raised again in 1987). Demand for automobile vehicles, nonetheless, increased as the Thai economy grew, forcing the government to lift the import ban on automobiles with less than 2300cc-engines and leading to more competition in the industry.

2. Liberalization period (1992-1996)

a. New Relationships Within Production Networks

From 1992 to 1996, the Thai automotive industry liberalized and grew by an average of 12%. The liberalization period that ensued was marked by a tax restructuring program to allow more competition after a long period of protection for local industry. Price levels of both passenger and commercial vehicles dropped to attractive levels, spurring greater demand for automobiles. Production and domestic sales reached historic levels in 1996, but dropped significantly two years later in the aftermath of the Asian financial crisis.

Those four years of double digit growth also happened at a time when major international auto assemblers were globally sourcing parts and components. Global sourcing has become more important through the years, especially for complex parts ("module approach") that have a direct impact on vehicle performance. For complex parts or module components, contracts are secured at world prices for the life of each part. (Less complex parts, conversely, have shorter contracts.) Contracts are frequently allocated on the basis of a "price auction," with the Free On Board (FOB) price for the component as the starting point of price negotiations.

The part-components are integrated into sub-assemblies, forcing first-tier and second- or third-tier firms to work together in the supply network. The differences between the two in the production network are as follows:

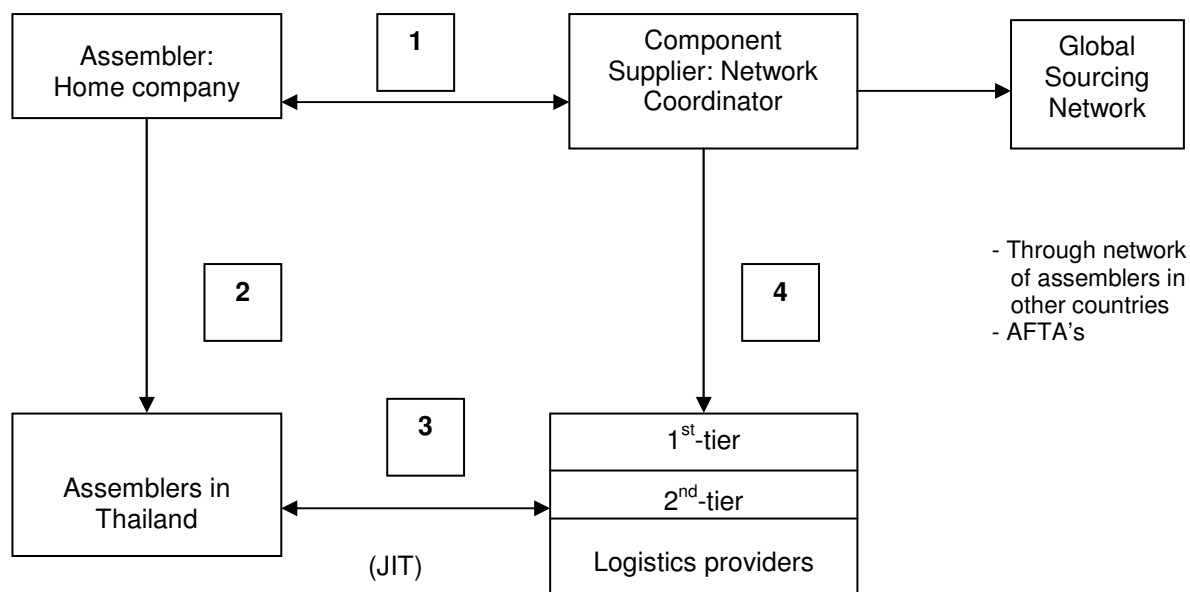
- i) First-tier suppliers are responsible for blackbox parts. Their engineers work with auto assemblers' resident engineers in providing design and blueprint, and work closely with the second-tier suppliers in making module part and component kits.
- ii) Second-tier suppliers are subcontractors responsible for detail-controlled parts. They are suppliers of plastic, rubber, and body parts.
- iii) There are also general-suppliers, which are sometimes called proprietary part suppliers, providing standard parts (spark plugs, etc.) made independently of any particular car project.

The new production network structure of the automotive industry has made necessary the concentration of part-component suppliers in areas where auto assembly plants are located. Production management under Toyota's Just-In-Time (JIT) system is one example of suppliers having to adopt their production plans in accordance with the auto-assembler's plan.

The key production network relationships are outlined in Figure 3. The relationship between a parent company and its key suppliers (relation number 1 in Figure 3) involves coordination and two-way information flows. Toyota Motors Thailand, for example, has units responsible for more than 200 first-tier part-component suppliers. The company has fostered close cooperation with its first-tier suppliers by setting up a "cooperative club" for informal get-togethers and consultations. On that note, a parent company and a local assembler (relation number 2 in Figure 3) always need to be closely connected, as they have to have compatible production plans. Suppliers and logistics providers essentially have the same links with Thai assemblers and the component supplier/network coordinator, though with respect to the production process, the most important relationship is number 4, requiring design information and criteria for contract selection based on quality, cost, and delivery.

For their part, American auto assemblers have adopted independent coordinators for part and component procurement systems. These coordinators, which have offices in Thailand, have subcontractors based all around the region.

Figure 3: Assembler-Supplier Relations (2nd period – Liberalization)



Source: Survey.

b. Government Policies

The period of liberalization was dominated by the government's tax restructuring effort, which aimed to nurture the establishment of supporting industries via the reduction of tariff rates. In 1994, new policies formulated allowed new automotive assembly facilities to be set up, and foreign capital was encouraged. The vision of Thailand being the "Detroit of Asia" was also adopted to promote competition and make the country (1) the production base for exports with scales of production at the competitive cost; (2) the production base for automotive parts and components as a result of an expansion of automobile exports; and (3) the distribution center for automobiles, parts, and components in the region.

Moreover, since tax incentives focused on microeconomic issues, cooperation between private institutions and the private sector were advanced for the industry's betterment.

3. Industrial Restructuring for Closer Regional Networks

The economic and financial crisis of 1997 shrunk the automobile market. Demand dropped to 140,000 units in 1998—only a quarter of the number sold in 1996. Local part and component suppliers laid off workers and cut costs while waiting for an economic recovery; many had to go out of business. Japanese auto companies even joined together and supplied loans, advance payments, and other forms of assistance to financially troubled suppliers. Toyota Motors Corporations, in fact, had to inject more than THB4 billion to maintain its operations without laying off a single worker. (Previously, auto assemblers spent billions of baht to increase their domestic market shares and produce for the entire region.) As a result, the country has a capacity glut that will last well into the next century—major new factories by latecomers, General Motors Corp and Ford Motor Co., increased the total capacity up to 1.2 million cars and trucks.

The bankruptcy of almost all of Thailand's finance companies because of the crisis posed another problem, as access to credit for vehicle purchases tightened. Today, financing remains tight: just 10% of consumers pay for automobiles in cash, compared to one-third of all consumers just before the downturn.

Production networks in Asia have been strengthened since the end of crisis, and this will continue in the automobile industry as overseas output by Japanese carmakers is expected to exceed production in Japan and Japanese investments (now about 40% of the total) continue to come into the region. In 2003, overseas output of Japanese carmakers reached 8.5 million. This number would increase to 10 million units as early as 2005.

During the crisis, the government had to adopt fiscal policies mandated by the International Monetary Fund (IMF) and increase value added taxes, excise taxes, and import duties on goods including cars. A weakened market and excess capacity forced major auto assemblers to increase exports in order to compensate for weak local demand. Amid the unfavorable environment however, some companies moved to Thailand to take advantage of the greatly-expanded production capacity, and in anticipation of 2003, when tariffs on cars traded within ASEAN were expected to drop to 5%. The leading auto assemblers would then continue to trade of CBU automobile under the Brand-to Brand-Complement (BBC) scheme, which started in 1992.

To help rehabilitate the economy, the Thai government adopted an industrial restructuring program for 13 industries immediately after the crisis. Many automotive part

and component suppliers joined this program, where concepts of global production and sourcing in industrial networks were explained to them, as indicated in Table 3. The local content policy was abolished effective January 1, 2000, as stipulated under World Trade Organization (WTO) rules, more imports began to be used to make locally-assembled cars internationally competitive, and taxes were restructured to meet international standards.

Table 3: Global Production and Sourcing

Business conditions	Business objectives	Production concept	Parts & components	Procurement policy
Low economic growth	Cost reduction	Minimize number of platform	Standardization	follow sourcing
Stagnated technological differentiation innovation Varied demands mega-competition	Quick delivery		Unit parts (module) parts for common use	Global sourcing

Source: Koike (2000)

IV. PRODUCTION AND EXPORT STRUCTURES OF THE THAI AUTOMOTIVE INDUSTRY UNDER CHANGING INDUSTRIAL NETWORKS

A. Production and Domestic Demand

Thai automobile production has increased rapidly since the latter half of 1980s. Average production growth from 1993 to 1996 was 9.53%, primarily because of lowered automobile prices in the local market due to liberalization. Production reached record levels in 2003, when Thailand exported almost 200,000 units of CBU cars. Many auto assemblers has utilized their production network to export more cars in order to compensate for the declined share of domestic market. As for domestic demand, sales of automobiles from 1993 to 1997 exceeded production, indicating that more CBU passenger cars were imported to fill the gap, as shown in Table 4.

Table 4: Production and Domestic Sales of Automobile in Thailand

Year	Production	Domestic sales
1993	419,861	456,461
1994	434,001	486,678
1995	525,680	571,580
1996	547,312	589,126
1997	360,303	363,156
1998	158,130	144,065
1999	327,233	218,330
2000	411,721	262,189
2001	459,418	297,052
2002	584,951	409,362
2003	750,512	533,176
2004	928,081	626,026

Source: Thailand Automotive Industry Association.

B. Thailand as a Production Base of One-ton Pick-up

Thammavit (1997) attributed the high percentage share of production in commercial vehicles (CV) to the government's policies and strong demand for multi-purpose uses. (See

table 5 for the percentage share of each vehicle type in Thai automotive production.)

After the financial crisis in 1997, production networks immediately adjusted to focus on commercial vehicles. Approximately 25 to 30% of commercial vehicles produced were exported to Europe and Australia.

Table 5: Thailand's Production Classified by Type

Item	1996	1997	1998	1999	2000	2001	2002	2003	2004
1. Passenger Vehicle (PV)	138,579	112,041	32,008	72,716	97,129	156,066	169,321	251,684	299,439
2. Commercial Vehicle (CV) excluding 1-ton pick-up	66,386	28,322	4,186	8,326	13,798	9,382	12,774	20,925	37,783
3. 1-ton pick-up truck	350,857	218,336	119,986	240,369	294,934	289,349	382,297	468,938	588,579
4. OPV	2,544	1,604	1,950	5,822	5,960	4,621	20,559	8,965	4,10
Total	558,365	360,303	158,130	327,233	411,721	459,418	584,951	750,512	928,081
Percent change	6.22	(35.4)	(56.1)	106.9	25.8	11.5	27.3	28.3	—

^a 1 ton pick-up includes Double Cab and PPV.

Source: Thailand Automotive Institute.

C. Capacity Utilization

Capacity utilization is an indicator of economies of scale in production. In Thailand's automotive industry, capacity utilization was at a peak in 1996, especially for commercial vehicles. Before 2004, capacity utilization in automotive industry was at its highest in 1996, especially for commercial vehicles. During the crisis and the years after it (1997 to 2000), capacity utilization went below the 50% level as domestic sales shrank, though production for export markets pulled the rate back to 62.1% in 2003 (See Table 6).

Table 6: Capacity Utilization in Automotive Industry

Year	Passenger vehicle	Commercial vehicle	Total
1996	54.9	78.2	65.7
1997	39.4	52.2	45.3
1998	13.0	22.1	17.2
1999	23.6	37.5	30.0
2000	24.7	44.1	33.7
2001	37.0	41.6	39.1
2002	43.4	56.6	53.6
2003	57.7	64.9	62.1
2004	68.2	85.9	80.2

Source: Bank of Thailand.

D. Thailand Vehicle and Part Exports

During the pre-crisis period, exports of vehicles, parts, and components were less than US\$10 million because of limited, domestic market-oriented promotions. Only 14,020 units of CBU were exported in 1996. The fall-out from the crisis forced some leading car companies—namely Mitsubishi, Isuzu and Toyota—to shift their commercial vehicle production base to Thailand. Over time, production networks have gradually diversified the export structure of the Thai automotive industry, as exports of OEM parts and components increased from only B976 million (US\$36 million) in 1996 to B22 billion (US\$556 million). (Mitsubishi, with B2 billion in exports to date, leads all other producers.) Overall, this has led Automotive Resource Asia (ARA) to predict that Thailand would account for 500,000 of ASEAN's 600,000 export vehicles in 2006. The country is also expected to service about 70% of the global demand (2 million units annually) for the one ton pick-up truck, with the rest of the supply coming from South America and Africa (See Table 7).

Table 7: Thailand Vehicle and Part Export, 1996-2003
(in THB million)

Year	Total Amount	CBU Unit	CBU Amount	Engine Amount	Spare Part Amount	Jig and Die		O.E.M. Part		Other Amount
						Unit	Amount	Body	Component	
1996	6,295.55	14,020	4,253.36	801.98	215.44		43.66	373.62	602.16	5.33
1997	20,722.84	42,218	16,226.99	2,023.89	505.28	17	56.34	1,037.60	845.16	27.58
1998	34,110.33	67,857	28,125.55	1,536.77	722.79	6,013	63.70	1,347.27	2,288.36	25.89
1999	60,105.53	125,702	50,187.21	3,731.81	883.42	177	141.35	1,424.40	3,678.86	58.48
2000	83,245.46	152,835	63,349.15	7,106.22	1,245.65		119.96	1,556.45	9,531.17	336.86
2001	107,110.60	175,299	83,894.70	7,481.38	1,758.56	5	141.19	1,989.49	11,748.57	96.71
2002	107,729.72	180,554	82,474.66	6,087.28	1,796.41	18	145.26	2,879.77	14,196.28	150.06
2003	114,737.54	196,800	85,393.48	4,552.28	1,796.63	2	148.36	3,348.01	18,928.13	570.65

Source: Thai Automotive Industry Association.

1. Export Markets for Thai Automobiles (CBU) in 2003

ASEAN countries constitute a third of the entire export market for Thai CBU (Table 8). This might be reflective of the preferential tariffs applied under AFTA, and indicate trade among companies in inter-country production networks. With the international multi-purpose vehicle (IMV) projects of Toyota underway starting 2007, this trend should continue. With respect to Japan, Thailand is projected to import more luxury cars and export more under IMV.

Table 8: Major Export Markets for Thailand Automotive (CBU), Year 2001

Country	Percentage share
Indonesia	22.92
Japan	20.02
Philippines	12.57
Belgium	11.70
Australia	11.56
Others	21.23

Source: Custom Department, Ministry of Finance

2. Export Markets for Automotive Parts and Components

Export statistics for 10 major items, which constitute 80% of the total, show that intra-AFTA trade accounted for slightly above one-fourth (26%) of total Thai exports in parts and components, as shown in Table 9.

Table 9: Top Ten Export Destinations of Thai Auto Parts and Components in 2001

Country	Percentage share
Japan	30.0
Malaysia	13.8
South Africa	15.8
USA	10.3
Sweden	9.4
Indonesia	6.6
Philippines	5.6
Australia	2.3
Pakistan	1.4
Vietnam	0.6

Source: Custom Department, Ministry of Finance.

1. Import structure of the Thai Automotive Industry

Only 10,000 CBU vehicle units, mostly from Japan, Europe, and South Korea, were

imported in 2001. Details of imports are given in Table 10.

Table 10: Thailand's Imports of CBU Vehicle

Country	1998	1999	2000	2001
Europe	1,377	2,372	5,695	5,765
Japan	723	4,655	5,342	1,454
South Korea	6	42	1,360	2,781
Others	443	31	163	79
Total	2,549	7,100	12,560	10,079

^a Unit: Vehicle unit

Source: Custom Department, Ministry of Finance.

2. Import Structure of the Thai Parts and Components Industry

Automotive production networks are owned and operated by parent companies operating in major industrialized countries like Japan, Germany, Sweden, and USA. Collectively, they contribute to the imports of major parts and components. Details of import sources are given in Table 11.

Table 11: Imports of Parts and Components (Sources of Thailand's Imports) in 2001

Country	Percentage share
Japan	72.5
Germany	9.4
Philippines	6.5
Sweden	2.1
Indonesia	1.7
USA	2.6
Malaysia	1.1
Taiwan	0.7
S. Korea	0.1
UK	0.3

Source: Information Centre of Ministry of Commerce.

3. Prospects for External Trade of the Thai Automotive Industry

Global sourcing and Thailand's vision to be "Detroit of Asia" will push Thailand's auto production to reach one million units by 2006, with 40% of this targeted for export. Thailand has consistently had trade deficits in auto parts and components (Table 12). This suggests that Thai parts and components suppliers need to upgrade their technical capabilities, and that those belonging to the industry's first-tier need to move on to manufacturing higher value-added components for the country to benefit from the production networks.

Table 12: Trade in Parts and Components of Thai Automotive Industry, 1994-2001
(in THB million)

Year	Import	Export	Balance
1994	137.1	28.2	-108.9
1995	189.4	23.1	-166.3
1996	158.9	25.6	-133.3
1997	98.6	36.4	-62.2
1998	44.9	53.6	8.7
1999	64.6	54.6	-10.0
2000	96.8	65.1	-31.7
2001	75.3	67.5	-7.8

^a Unit: million baht

Source: Ministry of Commerce.

V. INDUSTRY TRENDS

ASEAN countries have a combined market size of about US\$8.6 billion (as of 2002), with almost 1,700 manufacturers producing both OEM and after-market parts. Sixty percent of component manufacturers in ASEAN either have a foreign partner or receive foreign technical assistance.

More international companies, such as Denso, Autoliv, Daikin, Visteon, Delphi, TRW, Yuasa and Johnson Control, are setting up manufacturing sites in the ASEAN region. These international giants are partly responsible for bringing the latest industry trends to the ASEAN parts and components market. Jalalud (2004) points out some of the recent global trends that are making an impact on the ASEAN parts, and these are consolidations and strategic alliances, the module systems approach, persistent price pressures, shifting design capabilities, and an emphasis on R&D initiatives.

A. Consolidations and Strategic Alliances

Mergers, acquisitions, and alliances are strategies being adopted by some leading firms to expedite excess capacity and ensure a global presence through complementary product lines. ASEAN-based manufacturers, however, have been slow to adopt these measures, because few parts complement each other in the region: Thailand, Indonesia, and the Philippines concentrate on van and truck parts, while Malaysian makers focus on car parts. However, strategic alliances among ASEAN manufacturers are expected to gradually increase once AFTA comes into full force in 2008.

B. The Module System Approach

A module system is a group of components linked by function and supplied to automotive assemblers. Complex modules that incorporate multiple functions are still at an early stage in ASEAN, though big auto assemblers in Thailand and Malaysia are currently applying this module system with groups of suppliers working closely together. ASEAN manufacturers need extensive R&D initiatives and high investment to devise ways to take core parts and turn them into highly efficient assemblies.

Moreover, a large number of ASEAN factories are still not flexible enough to produce an integrated system, which demands frequent shifts in manufacturing capabilities. The present system is not designed to cater to various models set up, but targeted to mostly limited parts models.

C. Persistent Price Pressures

Cost cutting is essential part in sustaining the growth of this industry. However, cost reductions and price pressures have intensified since 2001 as a result of intense competition in the global automotive market. Globally, leading vehicle makers are pushing for a price reduction in the range of 5% per year for major component parts supplied to the OEMs.

A similar scenario is happening at the ASEAN level. As pricing becomes a key determinant in attracting buyers of cars to ASEAN, vehicle manufacturers are passing cost reductions to component part suppliers. This applies to every supplier in the OEM parts supply chain, from tier-one to tier-three suppliers.

D. Shifting Design Capabilities

Large OEMs like Ford, GM, Daimler Chrysler, and Toyota, have transferred design responsibilities to tier-one suppliers without relinquishing actual control over design and quality aspects. This is to concentrate on the core task of marketing and selling vehicles, and activities related to these. Consequently, global tier-one suppliers like Visteon, Delphi and Johnson Controls are taking an increasing share of risk from the OEMs to meet their tough requirements.

The idea of outsourcing design aspects is gaining ground in ASEAN automotive markets, particularly in Thailand and Malaysia. It is expected that regional outsourcing will escalate as most ASEAN countries join AFTA. On a relevant note, the reason why many Japanese and European OEMs are pushing for greater local involvement in parts design and manufacturing is to produce models that suit local demand. It must be noted though that the participation of purely domestic companies in design is very limited.

E. Emphasis on R&D Initiatives

Well-established parts and component manufacturers incorporate a host of technologies in order to create cost-efficient product differentiation and high value-added components. This is not yet the case for ASEAN manufacturers. A large number of parts and components suppliers have produced and are still producing low value-added parts. The low priority of modern technology among ASEAN manufacturers comes from inadequate engineering capabilities, high R&D costs, and lack of awareness among manufacturers and consumers alike.

A proper assessment of industry trends, however, might lead to a more competitive, technology-driven, and efficient ASEAN component parts industry. Toward this end, it is important that ASEAN firms cooperate more closely in advancing an integrated free trade region, as envisioned by AFTA. Ultimately, a strong and unified ASEAN components industry would be able to benefit from changes in the global automotive market, while being able to withstand competitive threats from other markets.

VI. GOVERNMENT POLICIES

A. The Changing Role of the Government

From 1961 to 1970, the Industrial Promotion Act was adopted to promote the establishment of auto assembly plants. High tariffs were set to protect local assembly plants from imported CBU units and finance budget deficits. During this period, the small local market deterred economies of scale in production. Local content requirements were also in place to induce supporting industries to establish production bases in Thailand.

The second period (1992 to 1996) was marked by liberalization and deregulation. Tax rates were restructured; excise and value added taxes were introduced. The ban on imports of CBU and new assembly plants were done away with, and more privileges were extended to new FDI for supporting industries.

After the 1997 crisis, the government's policies were aimed at rescuing the manufacturers in the sector through the revision of promotional privileges in provinces and the adjustment of rules to support production capacity expansion. On January 1, 2003, local content requirements were abolished in favor of global sourcing and closer regional cooperation in the production network.

Overall, since the adoption of liberalization and deregulation policies in 1991, the government has gradually changed its economic role over time. In broad terms, it shifted its stance from protecting the industry from competition to monitoring trends and supporting

efforts to enable competitiveness and compliance with WTO rules. More importantly, it is now assisting the industry on upgrading itself in the following aspects:

- i) HRD
- ii) Testing laboratory
- iii) Automotive Research and Development Centre
- iv) Technology Transfer
- v) Basic infrastructure (telecommunication and transportation)
- vi) Information technology
- vii) Revise laws and regulations which are against the tariff and tax structures.
- viii) Find measures and solutions for trade negotiations in order to protect national interests.
- ix) Promote and/or support trade mission in order to find new markets.

A summary of the relevant policy positions and events is provided in Table 13.

Table 13: Government's Policies and Automotive Production Networks

Period	General Characteristic	Driving forces	Policy measures	Networking Development
1. Pre-1991	<ul style="list-style-type: none"> - From small market to the emerging networks. - Diseconomies of scales - Baht devaluation (1984) - High economic growth (86-89) 	<ul style="list-style-type: none"> - Domestic demand 	<ul style="list-style-type: none"> - Import substitution - Industrial Promotion Acts - High import tariffs - Local content requirement (1971) - Limit model of car assembly - Revised local content 	<ul style="list-style-type: none"> - Establishment of parts and component (1974) - Cooperation between auto assemblers and part makers - Investment in supporting industry
2. Liberalization and deregulation (1992-1996)	<ul style="list-style-type: none"> - Lower taxes pushed the price of automobile down - Economy showed signs of weakness - Upward trend in domestic sales 	<ul style="list-style-type: none"> - FDI - Strong domestic demand 	<ul style="list-style-type: none"> - Partial liberalization - Lift ban on import of CBU - Lower tariffs and business taxes on imported CBU - Promote SMEs in automotive industry 	<ul style="list-style-type: none"> - Expansion of production capacity. - Establishment production network with more local supporting industries - Promotion of cooperation through AFTA program
3. Industrial restructuring for closer regional cooperation (1997-now)	<ul style="list-style-type: none"> - Financial crisis led to drop in demand. - Business in trouble (lack of cash flow) - Industrial restructuring 	<ul style="list-style-type: none"> - Intra-regions trade - Exports 	<ul style="list-style-type: none"> - Revise promotional privileges for new assembly plants - Abolish local content requirement (2000) - Create trade through regional cooperation and FTA 	<ul style="list-style-type: none"> - Global sourcing - Relocation of production base to Thailand (pick-up) - New trend in global part and component industry - New technology in automotive industry

ASEAN countries have attempted to integrate their automotive industries, forming a common effective preferential tariff (CEPT) scheme under the AFTA in 1993. However, most assemblers did not take account of the CEPT scheme in their planning, because automotive industry was initially on the "sensitive" list. But liberalization in automotive industry and promotion of bilateral trade among trading countries involving Thailand have moved tariff reductions among member countries sooner than earlier planned. The newly-planned tariff reduction is .05%, to be implemented in 2010. The Thai Automotive Industry Association proposed 0% CBU in 2005 as a means for the region to remain internationally competitive.

Moreover, ASEAN member countries have agreed to promote intra-regional trade in automotive parts and components via the BBC Scheme. The scheme assigns specific parts

of production to different ASEAN countries to exploit comparative advantages and develop economies of scale. It allows assemblers in each of the participating countries to receive local content accreditation and a 50% reduction in import duties for components sourced from ASEAN countries. Unfortunately, only three countries involving four automakers have participated in this program due to its limitations. In view of this, ASEAN agreed on a new scheme called ASEAN Industrial Co-operation Scheme (AICO) in April 1996. AICO provides the following privileges: (1) 0 to 5% import duty rates immediately; (2) local content accreditation; and (3) no restrictions on the export of the AICO products for participating countries.

As expected, the AICO scheme has enhanced intra-ASEAN trade in vehicles and auto parts. There are already ASEAN market cars that have effectively promoted trade and exploited economies of scale: Toyota (Soluna designed and assembled in Thailand, Avanza assembled in Indonesia) and Honda City assembled in Thailand.

On a relevant note, the Thai government has moved to promote bilateral trade with ten countries, though agreements are in different stages of preparation. It has been agreed that zero tariffs be applied in trade with India and China by 2010.

B. Tax Structures in the Automotive Industry

The Thai Automotive Industry Association has complained about tariffs on imported materials for parts and components production exceeding those for finished parts and components. Under existing law, the former has rates pegged between 10 to 50%; the latter between 0 to 5% only. This puts local manufacturers at a disadvantage.

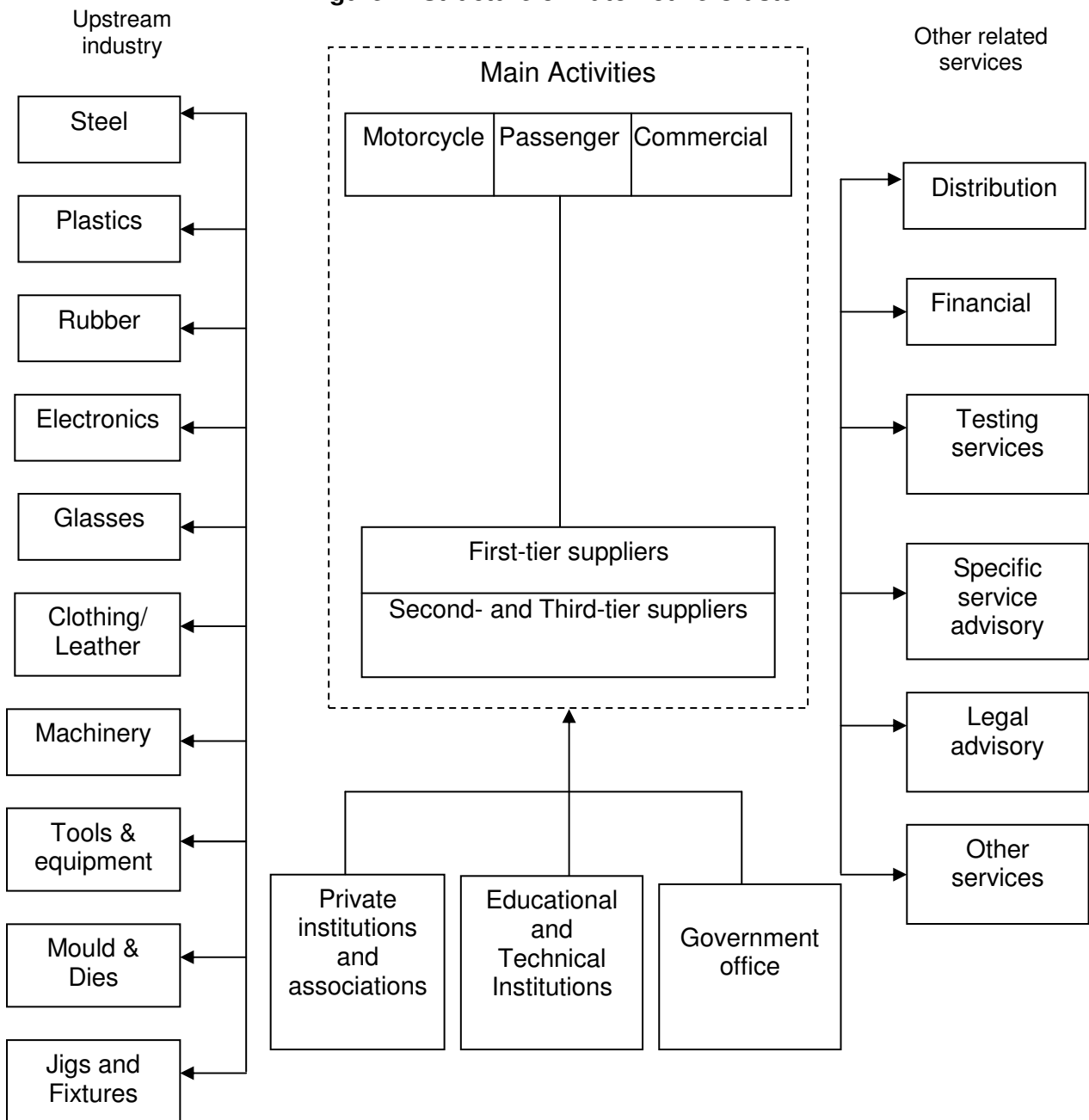
C. Clustering System

In revising its industrial development plan to promote SME efficiency and overall Thai industries' competitiveness, the government has adopted Michael Porter's clustering concept. The automotive cluster structure is extensively illustrated in Figure 4.

The geographical concentration of the five targeted industries—food, fashion (garments, leather, jewelry), electrical appliances and electronics, tourism, and automotives—is planned by the Committee on Competitiveness Promotion of National Economic and Social Development Board (NESDB), the central economic planning agency in Thailand.

Automotive clusters are planned in eastern parts of Bangkok, where major car assemblers are located. Main facilities are presently in Samutprakarn, and newly established locations are Rayong, Chacheongsao, Chonburi in the east and Ayudhaya in central Thailand.

Recently, the Thai Automotive Institute drafted a master plan for developing the industry. Included in the proposal is incorporating groups of related activities into the clustering system. Supply chain management and logistics systems, in addition, are being studied on behalf of the industry by Japanese consulting firms for application in the future. (Outsourcing logistics will not only help reduce costs and improve processes; it will also allow concentration on the core business of making cars.)

Figure 4: Structure of Automotive Cluster.

D. New Investment in the Automotive Industry

1. To Achieving the “Detroit of Asia” Status

The Thai government has jointly worked with the Thai Automotive Institute in promoting Thailand as “Detroit of Asia,” with the following objectives:

- i) Being able to produce 1.8 million cars, with 40% as exports, in 2010
- ii) Being the production base for the global one ton pick-up truck
- iii) Being a production base for motorcycles, with production capacity of over 2 million units.
- iv) Being a production base for OEM and REM parts, exporting more than B50 million annually.

2. To Achieving World-class Performance

In order to supply products that meet the needs of production facilities in the Asia Pacific region as they diversify and become more advanced, the Toyota Technical Centre Asia Pacific (TTCAP) was established in Thailand as a regional research and development hub. TTCAP utilizes the very latest vehicle design, development, and analysis tools and evaluation facilities. Wholly owned by TMC, it covers an area of 320,000 square meters. The B2.5 billion facility currently employs 240 staff and is expected to grow over time in accordance with demand. Initially, it will work on partial improvements, with the long-term goal of designing an entire vehicle.

3. To Strengthening Production Networks in Thailand

In 2007, Toyota Motors Thailand became the second largest production base of TMC outside Japan with a total capacity of 550,000 units per year. The products are aimed at domestic sales and export markets under IMV. The IMV project, aimed at utilizing Thailand as production base for one-ton pick up, multi-purpose vehicle (MPV) and diesel engines, was started in August 2004. Other countries included in the IMV project are Indonesia, Argentina, South Africa, the Philippines, and Malaysia. The total cost is THB21.86 billion for the factory, which is capable of producing 100,000 pick-up and SVV, as well as parts for export. The new plant is scheduled to start operations in 2007.

Moreover, Nissan is also planning a THB32.15 billion package of 3 projects, alongside a THB24.28 billion factory with production capacity of 200,000 passenger cars and pick-ups per year. The plant started operations in 2005. Forty percent of its output is for export. Nissan will also spend B4.4 billion on a plant to produce metal parts, plastic parts, and auto body parts to serve its car production lines. An additional B2.97 billion is also slated for creating plants to produce engines.

4. To Upgrading Technical Capability

Toyota has established a manufacturing arm in Thailand to make embedded system software. With embedded software expected to be an important technology for electronic control units (ECUs), the company will focus on the development of design, coding, and testing of this software. The total market for embedded software in the automotive industry is US\$1 billion, but that should increase to as much as US\$10 billion in 2010.

5. To Promote the ACES Car

In order to promote Thailand as the “Detroit of Asia” while encouraging fuel saving, the Ministry of Industry is promoting a scheme whereby the industry will promote vehicles that are 3.6 meters long and 1.6 meters wide, with engines capable of using fuel with a mixture of 20% ethanol and 80% gasoline. (This translates to a consumption of just 5 liters of gasoline per 100 kilometers run.) Retail prices for these cars should not exceed THB350,000. The project aims to encourage the replacement of old cars, which should lead to more tax collections by the government, and to save B200 million in fuel consumption.

VII. CONCLUSION AND RECOMMENDATIONS

For the past three decades, the government’s policy measures have been on the right track in promoting the growth and development of the Thai automotive industry through consistent support for the local production network. In particular, the liberalization and deregulation policies which started in 1992 have made possible the relocation of several

commercial vehicle production bases (Toyota and Isuzu) to Thailand. The pick-up truck alone is a Thai product sold in more than 150 countries.

Regional economic cooperation under the AIJE program has greatly benefited the production network, as it has multiplied the scale of production through work division among companies involved (Ford and Toyota).

ASEAN has become an emerging production base and market for the global automotive industry, similar to China and India. In this light, joint policy drafting efforts should target improved competitiveness of local SMEs in making parts for OEM and REM markets. This will strengthen production networking, and drive the region's industry along a sustainable development path.

Finally, the six challenges that Thailand and other countries in the region have to contend with as regards the industry are:

- i) Positioning of Thai and ASEAN Auto Industries in the global market;
- ii) Linking Thai SMEs to the automotive supply chain;
- iii) Empowering the Thai automotive industry workforce;
- iv) Developing and integrating supporting industries into the Thai auto industry;
- v) Modernizing the automotive industry through logistics and IT in order to strengthen competitiveness; and
- vi) Innovating to succeed through research and development.

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