

4. Transportation Machine Sector

4.1 Automobiles

4.1.1 Supply and demand trend

(1) Outline

The environment of the automobile industry has greatly been changing in recent years. In addition to the run-up of oil prices, a recession phase of the business cycle is beginning to be seen in overseas markets, too. Active export contributed to increase in domestic production by supplementing sluggish domestic sales, but as the export has tended to decline, the domestic automobile industry is going to change its direction greatly. According to the statistics for 2007, while the production and export of automobiles continued increasing, it can easily be forecast that slower growth in the overseas market will result in decrease in domestic production because the Japanese automobile industry is largely supported by export. The following sections will summarize the present situation and study the future direction of the automobile industry in Japan.

(2) Situation of domestic production

The domestic production of automobiles continued an upward trend in the past several years and registered about 11.6 million in 2007. The factor behind this was the fact that the steady expansion of passenger cars and buses more than made up for the dwindling production of trucks (Fig. 4.1.1). By type of vehicle, the output of passenger cars was 9.94 million, a similar level to the figure for around 1990 when the bubble economy was sweeping across Japan. Standard-sized cars enjoyed an especially marked increase in sales. By contrast, the production of small-sized cars suffered a decline for the second consecutive year. The output of light motor cars had increased favorably in the past but fell in 2007, stopping the upward trend of light motor car production that had continued after the burst of the economic bubble. The factors behind the rise in the output of standard-sized cars will be analyzed in more detail later, but the active export is supposed to have been an important reason. On the other hand, trucks have been unable to get rid of the tendency of decreasing production. The measures of automakers to cope with the exhaust gas control have been ended for the time being, and stricter control is scheduled to be imposed soon. Thus users are keeping from buying new trucks, and this is one of the factors in the lower truck output.

Fig. 4.1.1 Trend of domestic automobile production by type of vehicle

	Passenger cars				Trucks			
	Standard-sized	Small-sized	Light motor	Subtotal	Standard-sized	Small-sized	Light motor	Subtotal
2003	3,753,446	3,434,662	1,290,220	8,478,328	772,727	449,462	524,427	1,746,616
2004	4,044,563	3,309,147	1,366,675	8,720,385	769,953	446,536	514,202	1,730,691
2005	4,191,360	3,416,622	1,408,753	9,016,735	723,663	436,763	546,185	1,706,611
2006	4,915,428	3,302,265	1,537,210	9,754,903	699,410	419,404	521,879	1,640,693
2007	5,864,354	2,638,842	1,441,441	9,944,637	718,901	365,532	453,587	1,538,020

	Buses			Total
	Large-sized	Small-sized	Subtotal	
2003	11,406	49,668	61,074	10,286,018
2004	12,286	48,156	60,442	10,511,518
2005	11,763	64,550	76,313	10,799,659
2006	11,063	77,574	88,637	11,484,233
2007	11,516	102,154	113,670	11,596,327

Source: Based on the data of the Japan Automobile Manufacturers Association.

Fig. 4.1.2 Trend of domestic automobile production by manufacturer

	Toyota	Nissan	Mazda	Mitsubishi	Isuzu	Daihatsu	Honda	Fuji
2003	3,520,017	1,471,595	801,084	749,371	244,575	641,236	1,170,941	450,062
2004	3,680,946	1,439,007	818,730	639,883	218,352	679,485	1,242,528	491,792
2005	3,789,582	1,451,212	864,929	664,900	210,253	724,509	1,261,994	469,497
2006	4,194,188	1,234,400	966,547	758,478	230,807	791,291	1,332,866	482,283
2007	4,226,137	1,179,080	995,511	846,083	240,287	786,601	1,331,845	475,850

	Nissan Diesel	Hino	Suzuki	GM Asia Pacific (Japan)	Mitsubishi Fuso	Others	All automakers, total
2003	38,848	83,122	980,731	1,012	132,745	679	10,286,018
2004	40,107	93,837	1,045,735	0	120,118	998	10,511,518
2005	41,071	96,985	1,090,786	0	132,274	1,667	10,799,659
2006	42,833	100,122	1,206,805	0	141,503	2,110	11,484,233
2007	45,993	106,893	1,218,297	-	141,280	2,470	11,596,327

Source: Same as that for Fig. 4.1.1.

Figure 4.1.2 shows the automobile production by manufacturer. As seen in this figure, while no automakers increased their production considerably, Nissan's declining trend continued. After the introduction of the Nissan Revival Plan, the company recovered its output satisfactorily but suffered lower production in 2006 and did so in 2007, too. Isuzu, Nissan Diesel and Hino have focused on commercial vehicles and expanded their production, whereas Mitsubishi Fuso was in a leveling-off state. It is supposed that automakers managed to keep or increase their production level by making up for lower truck output by bus production.

As discussed above, the production of the automobile industry in Japan in 2007 showed favorable growth in general. But paying attention to the situation of small-sized cars and trucks, everything did not indicate a good performance. Moreover, as a result of the leap in gasoline prices, the behaviors that may be regarded as a trend away from driving cars have been observed in some cases. Further attention should be paid not merely to moves on the part of domestic users but to the tendency of overseas markets as well.

(3) Situation of domestic sales

The domestic production of automobiles still showed an upward trend, and it was considered by some people that the automobile industry continued enjoying briskness. But domestic sales remained inactive. More specifically, the sluggish sales in the past several years continued in 2007, registering 5.35 million. This indicates that the Japanese automobile industry is now in the structure where a half of cars made in Japan are for overseas markets. There are various reasons for this situation, including the longer period of use of cars to cope with oil price surges, emission gas control and keener competition for cost reduction in the transportation industry. In the passenger car segment, the sales of standard-sized cars showed an increase first in three years after 2004, recording about 1.3 million, but those of small-sized cars fell sharply to 1.65 million. Light motor cars had enjoyed brisk sales in the past but dropped to 1.45 million in 2007. Thus the turnover of all passenger cars was below the 4.5 million mark. Light motor cars had been popular mainly because of their convenience and low maintenance costs and had achieved greater sales even in the recovery phase of the business cycle; but partly because no new models were introduced, their turnover declined in 2007.

Fig. 4.1.3 Trend of domestic automobile sales by type of vehicle

	Passenger cars				Trucks			
	Standard-sized	Small-sized	Light motor	Subtotal	Standard-sized	Small-sized	Light motor	Subtotal
2003	1,229,907	2,194,194	1,291,819	4,715,920	208,752	373,259	509,044	1,091,055
2004	1,358,281	2,037,767	1,372,083	4,768,131	186,588	361,449	519,067	1,067,104
2005	1,271,349	2,089,992	1,387,068	4,748,409	197,548	351,708	536,648	1,085,904
2006	1,225,867	1,908,267	1,507,598	4,641,732	209,283	354,870	516,021	1,080,174
2007	1,299,168	1,654,025	1,447,106	4,400,299	171,998	293,021	472,713	937,732

	Buses			All vehicle types, total
	Large-sized	Small-sized	Subtotal	
2003	5,862	15,341	21,203	5,828,178
2004	5,098	13,049	18,147	5,853,382
2005	5,856	11,898	17,754	5,852,067
2006	6,064	11,536	17,600	5,739,506
2007	5,153	10,464	15,617	5,353,648

Source: Same as that for Fig. 4.1.1.

The general declining trend of truck sales did not end in 2007; the turnover was about 930,000 falling below the one million mark. The probable reasons are reluctance in buying pending a new emission gas control and difficulties facing shipping agencies, the main truck users. In other words, it is supposed that forwarding agencies failed to deal with higher costs due to the run-up of fuel prices by raising the freight, leading to difficulties in business management and a growing trend of restrained buying of new trucks, and that the market shrank mainly as a result of the bankruptcy or closure of many shipping agencies. Similarly, buses suffered duller sales. As in the case of trucks, the factor behind this was probably the fact that an increase in tourist bus agencies after the relaxation of the control intensified the pressure to reduce bus fares, followed by high rises in fuel costs, preventing agencies from passing higher costs on to bus fares. Thus the agencies holding down the purchase of new buses increased.

Domestic automobile sales by brand are shown in Figure 4.1.4. As seen in this figure, all of the brands, excluding Daihatsu and Lexus, suffered poorer sales.

Fig. 4.1.4 Trend of domestic automobile sales by brand

	Toyota	Nissan	Mazda	Mitsubishi	Isuzu	Daihatsu	Honda	Fuji
2003	1,704,717	825,090	277,783	367,034	86,104	541,855	715,119	243,824
2004	1,759,003	826,879	280,583	255,240	80,979	577,809	743,133	278,423
2005	1,703,185	866,226	286,919	244,251	84,197	601,154	714,115	258,217
2006	1,660,380	766,763	269,152	263,488	91,982	622,484	702,291	245,234
2007	1,551,876	721,025	254,061	226,913	69,723	626,847	621,935	225,818

	Nissan Diesel	Hino	Suzuki	GM Asia Pacific (Japan)	Mitsubishi Fuso	Lexus	Others	All automakers, total
2003	22,245	47,871	626,873	1,226	87,509	-	280,928	5,828,178
2004	19,704	50,902	662,135	0	73,293	-	245,299	5,853,382
2005	21,407	54,528	695,787	0	61,171	10,293	250,617	5,852,067
2006	19,754	53,952	691,033	0	71,414	31,097	250,482	5,739,506
2007	14,988	47,310	671,264	-	50,520	34,803	236,565	5,353,648

Note: In 2004, the sales statistics of registered cars were changed from a manufacturer basis into a brand basis. Thus there is no continuity between the data before and after 2004.

Source: Same as that for Fig. 4.1.1.

Fig. 4.1.5 Ranking of the domestic sales of main models of vehicle

	2007			2006		
	Model name	Manufacturer	No. of units	Model name	Manufacturer	No. of units
1	Wagon R	Suzuki	226,725	Wagon R	Suzuki	221,066
2	Move	Daihatsu	210,425	Move	Daihatsu	184,983
3	Corolla	Toyota	147,069	Corolla	Toyota	143,176
4	Vitz	Toyota	121,377	Vitz	Toyota	117,641
5	Fit	Honda	116,561	Tanto	Daihatsu	106,428

Note: The shaded items are those of light motor cars.

Source: Based on the statistics of the Automobile Dealers Federation and the Japan Mini Vehicles Association.

The main reason for stagnant domestic sales is probably the leap in fuel prices. Taking an example from the retail price of gasoline in Tokyo, regular gasoline was priced at ¥131/ℓ in January 2007 and remained roughly at ¥130/ℓ until April. But the price started to rise in May; it rose to ¥135/ℓ in May, exceeded ¥140/ℓ in July and ¥150/ℓ in November and reached ¥156/ℓ in December 2007. The rising trend continued thereafter, too. These sharp gains in gasoline price seem to have increased those users who “were determined not to use a car to save gasoline costs” rather than those who “decided to switch to a more energy-saving car” and to have accelerated less car use of drivers. The result was the sales figures that may suggest that even the manufacturers of light motor cars, who achieved good results in the past, have been confronted with slower sales. In this connection, a clear contrast has been exhibited between the manufacturers of light motor cars, who have supported automobile sales in the past ten-odd years. Suzuki attained its top position in light motor cars by, among others, the success in Wagon R, in the circumstance where domestic sales were sluggish, but experienced poorer sales in 2007 as it did so in 2006. By contrast, Daihatsu was content with the second place overwhelmed by Suzuki but achieved larger sales in 2007, although

the increase was small, while almost all of automakers had discouraging results. The difference in sales between Suzuki and Daihatsu was nearly 100,000 units but was reduced to about 45,000 units in 2007. But as shown in Figure 4.1.5, Suzuki's Wagon R continued to rank first in 2007 in the ranking of domestic sales.

(4) Situation of export and import

In contrast to weak domestic sales, the export of automobiles grew from about 5.97 million in 2006 to about 6.55 million in 2007. The number of automobiles exported continued to increase in the past several years, and the buoyancy of the Japanese automobile industry was supported by the growing automobile export. By type of product, rapid rise in the export of passenger cars has pulled the entire industry along. Specifically, the export of passenger cars increased from about 5.29 million in 2006 to 5.81 million in 2007, a gain of about 500,000 in a year. Truck exports had continued to decline in 2005 and after but rose to about 620,000 in 2007, returning to the 600,000 mark again. Similarly, the export of buses grew from the 90,000 mark to the 120,000 mark, passing the 100,000 mark. The factors behind the favorable expanding trend were the fact that with the run-up of crude oil prices, demand for Japanese-made vehicles with higher fuel efficiency went up and that the yen continued to be relatively weak. But foreign exchange rates shifted to stronger yen and the U.S. economy entered in a recession phase around in August 2007; these facts are likely to have adverse effects on the export of automobiles in the future.

Fig. 4.1.6 Trend of automobile export by type of vehicle

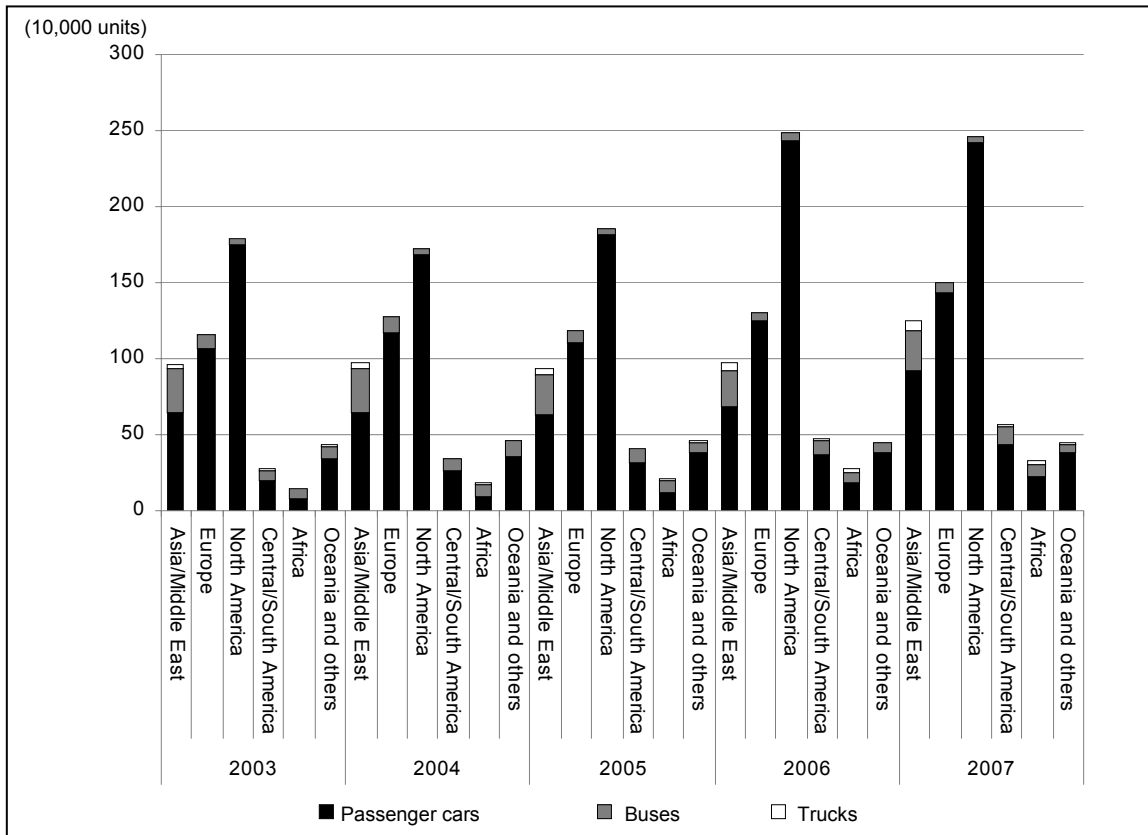
	Passenger cars				Trucks			
	Standard-sized	Small-sized	Light motor	Subtotal	Standard-sized	Small-sized	Light motor	Subtotal
2003	2,856,312	1,222,433	1,753	4,080,498	553,406	76,787	61	630,254
2004	2,995,259	1,217,013	1,755	4,214,027	591,236	96,450	109	687,795
2005	3,164,603	1,198,273	292	4,363,168	521,856	89,938	162	611,956
2006	3,843,387	1,451,302	808	5,295,497	488,644	89,189	141	577,974
2007	4,305,067	1,505,281	1,611	5,811,959	527,060	89,078	312	616,450

	Buses			All vehicle types, total
	Large-sized	Small-sized	Subtotal	
2003	8,279	37,312	45,591	4,756,343
2004	11,689	44,152	55,841	4,957,663
2005	9,953	67,984	77,937	5,053,061
2006	11,565	81,636	93,201	5,966,672
2007	13,868	107,663	121,531	6,549,940

Source: Same as that for Fig. 4.1.1.

By destination, export to North America continued to be good although it fell a little. Export to other regions increased, too, showing the buoyancy of the Japanese automobile industry. Growth in export to Asia and Middle East is especially remarkable. This is probably because, in addition to rapid growth in export to Asia thus far, there has been an increase in export to Middle East, which has recently enjoyed economic growth as a result of crude oil price surges. Depending on the future situation of the U.S. economy, Middle East may become more important as a promising trade partner to Japanese automobile manufacturers.

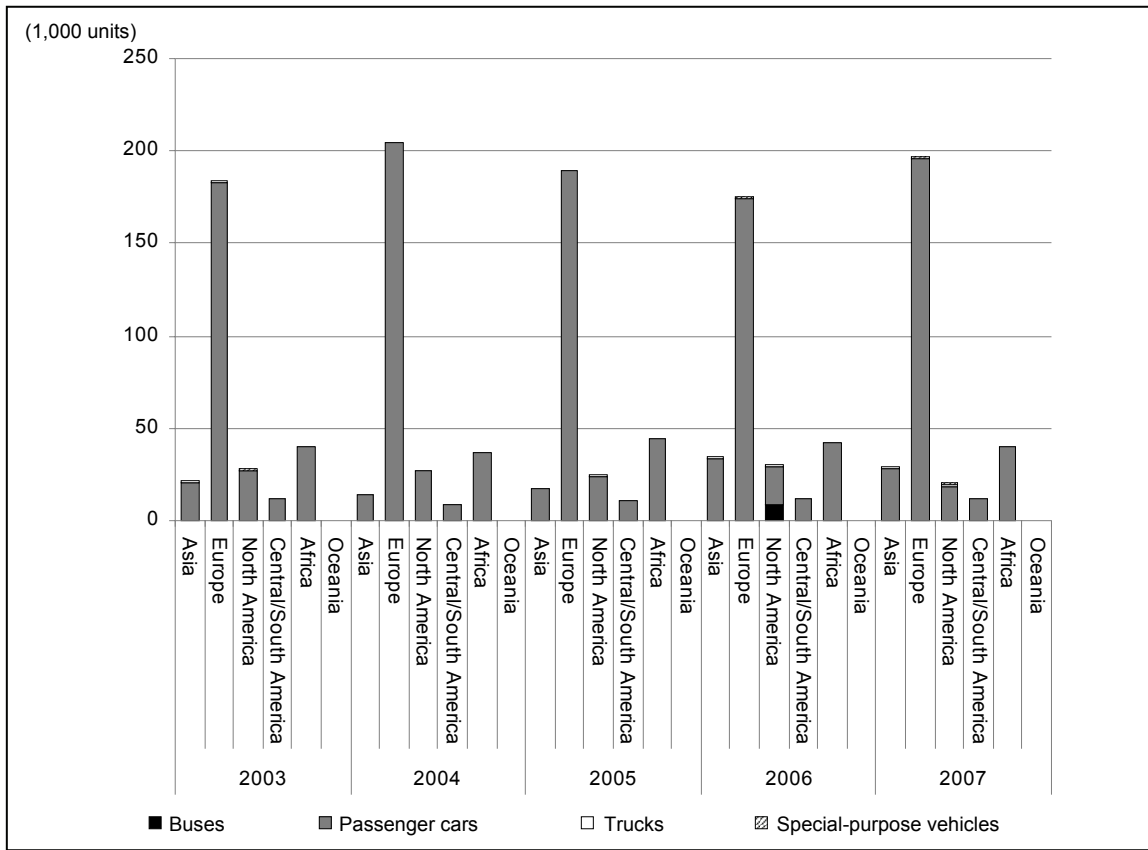
Fig. 4.1.7 Trend of Japan's automobile export by type of vehicle and destination



Source: Same as that for Fig. 4.1.1.

On the other hand, the import of automobiles has increased a little but has leveled off in general. This is probably the direct effect of dull domestic sales. Specifically, import from Europe showed a small gain, while import from other regions fell. Africa had played the role of the export base of European high-grade cars, but import from Africa decreased in 2007 as in 2006. By main brand, import from Volkswagen, BMW and Mercedes-Benz in 2007 did not change so greatly as compared with the previous year. What showed a considerable change was an increase in Nissan's import. This was because Dualis, which had been introduced in May 2007, was imported from the U.K. at first. This was a temporary step and beginning in 2008, the manufacture of the model for domestic sale was transferred to the plant in Kyushu, Japan. If Nissan's import of about 20,000 units is excluded, the number of automobiles imported in 2007 is roughly on the same level as in 2006.

Fig. 4.1.8 Trend of Japan's automobile import by type of vehicle and region



Source: Based on the Ministry of Finance, "Monthly Trade Statistics of Japan."

4.1.2 Problems of the global market and the future of the automobile industry in Japan

The production of Japanese automakers is increasing and the Toyota Group's worldwide sales are now a match for GM's (Fig. 4.1.9). While the top three American automakers have had slower growth, Japanese ones as well as global makers in other countries have registered larger sales. The good results of the automobile industry in the past several years have been supported by the expanded global market for automobiles rather than by the good performance of Japanese automakers.

Fig. 4.1.9 Trend of global sales by automaker group

	2003	2004	2005	2006	2007
GM Group	8,556,208	8,926,159	9,098,428	8,970,469	9,228,606
Toyota Group	6,657,558	7,381,130	7,940,227	8,563,648	9,004,823
Ford Group	7,565,367	7,824,310	7,808,394	7,734,847	7,747,256
Volkswagen Group	4,926,291	5,058,555	5,089,425	5,649,561	6,087,741
Renault/Nissan Group	5,215,627	5,580,143	5,842,112	5,581,633	5,801,785
Hyundai Group	2,804,575	3,202,873	3,768,949	3,981,558	4,164,065
Honda	2,887,116	3,169,036	3,336,425	3,517,745	3,760,510
PSA	3,158,527	3,165,821	3,253,670	3,320,032	3,500,291
Chrysler Group	2,606,702	2,698,337	2,823,621	2,690,095	2,657,605
Fiat Group	1,982,429	2,056,462	2,011,999	2,261,819	2,568,507
Suzuki	1,623,966	1,818,051	1,955,178	2,114,727	2,322,924
Daimler Group	1,796,123	1,873,353	1,910,148	1,949,805	1,955,814
BMW Group	1,062,090	1,176,124	1,301,183	1,337,584	1,438,503
Mitsubishi	1,319,365	1,135,771	1,151,652	1,132,544	1,214,439
AutoVAZ	864,875	838,254	898,938	930,622	897,100
Tata Group	275,751	361,384	406,754	534,946	561,168
Subaru	536,443	586,562	587,488	587,072	563,081
Chery	85,358	88,056	193,740	320,797	450,004
Foton	266,203	342,967	327,647	365,312	432,711
Isuzu	400,306	405,089	445,227	453,807	421,419
Others	4706382	5484552	5537949	6258986	5840046
Total	58,757,451	62,532,664	65,050,265	67,444,917	70,843,078

Original data: The data of automobile manufacturers' associations and similar organizations in each country.

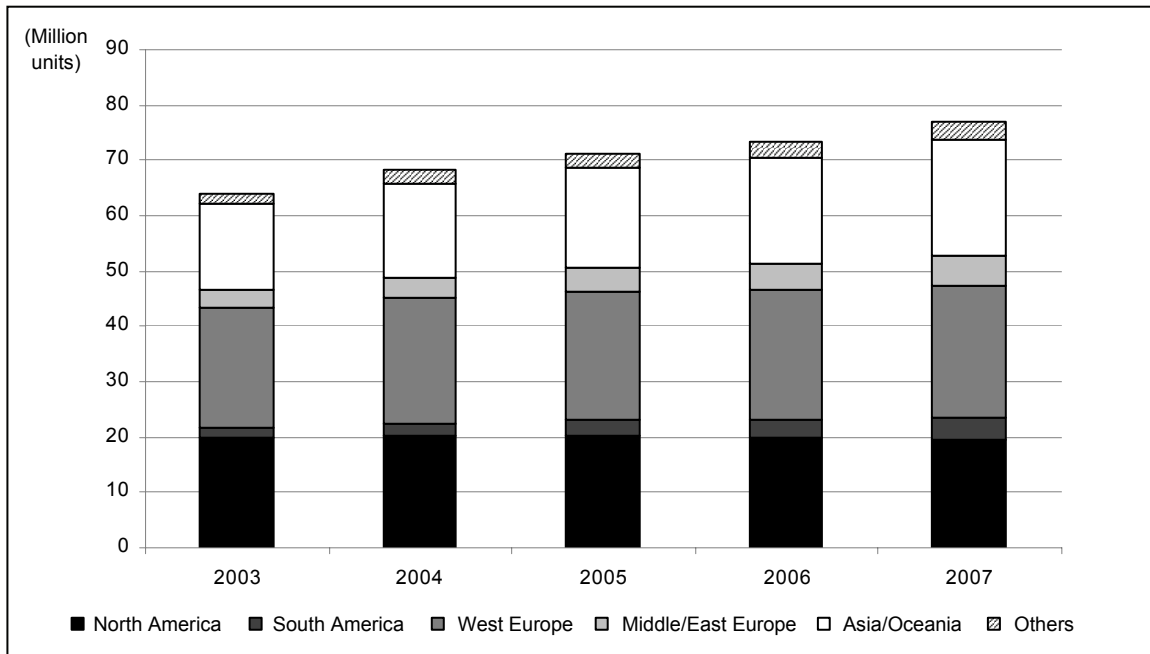
Sources: Quoted from Fourin (2008), "Annual Statistics of Global Automobiles 2008."

The main markets for the automobile industry are still the European and the U.S. ones. These markets are very large but have already matured and have leveled off, and so it is difficult to expect any further growth in these markets. Promising potential growth markets are ones in newly industrializing countries. While the European and U.S. markets have flattened off, the sales to Middle and East Europe, Asia and Oceania have risen. If automakers are to achieve further growth in the years ahead, they will have to secure an advantageous position in the newly industrializing markets, and it will be important for them to draft new strategies for attaining this goal. In particular, success in Asia having a very large population will be a key to automakers. But Asian countries have different characteristics from one another, and automakers will be unable to use the same strategies everywhere. Moreover, it is considered that competitive advantage in inexpensive small-sized cars will play an important part in Asian markets, and Japanese automakers are in a hurry for introduction of strategic small-sized cars in these markets.

The introduction of small-sized cars is not intended for the newly industrializing markets only but will be important in the European market, too. In the European market, the EU is now discussing a new emission gas control; in the new system, each manufacturer will be required to limit the CO₂ emission per km of all of its new cars to an average of 130g and will have to pay a surcharge if the manufacturer fails to attain this. Small-sized cars are more advantageous in terms of CO₂ emission;

thus the introduction of these products will be important not only in the newly industrializing market but in the European one as well.

Fig. 4.1.10 Situation of automobile sales by region



Original data: Same as that for Fig. 4.1.9.

Source: Same as that for Fig. 4.1.9.

Formerly in the newly industrializing market, automakers were able to make a profit easily even from small-sized cars by selling them at relatively high prices and to sell old models already written off. But at present, this market is no longer the one as it used to be. Manufacturers should introduce latest models into the market and may be faced with higher costs resulting from, among others, capital investment for that purpose. Moreover, the market of newly industrializing countries has become the one with keen price competition where automakers cannot raise prices easily. Even in the newly industrializing market, where future growth can be expected, the models so far sold in this market will not be accepted readily and there will be the need to introduce the models almost the same as those sold in the market of developed countries. For small-sized cars, too, automakers will have to introduce new models equipped with some advanced functions. To secure advantage in the newly industrializing market, manufacturers should use new strategies different from those in the past and redraft their global strategies.

4.2 Two-wheeled vehicles

4.2.1 Supply and demand trend

(1) Outline

The motorcycle industry in Japan is said to hold a dominant position globally, especially in developing countries, in terms of technology, quality and other factors. But Japanese motorcycle manufacturers have been chased after by home-grown makers and, in some markets, have had tough games after their advantage was taken by less expensive domestic products. The two-wheeled vehicle market is no place where Japanese manufacturers can easily do business; they should re-plan their strategies to get a greater advantage in this market. In the following sections, the trend of the two-wheeled vehicle industry is outlined briefly.

(2) Situation of production and sales

The production of two-wheeled vehicles in Japan has not expanded even in the situation where business activity has been said to be in good shape. After rising in 2005 over the previous year, it has dwindled. In 2007, the output fell to less than the 1.7 million mark, indicating that the industry has become a fully matured industry. The production of Type I motorbikes and small-sized two-wheeled vehicles went up in 2006 but declined in 2007, while that of light two-wheeled vehicles dropped as in 2006. The decline in the output of these products resulted in a low production in general. The reasons will include the maturing of the domestic market and the export reaching the ceiling as a result of increasing production by Japanese subsidiaries overseas. In the case of Type I motorbikes, not only the fact that import from abroad is steadily being established but also poor domestic demand can be regarded as the factor of falling production. By contrast, the output of small-sized two-wheeled vehicles exceeded the one million mark in 2006 after a long time but fell to 960,000 in 2007, less than the one million mark (Fig. 4.2.1).

Fig. 4.2.1 Trend of domestic production of two-wheeled vehicles by engine displacement

	Type I motorbikes (up to 50cc), total	Type II motorbikes (51-125cc)	Light two-wheeled vehicles (126-250cc)	Small-sized two- wheeled vehicles (251cc and up)	Total
2003	458,072	376,800	235,499	760,534	1,830,905
2004	331,449	304,622	271,126	832,387	1,739,584
2005	298,549	260,343	279,274	953,419	1,791,585
2006	306,246	149,868	276,043	1,039,229	1,771,386
2007	264,336	178,827	269,689	963,245	1,676,097

Source: Based on the data of the Japan Automobile Manufacturers Association.

As noted above, Japanese two-wheeled vehicle manufacturers have established a global production system, and it is considered that they have already built the system of differentiating global and domestic manufacturing bases. Domestic bases are those of high value added products and are supplying these products to global bases by export, but low-priced and low value added products, such as Type I motorbikes, are supplied by import from China and other countries in some

cases.

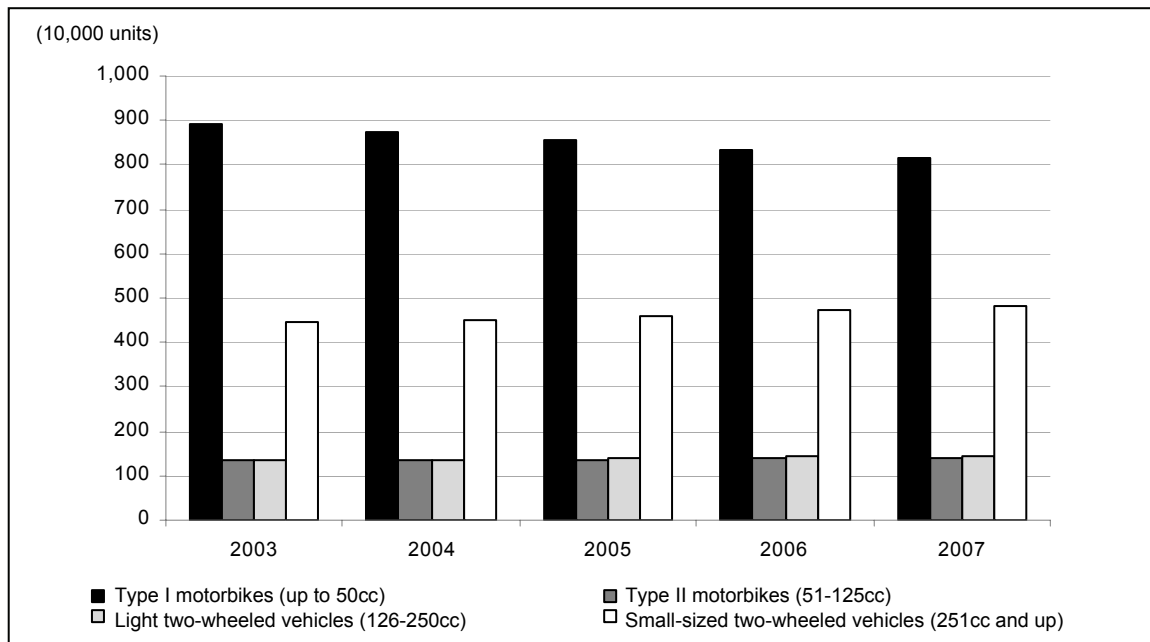
By manufacturer, Honda, Suzuki and Yamaha cut back the output, while Kawasaki, which focuses on the manufacture of two-wheeled vehicles with large engine displacement, stepped up its production. The situation where the motorbike purchase of people in high age brackets is increasing has probably worked to the advantage of Kawasaki, which makes mainly high value added medium- and large-sized products (Fig. 4.2.2).

Fig. 4.2.2 Trend of domestic production of two-wheeled vehicles by manufacturer

	Honda	Suzuki	Yamaha	Kawasaki	Others	Total
2003	653,941	412,342	554,858	208,752	1,012	1,830,905
2004	567,628	397,104	554,181	220,308	363	1,739,584
2005	590,251	489,005	471,254	240,648	427	1,791,585
2006	546,418	523,408	452,561	248,538	461	1,771,386
2007	466,147	500,696	430,319	278,591	344	1,676,097

Source: Same as that for Fig. 4.2.1.

The factors behind falls in domestic production are dull domestic sales and established overseas production. Domestic sales are on the decrease reflecting the maturing of the domestic market. More specifically, the output of Type I motorbikes and small-sized two-wheeled vehicles, whose sales had grown as the sales of two-wheeled vehicles fell in general, dwindled, too, in 2007. In particular, small-sized two-wheeled vehicles had attracted attention because demand grew mainly among baby boomers born in 1947 to 1949, but their sales fell in 2007; in this situation, Japanese two-wheeled vehicle manufacturers will have to plan new strategies. On the other hand, the sales of Type II motorbikes increased to over the 100,000 unit mark. Young people had supported demand for two-wheeled vehicles, but because these people have been less interested in two-wheelers and the birthrate has lowered, the absolute number of new users is on the decline. But the ownership of two-wheeled vehicles has shown a slow upward trend (Fig. 4.2.3). In other words, the situation is not that where the ownership has not fallen as a result of young people switching from two-wheelers to four-wheeled vehicles. The situation is probably the one in which relatively older people bought two-wheeled vehicles and have hold them for a longer period of time.

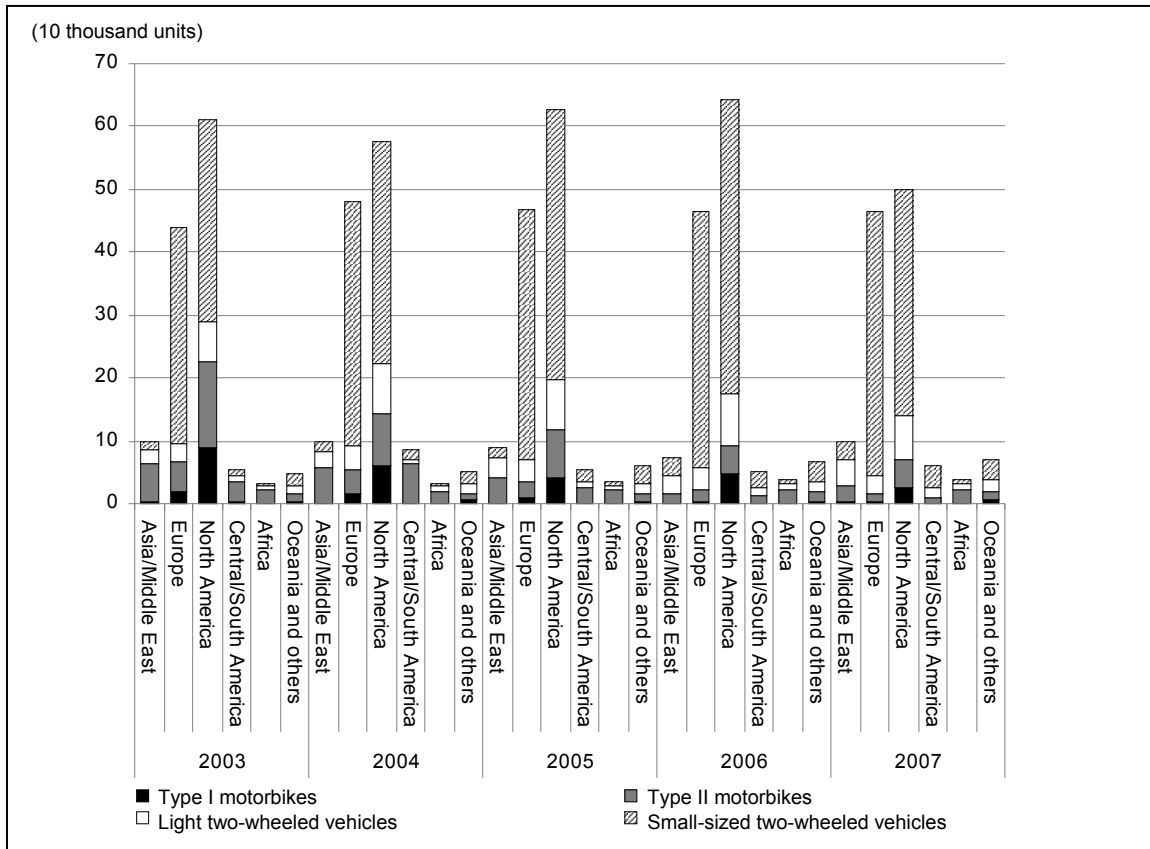
Fig. 4.2.3 Trend of ownership of two-wheeled vehicles by engine displacement

Source: Based on the statistical data of the Japan Mini Vehicles Association.

(3) Situation of export and import

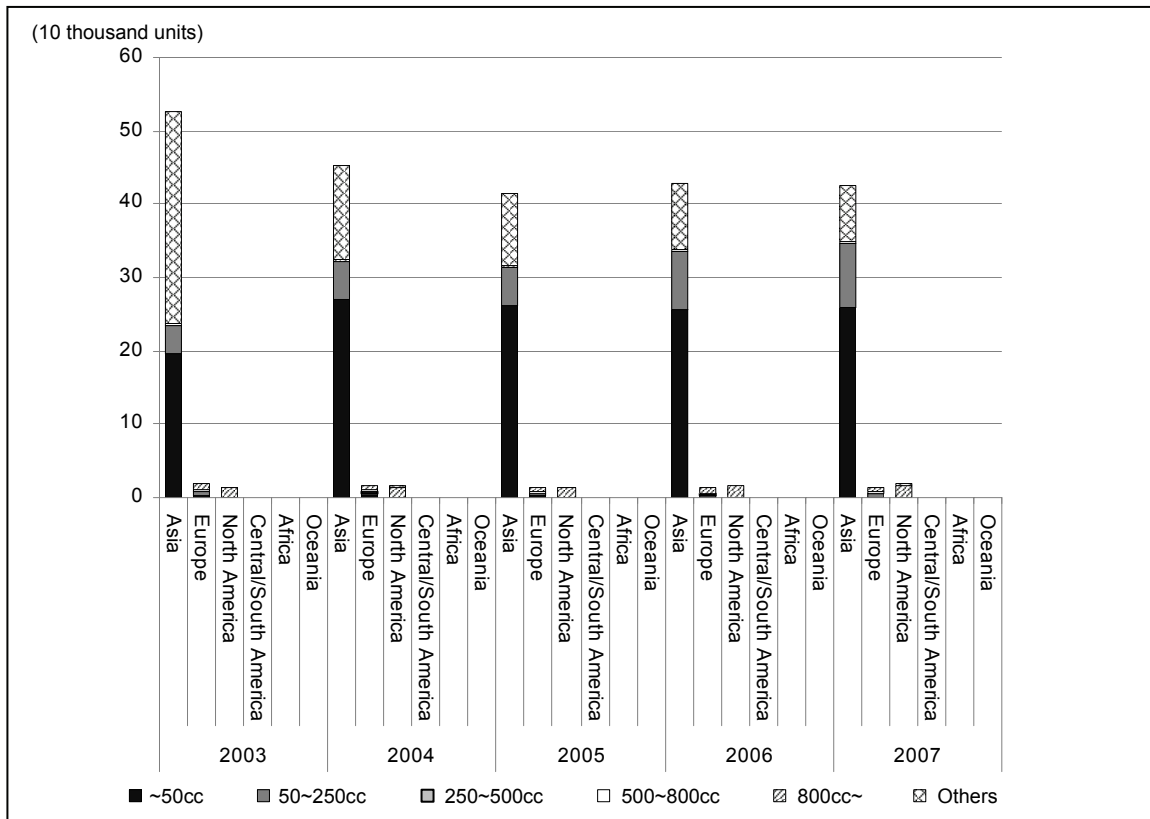
Japanese two-wheeled vehicle manufacturers are working to increase export to the European and U.S. markets laying stress on small-sized two-wheeled vehicles (Fig. 4.2.4). In 2007, export to Europe roughly leveled off. North America had contributed to expansion in export but export to this region fell in 2007, which was an important reason for the dwindling export of two-wheeled vehicles. Export to Asia and Middle East had continued dropping but light two-wheeled vehicles and small-sized two-wheeled vehicles showed a greater export in 2007. Behind this was an increase in export to Asia, including the Philippines and Bangladesh. The fact that the Philippine economy was steady in 2007 is probably the factor behind the expanded export to the country; but in view of the fact that it was already reported that Japanese makers constructed new plants in the Philippines, growth in export to the country seems to be only a temporary one. In general, Asia and Middle and South America are playing an important role as the production bases of Japanese manufacturers, and it is difficult to expect that export to these regions will continue to grow in the future. But attention should be paid to the fact that rises in export to Asia and Middle East have been supported by light two-wheeled vehicles and small-sized two-wheeled vehicles. In other words, it appears that demand has shifted to higher value added two-wheelers in these areas, too, due to economic growth and resultant higher income. It is considered that almost all of the overseas production bases of Japanese manufacturers are making products equivalent to Type II motorbikes with an engine displacement of 100cc or so. This may suggest the possibility that the role of Japanese manufacturers as the suppliers of high value added two-wheelers will become more important in the system for differentiating two-wheeler manufacture, which is being established.

Fig. 4.2.4 Trend of export of two-wheeled vehicles by region and engine displacement



Source: Same as that for Fig. 4.2.1.

The import of two-wheeled vehicles has roughly leveled off, affected by the situation of domestic sales, and Type I motorbikes made up a greater part of imports. This means that most of lower value added motorbikes have been secured by imports from other countries, especially Asian nations. As far as Type I motorbikes are concerned, roughly the same quantity as those made at home has been imported, and the simple ratio of imported products stands at about 56.3% of the total domestic sales of Type I motorbikes. As stated, the structure where low value added products are procured mostly by imports and high value added ones are exported from Japan has been established in recent years, and it is supposed that the system for differentiating the manufacture into that of high value added products and that of low value added ones has been built up.

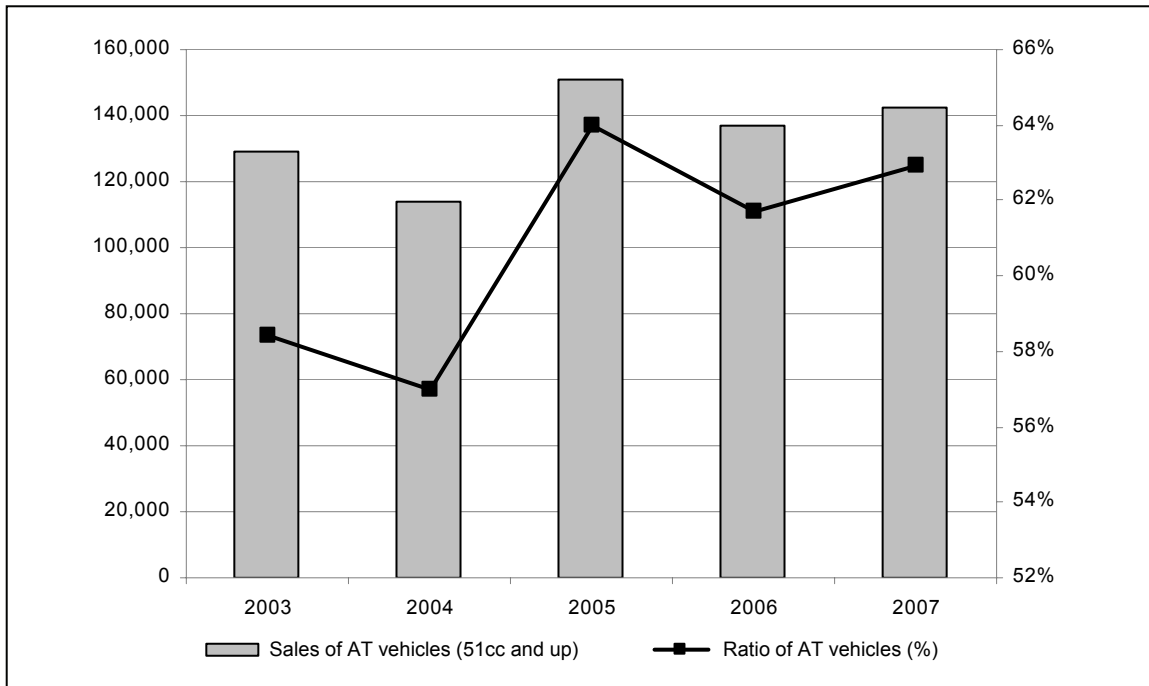
Fig. 4.2.5 Trend of import of two-wheeled vehicles by region and engine displacement

Source: Based on the Ministry of Finance, "Monthly Trade Statistics of Japan" for each year.

4.2.2 Structural changes in the two-wheeled vehicle market

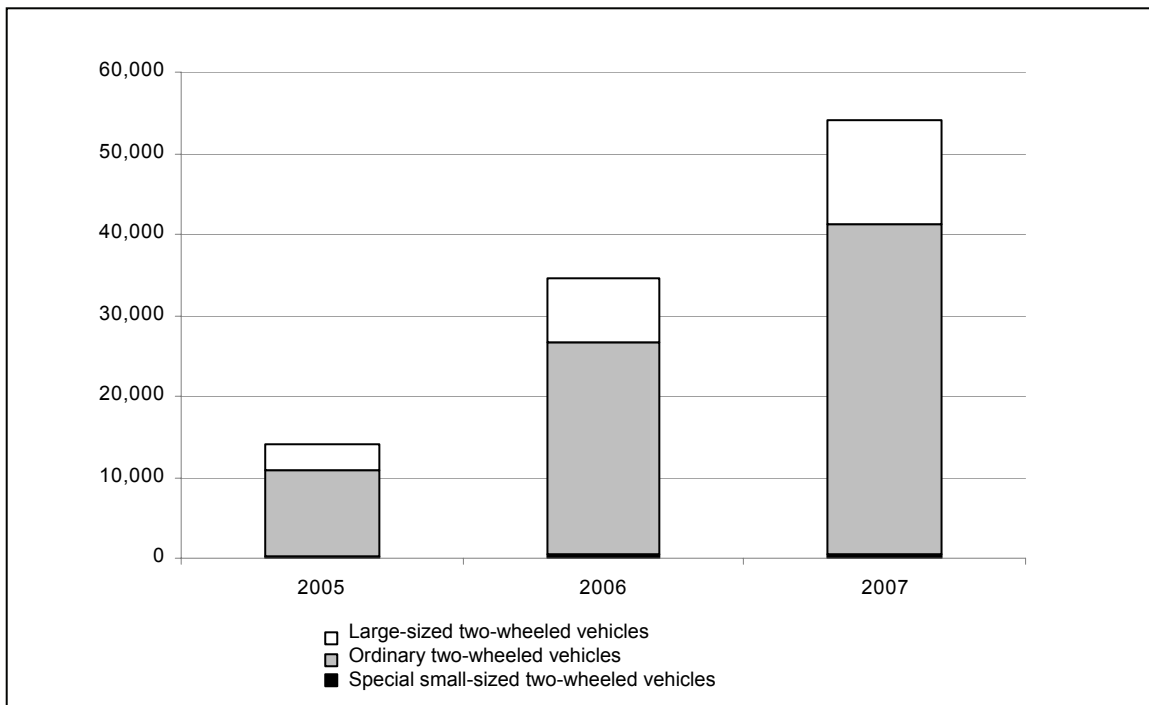
As described in the trend of domestic ownership of two-wheeled vehicles above, the ownership of Type I motorbikes decreased and that of other types of two-wheelers grew. The factor behind this is the situation where automatic transmission(AT)-type two-wheelers, which are easier to drive, have come into wider use. More than a half of the two-wheeled vehicles of 51cc and up sold in the market are now AT vehicles. In this connection, while the holders of a driver's license for two-wheelers are decreasing year by year, those of a driver's license for AT vehicles are on the rise, and most of driver's licenses for AT vehicles are those for ordinary two-wheeled vehicles (engine displacement: more than 50cc - 400cc). This situation probably shows the fact that more and more medium-sized AT vehicles (engine displacement: more than 125cc - 400cc) have been diffused. AT vehicles allow drivers to ride a two-wheeler more easily and so will be attractive not merely to the two-wheeler drivers who already hold a driver's license but to those who have got a license newly as well.

Fig. 4.2.6 Trend of sales and ratios of AT vehicles



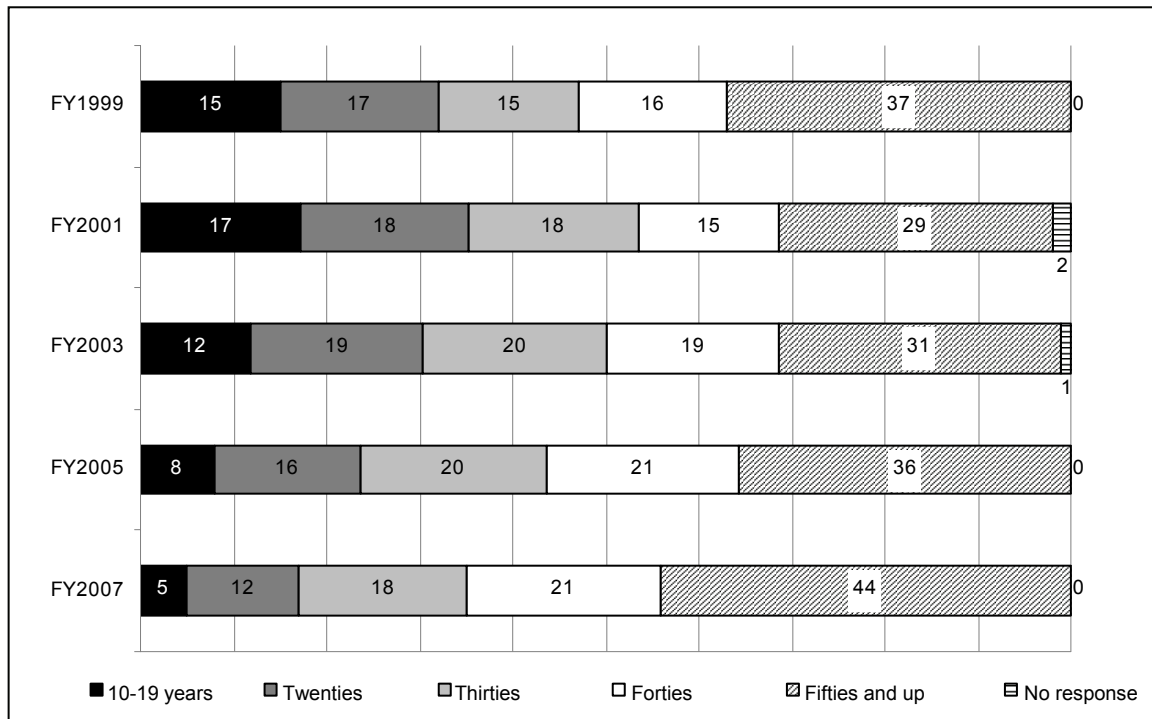
Source: Based on the Japan Automobile Manufacturers Association (2008), "World Annual Statistical Report of Automobiles, No. 7," p.209.

Fig. 4.2.7 Trend of holders of a driver's license for AT two-wheelers



Source: Based on the National Police Agency (2008), "Driver's License Statistics, 2007 Edition."

Fig. 4.2.8 Age structure of two-wheeler users



Source: Japan Automobile Manufacturers Association (2008), "Survey on the Trend of the Two-wheeled Vehicle Market, 2007," p.10.

The user population of two-wheeled vehicles has been aging. Since 2001 the ratio of two-wheeler users in their fifties and up has increased year by year, reaching 44% in 2007. This is in contrast to the declining trend of two-wheeler users between 10 and 19 years and in their twenties. Two-wheeled vehicle manufacturers are now required to take account of the aging of two-wheeler users in their product development efforts. While the diffusion of AT vehicles is probably one of the factors reflecting this situation, it will become a problem more important than in the past for manufacturers in securing the two-wheeler market to take measures considering the age of users, such as those for traffic safety and user-friendliness. According to the Survey on the Trend of the Two-wheeled Vehicle Market, "user-friendliness" was the third most important consideration for buying a two-wheeled vehicle, and "simple driving operation" was an essential point, too. The concepts of ease of use and safety are now required more than in the past to diffuse two-wheelers as handy vehicles and will be important, too, to keep up and expand demand in Japan, a matured market.

4.3 Aircraft

4.3.1 Supply and demand trend

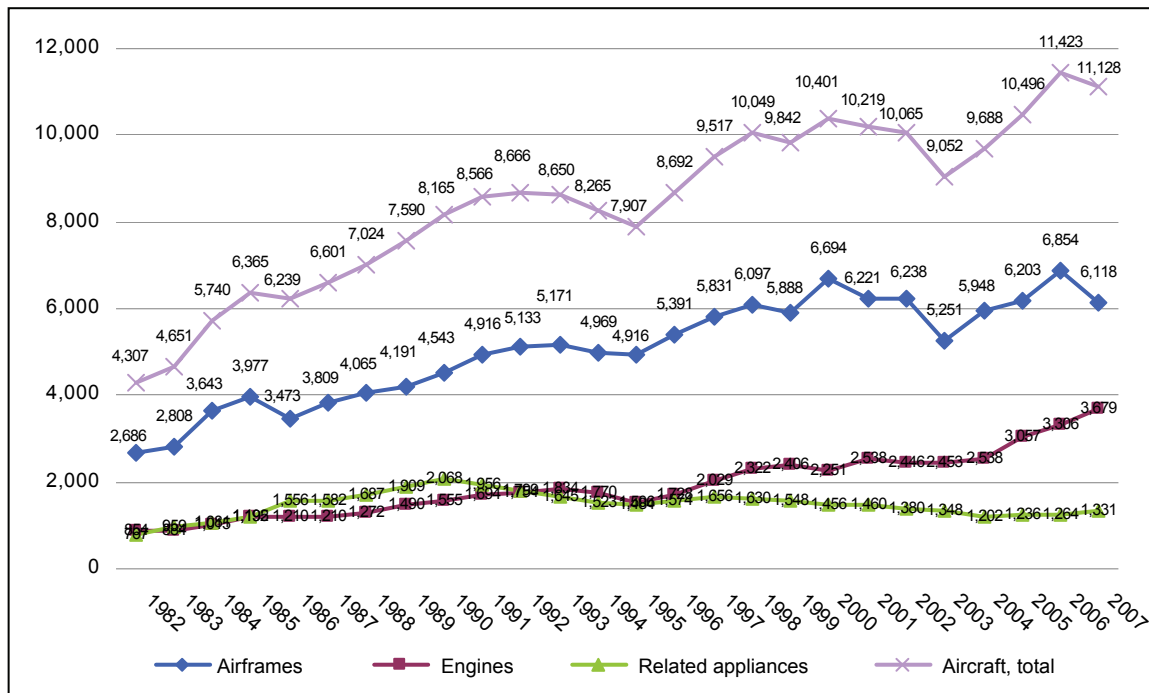
(1) Outline

The production of aircraft in 2007 (calendar year; final report) was ¥1,141.9 billion or a decrease of 4.3 points from the previous year, when the output was an all-time high. In July 2007, Boeing 787, the next-generation main medium-sized aircraft, was first shown at the company's Everett Plant. But the problems of supply chains and the need for reworking arose thereafter, and the delivery of the first product was postponed as far as to the third quarter of 2009 from the first quarter of 2008, the initial delivery period. As a result, it became difficult for All Nippon Airways, the launch customer for the aircraft, to receive the first product before the Beijing Olympics, and airlines, including Japan Airlines, are faced with the need to review their flight schedule and take other necessary steps. As of October 2007, orders for Boeing 787 totaled to 895 from 58 airlines.

In Japan, Mitsubishi Heavy Industries (MHI) decided in late March 2008 to launch the project for MRJ, a regional jet plane for the private sector, and founded Mitsubishi Aircraft Corp. in April 2008. This airplane will be given advantageous features in eco-friendliness, fuel efficiency and comfortable trip, which are key factors for airlines, and will compete with manufacturers of the same-size airplanes mainly in Brazil, Canada, Russia and China.

In October 2008, the Japan International Aerospace Exhibition 2008 was held in Yokohama first in four years. In the event, together with major aircraft manufacturers and related businesses in the world, small businesses and joint order receiving organizations in Japan trying to enter the aircraft field that were increasing across Japan established their booths and carried out positive sales activities for the world market.

Fig. 4.3.1 Trend of aircraft production (fiscal year)



Source: Based on the data of the Society of Japanese Aerospace Companies (SJAC).

(2) Production trend

The results of production (sales) of the aircraft industry in 2007¹ (Fig. 4.3.1) were poorer than those for the previous year by 2.7% with ¥1,112.8 billion. By type of product, the output of airframes dropped by 12.0% year on year to ¥611.8 billion, that of engines went up by 10.2% to ¥367.9 billion and that of related appliances rose by 5.1% to ¥133.1 billion.

(3) Trend of export and import

According to the Customs Clearance Statistics, the export of aircraft engines, airframes, parts, etc. in 2007 (calendar year) grew by 20.3% year on year to a total of ¥493.1 billion and the import increased by 14.8% to ¥1,190.3 billion (Figs. 4.3.2, 4.3.3).

¹ The amount of production of the aircraft and related industries computed independently by the SJAC on the basis of the Ministry of Economy, Trade and Industry, “Annual Report of Machinery Statistics” and is the total of the amount of production and that of repair charges.

Fig. 4.3.2 Export of aircraft in 2007 (calendar year)

(¥ million)

	Export
Aircraft engines (pistons)	102
Parts for aircraft engines (pistons)	1,223
Aircraft engines (turbines, etc.)	3,036
Parts for aircraft engines (turbines, etc.)	170,962
Gliders, hang gliders, balloons, airships, other aircraft with no engine	658
Helicopters, total	15,760
Empty weight: 2,000kg or less	604
Empty weight: over 2,000kg	15,156
Aircraft and other airplanes, total	108
Empty weight: 2,000kg or less	90
Empty weight: over 2,000kg but 15,000kg or less	18
Empty weight: over 15,000kg	
Components, total	301,266
Aircraft propellers and rotors and their components	174
Other components for aircraft or helicopters	286,021
Landing devices and other components	4,953
Others	10,118
Parachutes and rotochutes and their components	18
Aircraft catapults, arresting gears and other similar devices and their components	
Aircraft training devices and their components	
Aerial battle simulators and their components	
Other components	4
Total	493,137

Source: Based on the data of the SJAC.

Fig. 4.3.3 Import of aircraft in 2007 (calendar year)

	(¥ million)
	Import
Aircraft engines (pistons)	945
Parts for aircraft engines (pistons)	2,073
Aircraft engines (turbines, etc.)	198,003
Parts for aircraft engines (turbines, etc.)	282,058
Gliders, hang gliders, balloons, airships, other aircraft with no engine	98
Helicopters, total	25,196
Empty weight: 2,000kg or less	4,972
Empty weight: over 2,000kg	20,224
Aircraft and other airplanes, total	467,965
Empty weight: 2,000kg or less	1,066
Empty weight: over 2,000kg but 15,000kg or less	10,642
Empty weight: over 15,000kg	456,257
Components, total	206,180
Aircraft propellers	1,663
Helicopter rotors (including blades)	2,265
Propellers and rotors and their components (excluding helicopter rotors)	3,370
Other components for aircraft or helicopters	168,978
Landing devices and other components	24,052
Other components	5,852
Parachutes and rotochutes and their components	1,172
Aircraft catapults, arresting gears and other similar devices and their components	
Aircraft training devices and their components	367
Aerial battle simulators and their components	2,004
Other components	4,304
Total	1,190,365

Source: Based on the data of the SJAC.

(4) Future prospects

According to the survey on the 28 member businesses conducted by the SJAC (Figs. 5.5.4, 5.5.5), the estimated production in 2008 will increase by 1.6% (¥17.7 billion) year on year to ¥1,183.5 billion.

By type of product, the estimated output of airframes is ¥686.5 billion in expectation of a sharp rise in the output of airframe bodies, that of engines is ¥287.2 billion, about the same level as that in 2007, and that of aircraft equipment is ¥140.7 billion.

The estimated export in 2008 is ¥626.4 billion in anticipation of a good performance of mainly airframe bodies for Boeing. This is composed of ¥335.9 billion for airframes, ¥256.7 billion for engines and ¥33.8 billion for aircraft equipment.

Fig. 4.3.4 Prospects for the production of aircraft in FY2008

		Production (¥100 million)		
		Results in FY2006	Results in FY2007	Estimate for FY2008
Airframes	Bodies	1,817	1,390	2,172
	Parts	4,643	4,557	4,693
	Subtotal	6,460	5,947	6,865
Engines	Bodies	732	791	691
	Parts	2,524	2,822	2,872
	Subtotal	3,256	3,613	3,563
Equipment		1,480	1,751	1,407
Total		11,196	11,311	11,835

Source: The SJAC, "Prospects for Production, Export and Orders of Aircraft (May 2008)."

Fig. 4.3.5 Prospects for the export of aircraft in FY2008

		Export (¥100 million)		
		Results in FY2006	Results in FY2007	Estimate for FY2008
Airframes		2,469	2,725	3,359
Engines	Bodies	242	313	311
	Parts	1,913	2,182	2,256
	Subtotal	2,155	2,495	2,567
Equipment		299	252	338
Total		4,923	5,472	6,264

Source: The SJAC, "Prospects for Production, Export and Orders of Aircraft (May 2008)."

4.3.2 Results of operations and the trend of the aircraft industry

(1) Situation of management

Mitsubishi Heavy Industries (MHI) continued to enjoy a steady demand for passenger planes and attained greater sales than in 2007 due to increased orders for B777 air carriers (rear fuselages, etc.), engine parts for passenger planes, etc. In the self-defense segment, MHI had better sales than in 2007 because it had more orders for guided flying objects, such as Patriot, a surface-to-air guided missile, which supports the ballistic missile defense (BMD) system that is being established on a priority basis, although the company suffered less orders for patrol helicopters, etc. As a result, MHI's sales climbed by 1.1% year on year to ¥500.5 billion.

Kawasaki Heavy Industries (KHI) received orders for, among others, shared products for B787 and 777 passenger planes for Boeing. But because of poorer sales for the Ministry of Defense, the company's sales in 2008 dropped by 11.8% year on year to ¥237.3 billion.

Ishikawajima-Harima Heavy Industries (IHI) continued to experience an unfavorable situation in the self-defense field affected by the reduced budget for frontline equipment. In the passenger plane segment, while air transportation is expected to have a steady demand, demand for aircraft with a higher economic efficiency and for regional jet planes having a better maneuverability is developing more than in the past due to rises in the price of jet fuel caused by higher crude oil prices and intensified price competition among airlines. The market of aircraft engines and repairing for

passenger planes remained firm, too. IHI has smoothly carried out the development of the GENx engine, which will be loaded into Boeing's next-generation medium-sized passenger planes, and obtained an engine type certificate in March 2008. In this situation, the company did positive sales activities for getting orders and succeeded in receiving orders mainly for F110 engines and F100 engine parts from the Ministry of Defense and for engines and parts for V2500, CF34, GE90 and GENx and repairing of V2500 and CF34 in the passenger plane segment. IHI's sales grew by 5.2% year on year to ¥313.4 billion.

Fuji Heavy Industries (FHI) achieved larger sales in combat helicopters and pilotless airplanes in the self-defense field but suffered a drop in the sales of experimental next-generation fixed wing patrol planes and air carriers because the delivery of these planes reached the final stage. In addition to the increased delivery of center wings for Boeing 777, the shipment of center wings for B787, whose delivery was started in 2008, and that of main wings for "Eclipse 500," small-sized business jet, and medium-sized business jets grew. As a whole, FHI's sales in 2008 rose by 6.0% year on year to ¥96.6 billion, an all-time high for the third consecutive year.

ShinMaywa Industries received an order for two search-and-rescue amphibian planes from the Ministry of Defense and enjoyed satisfactory results both in airframe production and regular repairing. In the private sector, ShinMaywa had a decrease in orders for airframe components for the mass production program of B787 but got orders for components for B777 on the same level as in 2007. The company's sales were ¥28.5 billion.

Fig. 4.3.6 Financial situation of the five aircraft industries (consolidated)

		¥100 million, %						Year-on-year ratio
		As of Mar. '03	As of Mar. '04	As of Mar. '05	As of Mar. '06	As of Mar. '07	As of Mar. '08	
Mitsubishi Heavy Industries	Sales	25,938	23,734	25,907	27,921	30,685	32,030	4.4%
	of which the aerospace segment	5,067	3,922	4,079	4,459	4,950	5,005	1.1%
	Operating profit	1,153	666	147	709	1,089	1,360	24.9%
	Ordinary profit	781	297	125	503	830	1,095	31.9%
	Operation profit to sales ratio	4.4%	2.8%	0.6%	2.5%	3.5%	4.2%	-
Kawasaki Heavy Industries	Sales	12,395	11,602	12,415	13,224	14,386	15,010	4.3%
	of which the aerospace segment	1,548	1,737	1,882	2,185	2,691	2,373	-11.8%
	Operating profit	305	222	247	417	691	769	11.3%
	Ordinary profit	162	121	210	308	490	639	30.4%
	Operation profit to sales ratio	2.5%	1.9%	2.0%	3.2%	4.8%	5.1%	-
IHI	Sales	10,190	10,474	10,890	11,271	12,210	13,505	10.6%
	of which the aerospace segment	2,438	2,414	2,383	2,695	2,979	3,134	5.2%
	Operating profit	246	-232	106	218	△56	△168	200.0%
	Ordinary profit	96	-424	42	159	△0.08	△0.3	275.0%
	Operation profit to sales ratio	2.4%	-2.2%	1.0%	1.9%	-0.5%	-1.2%	-
Fuji Heavy Industries	Sales	13,723	14,394	14,464	14,764	14,948	15,723	5.2%
	of which the aerospace segment	630	566	595	818	940	996	6.0%
	Operating profit	675	503	420	583	479	456	-4.8%
	Ordinary profit	585	566	435	468	422	454	7.6%
	Operation profit to sales ratio	4.9%	3.5%	2.9%	3.9%	3.2%	2.9%	-
ShinMaywa Industries	Sales	1,395	1,306	1,279	1,297	1,444	1,389	-3.8%
	of which the aerospace segment	385	288	208	207	246	285	15.9%
	Operating profit	32	64	60	49	53	50	-5.5%
	Ordinary profit	24	59	61	52	54	47	-12.8%
	Operation profit to sales ratio	2.3%	4.9%	4.7%	3.8%	3.7%	3.6%	-

Source: Based on the quick reports on the settlement of accounts for the year ended in March 2008 of these companies.

In the aircraft equipment segment, the manufacturers of materials for passenger planes achieved larger sales than in the previous year in general (Fig. 4.3.7). There is some uncertainty about the delivery of B787, but considering the orders for this aircraft received, these manufacturers are likely to continue a production increase system in the years ahead.

Fig. 4.3.7 Financial situation of aircraft equipment manufacturers

	FY2006 (¥100 million)	FY2007 (¥100 million)	Year-on-year ratio	Consolidated sales (¥100 million)	Segment sales to consolidated sales ratio
Toray Industries	686	836	21.8%	16,497	5.1%
Toho Tenax	340	378	11.1%	515	73.4%
Mitsubishi Rayon	400	468	17.0%	4,185	11.2%
Yokohama Rubber	1,247	1,316	5.5%	5,514	23.9%
Nabtesco Corp.	500	566	13.3%	1,743	32.5%
Sumitomo Precision Products	219	235	7.5%	499	47.2%
Nikkiso	44	55	24.9%	725	7.6%
Koito Industries	265	331	25.2%	629	52.7%
Japan Aviation Electronics Industry	155	156	0.4%	1,561	10.0%
Kayaba Industry	60	61	1.7%	3,871	1.6%
Koito Mfg.	308	359	16.6%	4,706	7.6%
Showa Aircraft Industry	92	89	-2.5%	253	35.4%
Jamco Corp.	417	446	7.1%	446	100.0%
Shimadzu Corp.	570	642	12.5%	2,900	22.1%

Source: Based on the quick reports on the settlement of accounts of these companies, etc.

(2) Future prospects and problems

The news of considerable delay in the delivery of the first Boeing 787 plane has had impact not only on risk sharing partner businesses in Japan but on companies dealing with these businesses as well. For the aircraft industry and related businesses, which are regarded as requiring a long period of time between initial investment and recoupment, there are some uncertain factors, such as prospects for recovery of the global economy started by the subprime loan issues in the U.S. In April 2008, Mitsubishi Aircraft Corp. was founded to promote the MRJ project. This project is expected to embody in products the new values airline business will need in the years to come and to make impact on the air transportation industry. Not merely domestic manufacturers but many other businesses and business people are paying attention to the project as a supplier of new international commodities.

In the aircraft industry, small manufacturers, which have been involved in automobile and electronics business, are increasing their activities for finding new business chances, including those in the MRJ project, all over the country. But unlike automobile and electronics business, aircraft is no mass-manufactured products, although it is composed of a very large number of parts. It requires strict quality warranty, too. Small manufacturers will be required to have high-level technology and production equipment and will need to carefully study how to secure profits from their investment in aircraft business. In the manufacture of passenger planes, the need to save costs is likely to grow

greater more than in the past, and it has become an urgent task for Tier 1 businesses to build a supply chain stable enough to offer necessary technology and bear risks. The important problem will be how they can find firms that they will develop and cooperate with and how they can create good relations with these firms. On the other hand, the small manufacturers planning to enter the aircraft industry are making various attempts to build up relations with Tier 1 businesses while making new investment and working together with firms already having necessary equipment and technology.

The creation of a new supply chain for aircraft production by the cooperation between major aircraft manufacturers, aircraft equipment manufacturers and small manufacturers will become the base for the international competitiveness of the aircraft industry in the future.