

2. Industrial Machine Sector

2.1 Machine tools

2.1.1. Supply and demand trend

(1) Outline

Fig. 2-1 Orders received for machine tools by business category

		¥ million, %							
		2000	2001	2002	2003	2004	2005	2006	Year-on-year ratio (for 2006)
Iron and steel/nonferrous metal		7,824	5,189	3,680	5,557	8,613	11,619	12,996	11.9
Metal product		18,325	13,383	9,732	15,209	22,067	22,641	21,030	-7.1
Machine manufacturer	General machine	192,850	154,430	120,190	160,512	264,502	302,287	330,108	9.2
	(of which dies)	-	39,821	32,327	40,724	65,645	73,807	66,667	-9.7
	Electric machine	45,922	35,131	22,564	30,483	50,902	44,296	52,333	18.1
	Automobile	129,042	136,541	141,490	158,988	225,632	258,959	195,505	-24.5
	(of which automotive parts)	-	60,410	67,100	76,975	101,945	110,547	89,157	-19.3
	Shipbuilding and other transportation machine	10,227	15,587	14,287	12,074	17,328	23,942	27,066	13.0
	Precision machine	38,276	22,082	16,459	24,176	32,990	32,913	36,813	11.8
Subtotal		416,317	363,771	314,990	386,233	591,354	662,397	641,825	-3.1
Other manufacturers		26,557	17,198	14,197	24,507	37,643	33,333	37,719	13.2
National/local governments/schools		3,085	3,065	2,125	1,873	1,842	1,588	2,100	32.2
Other demand sectors		1,760	853	610	1,644	2,971	6,081	8,368	37.6
Trading firms/agencies		47,818	7,666	4,988	6,564	8,349	9,050	8,971	-0.9
Total, domestic demand		521,686	411,125	350,322	441,587	672,839	746,709	733,009	-1.8
Overseas demand		453,360	377,773	325,515	409,514	563,353	616,494	703,961	14.2
Total amount of orders received		975,046	788,898	675,837	851,101	1,236,192	1,363,203	1,436,970	5.4
of which NC machine tools		926,477	745,409	638,831	807,208	1,176,257	1,304,058	1,374,496	5.4
Sales		868,442	849,884	650,600	792,356	1,025,726	1,275,637	1,407,258	10.3
of which NC machine tools		821,236	804,798	617,671	754,995	975,911	1,219,016	1,348,759	10.6

Notes: 1. Figures for dies and automotive parts, which are included in those for general machines and automobiles, respectively, are shown in 2001 and after.
 2. Due to rounding off, the total of year-on-year ratio is not 100.0 in some cases.
 3. Figures with "-" are negative ones.

Source: Based on Japan Machine Tool Builders' Association, "Machine Tools," No.168, March 2007, p.14.

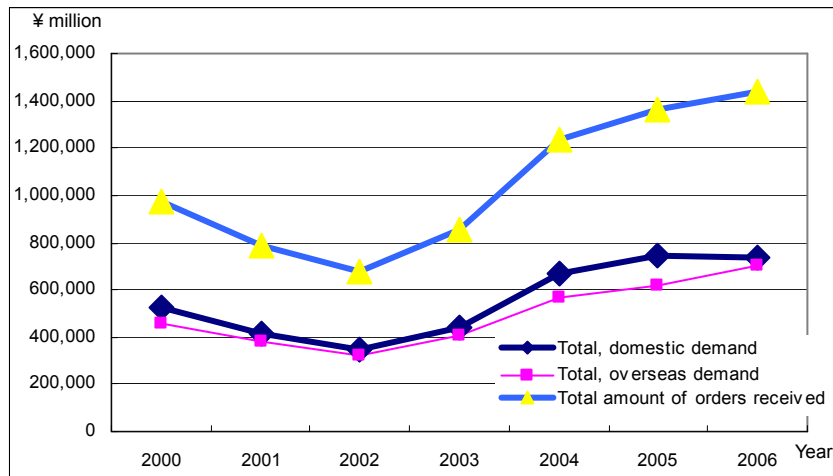
The amount of orders received for machine tools was greater than that for the previous year from 2003 to 2006 for four consecutive years, and it is believed that the amount in 2007 will be greater than that in 2006 for the fifth straight year. In 2006, the amount of orders received hit a new high of ¥1,437.0 billion first in 16 years after 1990 (Fig. 2-1).

(2) Production and demand

Orders received for machine tools were in a favorable trend, and overseas demand (net export) showed especially high growth, recording ¥704.0 billion or an increase of 14.2% in 2006 over the previous year. The growth rate of overseas demand was 25.8% y/y in 2003 and 37.6% y/y in 2004 but declined to 9.4% in 2005. In 2006, however, the amount of overseas demand exceeded ¥700 billion, suggesting that this demand will continue to be a big market for the machine tool industry in

the future. Domestic demand decreased a little by 1.8% from the previous year but registered ¥733.0 billion in 2006 (Fig. 2-2).

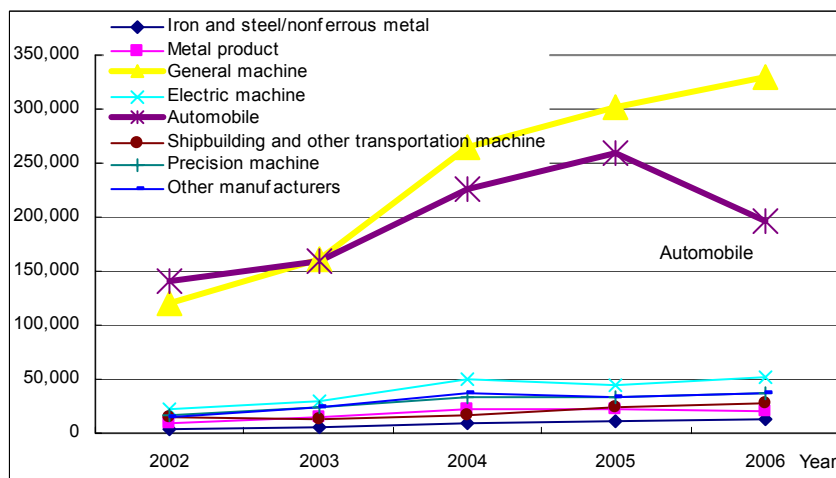
Fig. 2-2 Trend of the amount of orders received for machine tools



Source: Same as that for Fig. 2-1.

By the business category of the manufacturing industry, while orders from metal product manufacturers (¥21.0 billion, down 7.1% y/y) and automobile manufacturers (¥195.5 billion, down 24.5% y/y) decreased, those from other categories of manufacturers rose: ¥52.3 billion or up 18.1% y/y for electric machine manufacturers and ¥330.1 billion or up 9.2% y/y for general machine manufacturers (Fig. 2-3).

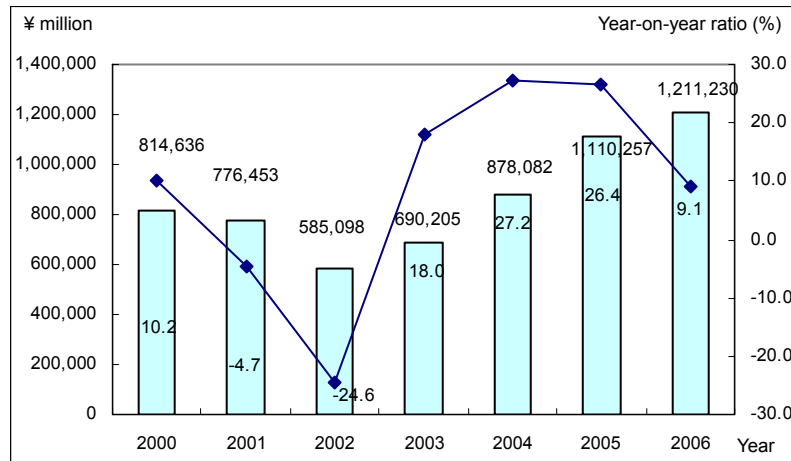
Fig. 2-3 Orders received for machine tools by the business category of the manufacturing industry



Source: Same as that for Fig. 2-1.

Then the production of machine tools in 2006 was favorable though the growth rate was lower than in 2005: ¥1,211.2 billion or an increase of 9.1% y/y. This production figure was over twice that in 2002 when it suffered a big fall and a growth for the fourth straight year after 2003 (Fig. 2-4).

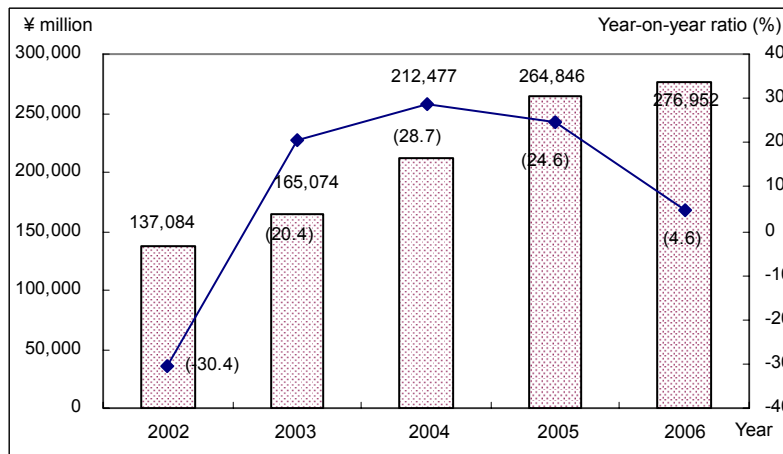
Fig. 2-4 Production of machine tools



Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

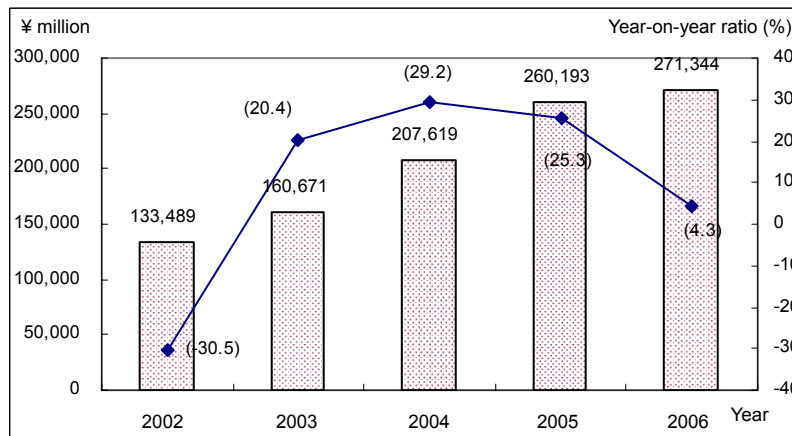
The production of machine tools by product category is as shown in Figures 2-5 to -11.

Fig. 2-5 Production of lathes



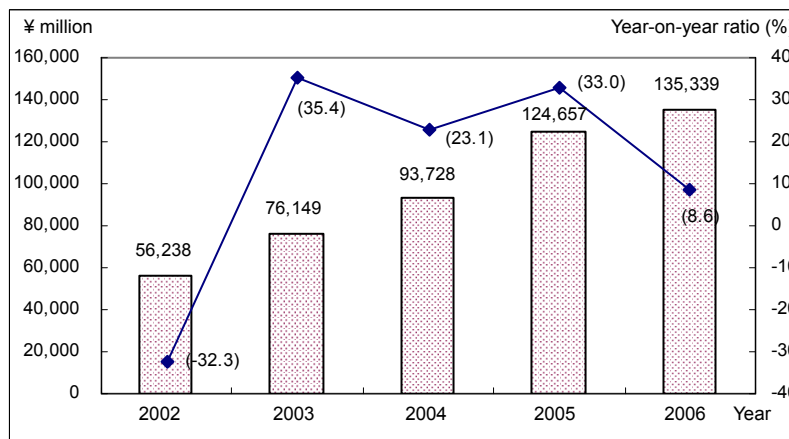
Source: Same as that for Fig. 2-4.

Fig. 2-6 Production of numerically controlled lathes (including turning centers)



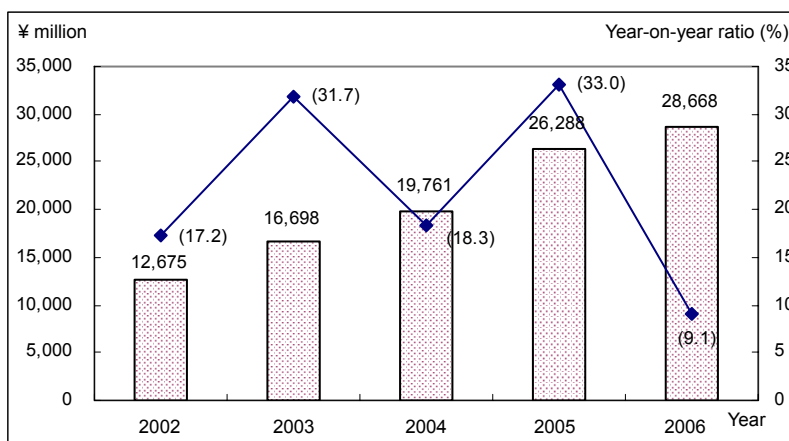
Source: Same as that for Fig. 2-4.

Fig. 2-7 Production of grinding machines



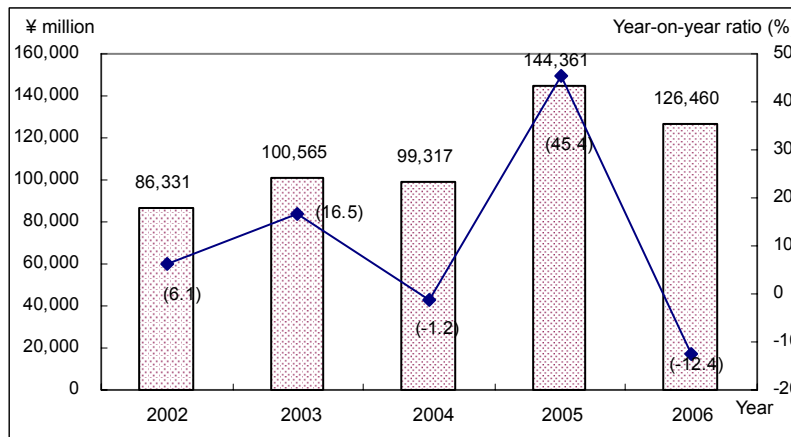
Source: Same as that for Fig. 2-4.

Fig. 2-8 Production of gear-cutting machines and gear-finishing machines



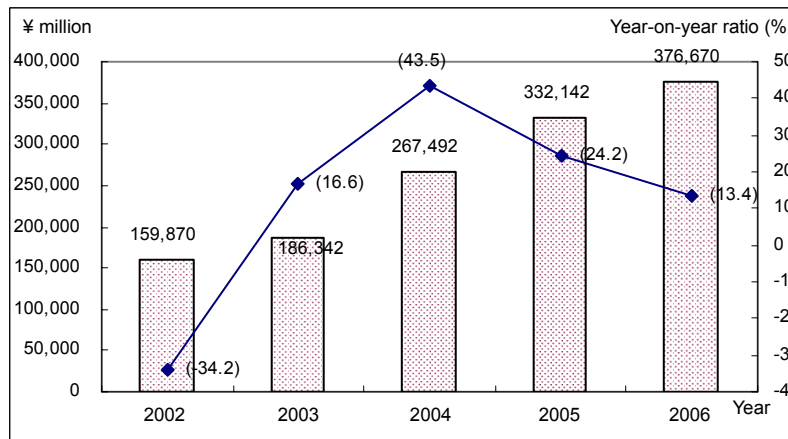
Source: Same as that for Fig. 2-4.

Fig. 2-9 Production of special-purpose machines



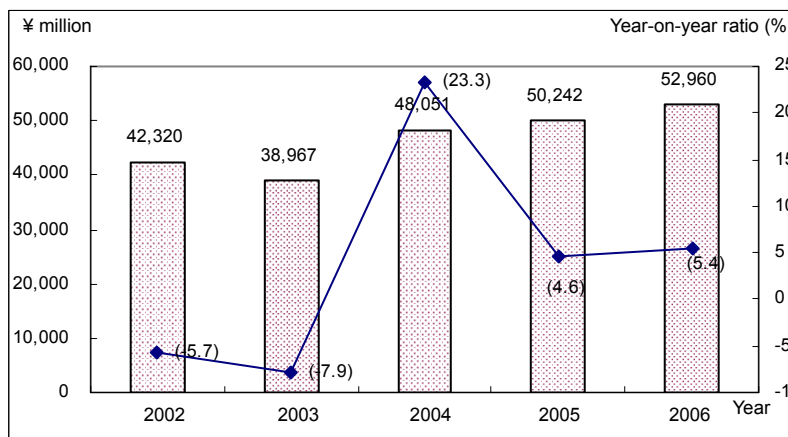
Source: Same as that for Fig. 2-4.

Fig. 2-10 Production of machining centers



Source: Same as that for Fig. 2-4.

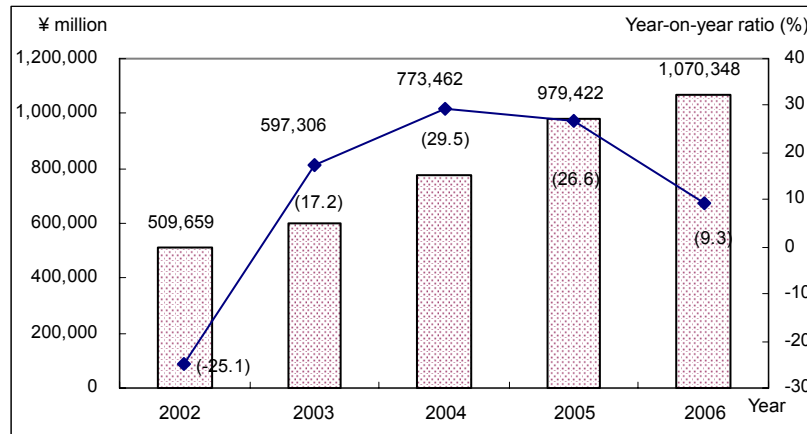
Fig. 2-11 Production of numerically controlled electric discharge machines



Source: Same as that for Fig. 2-4.

In general, the production of the machine tool products increased, though that of special-purpose machines fell to ¥126.5 billion (down 12.4% y/y) in 2006 (Fig. 2-9). In particular, as seen in the fact that the output of numerically controlled (NC) lathes amounted to ¥271.3 billion in 2006, a growth for four consecutive years (Fig. 2-6), the total production of NC machine tools steadily increased (Fig. 2-12).

Fig. 2-12 Total production of NC machine tools

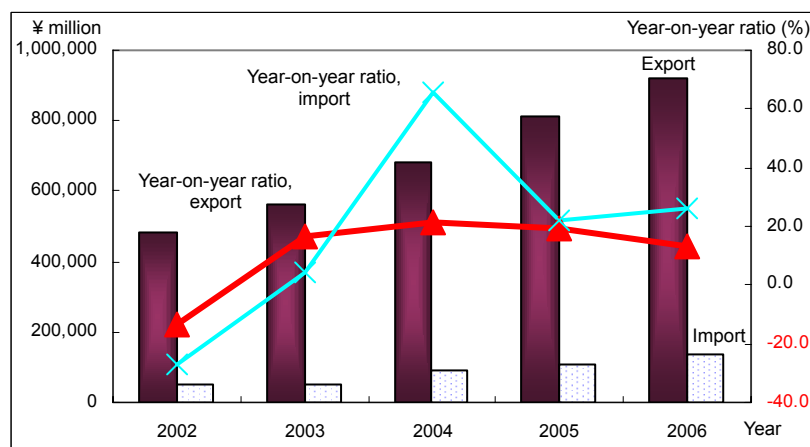


Source: Same as that for Fig. 2-4.

(3) Export and import

The export of machine tools in 2006 was ¥921.5 billion or an increase of 13.0% over the previous year, recording a growth for the fourth straight year from 2002. The import in 2006 was ¥135.6 billion or a sharp growth of 26.2% y/y (Fig. 2-13).

Fig. 2-13 Export and import of machine tools



Source: Based on Japan Machine Tool Builders' Association, "Machine Tools," No.168, March 2007.

By importing country, the U.S. is the largest importer of machine tools from Japan (¥229.4 billion in 2006), followed by China (¥157.2 billion) (Fig. 2-14). The financial statements and other data of machine tool manufacturers point out that demand for machine tools was large in the automobile, farm machine, construction machine and aircraft industries in these countries. Thus it is supposed that export to these industries was on a higher level.

According to the Japan Machine Tool Builders' Association, the export of NC horizontal lathes was the greatest in amount (¥185.9 billion, 20.2% of all), followed by horizontal machining centers (¥146.4 billion, 15.9% of all).

Fig. 2-14 Trend of export of machine tools by importing country (area)

	2002	2003	2004	2005	2006	Year-on-year change (%)	Ratio to total (%)
South Korea	39,480	40,378	85,584	70,548	75,414	6.9	8.2
Taiwan	44,035	49,288	87,390	86,939	99,718	14.7	10.8
China	54,084	70,729	118,298	123,760	157,183	27.0	17.1
Thailand	34,092	39,329	46,358	51,997	49,401	-5.0	5.4
Singapore	9,875	8,294	19,957	13,749	18,183	32.2	2.0
Germany	21,604	22,936	30,622	40,919	43,390	6.0	4.7
U.K.	10,177	5,025	6,403	7,469	10,447	39.9	1.1
Russia	4,131	320	1,251	2,420	2,067	-14.6	0.2
U.S.	138,646	128,758	143,067	195,493	229,396	17.3	24.9
Others	128,544	199,048	144,136	221,816	236,257	6.5	25.6
Total	484,668	564,105	683,066	815,110	921,456	13.0	100

Note: Figures with "-" are negative ones.

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

The U.S. is also the largest exporter of machine tools to Japan; the import from the country in 2006 amounted to ¥70.7 billion, accounting for over 50% of all (Fig. 2-15). According to the statistics of the Association mentioned above, the import of laser machines was the largest, totaling to ¥16.8 billion in 2006, of which the import from the U.S. was ¥7.1 billion. This is one of the reasons that the U.S. has a large presence in Japan's import of machine tools.

Fig. 2-15 Trend of import of machine tools by exporting country (area)

	2002	2003	2004	2005	2006	Year-on-year change (%)	Ratio to total (%)
South Korea	1,708	1,237	3,588	4,595	3,971	-13.6	2.9
Taiwan	1,466	1,879	2,312	4,654	5,656	21.5	4.2
China	2,264	2,416	3,992	6,387	8,340	30.6	6.1
Thailand	2,457	3,894	4,692	6,690	7,732	15.6	5.7
Singapore	1,282	2,292	3,455	2,864	3,747	30.8	2.8
Germany	6,826	7,485	10,262	11,419	17,577	53.9	13.0
U.K.	1,171	969	780	1,623	834	-48.6	0.6
Italy	843	430	1,011	1,622	1,026	-36.7	0.8
France	276	549	565	794	1,596	101.0	1.2
Switzerland	4,406	5,660	7,166	11,447	11,947	4.4	8.8
U.S.	25,282	24,275	48,560	53,136	70,734	33.1	52.1
Others	2,923	2,077	1,862	2,222	2,489	12.0	1.8
Total	50,904	53,163	88,245	107,453	135,649	26.2	100.0

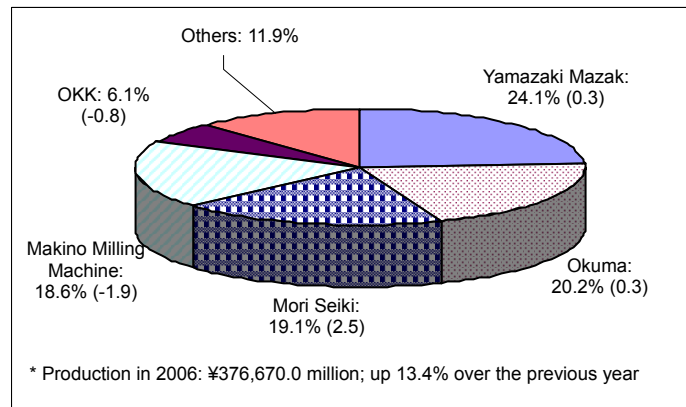
Source: Same as that for Fig. 2-14.

2.1.2. Results of operations and the trend of the machine tool industry

(1) Trend of management and overseas business activities

Figure 2-16 and -17 show the share of the manufacturers of machining centers and NC lathes in the domestic production. Major manufacturers have far greater parts of the share; the total production of Yamazaki Mazak Corp., Okuma Corp., Mori Seiki Co. and other leading manufacturers amounts to over 60% of all the domestic production.

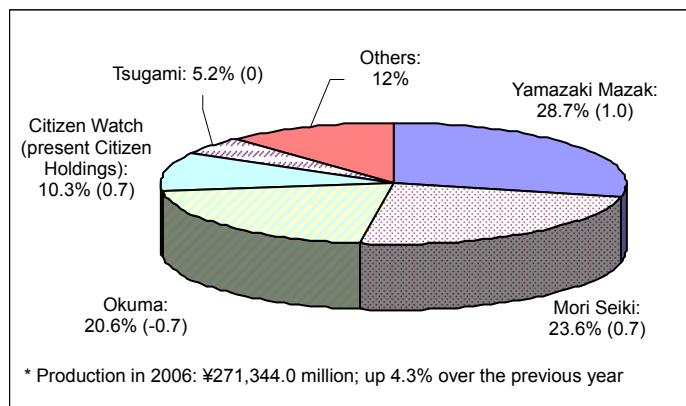
Fig. 2-16 Share of machining center manufacturers in the domestic production



Notes: Figures in parentheses are increase or decrease points (%); those with "-" are negative ones. Figures of the share are the estimates by Nihon Keizai Shimbun Inc.

Source: Based on the "Nikkei Sangyo Shimbun," August 10, 2007.

Fig. 2-17 Share of NC lathe manufacturers in the domestic production



Note: Same as that for Fig. 2-16.

Source: Based on the "Nikkei Sangyo Shimbun," August 17, 2007.

The results of operations of the main manufacturers of machining centers and NC lathes in 2006 are as shown in Figure 2-18. As noted above, machine tools enjoyed a good performance from 2005, and these manufacturers achieved greater sales in this favorable situation.

Fig. 2-18 Trend of business results of the main five manufacturers (consolidated)

¥100 million, %

		2005	2006	2005/2006 growth rate (%)	2007 estimate
Okuma	Sales	1,513	1,888	24.8	2,040
	Operating profit	187	273	46.0	298
	Ordinary profit	171	256	49.7	283
	Net profit	121	157	29.8	170
Mori Seiki	Sales	1,453	1,722	18.5	1,880
	Operating profit	163	250	53.4	280
	Ordinary profit	159	247	55.3	280
	Net profit	138	162	17.4	168
Makino Milling Machine	Sales	1,232	1,376	11.7	1,400
	Operating profit	119	168	41.2	170
	Ordinary profit	116	169	45.7	170
	Net profit	93	100	7.5	120
Citizen Holdings	Sales	3,359	3,362	0.1	3,440
	(of which industrial machine)	371	442	19.1	450
	(Machine tools of industrial machine)	307	375	22.1	375
	Operating profit	305	219	-28.2	240
	(of which industrial machine)	54	64	18.5	66
	Ordinary profit	346	260	-24.9	260
	Net profit	186	71	-61.8	140
Tsugami	Sales	340	366	7.6	350
	(of which machine tools)	291	328	12.6	-
	Operating profit	59	62	5.1	-
	(of which machine tools)	50	57	14.0	-
	Ordinary profit	54	55	1.9	51
	Net profit	55	34	-38.2	30

Note: Figures with "-" are negative ones.

Sources: Based on the financial statements, quick reports of settlement of accounts, etc. published on the website of these companies.

After merging former Okuma Howa Machine Co. in July 2006, Okuma Corp. further reinforced its product lineup to meet the needs of all user categories and attained an increase in orders received and in sales. As a result of the merger with former Okuma Howa, simultaneous five-axis controls and vertical machining centers, which Okuma had not had before the merger, were added to the product line. In the area of manufacture, to improve the integrated production of main shafts for machining centers, Okuma constructed the Fourth Kani Plant in March 2005 and the Fifth Kani Plant in February 2007; by these new plants, the company established an integrated manufacturing system capable of processing parts of double column machining centers to assembling them and worked to raise the productivity. As a result, the company recorded consolidated sales of ¥188.8 billion in 2006, an increase of 24.8% over the previous year, having an increase in revenue and profit for the fourth consecutive year.

Mori Seiki Co. registered sales of ¥172.2 billion in 2006 (up 18.5% y/y) as capital investment was increased in the automobile and automobile-related, general machine, construction machine, hydraulic machine and semiconductor-related industries.

Makino Milling Machine Co. had continued high-level orders from many categories of manufacturers and attained sales of ¥137.6 billion (up 11.7% y/y) in 2006, though orders for automotive parts and electronic and electric products in the domestic market were smaller than planned.

Citizen Holdings Co. enjoyed a nearly 20% increase in sales in 2006 over the previous year as orders for and sales of its CNC lathes, the main industrial machine business, were steady in general.

Thanks to the steady growth of the automobile and automobile-related and digital household electric appliance industries, Tsugami Corp. recorded sales of automatic lathes, its major products, of ¥21.0 billion (up 12.2% y/y) in 2006. Its sales of grinding machines were ¥6.2 billion or a growth of 25.4% over the previous year, due to the good performance of automobile-related and hydraulic machine industries. Thus, the company's total sales in machine tool business were ¥32.8 billion or an increase of 12.6% y/y.

As outlined above, the performance of the major machine tool manufacturers in Japan was in a steady tone, and their overseas sales also increased greatly (Fig. 2-19). The fact that the weak yen trend was one of the favorable winds can be regarded as part of the background of the good business results abroad. Growth rates were especially higher in Europe and each of the companies declared that they would lay emphasis on strategies in Europe, especially Eastern Europe, in the years to come.

Fig. 2-19 Overseas sales of the main four companies

	¥ million (year-on-year ratio)		
	Americas	Europe	Asia/Pacific
Okuma	434 (11.9%)	277 (38.5%)	236 (19.2%)
Mori Seiki	389 (6.9%)	470 (41.1%)	165 (33.1%)
Makino Milling Machine	284 (5.2%)	146 (30.4%)	406 (22.3%)
Tsugami	114 (6.5%)	33 (43.5%)	6.4 (8.5%)

Source: Same as that for Fig. 2-18.

Wages in Eastern Europe are relatively low and the moves of plants by Western European and U.S. manufacturers to Eastern Europe are increasing, leading to a rapid growth in demand for machines and equipment (See the article published in the "Nikkan Kogyo Shimbun," September 19, 2007). Yamazaki Mazak plans to open its sales bases complete with a product exhibition facility in the Czech Republic, Poland and Hungary in 2008 in order to increase sales in Eastern Europe, which are now only at a one-digit percentage of its total European sales of ¥800.0 billion a year, to 10% in two years. Okuma also started its sales footing in eastern Austria in October 2007 and will open branches with a showroom near the plants of major automobile manufacturers, such as Volkswagen, Audi and Peugeot. JTEKT Corp. says that it will establish a branch in Hungary or the Czech Republic by the summer of 2008 through its sales subsidiary in Germany. Mori Seiki indicates its intention to establish a competitive base in Europe: for example, it plans to increase its staff in Europe to the 400-person level in 2008 and to increase customers among smaller machining industries, too.

(2) Technological innovation and the business environment

Mori Seiki, a leader in machine tools, had planned to construct a new plant in Thailand, taking account of the growing demand for machine tools all over the world mainly in aircraft and construction machine industries. But in June 2007 the plan was cancelled due to the reason for preventing the diversion of machine tools to military use. Behind this cancellation was the fact that the series of machine tools planned to be made in Thailand had a precision far higher than that stipulated in the export control clauses of the Foreign Exchange and Foreign Trade Control Law. Machine tools can be diverted to the manufacture of arms, such as missiles, and Thailand is a so-called “non-white” country (Note: the exports that might be diverted to the development or manufacture of arms to a “non-white” country must be approved in advance by the Japanese Ministry of Economy, Trade and Industry). Considering this, Mori Seiki announced that instead of the planned project in Thailand, it would reinforce the production capacity by 20-30% of its Iga Plant (Iga, Mie Prefecture), the main manufacturing base in Japan, by the end of 2009.

While there is a trend toward the activities for limiting the manufacturing base so as to prevent diversion to military uses, as those of Mori Seiki mentioned above, machine tool manufacturers have started to monitor their products by mounting a sensor, etc. on the products.

Mori Seiki established the system for remote-monitoring its machine tools delivered to abroad around the clock. The machine tools sold to other countries may be resold illegally and then offered to military use. Mori Seiki puts a communications equipment in its machine tools and regularly accesses then equipment via the Internet, thus making it possible for a remote call center to detect any abnormality, including the stop of operation. The company uses this system not only to find the malfunction of machine tools themselves but also to prevent the illegal use for military purposes, etc.

Similarly, Yamazaki Mazak started to load a “machine move detector” on its machine tools. Starting from the shipment in August 2007, the company mounted the detector on part of products for export and said that it planned to adopt it to about 200 types of its machine tools, including those for domestic users, by the end of 2007. Citizen Machinery Co., Citizen Holdings’ machine tool subsidiary, loaded a sensor for preventing illegal export of its machine tools on all of its products beginning in 2007. This sensor can sense the shock at the time when the machine tools installed at the customer’s plant, etc. are taken away without permission, and prevent the computerized numerical control (CNC) from working.

(3) Future prospects and problems

The order receiving environment in Japan in 2008 has some uncertainties and is expected to tend to level off. Overseas, however, orders will substantially increase from the Asian region and will grow favorably in the European region, too.

In the amount of orders received in 2006, domestic demand was still a little greater than overseas demand, but this situation is expected to reverse in the future. According to the Japan

Machine Tool Builders' Association, the amount of orders received in 1990 during the economic bubble period totaled to ¥1,412.1 billion, and while the domestic demand was 73.6%, the overseas demand was 26.4%, the domestic demand accounting for a little smaller than three times that of the overseas demand. But in 2006, the domestic and overseas demands were getting balanced, being 51.0% and 49.0%, respectively. In addition, the total of the first half of 2007 (January to June) was ¥778.9 billion, an increase of 8% over the same period of 2006, and the overseas demand (¥414.9 billion) was greater than the domestic demand (¥364.0 billion). Orders received in August 2007 amounted to ¥129.7 billion, a growth of 12.6% over the same month in 2006, and some pointed out that the high growth was supported by the brisk overseas demand, mainly for automobile use, all over the world (See the article published in the "Nikkan Kogyo Shimbun," September 13, 2007). Since there is a very fair possibility that overseas demand will continue to increase in the future and manufacturers are reinforcing their system for increased production, it is expected that the sales will surely increase.

However, expanding overseas demand creates the need to consider foreign exchange risks. This consideration is an important factor in deciding whether to promote local production overseas further or not. Figure 2-20 shows the trend of overseas production of the major machine tool manufacturers. From this figure it is evident that Yamazaki Mazak surpasses others greatly in production abroad.

Fig. 2-20 Trend of overseas production of major machine tool manufacturers (2006)

	Overseas plants	Ratio of overseas production
Yamazaki Mazak	U.S., U.K., Singapore, China	A little less than 40%
Okuma	China, Taiwan, U.S. (knockdown export)	A little less than 10%
Mori Seiki	Switzerland	1% or less
Makino Milling Machine	China, Singapore, India	14%
Citizen Machinery	Thailand, Germany	21%
Tsugami	China	5%

Note: Figures for "Ratio of overseas production" are on a sales basis.

Source: The "Nikkei Sangyo Shimbun," August 22, 2007.

At late August 2007, Citizen Machinery announced that it completed the construction of a plant in Shandong Province, China with an investment of ¥500 million and planned to start the plant's operation in April 2008. It is the first time for the company to manufacture finished products in China, though already having made electric parts, etc. for machine tools. Citizen Machinery says that it will make low-priced models for domestic use in China and that behind the expansion in manufacture in China is the fact that the traditional strategy of making machine tools for China in Thailand is fairly costly because of import customs. As seen in the case of Citizen Machinery, machine tool manufacturers are making corporate efforts to firmly establish their local production system, and these strategies for overseas production will be one of the industry's future tasks.

2.2 Farm machines

2.2.1. Supply and demand trend

(1) Outline

The production of farm machines in 2006 totaled to about ¥498.5 billion, which was not so bad though the growth rate was low. The export was about ¥258.8 billion or an increase of about 15% over the previous year (Ministry of Finance, “Customs Clearance Statistics”). By region, in addition to a continued increase in the export to North America, the export to the Asian area greatly grew, making this area the second largest region for export from Japan that overtook Europe. The import was about ¥47.2 billion, showing a solid growth (Ministry of Finance, “Customs Clearance Statistics”). By region, while the import amount from Europe decreased, that from Asia achieved a high growth.

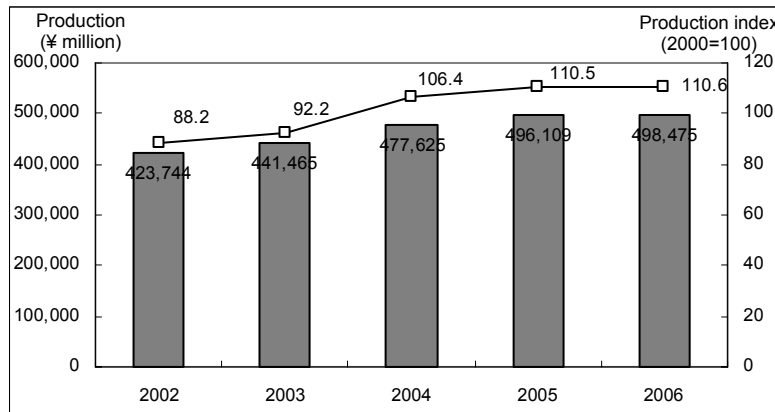
As for the trend of business activities of farm machine manufacturers, some attempts to reinforce sales in North America again were seen. But what is more noteworthy is that projects for local production targeted at the Chinese, Thai and Indian markets became more active. The export to and sales in those markets were favorable. At home, as farmers were divided into two (while large-scale farmers increased, small farmers were faced with aging and increasing part-time farmers), farm machine manufacturers introduced large machines for large-scale farmers but it remained true that the domestic market tended to become smaller. Thus, it became clearer that the future direction of farm machine manufacturers would be a shift of sales activities to overseas, mainly to China and other Asian markets.

(2) Production

The production of farm machines in 2006 was ¥498.5 billion or an increase of about ¥2.4 billion over the previous year, which was a steady performance. The production index supposing the production in 2000 to be 100 was 110.6 points, a slight growth of 0.1 point over that in 2005 when the figure was 110.5 points.

The production of farm machines increased in 2006 for the fourth straight year from 2003. As the domestic market was shrinking, the Asian area, which became the second largest region after North America for export from Japan, is expected to be the second largest market that could replace the domestic market (Fig. 2-21).

Fig. 2-21 Production of farm machines

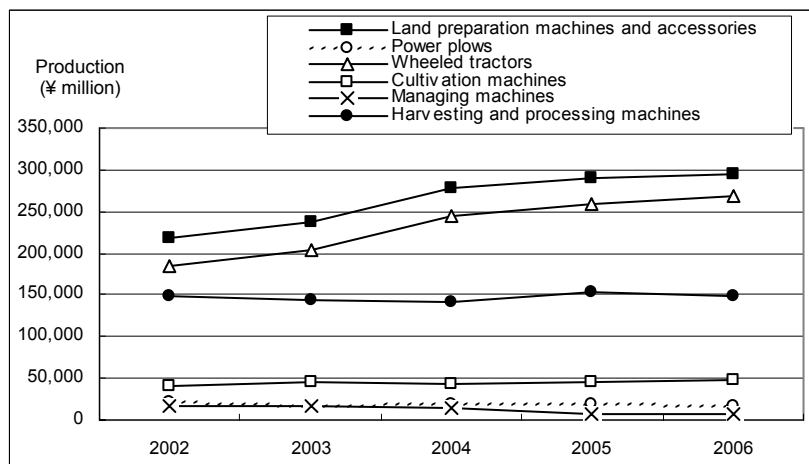


Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

By main type of machine, the production of farm machines in 2006 was as follows: land preparation machine and accessories, about ¥294.8 billion (up 1.7% y/y); power plows (including walking-type tractors), about ¥16.2 billion (down 15.8% y/y); wheeled tractors, ¥268.1 billion (up 3.7% y/y); cultivation machines, ¥47.7 billion (up 4.3% y/y); managing machines, a little over ¥7.6 billion (up 2.1% y/y) and harvesting and processing machines (e.g., combines and agricultural drying machines), a little less than ¥148.3 billion (down 3.1% y/y).

As noted above, the trend of production of farm machines by type can be regarded as favorable in general because the figure was higher than that in 2005 for almost all types of machines. However, the production of harvesting and processing machines, which have a large amount of production relative to other types of machines, decreased by 3.1% from the previous year, while power tillers suffered a substantial fall of 15.8%, accelerating the downward trend of the production of this category of machines (Fig. 2-22).

Fig. 2-22 Production of main types of farm machines

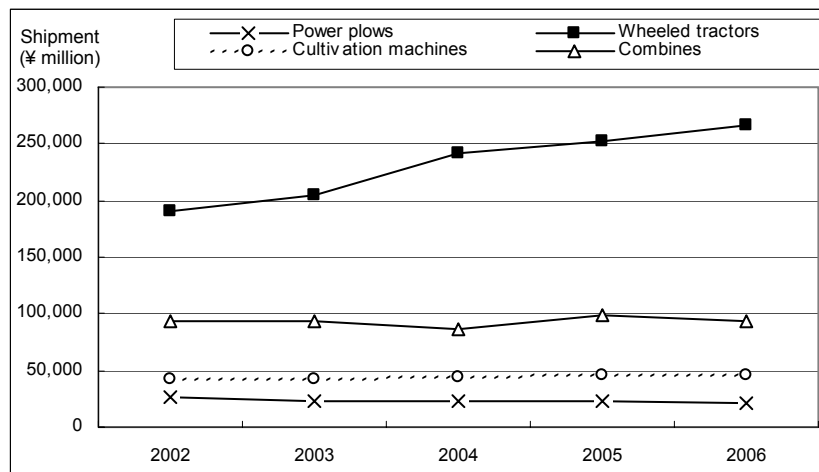


Source: Same as that for Fig. 2-21.

(3) Shipment

The shipment of power plows (including walking-type tractors) in 2006 was ¥20.9 billion (up 10.2% y/y), that of wheeled tractors, ¥266.0 billion (up 5.8% y/y), that of cultivation machines, ¥45.2 billion (up 5.8% y/y) and that of combines (combined machines for harvesting and threshing), ¥94.3 billion (down 3.8% y/y). While combines and power plows suffered a decline from 2005, wheeled tractors showed a firm growth (Fig. 2-23).

Fig. 2-23 Shipment of main types of farm machines

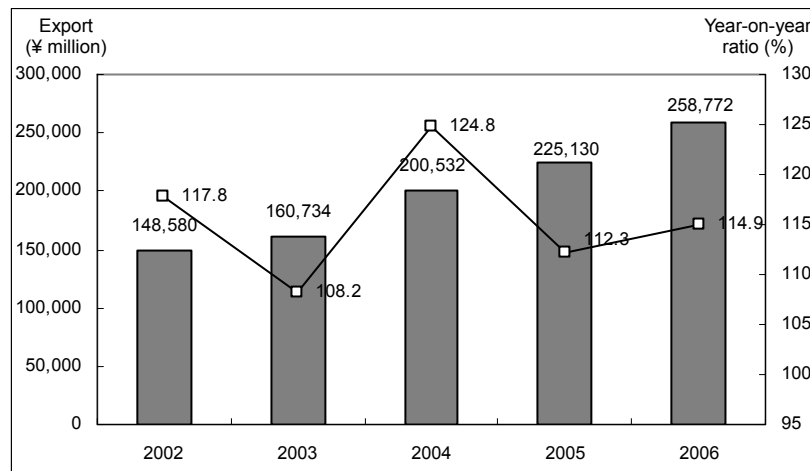


Source: Same as that for Fig. 2-21.

(4) Export and import

According to the Customs Clearance Statistics of the Ministry of Finance, the export of farm machines in 2006 was favorable, recording ¥258.8 billion (up 14.9% y/y). This export increased at least for six consecutive years, suggesting that the tendency was turning toward supplementing the shrinking domestic market with expanding export (Fig. 2-24).

Fig. 2-24 Situation of export of farm machines

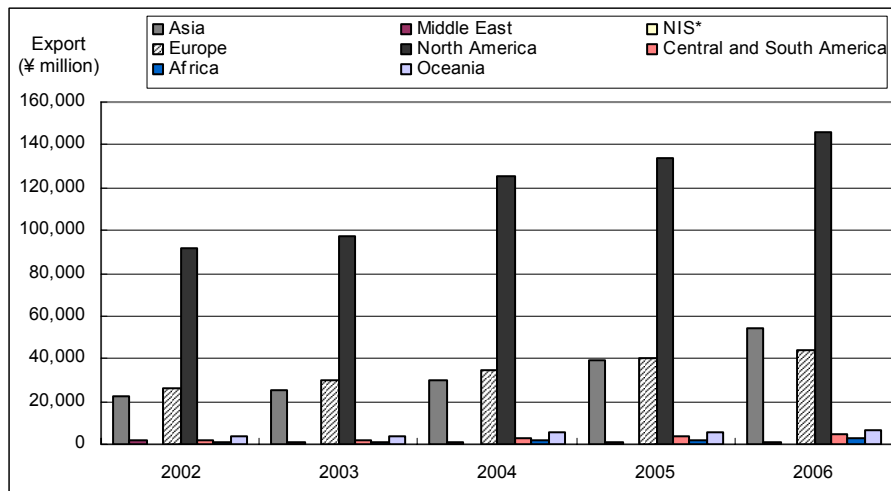


Source: Based on the Ministry of Finance, "Customs Clearance Statistics."

By region, the U.S. was the far largest importer of Japanese farm machines; in 2006, the export to the country was ¥149.2 billion or an increase of 9.1% over the previous year, continuing to show a steady growth. Europe, which had ranked second in the import from Japan, was overtaken by Asia and dropped to the third place; but the export to Europe in 2006 was ¥44.0 billion or a growth of 8.9% over the previous year.

The export to Asia, which rose to the second place in the import from Japan, was ¥54.2 billion or a substantial increase of 39.1% y/y, indicating a rapid growth. Behind the rapid expansion in the export to Asia, there are pointed out the following factors: export to China was brisk as the base of the manufacture and sale of farm machines; efforts to open the market were increased in Thailand and other ASEAN countries; and growing expectations for the market in India, a new industrial country. This upward tendency is expected to continue for some more time stimulated mainly by the growing demand for tractors in Asia. At the same time, Japanese farm machine manufacturers will promote local production in the Asian region in cooperation with local businesses (Fig. 2-25).

Fig. 2-25 Situation of export of farm machines by region

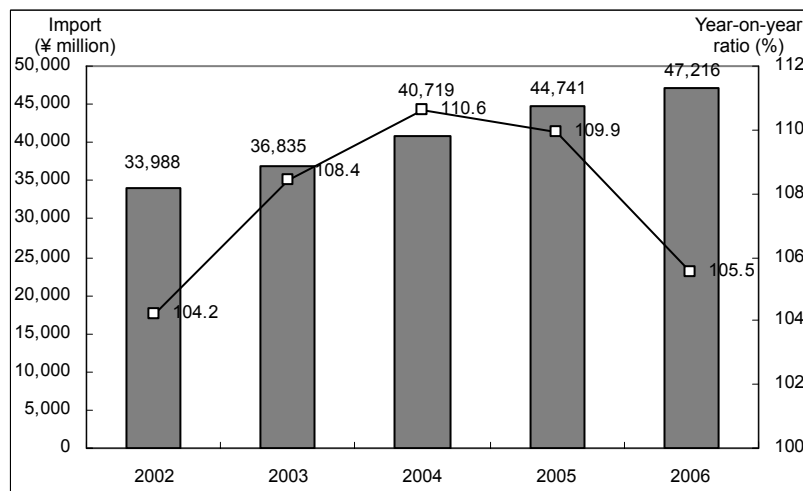


Note: NIS = New Independent States: 12 countries of new independent countries of the former Soviet Union excluding Estonia, Latvia and Lithuania.

Source: Same as that for Fig. 2-24.

The “Customs Clearance Statistics” of the Ministry of Finance says that the import of farm machines in 2006 was ¥47.2 billion or an increase of 5.5% over the previous year, continuing to show an upward trend. The import grew for six straight years in 2006, which made globalization noticeable in the import sector, too (Fig. 2-26).

Fig. 2-26 Situation of import of farm machines



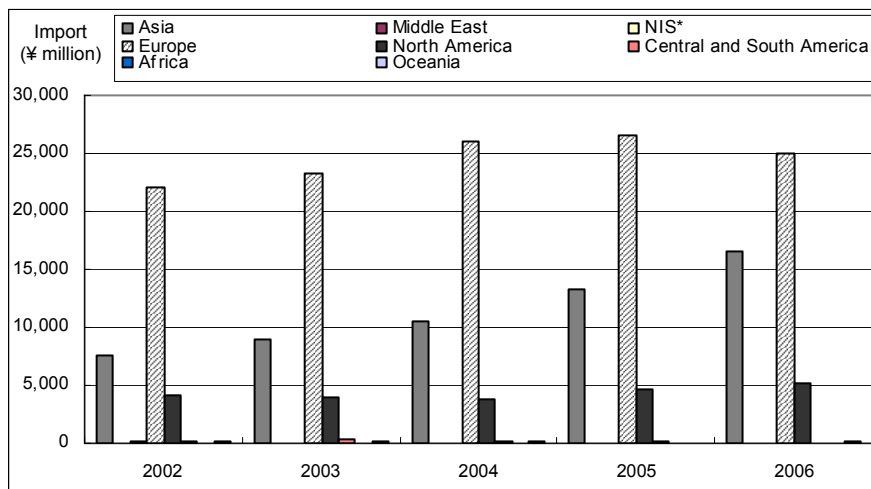
Source: Same as that for Fig. 2-24.

By region, Europe was the largest importer of Japanese farm machines in 2006; but the amount was ¥25.1 billion or a decrease of 5.4% from the previous year, the first fall in three years. By contrast, the import from Asia strengthened the tendency to increase in the recent six years; the

import from this region in 2006 was ¥16.6 billion, a high growth of 24.8% over the previous year. This may indicate the trend of growing dependence of Japan on Asia for both export and import. The import from North America repeated increases and decreases in the past six years, but in 2006 the import was a little over ¥5.2 billion or an increase 11.4% y/y, a steady growth.

As described above, the farm machine industry had a closer relation with Asia in import, too. It is thus expected that the industry's relation with Europe and Asia will become closer in the years ahead (Fig. 2-27).

Fig. 2-27 Situation of import of farm machines by region



Note: NIS = New Independent States: 12 countries of new independent countries of the former Soviet Union excluding Estonia, Latvia and Lithuania.

Source: Same as that for Fig. 2-24.

2.2.2. Results of operations and the trend of the farm machine industry

(1) Trend of management

This section mainly reports the overseas business activities of major farm machine manufacturers.

Kubota Corp. is positively reinforcing its business in the Chinese market. In 1998, it founded Kubota Farm Machine Co. in the City of Suzhou, Jiangsu Province, China and started the local production of head-feeding combines in 1999. Having got behind Yanmar Co. at first, Kubota became a top supplier in China as the total demand for these combines increased to 5,000 in 2005 and to 7,000 in 2006, and its market share in the country was a little over 60% in 2006. The company adopted the strategy of laying greater stress on service than on sales and has been working to improve its brand power in China rather than setting unreasonable prices in an attempt to increase sales. In addition, Kubota plans to start the production of farm tractors in Thailand around March 2009. In this project, the company aims at constructing a plant in Thailand as the base of production for all the areas in Asia and for Europe by forming a joint venture with the Siam Cement Group

(SCG), a Thai conglomerate, with a total investment of 3.0 billion bahts (approx. ¥10.6 billion). Kubota's share in the Thai market, where demand for tractors is rapidly increasing, is about 70% and will become the first Japanese manufacturer doing full-scale tractor production in Asia. Therefore, other manufacturers will promote the construction of overseas production bases instead of export-oriented business while carefully watching foreign exchange fluctuations.

Yanmar Co. announced the policy of restarting farm machine business in North America. In cooperation with a large farm machine manufacturer in the region, the company will start to sell products of its own brand in the fall of 2007 first in about 20 years. In the North American market, Yanmar had supplied farm machines to local manufacturers on an original equipment manufacturing (OEM) basis only. As the domestic market continued to become smaller as a result of decreasing and aging farmers, the company planned to uncover the global market by supplying its brand products in an attempt to shake itself free from its business structure heavily dependent on the domestic market. Yanmar set the objective of raising the ratio of its overseas sales from 30% at present to 50% by 2012, and the Yanmar brand project in North America has a test case-like meaning for the company in its future activities for creating new global markets, such as China and India.

Iseki & Co. is making full-scale entry to the farm machine market in Thailand. The company will sign an agency agreement with AMAC, a Thai company operating about 100 sales bases of farm machines all over Thailand, under which Iseki will export low-priced tractors developed for Thailand. What can be regarded as the factor behind Iseki's project is this: mostly imported used products had been sold in the farm machine market in Thailand, but because the purchasing power of Thai farmers increased due to recent economic growth, stable demand for tractors can now be expected in Thailand in the future. Already being making and selling farm machines in China, Iseki was behind Kubota, the industry leader, and other manufacturers in business in Southeast Asia. Thus the company plans to open up its market in Thailand taking advantage of this agency agreement and is now studying the possibility of expansion into Indonesia and Vietnam.

Mitsubishi Agricultural Machinery Co. (Higashiizumo-machi, Shimane Prefecture) announced that it would launch local production by a joint venture in Thailand and India in July 2007. With the modernization of agriculture and economic growth in Asia and other regions, demand for farm machines, mainly tractors, is quickly increasing, especially in Southeast Asia and South Asia. In this circumstance, Mitsubishi Agricultural Machinery Co. would like to expand its market share in these regions through the supply of products meeting the local needs. As it will be the first time that the company does overseas production, the local production is planned to start by the summer of 2008 after making final agreements with the Thai and Indian partners about the investment ratio and other matters.

As for parts for farm machines, the activities of Nanyo, a trading firm of farm machines, have attracted attention. The company established a business office in Dalian in the northeastern part of China, aiming at making the office a base for exporting parts for farm machines, etc. made in this part of China to Japan. More specifically, Nanyo will handle the export of hydraulic parts for the chassis, power transmission portions, etc. of tractors and other farm machines to Japan. As a result of the opening of the business office in Dalian, the company plans to increase its business in China's

northeastern part to ¥2.0 billion by March 2009, about twice that in March 2007 and to ¥3.0 billion by March 2010.

In the year ending in March 2008, Shin-Daiwa Kogyo Co. plans to add assembly lines at its Chiyoda Plant in Kitahiroshima-machi, Hiroshima Prefecture to increase the production capacity of small engines for farm and forestry machines, its main products, by 20%. With an investment of a little less than ¥200 million, the company will increase small engine lines from seven at present to 11 and start to operate the new lines in 2008 and after in order to reinforce the production of bush cutters and chain saws whose demand is growing mainly in North America.

As for the farm machine-related industries in Japan, the activities of manufacturers in Hokkaido have attracted attention. According to the Hokkaido Association of Agricultural Machinery Manufacturers, the production of farm machines of manufacturers in Hokkaido was about ¥20.0 billion annually; these manufacturers have a share of nearly 100% for upland farming machines for tractors at home and a share of 70% for dairy farming machines for tractors. This differs from the supply-demand structure of farm machines in other areas of Japan where major manufacturers take the lead. To enhance value added and to improve the work efficiency are now urgent issues for Hokkaido in order to compete with imported farm products. In such a situation, FE Co. in Asahikawa, a developer of machines, invented a “washing machine of daikon (long and white Japanese radish) with or without leaves;” since 2002 when it started to sell this machine, the company has sold over 150 units. In the summer of 2006, FE directly exported its medium-scale daikon washers, which can wash 10,000 daikon a day, to an incorporated farm in South Korea. The company’s technology, which is based on farmers’ problems and opinions about farm work that it collects carefully and introduces into its new products, has begun to be valued highly in Hokkaido. Also working to improve its existing products, FE is studying the colors and designs that do not fatigue the workers too much in cooperation with Hokkaido Tokai University. The company’s activities as these contribute to improvement in the site of agriculture (as well as forestry and fisheries) in Japan where the population is aging rapidly. Although this is a niche market, it will suggest one of the future directions of the farm machine industry in Japan.

2.3 Textile machines

2.3.1. Supply and demand trend

(1) Outline

The production of sewing and textile machines in 2006 was ¥287.8 billion, a substantial increase of 16.8% over the previous year and a higher figure than that for 2003 (¥285.7 billion). Main reasons are the fact that textile machines, which had been on the decline, turned to a great growth and that industrial sewing machines and preparation machines showed a steady increase.

The export of all textile machines in 2006 totaled to ¥277.7 billion or an increase of 15.4% y/y, a higher figure than that for 2004 (¥262.3 billion), although the export of industrial sewing machines did not grow very greatly (¥57.0 billion; up 1.7% y/y). Increases in the export of preparation

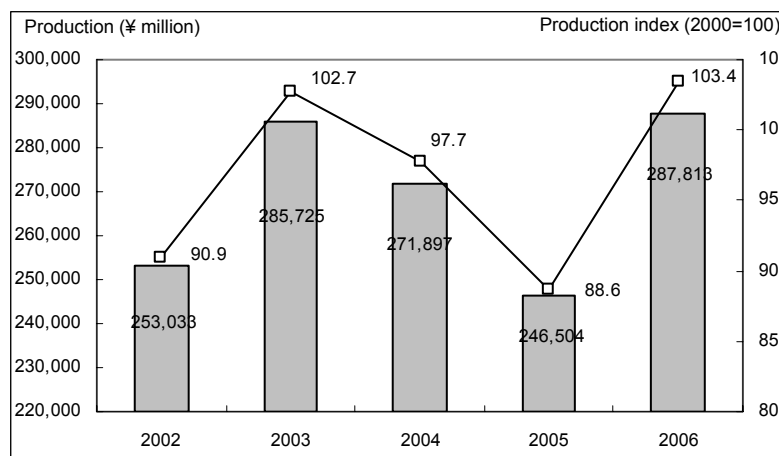
machines, weaving machines, synthetic fiber machines, etc. can be mentioned as the factor behind this.

The import amount of industrial sewing machines was about ¥3.5 billion, a decrease of 22.6% from the previous year, suggesting that domestic demand for industrial sewing machines surely fell. However, the import of all textile machines registered ¥42.0 billion (up 12.8% y/y), continuing to show an upward trend. The fact that the import of synthetic fiber machines, dyeing and finishing machines, other textile machines and parts and supplies increased can be cited as the reason for this, suggesting that the import of textile machines has continued to grow so as to supplement domestic-made textile machines.

(2) Production

The production amount of sewing and textile machines in 2006 increased by about ¥41.3 billion over the previous year to ¥287.8 billion, which was greater than the figure for 2003 and was a growth first in three years. The production index supposing the production in 2000 to be 100 was 103.4, higher than the figure for 2003 (102.7) by 0.7 point, indicating a recovery trend (Fig. 2-28).

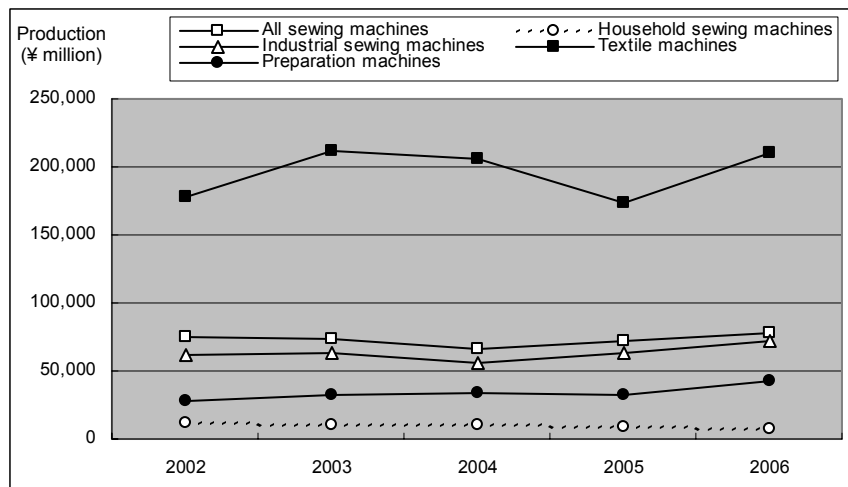
Fig. 2-28 Production of sewing and textile machines



Source: Based on the Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

By the type of machines, the production of textile machines (synthetic fiber machines, spinning machines, preparation machines, reeling machines, other preparation machines, weaving machines, knitting and braiding machines, dyeing and finishing machines and other textile machines) increased substantially and served as a propelling force for the entire production amount. And for sewing machines, while the production of household sewing machines (including programmed sewing machines) tended to decline, industrial sewing machines (including single-needle straight-sewing machines, hemming machines, other fabric sewing and knit sewing machines) showed a firm growth. Another characteristic of the production in 2006 is that the production of preparation machines, which are included in textile machines, substantially grew, though these machines accounted for only a small part of the entire production (Fig. 2-29).

Fig. 2-29 Production of textile machines by the main type of machines



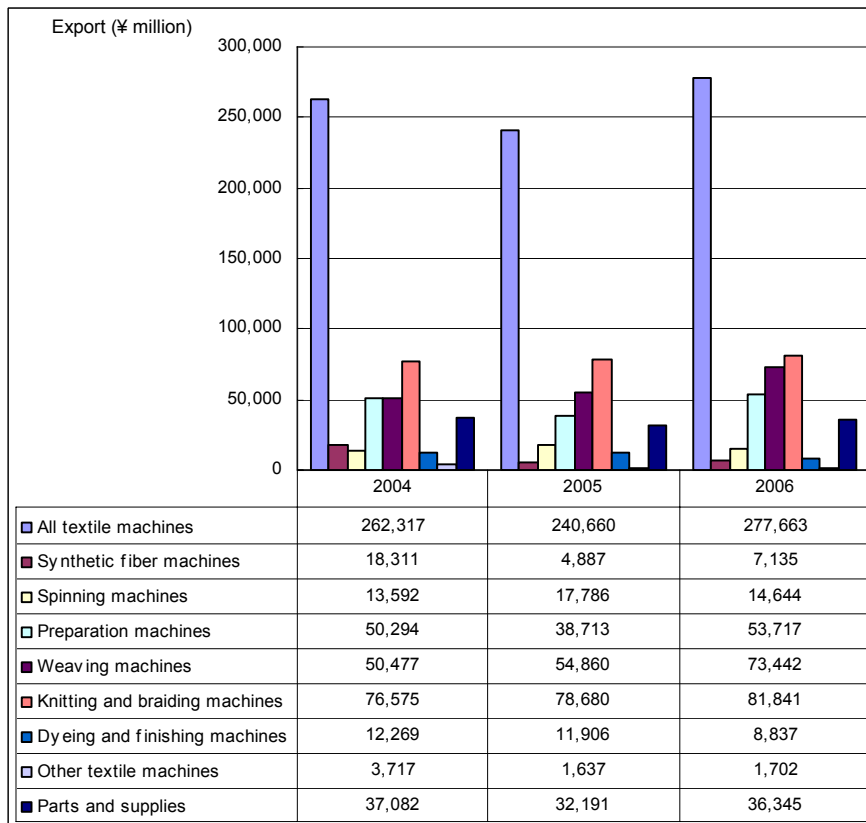
Note: Data are duplicated for some types of machines.

Source: Same as that for Fig. 2-28.

(3) Export and import

The export of all textile machines in 2006 greatly increased, recording ¥277.7 billion or up 15.4% over the previous year and turning from a decline in 2005 into an upward trend. By type of machines, the export of synthetic fiber machines was ¥7.1 billion, a substantial increase of 46.0% y/y, though it had only a small share of the total export. In addition, the export of preparation machines was ¥53.7 billion or an increase of 38.8% y/y and that of weaving machines, ¥73.4 billion or a growth of 33.9% y/y. By contrast, the export of dyeing and finishing machines was ¥8.8 billion or a decline of 25.8% y/y and that of spinning machines, ¥14.6 billion, down 17.7% y/y, both of them showing a substantial fall (Fig. 2-30).

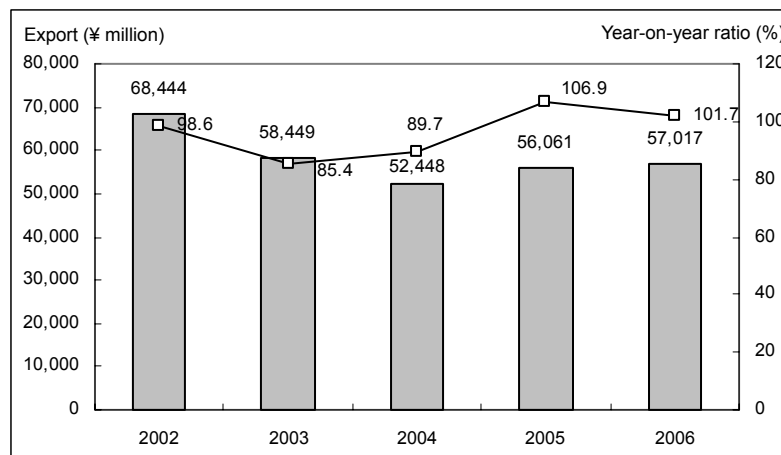
Fig. 2-30 Situation of export of textile machines



Source: Based on the data of the Japan Textile Machinery Association.

As for sewing machines, the export of industrial sewing machines in 2006 was ¥57.0 billion or a rise of 1.7% over the previous year. This was an increase for the second straight year from 2005 but the growth rate was low and unable to be regarded as a strong recovery (Fig. 2-31).

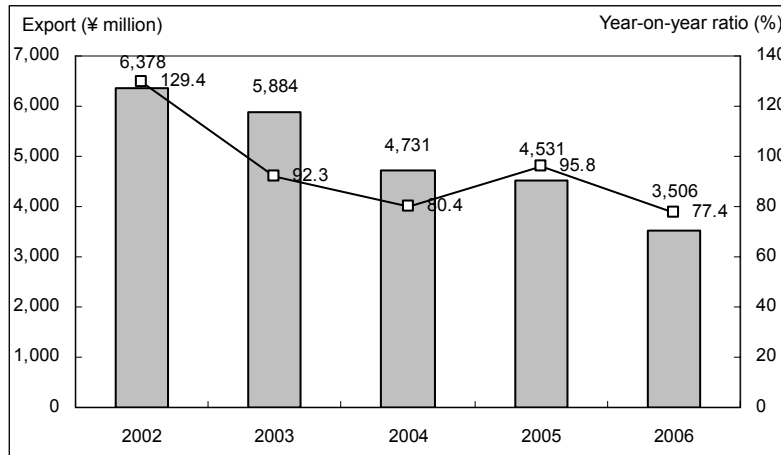
Fig. 2-31 Situation of export of industrial sewing machines



Source: Based on the data of the Japan Textile Machinery Manufacturers' Association.

The export of household sewing machines in 2006 was ¥3.5 billion or a decline of 22.6% from the previous year. This export was in a downward trend in 2003 and after, suggesting that demand for household sewing machines was inactive abroad from the view of export industry (Fig. 2-32).

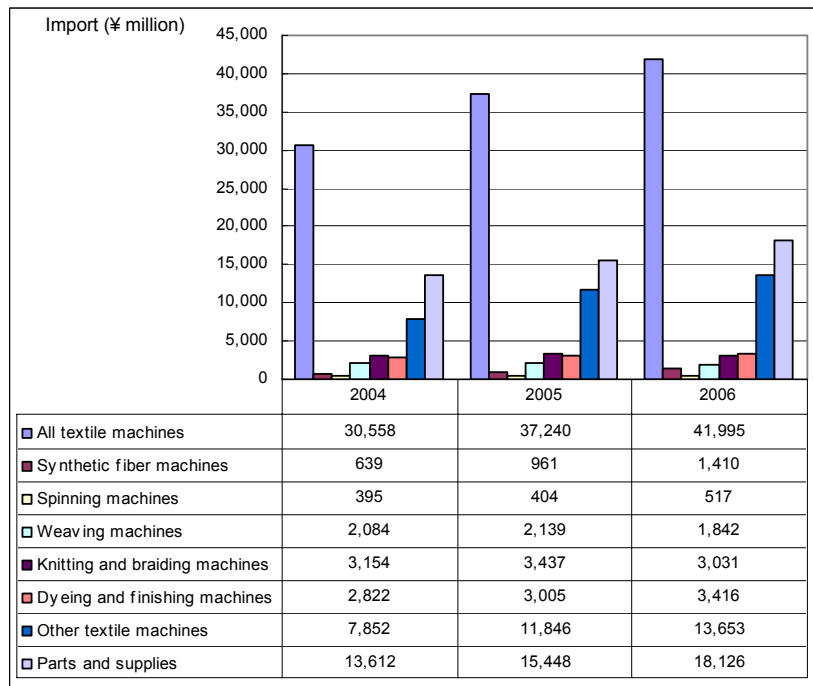
Fig. 2-32 Situation of export of household sewing machines



Source: Same as that for Fig. 2-31

The import of all textile machines in 2006 was ¥42.0 billion, up 12.8% over the previous year. By type of machines, the import of synthetic fiber machines recorded the highest growth rate of 46.7% y/y. Spinning machines also had a high increase rate of 30.0%. Parts and supplies and other textile machines, which both had a large share in the import of textile machines, registered an increase of 17.3% and 15.3% y/y, respectively, and served as the driving force in increasing the import of all textile machines. On the other hand, weaving machines and knitting and braiding machines showed a declining trend, a fall of 13.9% and 11.8% y/y, respectively (Fig. 2-33).

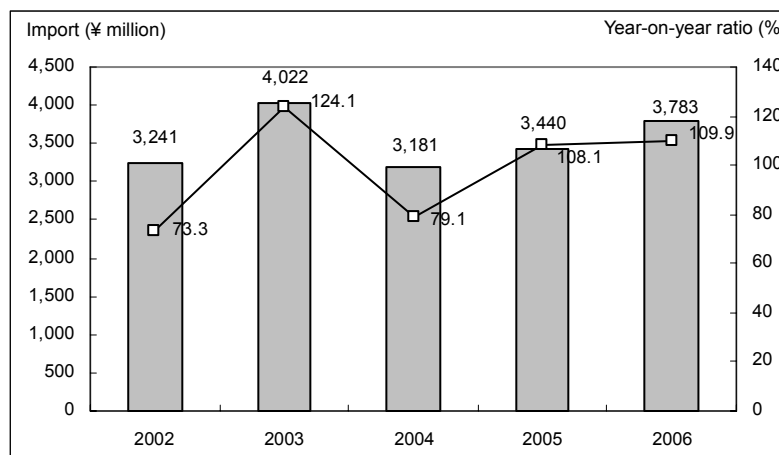
Fig. 2-33 Situation of import of textile machines



Source: Same as that for Fig. 2-30.

The import of industrial sewing machines in 2006 was about ¥3.8 billion or an increase of 9.9% y/y. This was a growth for the second consecutive year and gave signs of continued growth in the future (Fig. 2-34).

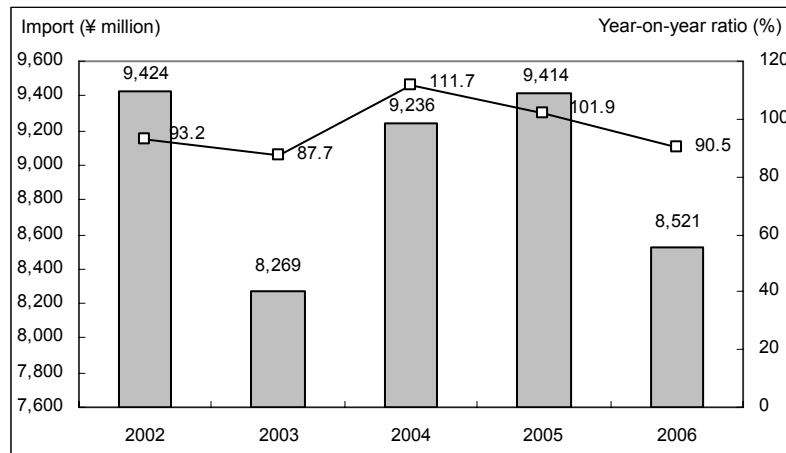
Fig. 2-34 Situation of import of industrial sewing machines



Source: Same as that for Fig. 2-31.

The import of household sewing machines consecutively increased in 2004 and 2005 but was only ¥8.5 billion in 2006, which represented a fall of 9.5% from the previous year and was close to the low level in 2003. This situation reflected the stagnant domestic demand for these sewing machines (Fig. 2-35).

Fig. 2-35 Situation of import of household sewing machines



Source: Same as that for Fig. 2-31.

2.3.2. Results of operations and the trend of the textile machine industry

(1) Trend of management

The trend of management of the textile and sewing machine business of major manufacturers is outlined below:

In the year ended March 2007, JUKI Corp. recorded consolidated sales of ¥140,497 million, up 12.6% over the previous year. Its ordinary profit was ¥11,962.0 million or an increase of 34.6% y/y, marking an all-time high as in the previous year's consolidated performance. By business segment, the company continued to increase its sales in India, Bangladesh and other Asian markets in the industrial sewing machine business. In addition, thanks to steady markets in China, Europe and other regions, the consolidated sales of the entire industrial sewing machine business amounted to ¥73,459.0 million (up 12.2%) and the ordinary profit, ¥11,670.0 million (up 22.2%) compared with the prior-year quarter. Meanwhile, in the household sewing machine business, the company suffered a substantial decrease in the sales of highest-grade computerized embroidering sewing machines as a result of the steps taken to cut back the door-to-door sales system; the consolidated sales of the entire household sewing machine business were ¥8,599.0 million (down 18.2%) and the operating loss was ¥1,458.0 million (¥76.0 million in the year ended in March 2006).

According to the report of Tsudakoma Corp. (which was published on December 27, 2006 after correcting the estimated consolidated business results for the year ended in November 2006), the company's consolidated performance in the year ended in November 2006 turned to a positive side

and recorded a surplus first in three quarters: sales, ¥46,750.0 million (up 18.4% y/y); and the ordinary profit, ¥780.0 million. While this was mainly supported by the favorable result of machine tools for automobile manufacturers, other reasons include that in the textile machine business, sales were roughly as planned, efforts were made to save total expenses and the improvement in selling prices began to show effects. In addition, in global-scale business activities, the company's export to China, which had been stagnant in the previous fiscal year, recovered and its export to India and Pakistan grew. As a result, Tsudakoma was able to reduce the deficit of its textile machine business by about ¥2.0 billion.

According to Shima Seiki Mfg., its consolidated results of operations in the year ended in March 2007 were in very high gear: the sales, ¥47,079 million or up 24.3% y/y and the ordinary profit, ¥9,450 million or up 67.7% y/y. According to the company analysis, the macroeconomic factors contributing to these favorable results are the fact that the U.S. economy remained steady in general though some slow-down was observed and the EU countries also enjoyed a domestic demand-led growth. Other reasons cited by the company include the fact that in Asia, the export to and investment in China increased and a high growth continued there and that the Japanese economy was sound, too, due mainly to improved corporate earnings.

For flat knitting machines, Shima Seiki's main business, the company attributed the good performance to the fact that the business environment changed and the producing areas were polarized into two: one is consuming-type producing areas, such as Japan, Europe and the U.S., where short delivery schedule and small volume production is carried out using highly fashionable and diverse designs, and the other is mass-producing areas, like China and Hong Kong, where labor-intensive production is made.

(2) Technological innovation, the business environment and overseas activities

The main developments in textile machine manufacturers and related industries, including technological innovation and the business environment, are outlined below:

In the production lines of sewing machines where automation is considered difficult because there are many minute assembly tasks, JUKI (Otawara Plant) had depended on manual labor for the 11 roughly classified processes, such as the screw turning work. But the plant is now trying to increase work efficiency by replacing workers' skills with pictures and numerical values in an effort to compete with newly industrializing countries (NICs), such as China, where the labor cost is lower. In 2004, aiming at expanding the concept of "digital booth" manufacturing system that was started to be introduced by other manufacturers and utilizing the idea for transmitting skills to the next generation, the company formed a team for developing digital booths and began the work to replace the work standard sheets on which the work procedures, key points of the task, etc. were written for each model with numerical values, pictures and other media. The first digital booth system was completed in September 2004, but because workers at the manufacturing site requested some corrections to it, another year was spent to improve the system by, among others, adopting multiple pictures, and the system was now usable for new employee education. As a future task, the company plans to build up a new digital booth manufacturing system that could deal with even the task

requiring high-level skills (e.g., trial sewing work known as a “Level-S difficulty” task), whose automation had been considered impracticable, by using voices and animations.

Tsudakoma Corp. is working to reinforce technical service for textile machines in newly industrializing countries and areas. It trains local staff employed in its bases in Shanghai, China, India and Pakistan so as to improve service for customers all over the world. For example, in India and Pakistan, the company’s local agencies founded a technical service firm in June 2006 and in February 2007, respectively. Tsudakoma is offering technical guidance to these firms and entrusts them with customer service tasks. The customer service is divided by language; India is regarded as an English-speaking area, and the Indian staff takes charge of English-speaking countries, including Europe. Pakistan is designated as an Islamic culture area, and Pakistani staff is responsible for Saudi Arabia and other Islamic nations. Because demand for after-sales technical service is increasing in China and other NICs, Tsudakoma would like to expand the service system in China, India and Pakistan and strengthen its sales basis in these countries and their neighboring areas through the development of human resources as mentioned above.

In June 2007, Murata Machinery, Ltd. announced that it would unite its two Taiwan subsidiaries (a corporation in charge of textile machine business and a corporation for distribution equipment business). This was the step to meet growing demand for systems for plants of semiconductors and liquid crystal products in Taiwan, and the company enlarged the corporate size by the unification and increased the employment of system engineers. In July 2007, the united company started business and is increasing its capacity by reinforcing the staff. It is also strengthening its regular support business, such as the maintenance of plant systems.

Toshin Ceratec Corp. (Seto, Aichi Prefecture) makes parts for textile machines. In late September 2007, the company started to operate a new plant of ceramic products in the Anada Industrial Park in Seto, Aichi Prefecture. After constructing the new plant, it is working to open up new business fields, such as parts for medical appliances. Toshin Ceratec is producing a wide variety of fine ceramic products, such as alumina and zirconia, in a small lot, and custom-made products accounts for 60% of its product line. The main products are parts for textile machines, industrial furnaces, etc., but the company intends to have orders for parts for medical appliances, electronic parts and the like, too, in the future.

Shima Seiki won the 53rd “Special Okochi Memorial Production Prize” for 2006 (The Special Okochi Memorial Production Prize was founded in 1954 in commemoration of the achievements of the late Doctor Masatoshi Okochi in the academic and industrial world and is awarded every year to remarkable achievements in the research and development of industrial engineering and manufacturing technology, the introduction of an advanced manufacturing system, etc. on the basis of recommendations from related fields). The “development of an advanced manufacturing method of knitwear using a computerized non-sewing flat knitting machine and design system,” to which the prize was awarded, solved some of the problems of knitwear production, including the stiffening and loss of elasticity of the fabric associated with cutting and sewing, considerable labor needed that requires long lead time, and high product cost caused by the cutting loss of fabric.

(3) Future prospects and problems

In the past several years, the textile machine-related businesses having both a textile machine segment and a machine tool segment showed a tendency of the machine tool segment covering losses in the stagnant section of the textile machine segment. In 2006, the textile machine field showed signs of recovery in general. As Shima Seiki pointed out above, the producing areas have been reorganized according to the regional characteristics of the global market, and there has been the polarization into consuming area-type producing areas, like Japan, Europe and the U.S., where short delivery schedule, small-lot production is made using highly fashionable, diverse designs, and labor-intensive producing areas, mainly China and Hong Kong, where mass production is carried out. In Japan, efforts to overcome high-cost structure is made by technical innovation of manufacturing method. This tendency of divided producing areas and markets in Japan and abroad centering on technological innovation is expected to increase in the future.

On the other hand, in the textile machine industry, the development of human resources (development of technical service staff) for each region of the world to meet the needs of after-sales service is being more and more globalized, too. As part of differentiation strategies or to build the basis for finding new markets, personnel training will become more positive in the future. Therefore, it will be a more important issue for the industry to secure and develop human resources at the head office in Japan who can deal with the challenge of global-scale management.

In addition, in the domestic business field, some of textile machine manufacturers, such as Toshin Ceratec, have begun to enter the area of medical appliances taking advantage of the core technology stored in the textile machine industry. It is thus expected that textile machine companies will begin business in the field of not only medical appliances but also precision machines, electronic parts and others. This will make the role of cooperation among industry, government and universities more important in new product development activities.