

3. Electric Machine Sector

3.1. Electronic devices

3.1.1 Supply and demand trend

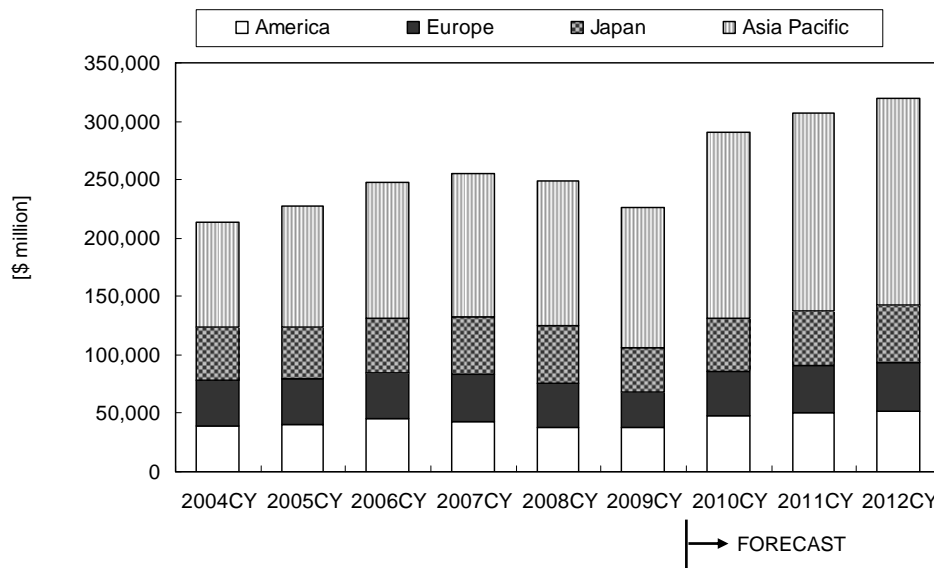
(1) Outline

The production of electronic devices in 2009 suffered a large negative growth. Affected by the global recession, demand for personal computers (PCs), cellular phone units, flat-screen televisions (TVs), digital cameras and other digital products declined all over the world, which contributed to the decrease in the domestic production of electronic devices. But solar cells and solar cell modules achieved a solitary good performance in the circumstance where the production of all the other electronic devices slowed down. Partly supported by the policy support of the government of countries, demand for photovoltaic generation systems went up and helped increase the output of electronic devices.

(2) Orders received

According to the “Forecast for the Spring Market in 2009” by the World Semiconductor Trade Statistics (WSTS) (published on June 8, 2010), the growth rate of the world’s semiconductor market in 2009 continued to be negative (as compared with the same month of the previous year) for about a year due to the global financial crisis started in the fourth quarter (October to December) of 2008 and then turned into positive in October 2009, but was -9.0% (\$226.3 billion) year on year for the whole year of 2009. It is expected that in 2010, the growth rate will show a substantial recovery of 28.6% year on year and the market will enjoy a favorable growth. It is supposed that the factors behind this are larger demand in newly industrializing markets, mainly China, in addition to a reaction to the negative growth in 2009. Estimates say that the global market size in 2010 will reach \$291.0 billion or an increase of \$64.6 billion year on year, exceeding the largest ever market of \$255.6 billion recorded in 2007. It is forecast that a gradual growth will continue in 2011 with a 5.6% rise and in 2012 with a 4.2% increase.

Fig. 3.1.1 Trend of the world semiconductor market by region (actual results for 2004-2009; estimate for 2010-2012)



	2004CY	2005CY	2006CY	2007CY	2008CY	2009CY	2010CY	2011CY	2012CY	CAGR 09-12
Worldwide (M\$)	213,027	227,484	247,716	255,645	248,603	226,313	290,951	307,388	320,161	12.3%
America	39,065	40,736	44,912	42,336	37,881	38,520	48,125	50,401	52,088	10.6%
Europe	39,424	39,275	39,904	40,972	38,249	29,865	38,183	40,103	41,805	11.9%
Japan	45,757	44,082	46,418	48,845	48,498	38,300	44,756	47,277	49,187	8.7%
Asia Pacific	88,781	103,391	116,482	123,492	123,975	119,628	159,887	169,606	177,081	14.0%
Europe (euro basis) millions of euro	31,709	31,575	31,771	29,927	25,968	n/a	n/a	n/a	n/a	n/a
Japan (yen basis) ¥100 million	49,549	48,535	54,024	57,497	50,242	35,786	40,608	42,896	44,628	7.6%

Growth Rate (%)	2004CY	2005CY	2006CY	2007CY	2008CY	2009CY	2010CY	2011CY	2012CY
Worldwide	28.0%	6.8%	8.9%	3.2%	-2.8%	-9.0%	28.6%	5.6%	4.2%
America	20.8%	4.3%	10.3%	-5.7%	-10.5%	1.7%	24.9%	4.7%	3.3%
Europe	22.0%	-0.4%	1.6%	2.7%	-6.6%	-21.9%	27.9%	5.0%	4.2%
Japan	17.5%	-3.7%	5.3%	5.2%	-0.7%	-21.0%	16.9%	5.6%	4.0%
Asia Pacific	41.3%	16.5%	12.7%	6.0%	0.4%	-3.5%	33.7%	6.1%	4.4%
Europe (euro basis)	11.1%	-0.4%	0.6%	-5.8%	-13.2%	n/a	n/a	n/a	n/a
Japan (yen basis)	10.0%	-2.0%	11.3%	6.4%	-12.6%	-28.8%	13.5%	5.6%	4.0%

Source: Extracts from the WSTS, "Semiconductor Conference in the Spring of 2010" (June 2010).

(3) Production

Fig. 3.1.2 Trend of the production of electronic devices (value base)

Unit: ¥ million

Production	2007	2008	2009	Growth rate in 2008-2009
Electron tubes, semiconductor devices and integrated circuits	7,136,487	6,780,411	4,967,140	-26.7%
Electron tubes	376,859	356,936	299,058	-16.2%
Semiconductor devices	1,124,980	1,116,522	852,580	-23.6%
Transistors	331,029	317,315	201,846	-36.4%
Photoelectric transducers	539,496	557,758	484,129	-13.2%
Light-emitting diodes	154,491	151,982	140,770	-7.4%
Solar cells ^(Note 2)	168,411	221,984	228,848	3.1%
Other photoelectric transducers ^(Note 3)	59,635	59,924	41,522	-30.7%
Integrated circuits	3,767,614	3,261,951	2,350,899	-27.9%
Semiconductor ICs	3,516,587	3,025,208	2,188,566	-27.7%
Linear circuits	445,579	413,854	273,519	-33.9%
Counting circuits	3,071,008	2,611,354	1,915,047	-26.7%
MOS type	3,053,377	2,597,744	1,904,704	-26.7%
Microcomputers	706,006	618,814	424,172	-31.5%
MPU	25,777	16,515	14,164	-14.2%
MCU	680,229	602,299	410,008	-31.9%
Logics	1,340,346	1,186,052	783,013	-34.0%
Standard logics	118,714	153,212	120,010	-21.7%
Semi-customized logics	564,616	501,289	310,879	-38.0%
Display drivers	208,888	170,750	104,764	-38.6%
Memories	612,753	438,307	459,272	4.8%
DRAM	40,204	35,570	23,783	-33.1%
SRAM	30,894	24,623	11,231	-54.4%
Flash memories	518,887	355,721	409,012	15.0%
Other MOS type	394,272	354,571	238,247	-32.8%
CCD	378,019	347,594	230,610	-33.7%
Liquid crystal elements	1,714,254	1,835,724	1,244,290	-32.2%
Active type	1,627,600	1,766,185	1,208,845	-31.6%
Passive type	86,654	69,539	35,445	-49.0%
Liquid crystal modules	58,925	43,110	20,771	-51.8%
Liquid crystal panels	27,729	26,429	14,674	-44.5%
Solar cell modules ^(Note 4)	152,780	209,278	220,313	5.3%

Notes: 1. Beginning in 2005, "Color televisions," "For electronic computer-related devices" and "Cathode-ray tubes for other purposes" are included in this product category.

2. Beginning in 2007, this product category is separated from "Other photoelectric transducers" and is independently shown.

3. Beginning in 2007, "Solar cells" are separated from this product category and are independently shown.

4. In 2005, this product category was newly established.

Source: Adapted by the authors based on the Research and Statistics Department, Industrial Policy Bureau, Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

The production of electronic devices in 2009 was ¥4,967.1 billion or a great negative growth of -26.7% from the previous year. By the type of product, the output of electron tubes was ¥229.1 billion (down 16.2% year on year), that of semiconductor devices, ¥852.6 billion (down 23.6%), that of integrated circuits, ¥2,350.9 billion (down 27.9%), that of liquid crystal elements, ¥1,244.3 billion (down 32.2%) and that of solar cell modules, ¥220.3 billion (up 5.3%). The reasons for this discouraging performance include a reduced demand for electronic appliances for which electronic devices are used, affected by the global-scale recession after the Lehman shock, and a smaller demand for high value-added products due both to a poor demand in industrial countries and larger demand in newly industrializing countries, which means that the price of electronic appliances went down increasingly, cutting the amount of semiconductors mounted on these appliances.

One of the characteristics of the production of electronic devices in 2009 is that while almost all of product types suffered a negative growth of -20% to -40%, solar cell products continued to grow: the output of solar cells was ¥228.8 billion or an increase of 3.1% year on year, and solar cell modules, ¥220.3 billion or a rise of 5.3%. The probable reasons for this are some policy supports, including the restoration of the subsidies for the construction of photovoltaic generation systems, and the demand stimulated by the announcement of the construction plans of mega-solar power plants in succession. Another characteristic is that the production of memories, especially flash memories (¥409.0 billion or up 15.0% year on year), attained a two-digit growth. Behind this is a greater demand caused by the increased use of flash memories for, for example, SSDs (solid state drives: the drives using flash memories as storage media whose introduction is increasing as substitutes for hard disk drives (HDDs)).

According to the “Outlooks for the World Production of the Electronics and Information Technology Industries” published in December 2009 by the Japan Electronics and Information Technology Industries Association (JEITA), the domestic production of electronic devices in 2010 is estimated at ¥3,429.8 billion for semiconductors (semiconductor devices and integrated circuits) and at ¥1,916.3 billion for display devices.

(4) Export and import

The export of electronic devices in 2009 was ¥2,963.6 billion, which was a considerable decrease of 25.5% from the previous year. By the type of product, the export of electron tubes was ¥22.5 billion (down 33.8% year on year), that of semiconductor devices, ¥671.7 billion (down 30.6%) and that of integrated circuits, ¥2,269.4 billion (down 23.7%). The export of integrated circuits suffered a sharp fall in all the product types due to the influence of worldwide decline in demand for electronic equipment with electronic devices, such as cellular phone units, PCs and digital audio-visual appliances.

The import of electronic devices in 2009 amounted to ¥1,698.4 billion or a sharp drop of 28.9% year on year. By product category, the import of electron tubes was ¥11.3 billion (down 36.4%), that of semiconductor devices, ¥177.3 billion (down 27.0%) and that of integrated circuits, ¥1,509.8 billion (down 29.1%). What characterizes the import of electronic devices in 2009 is the relatively good performance of photo-electric cells (optoelectronic elements) (¥40.4 billion, down 0.5%). The factor contributing to this is probably the fact that because the output of these products by Japanese manufacturers was insufficient to meet the greater needs due to an expanded domestic market of photovoltaic generation, Japanese module producers covered the shortage by imported solar cells from foreign suppliers, especially new manufacturers.

Fig. 3.1.3 Trend of the export of electronic devices (value base)

Unit: ¥ million

	2007	2008	2009	Growth rate in 2008-2009
Electronic devices	4,582,786	3,977,604	2,963,579	-25.5%
Electron tubes	37,124	33,955	22,469	-33.8%
Cathode-ray tubes for TVs	473	478	211	-55.9%
TV camera tubes, image-converter tubes, etc.	13,744	13,410	10,574	-21.2%
Data graphic display tubes (for color TVs)	2,210	3,182	2,327	-26.9%
Microwave tubes	3,701	3,286	2,607	-20.7%
Magnetrons	2,155	1,828	1,190	-34.9%
Klystrons	197	310	236	-23.8%
Receiving tubes and amplifier tubes	129	46	38	-17.1%
Fluorescent display tubes	12,674	10,262	4,632	-54.9%
Semiconductor devices	1,023,755	968,085	671,716	-30.6%
Diodes	108,821	90,144	64,076	-28.9%
Transistors	243,699	208,884	144,344	-30.9%
Less than 1W	86,884	74,024	49,172	-33.6%
1W or more	156,815	134,861	95,173	-29.4%
Thyristors, diacs and triacs	11,715	11,359	8,827	-22.3%
Photosensitive semiconductor devices	642,625	642,227	435,972	-32.1%
Unmounted ones	70,357	71,063	60,530	-14.8%
LEDs	215,088	200,982	156,518	-22.1%
Integrated circuits	3,521,908	2,975,563	2,269,395	-23.7%
Processors and controllers	38,015	831,780	566,248	-31.9%
Unmounted ones	273,543	223,619	154,947	-30.7%
Others	764,472	608,160	411,302	-32.4%
Hybrid integrated circuits	80,718	116,778	56,519	-51.6%
Others	683,754	491,383	354,782	-27.8%
MPU	143,593	56,710	53,895	-5.0%
MCU	256,462	235,385	149,722	-36.4%
DSP	25,718	22,335	28,939	29.6%
Memory elements	872,390	755,749	699,579	-7.4%
Unmounted ones	438,797	416,221	408,747	-1.8%
Others	433,593	339,528	290,832	-14.3%
RAM	166,034	139,205	122,471	-12.0%
DRAM	142,842	122,654	106,766	-13.0%
ROM	155,367	122,289	128,233	4.9%
Flash memories	130,245	103,507	116,397	12.5%
Amplifiers	126,571	113,434	80,438	-29.1%
Unmounted ones	32,207	19,795	13,711	-30.7%
Others	94,364	93,639	66,727	-28.7%
Hybrid integrated circuits	37,291	45,591	31,380	-31.2%
Others	1,484,932	1,274,601	923,130	-27.6%
Unmounted ones	435,258	420,233	342,228	-18.6%
Others	1,049,674	854,368	580,902	-32.0%
Hybrid integrated circuits	38,792	26,174	25,317	-3.3%

Note: The figures are those obtained from the year-to-year total figures published by the JEITA, and no retroactive adjustment is made on the figures.

Basic data: Ministry of Finance, "Trade Statistics of Japan."

Source: Adapted by the authors based on the data available on the website of the JEITA.

Fig. 3.1.4 Trend of import of electronic devices (value base)

Unit: ¥ million

	2007	2008	2009	Growth rate in 2008-2009
Electronic devices	2,750,208	2,390,327	1,698,420	-28.9%
Electron tubes	14,645	17,794	11,316	-36.4%
Semiconductor devices	242,905	242,711	177,290	-27.0%
Diodes	37,829	37,571	24,574	-34.6%
Transistors	57,099	44,717	30,244	-32.4%
Photosensitive semiconductor devices	132,974	146,238	113,083	-22.7%
LEDs	76,335	84,272	63,906	-24.2%
Photo-electric cells	33,201	40,706	40,483	-0.5%
Integrated circuits	2,492,659	2,129,822	1,509,814	-29.1%
Processors and controllers	636,317	522,167	389,173	-25.5%
Unmounted ones	78,178	38,640	33,124	-14.3%
Others	558,139	483,527	356,049	-26.4%
Hybrid integrated circuits	15,094	15,957	15,226	-4.6%
Others	543,045	467,570	340,824	-27.1%
MPU	260,423	232,889	167,132	-28.2%
MCU	61,627	71,073	43,677	-38.5%
DSP	32,070	28,825	16,600	-42.4%
Memory elements	858,508	717,511	524,675	-26.9%
Unmounted ones	61,818	55,832	70,555	26.4%
DRAM	38,015	43,299	62,512	44.4%
Others	796,690	661,679	454,119	-31.4%
RAM	450,637	355,460	270,029	-24.0%
DRAM	416,457	336,047	254,148	-24.4%
ROM	279,756	228,803	153,805	-32.8%
Flash memories	181,002	148,942	96,708	-35.1%
Amplifiers	24,232	24,108	13,810	-42.7%
Unmounted ones	1,333	1,146	647	-43.6%
Others	22,899	22,962	13,163	-42.7%
Hybrid integrated circuits	6,199	4,980	2,636	-47.1%
Others	973,602	866,036	582,156	-32.8%
Unmounted ones	176,095	170,399	86,512	-49.2%
Others	797,508	695,636	495,644	-28.7%
Hybrid integrated circuits	30,803	16,733	15,587	-6.8%

Note: The figures are those obtained from the year-to-year total figures published by the JEITA, and no retroactive adjustment is made on the figures.

Basic data: Ministry of Finance, "Trade Statistics of Japan."

Source: Adapted by the authors based on the data available on the website of the JEITA.

3.1.2 Results of operations and the trend of the electronic device industry

(1) Trend of management

Toshiba, the top manufacturer of electronic devices in Japan, experienced a substantial fall in sales in 2009, registering ¥1,309.1 billion, while the company had an increase of operating profit of ¥299.0 billion or a relatively small drop of ¥24.2 billion compared with the previous year. Toshiba succeeded in reducing its fixed costs by ¥173.0 billion in electronic device business by integrating and reorganizing its domestic manufacturing bases for the front-end process and by promoting overseas activities for its back-end process. The company aims at going into the black figures in 2010 by attaining sales of ¥1,380.0 billion and an operating profit of ¥90.0 billion.

In April 2010, Renesas Electronics Corp. was newly founded as a result of the merger between NEC Electronics Corp. and Renesas Technology Corp. Renesas Electronics plans to earn an operating profit and carry out structural reforms in 2010, the initial year of the integration, and to make a net profit in 2011. The company also aims at realizing a two-digit ratio of operating profit (to sales) on a medium-term basis. Renesas says that to attain these goals, it will follow the following

strategies: (1) Increase business chances strengthen the product competitive power (for example, purchase of the “wireless modem” business, core parts for communication, from Nokia Corp.); (2) Prepare for expansion in overseas business raise the ratio of semiconductor sales abroad to over 60% (for example, establishment of a division for opening up the Chinese market); (3) Introduce immediately effective cost reduction steps reinforce cost competitiveness (for example, closure of old manufacturing lines and impairment accounting of advanced manufacturing lines; subcontracting of manufacture to foundries; cutting of a little under 10% of employees for more proper staffing); and (4) Top-down structural reform activities (posting of ¥70.0 billion as an extraordinary loss). As a result of the simple totaling of the figures of the former two companies, Renesas Electronics recorded sales of 1,062.4 billion (down ¥153.8 billion) and an operating profit of ¥125.3 billion (up ¥53.7 billion). The company expects to achieve sales of ¥1,170.0 billion and an operating profit in 2010.

Fig. 3.1.5 Shares and rankings of the semiconductor market in the world in 2009
(final figures; unit: millions of U.S. dollars)

2008 Rank	2009 Rank	Company Name	2008 Revenue	2009 Revenue	Percent Change	Percent of Total	Cumulative Percentage
1	1	Intel	33,767	32,410	-4.0%	14.1%	14.1%
2	2	Samsung Electronics	16,902	17,496	3.5%	7.6%	21.7%
3	3	Toshiba	11,081	10,319	-6.9%	4.5%	26.2%
4	4	Texas Instruments	11,068	9,671	-12.6%	4.2%	30.4%
5	5	STMicroelectronics	10,325	8,510	-17.6%	3.7%	34.1%
8	6	Qualcomm	6,477	6,409	-1.1%	2.8%	36.9%
9	7	Hynix	6,023	6,246	3.7%	2.7%	39.6%
12	8	Advanced Micro Devices (AMD)	5,455	5,207	-4.6%	2.3%	41.9%
6	9	Renesas Technology	7,017	5,153	-26.6%	2.2%	44.1%
7	10	Sony	6,950	4,468	-35.7%	1.9%	46.1%
10	11	Infineon Technologies	5,954	4,456	-25.2%	1.9%	48.0%
11	12	NEC Electronics	5,826	4,384	-24.8%	1.9%	49.9%
16	13	Micron Technology	4,435	4,293	-3.2%	1.9%	51.8%
14	14	Broadcom	4,643	4,278	-7.9%	1.9%	53.6%
19	15	Elpida Memory	3,599	3,948	9.7%	1.7%	55.4%
24	16	MediaTek	2,896	3,551	22.6%	1.5%	56.9%
13	17	Freescale Semiconductor	4,966	3,402	-31.5%	1.5%	58.4%
15	18	Panasonic Corporation	4,473	3,243	-27.5%	1.4%	59.8%
17	19	NXP	4,055	3,240	-20.1%	1.4%	61.2%
18	20	Sharp Electronics	3,607	2,977	-17.5%	1.3%	62.5%
21	21	nVidia	3,241	2,826	-12.8%	1.2%	63.7%
20	22	ROHM Semiconductor	3,348	2,586	-22.8%	1.1%	64.8%
23	23	Fujitsu Microelectronics	2,978	2,574	-13.6%	1.1%	66.0%
22	24	Marvell Technology Group	3,059	2,572	-15.9%	1.1%	67.1%
26	25	IBM Microelectronics	2,473	2,253	-8.9%	1.0%	68.1%
		Other Companies:	85,619	73,445	-14.2%	31.9%	100.0%
		Total Revenue:	260,237	229,917	-11.7%	100.0%	

Source: Quoted from iSuppli Japan, news release on March 17, 2010.

Fig. 3.1.5 shows the shares and rankings of the semiconductor market in the world in 2009 (final figures) published by iSuppli, a U.S. research firm. Of the top ten, those having a higher growth rate are two South Korean companies, second-ranking Samsung and seventh-ranking Hynix

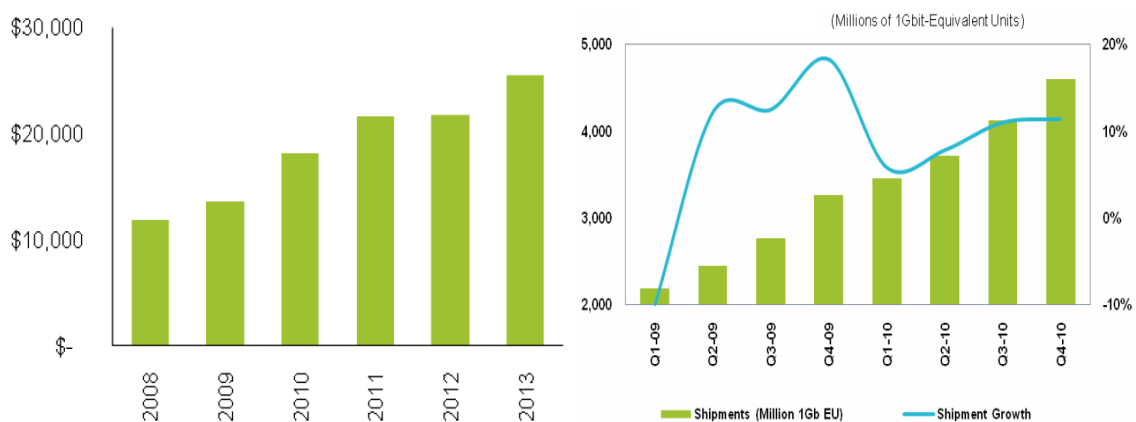
Semiconductors, and 15th-ranking Elpida Memory. This shows that increases in the price of DRAMs as a result of deficiency in DRAM supply favorably affected the performance of memory manufacturers.

Behind the good results of memory companies is an insufficient supply of DRAMs and NAND-type flash memories. Demand for NAND-type flash memories in 2010 was supported mainly by the brisk sales of and great memory use for Apple’s iPhone. The report of iSuppli says that according to their provisional forecast, NAND-type flash memories of 35.2G bits on an average will be used for the iPhone introduced in 2010, that the shipment of iPhone in 2010 is estimated at 33 million units, an increase of 35.1% over 2009 when the shipment was 25.10 million units and that iPhone is the largest application for NAND-type flash memories and a high growth in iPhone will cause a deficiency in the supply of NAND-type flash memories for a certain period of time. The provisional forecast indicates that because an increase in the shipment of iPhone and competing smartphones and a rapid growth in NAND-type flash memories, which are incorporated in cellular phone units, are likely, the sales of NAND-type flash memories in the world in 2010 will rise to \$18.1 billion, an increase of 34.1% over those in 2009 when the sales were 13.5 billion.

According to DRAMeXchange, another research firm, DRAMs will face a short supply in the second half of 2010 because of growing demand. The firm expects that the shipment of PCs in 2010 will increase by 13% year on year, with the shipment of notebook PCs of 160 million (up 22.5%) and that of less expensive netbooks of 35 million (up 22%). It is expected that DRAM manufacturers will increase their capital investment by 80% over 2009 to \$7.85 billion in 2010 and further to \$10.0 billion to \$12.0 billion by 2011 or 2012. According to iSuppli, general-purpose parts are liable to be affected by changing supply-demand balances. The firm says that the shipment of DRAMs in terms of 1G bits in 2010 will rise to 15.9 billion, an increase of 48.6% over 2009 when the shipment was 10.7 billion.

Fig. 3.1.6 Forecast of the memory market

Forecast of the sales of NAND-type flash memories in the world (on a year basis) (figure at left)
Forecast of the shipment of DRAMs in the world (on a quarterly basis) (figure at right)



Source: Quoted from iSuppli Japan, news release on February 23 and August 13, 2010.

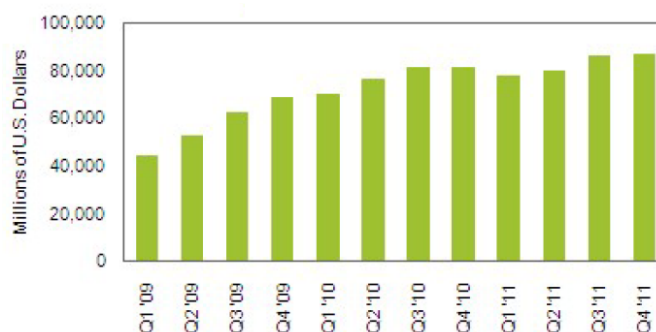
According to iSuppli, in 2009, the whole semiconductor industry was seriously affected by the recession but Asian semiconductor manufacturers succeeded in minimizing the impact of the recession. The semiconductor market in the world was \$229.9 billion or a fall of 11.7% year on year, but the sales of semiconductor companies having their head office in the Asia/Pacific region were \$44.5 billion, an increase of 2.3% over the previous year. For shipment by region, too, the Asia/Pacific region had a relatively small decline of 5.3% from 2009 as compared with 20.7% for Japan, 20.5% for Europe (including the Middle East and Africa) and 10.5% for the Americas. iSuppli says that these suppliers were the leading ones of such products as NAND-type flash memories and LEDs, whose demand was large in 2009.

As already noted, Renesas Electronics was founded in April 2010 as a result of the merger between NEC Electronics and Renesas Technology. The new company had a market share of 4.1% in the first quarter of 2010. Because Renesas Technology had had the largest share in the MCU market and NEC Electronics, the second largest one, the merged company became a supplier having by far the largest share in the MCU market.

(2) Future prospects and problems

Gartner, Inc., a U.S. research firm, announced that the sales in the semiconductor market in the world in 2009 were \$228.4 billion or a drop of -10.5% from the previous year. This was the first time when the semiconductor industry suffered poorer sales for the second consecutive year. But in the second half of 2009, the production of electronic devices recovered, and the decrease in sales was not as sharp as had been expected. iSuppli, another U.S. research firm, says that the firm made its sales forecast for 2010 more favorable considering an active demand for semiconductors. This firm revised upward its forecast for sales growth on the semiconductor market in 2010 to a figure equivalent to an all-time high. It predicts that semiconductor sales in 2010 will grow by 80.7 billion over 2009, the largest growth rate in history. According to iSuppli, the semiconductor market in 2010 has expanded supported by an already large demand for consumer appliances. The firm also says that the factors contributing to bigger sales of semiconductors in 2010 include rising semiconductor prices, inventory buildup and increases in the price of semiconductors mounted on smartphones, the major products, and on the latest models of liquid crystal TVs.

Fig. 3.1.7 Forecast of semiconductor sales in the world (on a quarterly basis)



Source: Quoted from iSuppli Japan, news release on August 13, 2010.

3.2. Telecommunications equipment and wireless-applied appliances

3.2.1 Supply and demand trend

(1) Outline

The production of wired and wireless communications equipment both suffered a large negative growth in 2009. The export of mobile phones may increase if the strategies for overseas markets of Japanese manufacturers of cellular phone units succeed. The import of mobile phones attained good results because the sales of iPhone3G of Apple in the U.S. were great in the Japanese market.

(2) Production

Fig. 3.2.1 Trend of production of telecommunications equipment and wireless-applied appliances (value base)

Unit: ¥ million

Production	2007	2008	2009	Growth rate in 2008-2009
Telecommunications equipment and wireless-applied appliances	2,813,289	2,536,952	1,875,481	-26.1%
Wired communications equipment	426,381	473,753	389,347	-17.8%
Telephones	14,200	12,081	10,453	-13.5%
Telephone-applied appliances	106,781	86,471	70,000	-19.0%
Button telephone sets	46,644	36,344	28,596	-21.3%
Intercoms	53,135	44,137	35,669	-19.2%
Telegraph/image appliances	23,894	21,715	14,009	-35.5%
Facsimiles	17,146	15,874	9,421	-40.7%
Switchboards	142,643	133,067	117,664	-11.6%
Electronic switchboards	122,881	114,140	100,928	-11.6%
For exchanges	81,434	74,698	70,245	-6.0%
For PBXs	41,447	39,442	30,683	-22.2%
Carrier devices	245,644	306,890	247,221	-19.4%
Wireless communications equipment (including satellite communications units)	2,241,898	1,937,472	1,391,188	-28.2%
Broadcasting appliances	71,100	71,915	62,409	-13.2%
Wireless communications appliances	1,931,716	1,589,900	1,067,093	-32.9%
Fixed communications appliances	144,981	141,546	91,038	-35.7%
Ground communications appliances	134,535	127,199	78,345	-38.4%
Satellite communications appliances	10,446	14,347	12,693	-11.5%
Mobile-station communications appliances	1,777,335	1,432,955	967,563	-32.5%
Mobile communications appliances	1,695,552	1,348,050	912,775	-32.3%
Ground mobile communications appliances	1,681,986	1,334,929	901,655	-32.5%
Cellular phones	1,587,678	1,240,390	841,695	-32.1%
Maritime/aircraft mobile communications appliances	13,566	13,121	11,120	-15.3%
Base-station communications appliances	81,783	84,905	54,788	-35.5%
Wireless-applied appliances	239,082	275,657	261,686	-5.1%
Radar appliances	61,069	86,901	68,568	-21.1%
Wireless position finders	24,598	33,634	22,848	-32.1%
Network-connecting appliances	38,229	39,256	24,946	-36.5%
Routers/hubs	33,565	35,752	22,723	-36.4%

Source: Adapted by the authors based on the Research and Statistics Department, Industrial Policy Bureau, Ministry of Economy, Trade and Industry, "Annual Report of Machinery Statistics."

The production of telecommunications equipment and wireless-applied appliances in 2009 suffered a negative growth, amounting to ¥1,875.5 billion, a decrease of 26.1% from the previous year.

The output of wired communications equipment in 2009 was ¥389.3 billion or a negative growth of -17.8% year on year. By the type of product, the production of telephones was ¥10.5 billion (down 13.5%), that of telephone-applied appliances, ¥70.0 billion (down 19.0%), that of telegraph/image appliances, ¥14.0 billion (down 35.5%), that of electronic switchboards, ¥117.7 billion (down 11.6%) and that of digital transmission units, ¥247.2 billion (down 19.4%).

The amount of production of wireless communications equipment in 2009 was ¥1,391.2 billion, suffering a year-on-year decrease of 28.2%. By the type of product, the output of broadcasting equipment was ¥62.4 billion or down 13.2% year on year, that of wireless communications appliances, ¥1,067.1 billion or down 32.9% and that of wireless-applied appliances, ¥261.7 billion or down 5.1%. Of wireless communications appliances, the production of fixed communications appliances amounted to ¥91.0 billion or a fall of 35.7% year on year and that of mobile communications appliances, ¥967.6 billion or a 32.5% decline. It can be seen that the output of cellular phones (¥841.7 billion; down 32.1%), which account for the greater part of that of mobile communications appliances, was affected by the reduced demand due to recession because the cellular phones made at home by Japanese manufacturers are mostly for the Japanese market and are high-priced and high-performance ones.

According to the “Outlooks for the World Production of the Electronics and Information Technology Industries” published in December 2009 by the Japan Electronics and Information Technology Industries Association (JEITA), the estimated output of telecommunications equipment in 2010 is ¥2,020.9 billion, a similar level to that in 2009, while the estimated production of wired telecommunications equipment and that of cellular phones, which are included in the group of wireless telecommunications equipment, is a little below the level in 2009, ¥504.1 billion (down 2%) and ¥914.4 billion (down 2%), respectively.

(3) Export and import

The export of telecommunications equipment in 2009 was ¥328.1 billion or a decrease of 23.2% from the previous year. That of wired communications equipment in 2009 amounted to ¥4.9 billion or down 55.6% year on year, which almost means a 50% decline. The export of wireless communications equipment in 2009 greatly decreased, too, with ¥323.2 billion and a fall of 22.4%. Considering that the export of base-station equipment suffered a steep drop of 43.3% amounting to ¥36.7 billion, it is supposed that the export was seriously affected by a decrease in the capital investment of telecommunications companies in the global economic crisis.

Fig. 3.2.2 Trend of export of telecommunications equipment and wireless-applied appliances (value base)

Unit: ¥ million

Export	2007	2008	2009	Growth rate in 2008-2009
Telecommunications equipment	446,876	427,311	328,117	-23.2%
Wired communications equipment	13,017	11,060	4,913	-55.6%
Telephones	13,015	11,059	4,913	-55.6%
Wired telephones with cordless handset	2,520	1,878	1,513	-19.4%
Wireless communications equipment	433,859	416,251	323,203	-22.4%
Broadcasting appliances	17,082	15,828	8,992	-43.2%
Wireless communications appliances	245,759	243,593	198,116	-18.7%
Mobile phones	48,249	23,944	17,910	-25.2%
Base-station equipment	79,969	64,614	36,659	-43.3%
Transmission, receiving, conversing and reproduction appliances (including those for wired communications)	106,588	148,471	138,525	-6.7%
Wireless-applied appliances	171,017	156,830	116,096	-26.0%
Radars	20,838	23,626	17,629	-25.4%
Direction finders	1,191	371	212	-42.7%
Other wireless equipment for navigation	134,895	122,306	91,245	-25.4%
Wireless remote control appliances	14,092	10,527	7,010	-33.4%

Note: The figures are those obtained from the year-to-year total figures published by the JEITA, and no retroactive adjustment is made on the figures.

Basic data: Ministry of Finance, "Trade Statistics of Japan."

Source: Adapted by the authors based on the data available on the website of the JEITA.

The import of telecommunications equipment in 2009 was ¥688.0 billion or a slight decrease of 2.8% from the previous year. That of wired communications equipment in 2009 was ¥12.3 billion or a significant decrease of 33.1% year on year. The import of wireless communications equipment showed a small negative growth of 2.0% amounting to ¥675.8 billion. In particular, the import of mobile phones, which accounted for about a half of the total import, was ¥281.4 billion or up 25.8%, and mobile phone imports from Asia continued growing. It is supposed that this upward trend was the result of the introduction of iPhone3G of Apple in the U.S. into the Japanese market. A new model of iPhone3G, "iPhone 4," was on sale on June 24, 2010, and the import of mobile phones will increase, too, in 2010.

Fig. 3.2.3 Trend of import of telecommunications equipment and wireless-applied appliances (value base)

Unit: ¥ million

Import	2007	2008	2009	Growth rate in 2008-2009
Telecommunications equipment	688,998	707,969	688,044	-2.8%
Wired communications equipment	24,007	18,344	12,274	-33.1%
Telephones	23,675	18,344	12,273	-33.1%
Wireless communications equipment	664,991	689,624	675,770	-2.0%
Broadcasting appliances	9,235	5,990	4,277	-28.6%
Wireless communications appliances	625,545	639,726	627,022	-2.0%
Mobile phones	192,329	223,630	281,424	25.8%
Base-station equipment	56,421	40,776	43,353	6.3%
Transmission, receiving, conversing and reproduction appliances (including those for wired communications)	338,710	349,596	286,055	-18.2%
Wireless-applied appliances	30,212	43,908	44,471	1.3%
Radars	5,761	5,525	5,821	5.4%
For vessels	150	360	830	130.7%
For aircraft	5,080	4,811	3,766	-21.7%
Wireless appliances for aviation	15,281	28,104	29,816	6.1%
For aircraft	5,287	4,886	4,282	-12.3%
Wireless remote control appliances	9,169	10,279	8,834	-14.1%

Note: The figures are those obtained from the year-to-year total figures published by the JEITA, and no retroactive adjustment is made on the figures.

Basic data: Ministry of Finance, "Trade Statistics of Japan."

Source: Adapted by the authors based on the data available on the website of the JEITA.

3.2.2 Results of operations and the trend of the telecommunications equipment and wireless-applied appliances industry

(1) Trend of management

Sharp Corporation, the company having the largest market share in Japan, registered sales of ¥1,332.9 billion, a 2.5% decrease year on year, but achieved an operating profit of ¥3.7 billion, an increase of ¥61.5 billion as compared with the previous year's level, thereby going into the black. Sharp's targets for 2010 are sales of ¥1,470.0 billion and an operating profit of ¥26.0 billion. The company's cellular phone business recorded sales of ¥454.4 billion and 10.54 million units in 2009 and its plans for 2010 are a turnover of ¥505.0 billion and 13.70 million units.

The reorganization of cellular phone unit business was in progress. In June 2010, Casio Hitachi Mobile Communications Co. and NEC's cellular phone unit division integrated their business and the newly founded NEC Casio Mobile Communications, Ltd. started its business. Fujitsu and Toshiba also announced that they had agreed on the integration of their cellular phone business in June 2010 and had signed a final agreement on the integration in July of the same year. The two companies will jointly found a new company, and Toshiba will transfer its cellular phone business to the new company, while Fujitsu will acquire 80.1% of the new company's shares from Toshiba, the new company becoming Fujitsu's subsidiary. This integration of Toshiba and Fujitsu will create a new cellular phone manufacturer with a domestic market share of 18.7% in terms of the number of units shipped (on an annual basis), shipment of 6,440,000 units and the second place in Japan. The new company aims at increasing its domestic market share to 25%, and Toshiba has already started smartphone business for overseas carriers. Fujitsu also plans to begin the supply of smartphones to the European and North American markets in the future.

(2) Technological innovation and the environment of the telecommunications appliance industry

According to the JEITA's "Report of the Market Research on Mobile Phones" (March 2010), the shipment of cellular phone units in Japan in 2009 suffered a great negative growth for two years running, with 31.30 million units, falling below the 40 million-unit mark first in ten years. The JEITA says that the downward trend will continue in 2010 and that while the shipment will go into the black in 2011 but will not reach the 40 million level until 2015. Cellular phone units have stimulated demand by adding additional functions, such as camera, account settlement and "One Seg" functions, but due to the maturing of the market and slower economic growth, it can no longer be possible to expect any rapid expansion in the market.

The products on which hope is placed in the situation mentioned above are smartphones. In 2009, demand for cellular phones increased in overseas markets, mainly in China, India and other newly industrializing countries but considerably fell in industrial nations; the production of cellular phone units in the world in 2009 is expected to decline by about 10% year on year to 1,131.60 million. It is predicted that the output will turn into an upward trend in 2010 because demand in industrial countries will be stabilized in addition to steady demand in newly industrializing nations. In the future, the commercial service of the LTE (Long Term Evolution; new communication standards for cellular phones, i.e., high-speed communication service following 3G (third-generation mobile communications), also known as 3.9G; this service will be started in the world around 2010) will be started but will not become any strong driving force in a short period of time.

The market of cellular phone units has increasingly been divided into two. In the market of newly industrializing countries that is maturing, great hopes are pinned on smartphones and other high-performance products and products with fashionable designs for replacement demand and demand for the second unit. By contrast, in the emerging market that is expanding, there is active demand for low-end products and popular models featuring reduced prices have been introduced even for 3G cellular phone units. Thus, to secure a share in the market of newly industrializing nations, it has become important to get hold of the market of low-end 3G cellular phone units.

Fig. 3.2.4 World market of cellular phones**[Trends by region: scale of the cellular phone market by region]**

Unit: 1,000 units

	2006	2007	2008	2009 (estimate)	2010 (estimate)	2011 (estimate)	2012 (estimate)
Asia/Oceania	353,302	395,060	431,145	434,150	467,890	517,680	543,250
Western Europe	190,679	207,965	219,612	190,170	204,000	212,100	218,810
Central/Eastern Europe	85,185	99,325	103,765	86,730	91,670	96,870	101,380
North America	159,678	162,783	187,445	166,110	175,000	177,740	191,250
Central/South America	142,320	153,050	149,430	131,710	140,540	149,200	155,750
Middle East	41,088	48,095	52,785	49,020	53,780	57,450	61,530
Africa	28,655	33,998	38,710	36,350	41,060	45,960	50,800
Total	1,000,907	1,100,276	1,182,892	1,094,240	1,173,940	1,257,000	1,322,770

[Trends by communication system: scale of the cellular phone market by communication system]

Unit: 1,000 units

	2006	2007	2008	2009 (estimate)	2010 (estimate)	2011 (estimate)	2012 (estimate)
GSM	702,632	653,368	560,353	387,720	361,190	316,185	278,540
3G (W-CDMA, HSPA)	111,662	246,851	397,090	474,180	567,020	666,595	730,640
CDMA1X	175,898	194,435	223,203	228,520	231,600	236,200	227,200
LTE	0	0	0	120	960	8,650	33,650
TD-SCDMA	0	0	294	3,250	12,720	28,870	52,240
Others	10,715	5,622	1,952	450	450	500	500
Total	1,000,907	1,100,276	1,182,892	1,094,240	1,173,940	1,257,000	1,322,770

Source: Yano Research Institute, "Results of the Research on the Cellular Phone Markets in the World 2009" (July 2009).

Figure 3.2.5 shows the trend of the market share of cellular phone unit manufacturers in the world. According to Gartner, the sales of cellular phones in the world in 2009 were about 1.2 billion units and Nokia in Finland ranked top, followed by Samsung Electronics (South Korea) and LG Electronics (South Korea). While Nokia suffered a sluggish rise in sales, Samsung and LG both achieved a better performance than in 2008. Regrettably, no Japanese manufacturers were among the top ten, but because they said that they would reinforce their activities on the smartphone market and thus their market share is expected to increase in the future.

Fig. 3.2.5 Trend of sales and market shares of cellular phone manufacturers in the world (2009)

Manufacturer	2009 (number of units sold: units)	2009 (market share: %)	2008 (number of units sold: units)	2008 (market share: %)
Nokia Corp.	440,881,600	36.4	472,314,900	38.6
Samsung Electronics	235,772,000	19.5	199,324,300	16.3
LG Electronics	122,055,300	10.1	102,789,100	8.4
Motorola	58,475,200	4.8	106,522,400	8.7
Sony Ericsson Mobile Communications	54,873,400	4.5	93,106,100	7.6
Others	299,179,200	24.7	248,196,100	20.3
Total	1,211,236,600	100.0	1,222,252,900	100.0

Source: Gartner, February 2010.

According to MM Research Institute, a Japanese research firm, the shipment of cellular phone units in Japan in 2009 (April 2009 to March 2010) decreased by 4.0% from the previous year to 34.44 million units, a fall for the second consecutive year. The firm says that behind the relatively small drop in shipment in 2009 were both the negative factor (replacement cycle tending to become longer due to rising shop prices resulting from reduced subsidies for stimulating purchases in the Japanese market where demand is mostly for replacement) and the positive factor (expansion in the smartphone market more rapid than expected). In shipment by manufacturer in 2009, Sharp ranked top for five years straight with a share of 26.2% (up 3.2 percentage points year on year; 9.03 million units), achieving an increase both in market share and the number of units shipped. Panasonic Mobile Communications took second place with 15.1% (down 2.7 percentage points; 5.20 million units), followed by Fujitsu with 15.0% (up 2.2 percentage points; 5.18 million units), which went upward from the fourth place in 2008. NEC was placed fourth with 10.5% (down 2.5 percentage points), going downward from the third position in the year before. Kyocera ranked fifth with 6.1% (up 0.7 percentage points), going upward from the seventh place in 2008.

MM Research Institute also reports that the smartphone market in Japan saw a rapid increase in the shipment of smartphones, mainly iPhone 3GS of Apple in the U.S., totaling to 2.34 million units or a 113% growth year on year. This means that smartphones accounted for 6.8% of the market of cellular phone units in Japan (34.44 million units). The top company in the shipment of smartphones shipped was Apple (72.2%), accompanied by HTC (11.1%), Toshiba (6.8%) and Research In Motions and Sony Ericsson (both 4.3%). Apple, the supplier of units to Softbank Mobile, had by far the largest share, but on October 28, 2010, NTT DoCoMo introduced Galaxy S, the smartphone of Samsung Electronics, in an attempt to chase iPhone. It is expected that competition for a larger market among manufacturers will be intensified in the Japanese smartphone market, involving careers, in the years ahead. MM Research Institute predicts that the smartphone market in Japan will reach a 3-million unit level in 2010.

(3) Future prospects and problems

In June 2010, MM Research Institute published its forecast of demand for cellular phone units and smartphones in Japan for the period up to 2015. According to the forecast, the sales of cellular phone units in 2009 will be 35.82 million units or down 5.4% year on year and those in 2010 will increase a little by 1.5% to 36.35 million units. The demand in the subsequent years is estimated at 36.36 million units in 2011, 37.45 million units in 2012, 37.30 million units in 2013, 37.12 million units in 2014 and 37.19 million units in 2015. The number of smartphones sold in 2009 was 2.17 million units because of the good performance of iPhone, and that in 2010 is expected to grow by 77.9% year on year to 3.86 million units. The firm predicts that the use of smartphones will be accelerated in the future because Japanese manufacturers will introduce them into the domestic market. MM Research Institute estimates the smartphone market in 2011 and after at 6.60 million units in 2011, 10.50 million units in 2012, 15.30 million units in 2013, 18.40 million units in 2014 and 20.30 million units in 2015. The firm says that by 2015, smartphones will account for 54.6% of the total sales of cellular phone units sold.

In the market of cellular phone units, 3G units, which Japan was the first to introduce in 2001, evolved in a unique way in Japan and so-called “Galapagos phenomenon” (the phenomenon of Japanese standards becoming very different from the world standards just as the evolution in the Galapagos Islands came to differ greatly from that in other parts of the world) has been pointed out. Japanese manufacturers will soon be faced with the need to choose either of the two alternatives in the smartphone market highly likely to expand in the coming years: to aim at overseas business and try to compete with foreign manufacturers, or to make “Galapagos phenomenon” occur again. If they are to win in the global market, it will be important for them to (1) secure customization ability in anticipation of localization and to (2) cooperate with overseas carriers. Japanese manufacturers have focused on the development of high-performance units of Japanese specifications in cooperation with carriers, but in the area of smartphones, are taking aim at overseas markets. In May 2010, Sharp introduced “KIN” into the market in Europe and America but stopped to sell this product two months after. The company will offer for sale two smartphone models in China in October 2010. The company’s future activities should be watched carefully.

3.3. Medical equipment

3.3.1 Supply and demand trend

(1) Outline

According to the Annual Report on Pharmaceutical Production Statistics 2008¹, the domestic demand for medical appliances² was ¥2,223.9 billion or an increase of 4.3% from the previous year (Fig. 3.3.1). The world market totaled to about ¥25,000 billion, and Japan had a 10% share after the EU and the U.S. As the aging rate in Japan reached 22.1% in 2008, people’s dependence on medical service has been increasing. In addition, national medical care expenditure was as high as about ¥34,000 billion, and this fact has exerted pressure on the government’s health care budgets and has also affected demand for medical appliances.

(2) Production trend

In the production of medical appliances in 2008 (Fig. 3.3.2), diagnostic imaging systems continued to take first place but clearly showed a declining trend with a drop of 6.8% year on year to ¥368.7 billion. The production of household medical appliances greatly fell (-6.1%), too, while that of other medical appliances kept a leveling-out tendency.

For the production of medical electronic appliances³ in 2009 (Fig. 3.3.3), that of medical X-ray

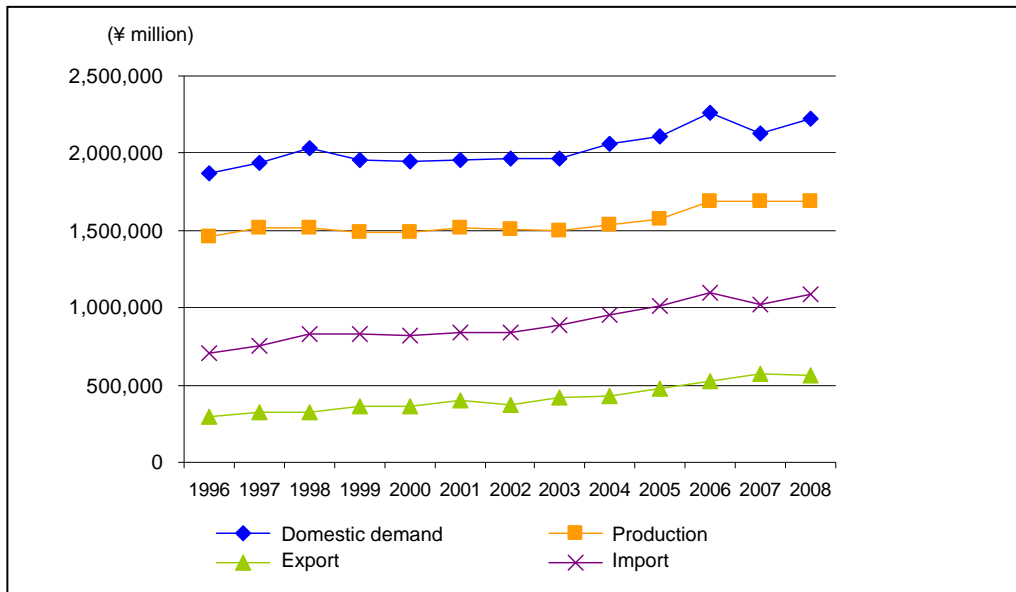
¹ Because the Annual Report on Pharmaceutical Production Statistics 2009 was not published yet, the data of the 2008 edition was used here.

² Domestic demand = amount of import + amount of production - amount of export.

³ Medical electronics appliances mean the electronic application devices listed in the Ministry of Economy, Trade and Industry, “Annual Report of Machinery Statistics” that are counted as those for medical purposes.

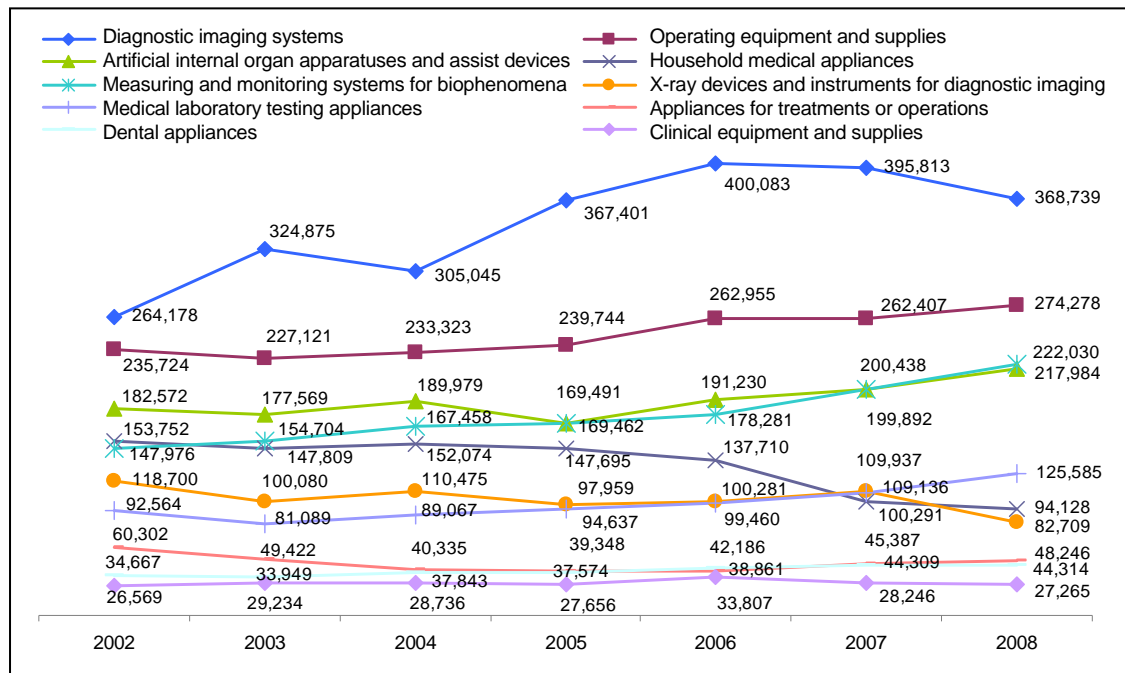
devices declined by 14.5% year on year to ¥148.7 billion, that of ultrasonic application medical appliances dwindled by 27.9% to ¥58.8 billion and that of other medical appliances dropped by 7.2% to ¥81.4 billion. As a whole, the amount of output of these appliances suffered a considerable decrease of 13.8% year on year.

Fig. 3.3.1 Trend of supply of and demand for medical appliances (amount of money)



Source: Based on the Health Policy Bureau, Ministry of Health, Labour and Welfare, ed., "Annual Report on Pharmaceutical Production Statistics." * Including medical materials.

Fig. 3.3.2 Trend of production of medical appliances
(calendar years; ¥ million)



Source: Based on the Health Policy Bureau, Ministry of Health, Labour and Welfare, ed., "Annual Report on Pharmaceutical Production Statistics."

Fig. 3.3.3 Trend of production of medical electronics appliances
(calendar years)

Unit: ¥ million

	2003	2004	2005	2006	2007	2008	2009	Growth rate (%)
Medical appliances, total	289,922	290,140	367,618	379,122	386,447	339,648	288,864	-15.0%
Medical X-ray devices, total	161,193	152,212	191,367	204,308	201,836	173,847	148,653	-14.5%
Medical and dental X-ray devices	78,113	75,076	76,454	77,826	78,228	75,083	68,790	-8.4%
CT devices	83,080	77,136	114,913	126,482	123,608	98,764	79,863	-19.1%
Ultrasonic application medical appliances	72,587	75,846	94,799	88,105	94,356	81,621	58,820	-27.9%
Other medical measuring instruments	56,142	62,082	81,452	86,709	90,255	84,180	81,391	-3.3%

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

(3) Trend of export and import

The total amount of export of medical appliances in 2008 was ¥559.2 billion or a year-on-year decrease of 2.8%, turning into a downward trend from the growth in the previous year. The import amounted to ¥1,090.8 billion or a fall of 6.7% year on year. The export of some types of medical appliance products showed a considerable decline although the export amount was not very large: the export of appliances for treatments or operations dropped by 43.0% year on year to ¥4.5 billion; that of household medical appliances, by 23.7% to ¥6.9 billion; and that of measuring and monitoring systems for biophenomena by 15.2% to ¥49.8 billion.

The import of medical laboratory testing appliances recorded a large increase of 39.6% year on year although the amount was small. That of diagnostic imaging systems, that are large in terms of money value, grew by 8.0% to ¥862.1 billion turning from the decline in 2007, indicating the fact that an unfavorable balance of trade continued even for these systems in which Japan is strong. In 2008, the export of medical appliances tended to fall and their import, to grow, suggesting the tendency of Japan's dependence on imported products.

Fig. 3.3.4 Trend of export and import of medical appliances (calendar years)

Unit: ¥ million

	Export			Import		
	2007	2008	Year-on-year ratio (%)	2007	2008	Year-on-year ratio (%)
Medical appliances, grand total	575,054	559,160	-2.8%	1,021,974	1,090,749	6.7%
Medical appliances, total	560,310	544,986	-2.7%	799,016	862,641	8.0%
Diagnostic imaging systems	219,535	199,785	-9.0%	94,480	87,447	-7.4%
Operating equipment and supplies	80,648	90,036	11.6%	255,762	267,085	4.4%
Measuring and monitoring systems for biophenomena	58,727	49,820	-15.2%	42,631	40,859	-4.2%
Artificial internal organ apparatuses and assist devices	50,644	51,733	2.2%	291,623	339,500	16.4%
Medical laboratory testing appliances	72,382	80,928	11.8%	15,784	22,041	39.6%
X-ray devices and instruments for diagnostic imaging	38,986	36,927	-5.3%	9,700	5,498	-43.3%
Dental appliances	17,634	19,238	9.1%	10,210	7,515	-26.4%
Household medical appliances	9,057	6,914	-23.7%	22,926	25,371	10.7%
Appliances for treatments or operations	7,968	4,540	-43.0%	47,712	56,105	17.6%
Clinical equipment and supplies	4,729	5,065	7.1%	8,188	11,220	37.0%
Other medical appliances	14,744	14,174	-3.9%	222,958	228,108	2.3%

Source: Based on the Health Policy Bureau, Ministry of Health, Labour and Welfare, ed., "Annual Report on Pharmaceutical Production Statistics."

(4) Future prospects

Major medical appliance businesses in Japan are promoting global-scale business activities not only in the West but also in China, Russia and other newly industrializing countries. By these activities, they will build up more global sales systems. But the recent trend of strong yen has raised the exchange rate of the yen much more than they expected and may have adverse effects on their business results.

3.3.2 Situation of the medical appliance industry seen from electronic application devices

(1) Market trend

Fig. 3.3.5 Production of electronic application devices

Unit: ¥ million

	2005	2006	2007	2008	2009	Growth rate in 2008-2009
Electronic application devices	1,002,250	1,052,909	1,072,622	945,273	681,913	-27.86%
X-ray devices	204,782	217,102	216,383	189,405	166,598	-12.04%
Medical	191,367	204,308	201,836	173,847	148,653	-14.49%
Medical and dental purposes	76,454	77,826	78,228	75,083	68,790	-8.38%
CT devices	114,913	126,482	123,608	98,764	79,863	-19.14%
Other X-ray devices	13,415	12,794	14,547	15,558	17,945	15.34%
Radioactive substance application appliances	23,040	21,715	16,614	19,629	16,222	-17.36%
Radiation counters	9,961	8,707	9,756	9,326	8,253	-11.51%
Ultrasonic application appliances	170,280	175,964	184,908	148,139	116,266	-21.52%
Washers	18,780	18,926	14,543	9,560	6,000	-37.24%
Medical appliances	94,799	88,105	94,356	81,621	58,820	-27.94%
Welders	22,579	33,074	27,315	16,115	8,103	-49.72%
Other ultrasonic application appliances	34,122	35,859	48,694	40,843	43,343	6.12%
High-frequency power application equipment	5,655	5,411	5,277	4,502	3,011	-33.12%
Other electronic application devices	170,280	175,964	184,908	574,272	371,563	-35.30%
Electron microscopes	42,052	45,462	46,992	47,141	35,217	-25.29%
Industrial TV sets	82,241	93,610	90,247	74,582	50,191	-32.70%
Medical measuring instruments	81,452	86,709	90,255	84,180	81,391	-3.31%
Others	382,787	398,229	412,190	368,369	204,764	-44.41%

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

The production of electronic application devices in 2009 (Fig. 3.3.5) was ¥681.91 billion or a decrease of 27.86% from the previous year. By the type of product, while the output of X-ray devices and other ultrasonic application appliances grew, that of all the other product categories suffered smaller production year on year. The declining rate of medical X-ray devices and medical measuring instruments was relatively low as compared with that of all electronic application devices: down 14.49% for medical X-ray devices, which have a close relation to medical and welfare appliances; down 27.94% for ultrasonic application appliances; and down 3.31% for medical measuring instruments.

3.3.3 Results of operations and the trend of the medical appliance industry

(1) Results of operations

Toshiba Medical Systems Corp. experienced a difficult management environment due to the postponement of delivery schedules and reluctance in buying in the medical appliance market resulting from recession as well as lower selling prices. In January 2010, the company reformed its management system by, among others, integrating the sales management and support divisions of the

branches across the country into the head office and is strengthening its global development system, including efforts to expand market in newly industrializing nations.

Hitachi Medical Corp. achieved greater sales because the sales of MR imaging devices in Japan continued to be favorable as in 2008 but had slower sales in the West owing to business recession and strong yen. The company's sales of X-ray CT devices were on an equal level to the previous year in Japan but were smaller in Europe affected by recession and yen appreciation, resulting in a decline in the world as a whole. The sales of X-ray devices were better than in 2008 as domestic sales were large and the higher earnings from services made good lower sales in the West. Those of ultrasonic diagnostic devices increased in Japan because new models were rated highly but fell in the Western markets influenced by recession and strong yen.

Shimadzu Corp. enjoyed greater sales in Japan as demand for some products recovered as a result of the revision of the medical fee schedule in 2008. But in the overseas market, the company had a decrease in sales as a whole. The factors behind this situation are inactiveness in the U.S. resulting from restrained buying due to recession and the reform of the medical insurance system and greater sales in China and Central and South America because of steady demand.

Fig. 3.3.6 Results of operations of main medical appliance manufacturers

	Toshiba Medical Systems ¹⁾	Hitachi Medical ²⁾	Shimadzu Corp. ³⁾	Olympus Optical ⁴⁾	Aloka Co. ⁵⁾
Settlement term	Year ended in March 2010				
Unit	¥ million				
Entire company's sales	260,064	108,452	238,255	883,086	45,811
Year-on-year ratio	-10.5%	-5.8%	-12.7%	-10.0%	-6.5%
Operating profit	9,592	387	10,294	60,149	2,451
Year-on-year ratio	-46.5%	-89.7%	-47.5%	73.9%	-20.4%
Ratio of operating profit	3.7%	0.4%	4.3%	6.8%	5.4%
Sales of the medical appliance section	-	97,592	50,483	350,716	38,944
Sales ratio of the medical care section	-	90.0%	21.2%	39.7%	85.0%
Year-on-year ratio	-	-6.6%	-1.1%	-8.6%	-8.6%
Operating profit	-	-42	1,259	74,929	-
Year-on-year ratio	-	-101.2%	7.1%	-0.2%	-
Ratio of operating profit	-	0.0%	2.5%	21.4%	-

Source: Data of each company (on a consolidated basis)

Notes: The data for the medical appliance division is that for the company's related business segment:

- 1) In October 2003, Toshiba Medical Systems Corp. integrated its medical system division into Toshiba Medical Corp., which took charge of domestic sales and services. Toshiba Medical Corp. is engaged in the development, manufacture, sale and service of medical devices and systems.
- 2) The entire company's sales include those of medical information systems.
- 3) The figures for the medical appliance division are those for the company's medical system field.
- 4) The figures for the medical appliance division are those for the company's medical system company.
- 5) The figures for medical appliance division are those for the total sales of medical electronics and analyzing devices except general-purpose analyzing devices.

In the field of medical endoscopes, Olympus Optical Co. registered larger sales in the Chinese

market but suffered a fall in income due to stagnancy in hi-vision-compatible video scopes, the company's flagship. In the area of surgical and endoscopy instruments, Olympus experienced a drop in revenue as a whole affected by unfavorable foreign exchange situations, although the sales of sampling instruments and disposable guide wires were big.

For ultrasonic diagnostic devices, Aloka Co. publicized in Japan the usefulness of ultrasonic diagnosis using contrast media for diagnosing cancer in the digestive system and for the early diagnosis of arteriosclerosis, and these efforts were highly rated by a wide range of users. As a result, the company achieved a steady growth in the sales of not only the devices mentioned above but also of popular models. Overseas, foreign exchange fluctuations put pressure on the increase both in sales and earnings, and Aloka suffered poorer sales than in the previous year. For specimen pretreatment systems, the company experienced sluggish lease business and dull sales in Japan. Aloka's overseas sales of OEM analyzing devices remained steady.

(2) Future prospects and problems

In Japan, it is expected that population aging will expand further and demand for medical appliances will become greater as a result. On the other hand, the financial situation of national medical care expenditure has been tight, and it has been an urgent issue to prevent the expenditure itself from becoming higher. In addition, while an increasing trend of import ended, global competition will continue to intensify. The Japanese medical appliance industry is required to study a proper supply and demand balance in the circumstance of global competition where there is the need to control national medical care expenditure.

Moreover, medical appliance manufacturers in Japan have one problem: "device lag." Device lag means the time lag between the development of new medical devices and their introduction into the Japanese market. The Japanese government began to review the examination and approval system of these appliances in December 2008 and has since striven to eliminate the device lag. But a drastic deregulation aiming at solving device lag will also invite foreign manufacturers' entry into the Japanese market. Therefore, Japanese manufacturers will need to take some steps to cope with expected greater market competition at home.

3.3.4 Trend of the market of welfare equipment and the welfare equipment industry

(1) Market trend

In the welfare equipment industry⁴, the market of welfare equipment in 2008 (Fig. 3.3.7) shrank as the upward trend until 2007 discontinued, totaling to ¥1,192.1 billion. This was largely affected by the Lehman shock and the market is likely to turn to a rising tendency again considering the market in Japan where population aging has been accelerated. By the type of product, while the production of communication equipment, such as hearing aids and eyeglasses, continued to lead that

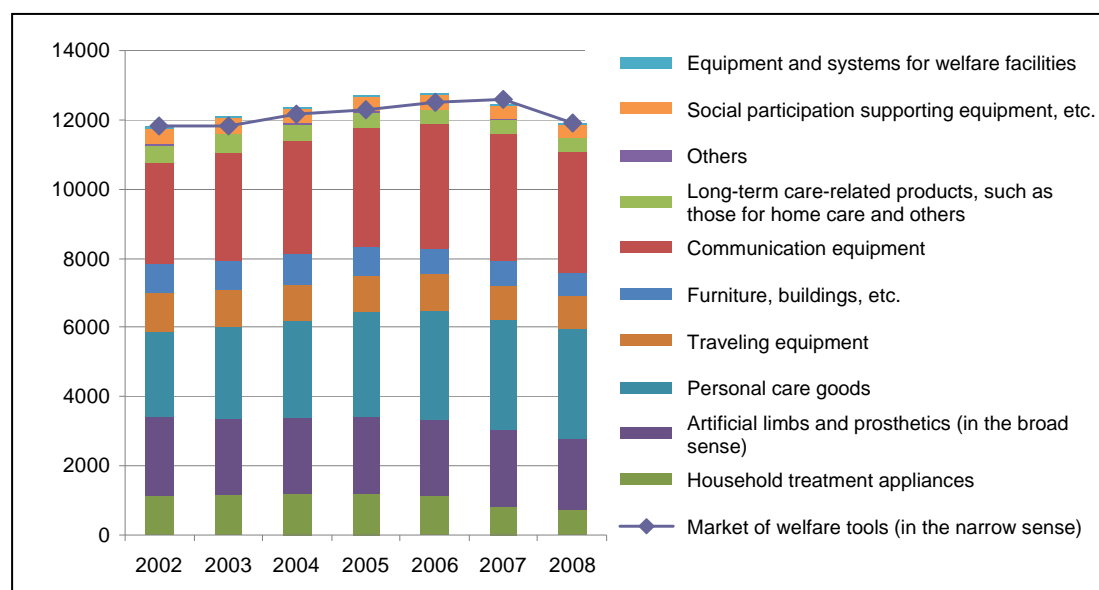
⁴ The welfare equipment industry here means the "welfare instrument industry in the narrow sense" defined by the Japan Assistive Products Association.

of other product categories, the total output of welfare equipment declined by 5.3% year on year to ¥346.2 billion. The production of personal care products, the second largest segment, including incontinence diapers and bathing goods, roughly leveled out with a fall of 1.1% year on year. The market of all the other product types got smaller.

(2) Trend and future problems of the welfare equipment industry

Prevention has been increasingly emphasized in the field of medical care in recent years, and this concept began to be advocated in the welfare area, too. For example, the pie has been growing in the market of wheelchairs excluding assistive models, such as self-propelled and electric wheelchairs, sticks and walking frames, despite the shrinking whole market. The market of artificial limbs and prosthetics and wigs has been stable in the past 15 years regardless of economic situations because these are essential goods for daily life. In the future, it should be noted that while there will be those areas where market expansion is expected from the viewpoint of preventive welfare, there will also exist the fields whose market could shrink due to the appearance of new substitute products, such as wheelchair lifting devices. Even so, high hopes have been laid on the welfare equipment industry as a new manufacturing area because it is likely that the population of the elderly will continue to increase even in the declining trend of population and thus the market will grow larger.

Fig. 3.3.7 Trend of the market of welfare equipment



Source: Based on the Japan Assistive Products Association, "Report of the Research on the Trend of the Market of the Welfare Tool Industry," 2010.