

### 3. Home Electric Appliances (Audio-Visual Equipment and White Goods)

#### 1) The Worldwide Position of Japan's Home Electric Appliance Industry

As we entered the 1990's, Japan's home electric appliance companies lost their relative ability to compete. Another way to phrase that would be to say they entered a period where conditions prevented them from making full use of what had, up to that point, been their strengths. To be certain, the sales rankings of our home electric appliance industry (home electric appliance divisions of electric equipment companies) has, with Matsushita Electric Industrial Co., Ltd. at the lead, maintained its relative rank worldwide. (Chart 3-1) Also, as can be seen in Chart 3-2, the Japanese electric companies' aggregate share of world demand occupies over 60% in areas such as home audio-visual equipment including digital cameras and video camcorders, audio-related goods, VTR, and DVD players; and white goods including air conditioners and microwave ovens. In addition, from the view of sales trends in Japan's home electric appliance industry, we would see little cause for alarm. However, although these statements are true, there is the problem of low profits against sales in Japan's home electric appliance industry. Also, problems such as the rapid drop in the ratio in the world product demand are beginning to raise their heads. These things are part of the direction of global flow between the home electric appliance companies in advanced countries in Europe and America, who have been in competition with Japan over the years. Also of particular note is the fact that stand-alone products are greatly influenced by the rapid appearance of products from developing Asian countries such as Korea and China, (refer to Chart 3-3).

Until the 1990's, our nation's home electric appliance industry (electric equipment companies' home electric appliance divisions) were representatives of internationally strong Japanese corporations in both name and reputation, and maintained an extremely high level in all areas of

product development, manufacturing, and sales. Also, these companies supported the growth of the Japanese economy even in the domestic sector, leading the growth and development of Japan's manufacturing industries. In addition, audio-visual equipment and white goods (or, recently, digital home electric appliances) offered a wide variety of products, and each and every one of the product categories involves multiple companies and their related companies, which is the special characteristics of Japan's home electric appliance market. Therefore, to overcome extreme and pervasive competition between companies, each company was thoroughly and unceasingly challenged to develop new technology and new products, open up new markets, strengthen production systems and improve productivity. Moreover, a majority of the home electric appliance companies produced not only home electric appliances but were also active in other areas such as industrial electronic equipment, electronic parts, semiconductors, and heavy electrical equipment. Therefore they could arrange coordination within the company's divisions or with other companies in their related group companies. At the same time they could also promote development within the supplier industry through a division of operations between large companies and subcontractors or related cooperating companies.

Japan's home electric appliance companies have developed overseas from an early period. In the 1970's and the first half of the 1980's, overseas production was promoted for the supply in local countries as well as neighboring countries, and as a means of reducing trade friction. After the second half of the 1980's in order to reduce the relative cost of domestic production due to rapid and extreme strength in the yen exchange rates, manufacturers mainly moved to Asia (mainly ASEAN nations and China) seeking relatively cheap local labor and materials, while in the 1990's, they began further construction of a global-

scale supply system, developing not just production centers, but planning and development divisions targeting local markets.

In this fashion, while Japan's home electric appliance companies continued to battle fierce domestic competition, by taking the initiative to develop overseas (global strategies) they could build leading positions as companies. As a result, they held a strongly competitive position even in global markets, particularly in audio-visual equipment, managing to gain a large market share on a world-wide scale. Also, Japan's home electric appliance companies (home electric appliance divisions) saw audio-visual equipment as well as white goods independently, and in concert, contributing to the development of gigantic organizations in growth both lateral and comprehensive.

## **2) The Background of the Loss of Competitiveness**

The background causes of the present situation where Japan's home electric appliance companies cannot make good use of what has heretofore been their "strengths" lie in three categories given below. However, the first and second categories, when compared to the third, are not so much a direct cause of failure to make full use of "strengths," but are instead a variety of side issues that contribute to the situation where home electric appliance companies are unable to respond rapidly and accurately to structural changes.

First, as an industrial structural cause, under the need to construct systems corresponding to IT, globalization, software emphasis, and environmental soundness (recycling), the large number of issues that must be responded to in a number of ways is given.

Second, in addition to the cause mentioned above, as a demand-side problem, the changes in socioeconomic factors have a large influence on home electric appliance companies. (1) Such changes in the economic environment as long-term economic stagnation and deflationary trends in the economy, and currency exchange rate issues, while (2) changes in the social structure, such as

demographic changes in the population (aging population, fewer children), changes in family structure and living structures (independent households and single lifestyles), women moving into the workforce, and changes in lifestyle (individualization, diversification) are also given.

In addition, the third cause is based on the first and second causes, and has to do with Japan's home electric appliance companies as well as home electric appliance industry: (1) Supply-side related causes such as maturation and saturation of the home electric appliance market, lack of large-scale hit products, changes in demand (diversification of consumer needs and purchasing habits, low demand, etc.), intensified price competition, and the lowering of product price. (2) Although there is some feeling that a plateau has been reached, global strategies require companies to first target cost-cutting, then focus on overseas production, which on the whole is gradually increasing. (3) The internal problems of Japan's home electric appliance companies: They struggled to absorb employees together with expanding operations. As a result, their business activities cannot quickly respond to market demands, and are suffering high costs and excessive waste. (4) The emergence of Asia in the home electric appliance market: Korean companies have increasingly strengthened their competitiveness, China's local areas boast their superior locations, and local capital companies have drastically grown in various countries including these areas.

Let's take (1) market saturation among the third cause mentioned. If Japan's home electric appliance companies try to enter not just the domestic market but overseas markets as well, European and American companies, as well as Korea and the rapidly growing Chinese companies have already existed there, and even the Chinese market where great possibilities had been seen is already crowded with home electric appliance company from all over the world. The results will be price wars, oversupply, and situations where no company can make any profits. As for (2), overseas development, as the usual pattern of stages in overseas development, we took the allocation

strategy of transferring production of mature products overseas and keeping high added-value and high-tech products under domestic manufacture, but this strategy is already showing signs of breaking down. It's not just that manufacture of the high-tech cutting edge digital TV, digital cameras, and DVD players have all shifted to China, it's that the shift itself has been made in time periods that are steadily shrinking. Amidst concerns that Japan is hollowing out its industry, the mismatch between home electric appliance companies' productive capacity (strengths as a company) and the productive capacity of Japan (strengths as a local area or a nation), is a great problem we currently face.

### 3) Future Developments

With the above background, Japan's home electric appliance companies are exploring new developments while responding on all fronts including organizations, business fields, products, and production and sales systems, separately or linking together all these elements, first taking stern steps in response to the need to cut costs. However, in the rapidly changing world, Japan's home electric appliance companies will not be able to see quantitative growth in the future. And it is clear that the present system of only providing stand-alone goods will in the end prove to be only a repeat of the same things, and accordingly the strategy models for growth (development) will no longer effectively hold true.

In the future, while market development and growth brought by the switch to broadband linkups in the area of audio-visual equipment and the networking even in the field of white goods can be expected, the world's home electric appliance (electric equipment) companies, together with companies from other industrial categories, are headed into areas where existing frameworks do not work. Not only for stand-alone products (where Asia is a competitive national group), but also for other categories (competitors are Euro/U.S. and Korean companies), it is clear that Japanese companies will be pulled into stiff competition, and, among the global suppliers in both fields, how

to move as the central figure is of course the major point of focus.

Future responses to digitalization and networking, and manufacturing from a new viewpoint are part of the natural flow. In this situation, in order to re-create Japan's position of importance in the world, and to play an important role in the fields such as the development of technology and products, and market exploitations where qualitative functions are increasingly important, we will need to (1) recognize that present-model home electric products have in many senses reached their limits, (2) recognize we need to provide some impetus to re-enlarge the home electric appliance market. We also (3) need to further strengthen the world's optimal production/sales systems in order to respond to product development from the consumer's point of view, and respond to a global management point of view in the present move toward globalization, and deal with (4) the need to reduce the organization down to an organizational size that can take appropriate action as a home electric appliance division spearheading the "selection and focus" in the electric equipment companies, strengthening the non-production elements within the companies. In relation to this last item, we will need to (5) revolutionize as a company and as an organization, and (6) bring about basic yet radical changes, while covering the weaknesses as well as promoting the strengths of selection and focus that go outside the framework of the company or organization, through the emerging multi-corporation joint efforts, etc.

Amidst all this, the strategies (business methods) employed by the global home electric appliance companies can be divided into two main groups. Those firms in top world ranking, such as Matsushita Electric, Sony, Sanyo Electric, or overseas companies such as Phillips (Holland), Electrolux (Sweden), or Whirlpool (U.S.) which are the home electric appliance companies in advanced countries, are following the product strategy of "moving away from a complete line of goods," and moving toward main strengths and specific products, changing their domain as part of

operational strategies while actively pursuing links with other home electric appliance companies. On the other hand, Samsung and LG Electronics (Korea), the rapidly growing Haier Group (China), and other Asian capital companies have tried to handle all product areas, placing thorough emphasis on cost and price, have stressed production systems development. (However, Samsung and LG Electronic are at their present stage increasing their competitive strengths to the point where they can lock horns with or even surpass the companies in advanced countries.)

Also, if we, to be specific, look at the strategies (business methods) of the home electric appliance companies in our country, each is displaying its own characteristics: Sony has emphasized contents and creative market products, maintaining product innovation strengths, while Matsushita Electric has focused on its core strength products and gained international competitiveness as a "super manufacturer" through process technology based in making products. Sanyo Electric has established company-wide key devices (semiconductors, batteries, etc.), and is sweeping aside its identity as a comprehensive home electric appliance firm by moving into the digital equipment specialization and tie-ups with other firms in the same industry.

However, in the end, the development of very similar business methods can be predicted seeing the factors mentioned below. The future strategies

of the various home electric appliance companies do not seem to be breaking out of their past frameworks, and they are all lined up together and headed toward the same goals, seemingly unable to consider manufacturing without the merits of mass production. Even though the market for home electric appliances is said to be saturated, a steady and stable demand for replacement goods can be expected (where of course a fierce battle for market share among the various home electric appliance companies exists). Also, it seems Japan's companies cannot easily rid themselves of the mentality and faults of a giant corporation. Therefore, the present conditions will be maintained for some time, or must unavoidably be maintained in companies not only in Japan but also world wide.

If this is the case, the unfolding competition between home electric appliance companies in the global markets will be won or lost depending upon the differentiation seen in the much-awaited digital networking of home electric appliances including audio-visual equipment and white goods, the coordination between companies in order to bring about compatibility between the products of different manufacturers, the ability to make internal company standards into industrial or global standards, and the service contents and quality obtained by joint work with software companies.

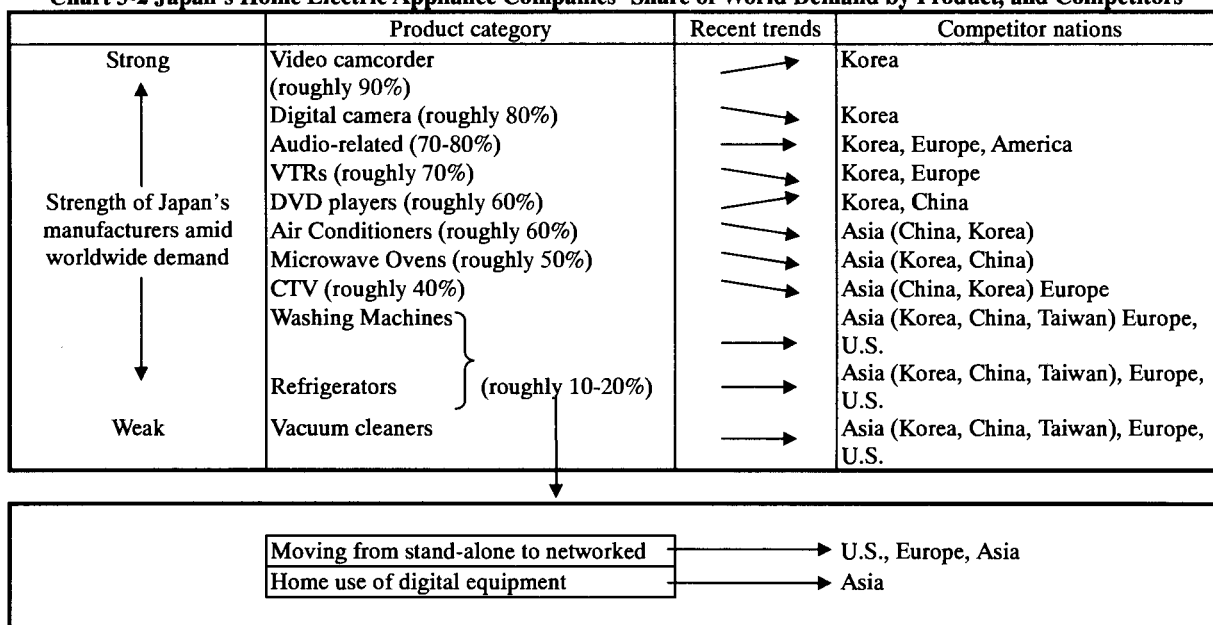
**Chart 3-1 Worldwide Ranking of Electric Equipment Companies by Home Appliance Division Sales (for 2000)**

Rank	Company	Nationality	Home Appliance Division		Overall Firm	
			Segment (%)	Sales (Million \$)	Sales	Net Profit
1	MATSUSHITA ELEC.INDL.	JAPAN	36.0	25,011	69,475	375
2	SONY	JAPAN	38.6	25,537	66,158	152
3	ROYAL PHILIPS	NETHERLANDS	57.7	20,190	34,991	8,874
4	LG ELECTRONICS	SOUTH KOREA	87.1	17,496	20,087	356
5	SAMSUNG ELECTRONICS	SOUTH KOREA	35.0	13,472	38,491	5,308
6	SANYO ELECTRIC	JAPAN	51.4	10,418	20,269	382
7	WHIRLPOOL	U.S.	100.0	10,325	10,325	367
8	ELECTROLUX	SWEDEN	74.0	9,642	13,030	467
9	THOMSON MULTIMEDIA	FRANCE	95.6	8,696	9,094	394
10	GENERAL ELECTRIC	U.S.	4.5	5,887	129,853	12,735
11	SHARP	JAPAN	31.9	5,807	18,205	348
12	HITACHI	JAPAN	9.0	6,851	76,127	944
13	mitsubishi electric	JAPAN	17.7	6,611	37,349	1,129
14	TOSHIBA	JAPAN	10.1	5,437	53,827	870
15	Haier Group	CHINA	100.0	4,905	4,905	63

Sources: "Fortune" magazine, individual companies' home pages, and others

For some firms, home appliance division figures have been projected from existing data.

**Chart 3-2 Japan's Home Electric Appliance Companies' Share of World Demand by Product, and Competitors**



Toward Digital, Data, IT and Network Home Appliances

← Home appliance manufacturers and non-appliance manufacturers moving into this area

Source: "Home Appliance handbook," "Consumer electronic appliance data" and others

	Japan		Europe		Overseas	
	Although differences exist by product category, historic home appliance superiority and corporate strength remain, future trend and directions may depend on information access home appliance and other fields.		Competitiveness and product development strengths in the field of audio-visual equipment		Korean expansion, sudden appearance of China, SE Asian local Japanese companies' strengths	
Company name	Matsushita Electric		Electrolux		LG Electronics	
Home Electric Appliance division	A-V Comm. Network	Appliances	Audio/Visual Field	Consumer, Lighting	Appliances	Display media
Share (%)	57.2	17.9	31.3	49.8	78.8	37.6
Sales	19,373	6,045	1,070,900	7,908	56,021	3,269
Against prev. yr, same period. (%)	Δ5.9	Δ5.2	0.6	Δ6.4	8.5	*
Operating profits	Δ322	257	70,600	Δ260	2,692	92
Against prev. yr, same period (%)	—	14.2	Δ13.1	—	Δ11.1	*
Operating Profitability (%)	Δ1.7	4.3	6.7	Δ3.3	4.8	2.8
Gross Company Base	Matsushita Electric		SONY	Royal Philips Electronics	Electrolux	LG Electronics
Sales	33,856		3,424,788	15,890	71,129	8,700
Against prev. yr, same period (%)	Δ9.4		5.2	Δ9.1	9.0	26.2
Operating profits (losses)	Δ757		Δ388	Δ413	3,888	539
Against prev. yr, same period (%)	—		—	—	Δ14.0	*
Operating profitability (%)	Δ2.2		Δ0.01	Δ2.6	5.5	6.1
Units	100 million yen		million yen	EUR m.	SEK m.	W bil.
Period	first half FY 2001		first half FY 2001	first half 2001	first half 2001	first half 2001

Sources: Individual Companies' announced closing (from individual companies' home page), etc.

## 4. Auto Parts

### 1) Changes of Environment Surrounding the Auto Parts Industry

Influenced by worldwide reorganization of the auto industry, the environment surrounding the auto parts industry has changed quickly in recent years and become a great turning point. While the developed markets have already matured and sizeable sales increases are to be expected no more, finished car manufacturers are increasingly trying for globalization in search of newly emerging markets. In the emerging markets, they are trying to gain the market share by developing products to meet the local requirements. In the mature developed markets, they try to improve profitability by identifying the market needs quicker and more precisely, and by supplying their products at lower costs. For that purpose, they are contriving for standardization and shared use of parts, modularization and unitization of components, systematization, reviewing of purchase strategies (establishment of an optimum worldwide procurement system, etc.), and standardization of networks (procurement networks such as Convisit, ANX, JNX, etc.). Cost competition has become much keener in the changing market, and finished car manufacturers are now demanding severer cost cuts to auto parts manufacturers. It was not too far back that Nissan and Mazda started to buy from new parts manufacturers, free from capital relations, bringing forth the collapse of the famous Japanese “KEIRETSU” (business affiliations), as a result.

Modularization was the remarkable movement among European car manufactures in the second half of the 1990s, which was to fabricate multiple components into one unit on the production line in advance. This modularization enables auto manufacturers to considerably cut production processes, reduce capital investments, greatly decrease cost of parts by reducing the number of parts while developing the module, and reduce

purchase costs by decreasing the number of parts suppliers. European and American manufacturers are positively moving to modularization and enjoying the full merits of the cost reductions.

Furthermore, the need to reduce huge development costs of next generation technologies for the environment, safety and information communication accelerate the movements toward global reorganization of auto manufacturers. ITS, Intelligent Transport System, one of the most notable technologies among this new generation, is being developed in Japan, Europe and the United States, as a means to achieve higher safety, more efficient transport, improved amenity, and other needs of the users and society relating to the transportation environment as well as the conservation of the global environment, through full use of technologies relating to the environment, safety and information communication, and the establishment of a single integrated system of “men,” “vehicles,” and “roads.” As it is difficult for finished car manufacturers to develop those ITS-related parts all by themselves, joint developments and business alliances are sought for with other auto manufacturers, parts manufacturers, and manufacturers of electric equipment or communication devices who have strengths in respective fields.

The global reorganization of the auto industry has brought about chances as well as risks, encouraging risk-taking for the development of parts for modules, establishment of a global supply system of parts, and product developments in the areas of environment, safety, and information communication, while contriving for worldwide buy-outs, amalgamations, and business alliances for survival. Here we shall discuss “DENSO,” “Delphi,” and “Bosch,” three major figures of world industry, and study their business strategies. Corporate profiles of these three are summarized in Charts 4-1 and 4-2.

Chart 4-1 Company Profiles of the Major Three (1)

	DENSO			Delphi			Bosch		
	1998 ('99/3)	1999 ('00/3)	2000 ('01/3)	1998	1999	2000	1998	1999	2000
Employees	72,359	80,795	85,371	201,000	203,000	211,000	188,017	194,335	196,880
Sales	1,758,842	1,883,407	2,014,978	28,479	29,192	29,139	50,333	54,579	61,717
Proportion of major customers (Major customers)	51.0%	49.4%	50.2%	78.4%	76.4%	70.9%	-	-	-
Proportion of overseas trade (Note 3)	37.2%	38.4%	38.1%	18.80%	16.82%	19.01%	65.0%	66.0%	72.0%
Proportion of relevant business division (Business division)	-	17.1%	17.6%	16.94%	18.14%	18.34%	63.2%	65.0%	71.2%
	(Toyota Group)			(GM & affiliates)			(Auto equipment technology)		
	(Electronic equipment business (Note 2))			(Electronics and mobile communication)					
Operating income	106,663	116,682	123,526	630	1,682	1,693	-	-	-
Net profit	58,969	61,913	60,799	439	1,083	1,062	850	900	2,700
ROE	5.4%	4.9%	4.4%	13.84%	33.84%	28.20%	7.16%	6.92%	16.66%
ROA	3.2%	3.0%	2.7%	2.35%	5.90%	5.73%	2.34%	2.21%	5.63%
Cost of research and development	154,207	160,055	176,959	1,400	1,700	1,700	3,478	3,757	3,971
Proportion in total sales	8.77%	8.50%	8.78%	4.92%	5.82%	5.83%	6.91%	6.88%	6.43%

Source: Compiled from business reports of each company

Note. Unit: US\$ 1 million for Delphi, DM 1 million for Bosch, and ¥ 1 million for DENSO.

Note 1. Data for DENSO are based on financial years.

Note 2. 1999 figures are not available as product categories were changed from 2000.

Note 3. Proportion of overseas trade for Delphi does not include North America (USA, Canada and Mexico).



Chart 4-2 Company Profiles of the Major Three (2) (First Half 2001)

Business division	DENSO		Delphi (Note 1)		Bosch	
	Automotive division	7.3%	Electronics and mobile communication	6.6%	Auto equipment technology	
Sales operating income ratio by divisions (%)						

**Proportion of the above in total sales (%)**

Proportion (of above division) in total sales	93.1%	18.4%
Proportion (of above division) in total operating income	108.5%	53.8%

**Total company**

Sales/operating income ratio (%)	6.3%	2.3%
Total asset/operating income ratio (%)	2.9%	1.6%
Proportion of overseas sales	42.3%	
Operating income per person (Note 2)	0.80	0.14
Sales per person (Note 2)	12.77	6.39

**Overseas production bases (Bases for R&D) (Note 3)**

Domestic	12(1)	44(14)	25(2)
The Americas	22(0)	49(4)	27(5)
Europe	10(0)	68(7)	47(10)
Asia, Oceania, etc.	12(0)	20(2)	37(3)

※ Figures for blank columns are not available.

Source: Compiled from business reports of each company. Figures for Japanese companies are for half a year ending September 2001.

Note 1. Figures exclude in-house processing costs.

Note 2. Unit: US\$ 10 thousand for Delphi, and ¥ 1 million for DENSO.

Note 3. As for the number of overseas production bases,

DENSO: Figures are for 2001.

Delphi: (1) Figures are for 1999

(2) "Domestic" represents USA and Canada

(3) Europe includes Europe, Middle East, and Africa

(4) R&D bases are for the number of technical centers

Bosch: (1) Figures are for 2001

(2) Asia, Oceania, etc." includes one base in Africa

## 2) Strategies of Auto Parts Manufacturers<sup>1</sup>

### [DENSO]

DENSO Corporation, the fourth biggest manufacturer in the world, has been promoting the “3 Ss” management of “Simplicity,” “Slimness” and “Speed” after its “Denso Vision 2005,” aiming at “joining the big three of world auto parts industry” and “increasing the items it enjoys the top share of in the world (25 items and 70% of the sales).” In 1999, the company achieved large scale reorganization, introducing the “quasi-company system,” reorganizing 10 existing business divisions into 4 business groups of power train equipment, thermal components, electronic and electric equipment, while reforming its headquarter functions into 4 centers.

The company has been involved in the field of ITS since the early stages, and which is expected to be the core business of the company for the 21st century. It has been engaged in the development and production of environmentally sound products such as parts for direct injection engines, and parts for hybrid products, as well as car navigation systems, car-mounted ETC devices, and other information communication related products. The company has also been involved in the cellular phone business in particular, despite huge losses, taking a long-range point of view in order to accumulate communication technologies for cars, essential to the ITS. As a result, DENSO has become the only company in the auto parts industry to have retained both the communication and automotive technologies required for the establishment of ITS.

As for modularization, unlike cockpit modules, front-engine modules and other large scale modules used in Europe and the United States, DENSO is developing modules in highly value-added areas such as air intake/fuel supply systems and car body electronics including a “cooling module” which is used for “Prius”. However, in face of the fact that European and American type modules are becoming the global standards, the

company has started to develop cockpit modules as well, entering into separate business alliances with several manufacturers which are producing instrumental panels, to step up its preparations against this pattern.

For globalization, DENSO has recently modified its strategy and accelerated the expansion of business scale, aiming at the establishment of the four-polar system to cover the world, in order to respond to the requirements of finished car manufacturers worldwide for optimum procurement of parts. In the European markets in particular, where the company had been somewhat behind due to considerations for Bosch, one of its shareholders, DENSO has started the production of an electronically controlled distributor type diesel fuel injection pump at its Hungary Plant, more seriously penetrating into the areas of electric fittings and engine management.

### [Delphi]

Delphi is a company capable of supplying all five fundamental modules of a car (cockpit, door system, brake system, under-the-bonnet devices, and integration system for air and fuel) by itself. In order to quickly respond to the package procurement needs of finished car manufacturers, the company reorganized its structure in 2000 (from divisional system to 3 business group and 7 division system consisting of “cruise control,” “safety, heat exchange and electronics,” and “electronic and car-mounted communication” groups), while positively trying to come into joint ventures with outside parts manufacturers and to establish cooperative relations with strong and specialized parts manufacturers, aiming at acquiring strategic technologies necessary for promoting modularization. Also, the company is actively tackling the fields of “environment,” “safety” and “Telex (the fusion of cars and information communication technology),” thought to be the areas of future growth, and is promoting product developments for engine control and car-mounted information terminals, with which high added value is expected.

1. The following analyses are based upon published literature of relevant companies.

Further, in the trend of globalization, Delphi is going to streamline its structure to respond to the needs of local production and to expand sales in the newly emerging markets of China, Southeast Asia, other Asian countries, and Brazil, while reinforcing its approaches of product development in European and Japanese markets.

Delphi, since it was separated from GM in 1999, has actively expanded its business as the world's top manufacturers of auto parts, and successfully continued to improve its performance. However, these results are rapidly deteriorating now due to the recession in the United States. The company is contriving for restructuring of its business system to regain profitability, concentrating the management resources to the growth areas, and reducing or withdrawing from the areas with poor future prospects. In trade relations, the company is trying to be less dependent on GM, and to expand businesses with finished car manufacturers other than GM and outside North America.

#### **[Bosch]**

Bosch has been promoting its business on the "3 Ss," namely, "Sauber" (clean), "Sparsam" (energy-saving), and "Sicher" (safe), as key words. In the movements for global reorganization, the company has not been active in expanding its trade volume through acquisitions, but has focused on the establishment of strategic alliances to reinforce its competitive edge in the fields of "safety" represented by brakes.

Bosch has jointly developed brake systems with Michelin, France; had a joint-venture with Knorr Bremse in brake business for heavy commercial vehicles; an acquired the brake division of Allied Signal (now Honeywell); the electrical power steering business of ZF Linksysteme; and the hydraulic brake business of Allied Signal. The company has combined these with the existing ABS and TCS, to develop the ESP, or Electronic Stability Program, and to establish a structure to be able to supply whole brake systems fully utilizing electronic technologies. In the engine management area, where the fuel injection system, the main business

of Bosch, represents the central portion, the company is actively working on integrated and optimum controls of gasoline and diesel direct injection systems, exhaust gas purifying systems, brake and transmission systems, etc.

As for modularization, the company aims at the modules accompanied by system integration to integrate all systems as one, instead of modules merely assembled of individual parts. In particular, the company focuses on the cockpit module to centrally control sensor/control units for safety system, circuits for onboard electronic control unit, car-mounted electric fittings and electronic control unit, and is promoting the penetration into these business fields.

Finally, thinking about globalization, in the global reorganization of automobile and auto parts industries, Bosch is largely reviewing its strategy. The company is particularly focusing on the Asian markets, where a rapid increase is expected, but the overseas trade ratio had been relatively small.

Bosch has had business relations with three companies, Zexel, Jidosha Kiki, and Asco, through technical assistances, minor share holdings, and joint ventures in North America and Asia. The company has increased its investment to these companies and amalgamated them, to make them the strategic bases for the Asian market. Thus Bosch is now contriving to develop the Asian markets more aggressively.

#### **3) Conclusion**

We have seen the business strategies of 3 major interests of the auto parts industry, "DENSO," "Delphi," and "Bosch." The business strategies of these three, in relation to the environmental changes of auto industry, can be summarized as below:

Influenced by global-scale auto industry reorganization, all three companies are positively pushing their developments abroad, aiming at the establishment of global supply system of parts. Delphi and Bosch are focusing on the Asian markets, where a higher growth is expected and their relative shares were low, and are active in acquisition and amalgamation of Japanese auto

parts manufacturers to gain strategic bases for the markets.

In contrast, DENSO, who has already long developed Asian markets, is now working on acquisitions and establishment of new production bases, trying to expand its European market, where the company had been somewhat behind in penetration.

As for product developments, Delphi has successfully dealt with the rapid progress of modularization since early on, having established its position as the only company that is able to supply all five fundamental modules to the auto industry, and having reorganized its business structure to meet the package procurement needs of modules. DENSO and Bosch, on the other hand, are contriving for modularization with high value-added systems and functions, instead of the modules simply assembling individual parts.

DENSO has long promoted research and development activities in product developments related to the environment, safety and information communication areas, from long-

range viewpoints. As a result, DENSO is now the only company in the industry to have both communication and automotive technologies necessary for ITS.

Meanwhile, Bosch is trying to promote strategic alliances to be able to supply the whole range of brake systems, the major part of the base carrier, and to strengthen its competitive power in the area of "safety".

As global reorganization proceeds, these three companies are contriving to respond to the requirements of finished car manufacturers, for the ability of global supply, modularization, cost competitiveness, technological developments for the next generation, etc. While DENSO and Bosch have stable core businesses of their own and, on those axes, are targeting business developments in the growing areas of environment, safety and information communication, Delphi is positively pushing modularization – which is the difference in their strategies. At this "point in time", it is hard to tell for certain how far the difference will influence their competitive powers. It is yet to be seen.

Exhibit 1. World Ranking of Auto Parts Sales

Ranking 2000	Ranking 1999	Ranking 1998	Company	Head office	Sales 2000 (Million US\$)	Sales 1999 (Million US\$)	Comparison with the previous year (%)	Composition by areas (%)2000			
								North America	Europe	Asia	Others
1	1	1	Delphi	USA	26,480	27,259	-2.9	81	16		3
2	2	2	Visteon	USA	18,569	18,481	0.5	81	14	4	1
3	3	3	Robert Bosch	Germany	17,800	16,700	6.6	33	55	10	2
4	4	4	DENSO	Japan	16,392	12,575	30.4	23	10	67	
5	5	5	Lear	USA	14,100	12,429	13.4	61	29		10
6	6	6	Johnson Controls	USA	11,869	11,207	5.9	64	33	1	2
7	7	7	TRW	USA	11,000	11,000	0.0	51	41	5	3
8	9	8	Magna International	Canada	10,100	9,000	12.2	68	30	1	1
9	8	9	Dana	USA	9,467	10,133	-6.6	75	17	4	4
10	10	10	Valeo	France	8,592	7,754	10.8	29	61	7	3

※ Sales of Robert Bosch are estimates.

Source: "Automotive News"

**Exhibit 2. Main Business Reorganizations of the Major Three in Recent Years**

**[DELPHI]**

Year	Country	Electronics Companies and businesses concerned	Main products	Purposes
1997	USA	Delco separated from Hughes and amalgamated	Car electronics	Integration
1997	USA	Aegis Technologies LLC (Party concerned: Talley Ind.)	Airbag inflators	Joint venture
1997	Brazil	Delco Chassis NSK do Brazil (50% investment)	Starters	Joint venture
1997	Poland	60% shares of F.A. Krosho	Shock absorbers	Buy-out
1997	China	Tianjin Delphi Suspension Systems (55% investment)	Shock absorbers	Joint venture
1997	Morocco	Majority shares of Sodax	Shock absorbers	Buy-out
1997	Japan	Delphi Saginaw NSK (50% investment)	Design and sales of constant velocity universal joints	Joint venture
1998	China	Delphi Shanghai Steering & Chassis Systems	Steering and braking units	Greenfield investment
1998	China	Beijing Wan Yuan, joint venture with local investments by GM and AEC	Fuel pumps	Buy-out
1998	China	Shanghai Delphi Automotive Air Conditioner (30% investment)	Condensers, evaporators	Joint venture
1998	Saudi Arabia	Middle East Battery Co.	Batteries	Joint venture
1998	UK	Took over parts recycling business of Lucas Varsity	Recycled alternators	Recycling
1998	USA	Seat business → Lear	Seats	Sell-off
1998	USA	Car lighting system business → Guide Corp. (US)	Lighting systems	Sell-off
1998	USA	Filter business → Dana	Filters	Sell-off
1998	USA	Coil spring business → Walton Johnson Group (US)	Coil springs	Sell-off
1999	USA	Spun-off from GM (Concluded in May)	Various modules, etc.	Independence
1999	China	Shares of Delphi PE Baicheng, a joint venture, increased from 53% to 100%	Fire harnesses	Buy-out
1999	Hungary	Delphi Automotive Systems - Calsonic (Shareholding)	Car air compressors	Joint venture
1999	Japan	Capital participation in Akebono Brake Industry (5.85%)	Brake parts	Alliance
1999	Japan, USA	Tie-up with Ashimori Industry in technology, production, and sales	Seat belts	Alliance
2000	UK	Lucas Diesel Systems, a subsidiary of TRW	Diesel fuel injection units	Buy-out
2000	UK	AP Distribution Services	After market sales	Buy-out
2000	Japan	33.4% shareholding of Calsonic Kansei scheduled (to be bought from Nissan)	Air conditioners, mufflers, interior trims	Buy-out
2000	China	Shanghai Delphi Automotive Door Latch & S. Sys.	Door latches	Buy-out
2000	Brazil	Production started at Jaguariuna new plant	Car air compressors	New construction
2000	Korea	Agreement on joint development with Hyundai Motor	Cockpit modules	Alliance
2000	USA	Agreement on joint development with Ericsson (S)	Car-mounted cellular terminal technology	Alliance
2000	USA	Agreement on joint development with Orbital Engine	Gasoline direct injection systems	Alliance
2000	Europe	Agreement on joint development with BMW, Renault	Fuel cells	Alliance
2000	USA	Joint venture company with Plastech Engineered Products (49%)	Wire harnesses	Amalgamation
2001	Thailand, Australia	New plants constructed	Brake calipers and fuel processing systems	Greenfield investment
2001	Italy	Desio plant, Italy, closed down → Production shifted to European and Asian factories	Door latches, wire harnesses, suspension modules	Close-down
2001	USA	Sold off composite material spring business to the National Composite Center, USA	Composite leaf springs	Sell-off
2002	USA	Agreement on joint development with Authen Tec	Security devices	Alliance

Source: Compiled from various news materials

**[BOSCH]**

Year	Country	Companies and businesses concerned	Main products	Purposes
1997	Japan	Shares of Zexel increased from 13.9% to 30.1%	Diesel fuel injection units	Buy-out
1997	Korea	Shares of Motor Systems & Technology increased from 40% to 70%	ECU for engines	Buy-out
1998	Germany	Air brake business for trucks → Knorr-Bremse Systeme	Air brakes for trucks	Joint venture
1998	Korea	Shares of Korea Automotive Motor increased from 50% to 100%	Small motors	Buy-out
1999	Japan	Jidosha-Kiki → Bosch Brake Systems	Brake systems/ABS	Buy-out
1999	Germany	ZF Linksysteme (50% investment, the rest held by ZF)	Power steering	Joint venture
1999	Italy, Germany	Automotive Lighting, a joint venture (50% investment, the rest held by Magneti Marelli)	Car lighting systems	Joint venture
1999	Japan	Shares of Zexel increased from 31.7% to 50.04%	Diesel fuel injection units	Buy-out
1999	Italy	A joint venture company established in Australia with Magneti Marelli, Italy (Equal shares)		Joint venture
2000	Germany	Joint buy-out of Atecs Mannesmann with Siemens	Measuring instruments, Shock absorbers	Company buy-out and amalgamation
2000	Hungary	Hatvan Plant completed	Electric fittings	Greenfield investment
2000	Germany	Agreement on standardization with Siemens and Temic Telefunken	Airbag buses	Alliance
2000	USA	Buy-out of brake division of Allied Signal, USA	Brake systems, brake parts	Buy-out
2001	USA	Joint development of car navigation and ITS technologies with Microsoft	Car-mounted information terminal technology	Alliance

Source: Compiled from various news sources

[DENSO]

Year	Country	Companies and businesses concerned	Main products	Purposes
1998	Japan	Wire harness business of Tokai Denko → Techma	Wire harnesses	Buy-out
1998	Germany	TD Deutche Klimakompressor (35% investment)	Car air compressors	Joint venture
1998	France	Production consignment of various meters to SAGEM	Instrumental panels	Alliance
1998	Japan	Technical cooperation with Maspro Denkoh in the area of ITS (6.5% investment)	Automotive terminals	Alliance
1998	Japan	Total production shift of 2 kinds of parts to Toyota Boshoku	Cabin air filters	Business shift
1999	Italy	80% investment on Magneti Marelli's rotating machines division	Starters, oil meters	Buy-out
1999	Hungary	DENSO Mfg Hungary started production for Isuzu Plant	Fuel injection pumps	Greenfield investment
1999	Canada	DENSO MFG Canada opened new plant	Automotive air conditioners	New construction
2000	Japan	Joint development with Aishin Seiki	Brake systems	Alliance
2000	Japan	Joint development of car navigation and ITS technologies with Microsoft	Car-mounted terminals	Alliance
2001	Mexico	Joint venture company established in Mexico with GAC Japan	Hosing and piping for spot coolers and automotive air conditioners	Joint venture
2001	Japan	Advics, a new joint venture company established with Aishin Seiki, Sumitomo Electric Industries and Toyota	Brake systems, brake parts	Joint venture
2001	Japan	Agreement on joint development with Kyocera and Kenwood	Cellular phone terminals	Alliance
2001	Saudi Arabia	Joint venture company established with Abdul Latif Jameel, Saudi Arabia	Production of automotive air conditioners	Joint venture
2001	Viet Nam	DENSO Manufacturing Viet Nam established	Air flow meter and other engine parts	New construction
2001	USA	Purodenso the joint venture company with Arvin Meritor, now wholly owned (Formerly 50%)	Air cleaners, oil filters, fuel filters	Buy-out
2001	Italy	Acquisition of Magneti Marelli's air conditioner business	Automotive air conditioners, radiators	Buy-out
2001	Japan	Withdrew from cellular phone production and shifted the business to Kenwood and Kyocera	Cellular phones	Sell-off
2001	Japan	Shifted domestic production of compressors for automotive air conditioners to Toyota Industries	Compressors for automotive air conditioners	Sell-off
2001	Czech	DENSO Manufacturing Czech established (Production scheduled to start in 2003)	Automotive air conditioners	New construction
2002	Japan	Individual collaborations in development with several manufacturers of instrumental panel	Cockpit modules	Alliance

Source: Compiled from various news sources