

## Chapter 5 Feasibility of consolidating the service business in the machine industry

### 5.1 Introduction

The machine industry, faced with a long-term economic slump and global competition, has high hopes and interests in securing its competitiveness and profitability, as well as recruiting opportunities by consolidating its machine (hardware) and service businesses. We shall discuss here, against such a backdrop, the implication of consolidating machine and service businesses and whether expected results, if any, are really feasible based on a hands-on study of the service business at machine manufacturers (mostly capital goods).

In many areas of capital goods, securing profits

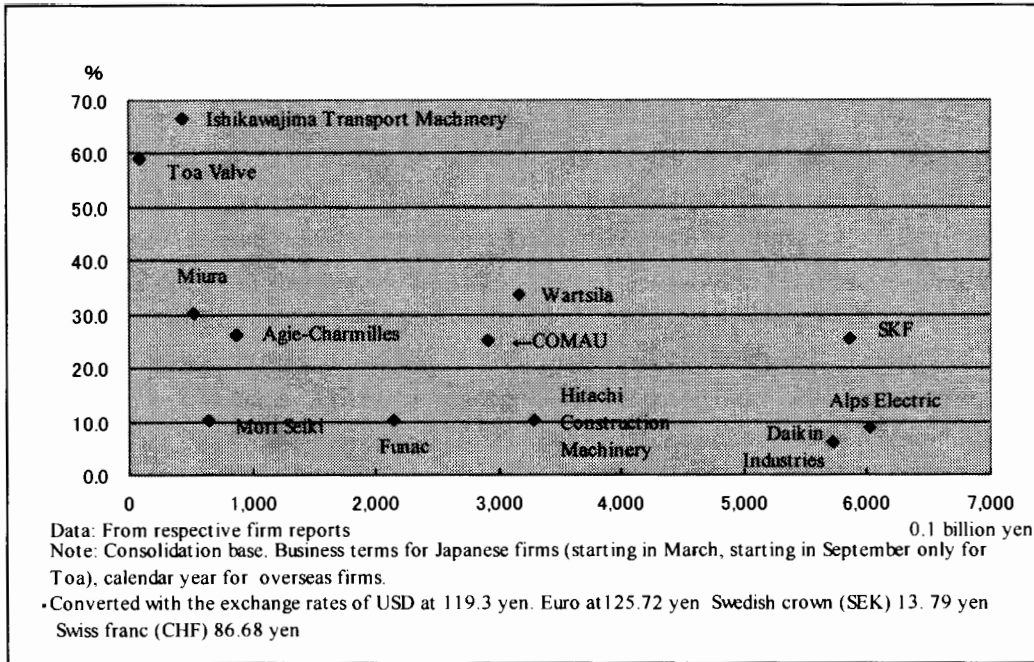
in the hardware business is difficult and we are witnessing the pursuit of sales and profit enhancement in their overall operation where the service business has been incorporated. The feasibility of turning services into a business probably exists to a certain degree with any capital goods, including parts and dies. On the other hand, it can be stated that customer needs also demand contributions to the industrial and societal bases in the form of consolidated services in addition to machine supplies on the part of capital goods makers. This is thus an indication of business opportunities for equipment goods.

### 5.2 Evolution of service business at machine manufacturers

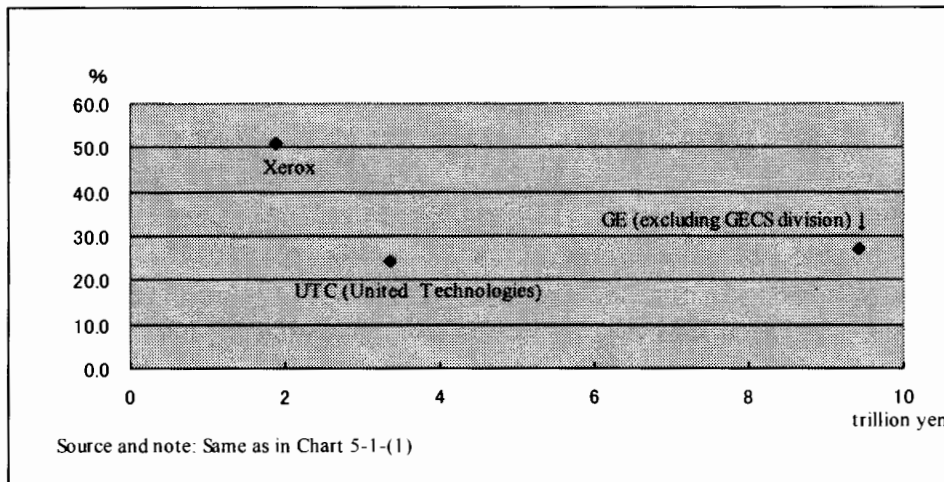
Many machine manufacturers are thought to provide services (business) in one form or another but few firms, after having turned the service into a business, release financial information. Here we shall discuss the current status of service business based on some limited cases where information has been released.

Charts 5-1-(1) and (2) compare the ratios of service business within the 2002 sales figures at 15 domestic and foreign firms. Among the Japanese firms there is a group with relatively high sales figures and with a sales ratio for the service business at about 10 % and a group with less than

100 billion yen in firm-wide sales figures but with a high sales ratio for the service business. Four European firms show the ratio of service business at about 30 % irrespective their sales figures. US firms show relatively high sales figures by percentages in the twenties, for their service business at GE and UTC with complex and multiple departments. Xerox shows 50 % or over for the service business. The fact that the sales ratio for the service business exceeds 50 % of the firm-wide sales should indicate that it is a service firm, belonging to the service industry, rather than a hardware manufacturer.



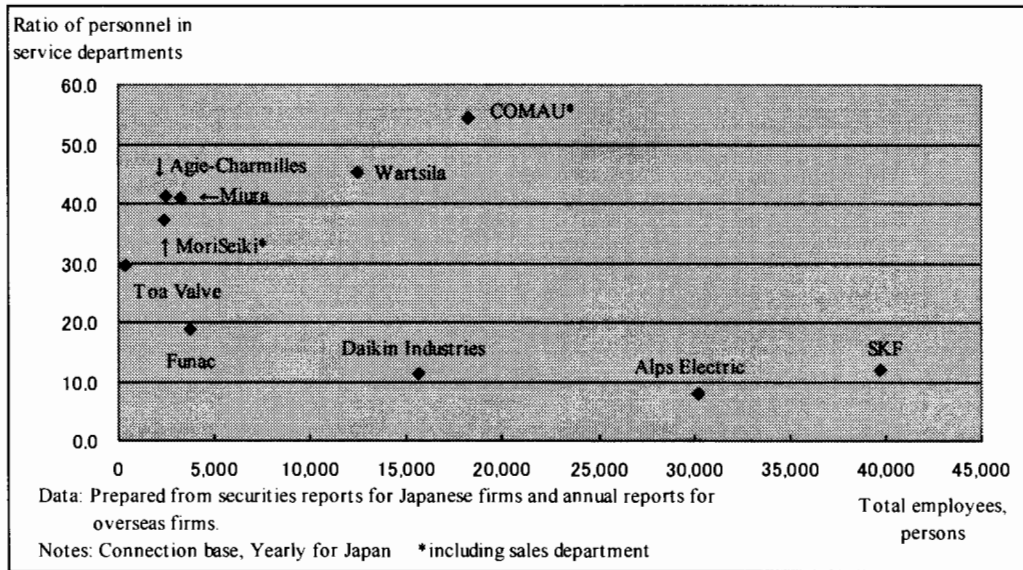
**Chart 5-1-(1) Relative importance of sales by service business in machine firms in 2002 (eight Japanese firms, four European firms)**



**Chart 5-1-(2) Relative importance of sales by service business in machine firms in 2002 (3 US firms)**

Chart 5-2 compares the ratios of employees in total for ten firms out of the 15 above whose employee numbers in the service department are released. At six firms, over 30 % of their employees

belong to the service department, and at four firms, 20 % or less. At large scale firms the ratio of employees in the service department remains at about 10 %.



**Chart 5-2 Relative importance of service departments in terms of employee numbers in 2002**

Next, we shall discuss the effects of a service business consolidation based on Chart 5-3. The chart compares the growth of sales figures (years 2002/2000) and average levels of sales-operating profit ratios from the past three years (2000 through 2002) firm-wide and by the service

department. This also is limited to firms which released information, and we could compare eight firms only. Though there are other fine points which should be taken into consideration, we can point out at least the following two items from the chart as a rule of thumb.

**Chart 5-3 Results of service business consolidation in machine firms**

	2002/2000	Average of 3 preceding years	2002		
	Multiplication ratio in sales (2002/2000)	Sales-operating profit ratio %	Sales (firm-wide), million yen	Relative importance of service business %	Relative importance of other business departments %
Alps	1.05	4.6	601,816	100.0	
Electronic parts, musical products, etc.	1.04	3.9			91.0
Service business department	1.15	7.5		9.0	
Toa Valve group	0.85	3.1	8,906	100.0	
Production of valve products, etc.	0.86	-13.0			40.9
Service business department	0.93	14.8		59.1	
Miura Co., Ltd.	1.04	13.2	53,225	100.0	
Sale of boilers, etc.	1.00	13.9			69.8
Service business department	1.09	27.5		30.2	
SKF	1.06	9.0	585,110	100.0	
Industrial Division	1.09	10.8			26.7
Automotive Division	1.07	3.2			25.5
Electrical Division	0.95	5.8			11.4
Aero and Steel Division	0.99	3.3			10.8
Service business department	1.07	8.4		25.6	
Wartsila	0.93	14.4	316,689	100.0	
Power Plant	0.80	na			26.4
Marine	1.06	na			30.3
Service business department	1.20	na		33.5	
Xerox	0.85	-0.3		100.0	
Sale and finance, etc.	0.78	na			48.9
Service business department	0.93	na		51.1	
UTC (United Technologies Corp.)	1.06	10.7	3,367,666	100.0	
Product sales	1.05	na			75.1
Financing revenues and other income, net	0.62	na			0.8
Service business department	1.13	na		24.1	
GE (excluding GECS)	1.14	14.3	9,436,079	100.0	
sales of goods	1.14	na			65.7
Service business department	1.16	na		27.0	

Sources: Prepared from securities reports for Japanese firms and from annual reports, etc., for overseas firms.

Notes: Consolidation base, business year 2002 for Japanese firms (2003 September term for Toa Valve Group),

calendar year for overseas firms

Sales volume calculated as in Chart 5-1 notes

First, sales figures by service business have grown more than the firm-wide sales figures at all of these firms which have released the segment information of their service business departments. Next, four firms which constitute one half of the firms in the chart demonstrate high figures in the "sales-operating profit ratio" in two digits. Unfortunately, it is not clear whether this double-digit profit ratio is attributable to contributions by the service business department be-

cause there is no sufficient information released on the service business departments besides Miura Co., Ltd. In any case, it is our estimation that it is highly likely that there is a contribution to the sales profit ratio, since the sales ratio by the service business has a certain importance at 25 % - 30 %, with higher growth rates achieved by the service business departments than by other departments.

As we have seen so far the current status of the service business in terms of sales, profits and numbers of employees at machine manufacturers, we are able to verify that firms exist which have

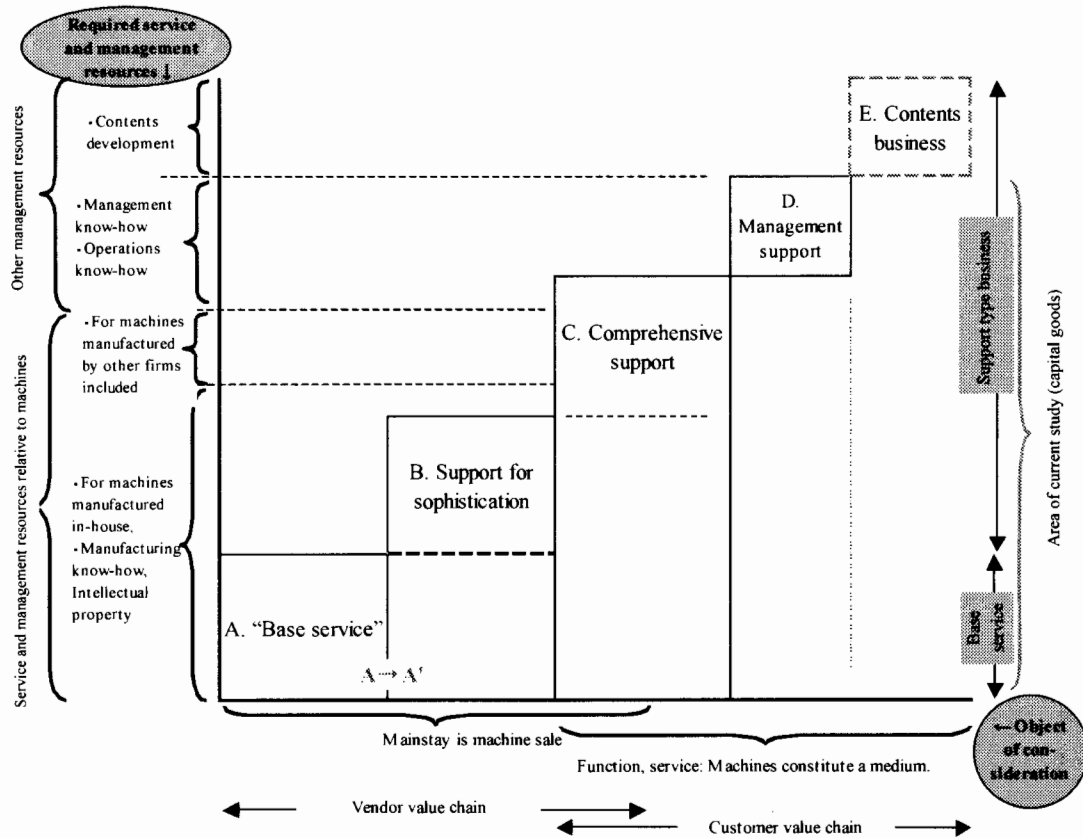
made relatively high achievements through the consolidation of hardware and service businesses, and that there is a substantial discrepancy in achievement levels among the firms.

### 5.3 New service business

Here we shall clarify, from the hearing investigations on about twenty domestic machine manufacturers, the characteristics and trends of the service business conducted by hardware manufacturers. For our investigations we took note of the service business which makes use of accumulated knowledge on machine manufacturing and we selected manufacturers with presumably unique business with an emphasis on the service business and high profitability. Investigations cover diesel engines, fiber machines, food filling machines, seawater desalination equipment, bearings, machine tools, electronic medical devices, air conditioners, instrumentation, eleva-

tors, vertical parking facilities, boilers, ship navigation equipment and dies from capital goods.

Service business is diverse but a rough classification into "base service" and support type service can be made. The support type service can be classified further by the criteria of whether the object of the service business consideration centers around machine sales, whether required service and management resources are relative to machines manufactured in-house and whether required service and management resources are relative to machines. We shall classify these items into five from A to E and clarify their characteristics. (Chart 5-4)



Sources: Prepared from "High achievement makers sell 'service'" by Tetsuro Komori and Takashi Nawa  
"Business Research" "Solution business by manufacturing firms  
— expansion of profits by service business" by Hisashi Ono, etc., by adding results from hearing investigations

**Chart 5-4 Classification of service business in machine firms: center around capital goods.**

### A. "Base service"

"Base service" is an accompanying service of machine sales. It is provided in order to exhibit, maintain and restore the functions and accuracy inherent to the machines, while the mainstay will be repairs, maintenance and supply of various support information and spare parts. The "base service" is supposedly implemented by all machine manufacturers while it is conventionally defined as part of machine sale promotion rather than object of interest in a profitable business. Given the Japanese custom of regarding service as gratis, the fact remains that it is not easy to collect charges for services with the exception of spare parts supplies. Despite the presence of maintenance contracts with liable charges, the percentage of such contracts appears to remain at a single digit. Under such circumstances, our current study confirmed the existence of firms who have turned the "base service" into a profitable business.

Cases of the "base service" having been turned into a business often involve products with relatively long machine life. The speed of technological renovation is not as fast as the IT field and a large growth in machines demand is not likely. Consequently, there is a severe competition for machines (hardware) on one hand, and basic maintenance service, "rehabilitation" (repair service) and demands for spare parts become important as they accompany machines with long life as being capital goods.

As spare parts are sold "loose" in accordance with customer demands, their profitability is high. The after-sale service market, also referred to as "after-sales service," often makes up a size twice to three times that of the initial investment for the hardware. Firms attempting to gain profitability around the "base service" take note of this. Such cases involve bearings and diesel engines.

More than the average competitiveness and business size become important for the machine business, as the level of machine sale shares di-

rectly determine the success or failure of service business in the "base service." It is noted that Wartsia (Finland) is a firm that has consolidated the service business as a profitable business with a core of spare parts against the background of high product share by securing a business size through acquisition of other companies.

### B. Sophistication support service

Sophistication support service supports sophistication in machine application, not expected at first, through additional services other than the "base service." Monitoring of machine operation status and conditions, control of breakdown history, predictions and preventive maintenance or upgrading machines are provided by means of IT against the background of information control for facilities and machines. It is often relative to maintenance service. Support toward high operational rates under optimal conditions, required of machine manufacturers against the background of machine specialization, high sophistication and high costs, belongs here. Long-term extension of machine life and overall cost reduction for customers result from this service. Many of the solution services, noted recently, apply here.

Firms providing such services are categorized into two: firms with machines relative to the infrastructure and firms with other machines. The former category often involves manufacturers of machines and equipment such as gas turbines, boilers, desalination equipment relative to supplies of water, electricity and heat, in other words relative to the societal and industrial infrastructure. Also elevators, vertical parking facilities, and instrumentation and diesel engines can be considered to be machines associated with the infrastructure from certain customers and specific domains. Machines of the latter category consist of machine tools and medical electronic devices, which are machines for specific purposes.

### **C. Comprehensive support service**

Sales of machines manufactured in-house do not necessarily constitute the main object of sales and profit in the comprehensive support service. Lump and comprehensive (including periphery equipment as well as including equipment manufactured by other manufacturers) services are provided to satisfy customer needs from the customer interest and perspective for specific in-house manufactured machines as well as related facilities located at customer sites. This includes the following two:

First, the machines and periphery equipment by other manufacturers, not just machines manufactured in-house, become the object of service, which is referred to as "multi-vendor service." Comprehensive maintenance services are provided for production lines consisting of complex machines and periphery equipment in the hands of the customers as well as machines and facilities in specific ranges. Cases include comprehensive maintenance service for complex electricity generating equipment and rehabilitation service at seawater desalination plants.

Secondly, services are provided where the sale of machines is not necessarily the precondition and we have lease and maintenance, operation and maintenance (O&M) as well as outsourcing. It is often the case that the customers merely need to secure machine functions and services in the qualities and quantities and at costs required without actually purchasing and owning the machines. Machine manufacturers (vendors) thus will be able to secure the customer advantages through the provision of such functions and services per se, which will generate stable income.

There is an added advantage in the application of the know-how obtained in this business to the machine (hardware) business. There is an ongoing trend in Japan also to opt for this mode of service as deregulation moves on amid stronger

operation and maintenance (O&M) in the main executes operations of machines and systems on the customers' behalf. This is a business mode which has been steadily growing in actual figures among overseas firms as a high added value business relative to plant exports, capturing the interest of Japanese firms. As the use of O&M permits the customers to focus on their regular business, we are witnessing active trends toward O&M in conjunction with various manners of organizations and firms for large-scale projects. We have water supply devices and diesel engines for ships in our current study.

Machines are not sold per se in outsourcing. Functions and services are provided and sold as in the business of "steam sale" by boiler makers, "water sale" by desalination facilities manufacturers as well as "super pure water sale" or "electricity sale." This reflects a shift in the customer needs from the possession of machines to the use of machines and a trend toward deregulation. Many are dealt with anew.

### **D. Management support related service**

This intends to make a business by providing services based on various technologies, knowledge, experience and know-how accumulated in the framework of corporate management, rather than making the management resources relative to machines into factors for competitiveness and differentiation. This is a service business not directly related to manufacture and sale of machines although machines manufactured in-house and their service constitute the opportunity. Cases include support services for hospitals and a service business out of distribution and procurement.

Incidentally, E. "Contents Service" is not discussed here though it develops and provides varying information and contents by treating the machines as a medium.

## 5.4 Resultant differences in the service business

While expectations are high for consolidating and executing the service business by machine manufacturers, there are a number of cases of non-success. Items below should be important in delivering clear-cut advantages meeting the customer expectations and at the same time in generating success for the vendors.

### **(1) Comprehension of user needs: by firm-wide efforts**

Since the latter half of the 1990s networking environs have been rapidly provided, so that the use of IT tools is expanding business chances. However, in order to “discover” the needs more than the customers, an awareness to turn the service into a business and organizational approach are called for, while it is important to intensify, analyze and utilize firm-wide the varying information obtained from wide-ranging contacts with the customers. As for cases from overseas, what attracts attention is the case of facing the six sigmas and using them as an opportunity to come in contact with the needs in the consolidation of machine and service businesses widely. It is a sharp contrast to Japan where “kaizen” or improvement is concentrated almost exclusively on the production sites and the machine business.

### **(2) Core business: Identification of strategic domains**

Even if top-notch products are developed, competitors will develop similar products, so that there will be almost no difference in the machines per se. Consequently, differentiation by means of consolidation with the service business will be considered important, where, however, the consolidation with the service business and clear identification of business domains effective for this differentiation will affect the result.

For example, as boiler sizes constitute different levels of risks, the industries which use them as well as maintenance regulations differ. Miura Co., Ltd, who successfully developed small-scale

once-through boilers, had diligently collected and analyzed the customer needs with their managers’ strong belief in the business feasibility of the service. The firm thus could specialize in a business niche which would be impervious to regulations and they enjoy a high profitability today in the maintenance business against the backdrop of their high share, said to constitute about 60% of the small-scale once-through boilers. As GE is said to have selected gas turbines from a strategic perspective, clear identification of business niches is important.

### **(3) Use of intellectual property in the development of service merchandise: setup of appropriate domain**

In order to generate a high-profit business for vendors by offering users advantages through a service business, sufficient guarantees and intellectual properties to back up such a business as well as a close relationship with customers will be necessary. Consequently, the issue is whether in-house technologies and intellectual properties are superior to those of competitors and whether the business domain is set up within the range capable of generating results.

In connection with ships for example, a service business is highly likely to develop for engine manufacturers who has concentrated information regarding ship navigation, although related firms vary widely such as ship owners, operation and management companies, cargo owners, ship builders and manufacturers, engine manufacturers, and manufacturers of equipment for various control equipment for ships. On the other hand, a service business relative to cooling containers for ships, developments is feasible with cooling equipment and control equipment.

Further, conditions vary if the object domain is placed domestically or overseas. For example, there are larger-than-life ship operators and management firms and service firms specializing in water treatment in Europe and North America,



whereas such specialized service firms are rare in Japan or Asia. Service business consolidation for machine manufacturers is highly feasible in the fields of waterworks and industrial water due to the scanty availability of specialists with experience and know-how in local governments and among customers. This is demonstrated by the situation after the introduction of PFI in Japan.

**(4) Know-how to meet customization; appropriate economy size for service business**

The know-how compatible with customization needs to be structured and IT applied organizationally and globally by expending time, even if the application of IT is opted for, so that it can be selected as an option from the experience and know-how and data collected. In order to guarantee good results, service businesses will require certain sizes in terms of contract volume and contract rate. Contract volumes vary by area, but contract rates exceeded 80 %, at least 50 ~ 60 % for cases with estimated high results in the current study. This demonstrates the necessity for an appropriate economy size for the service business.

**(5) Human resources: training system and effective application**

Awareness to conduct a serious service business in the area of human resources as well as

structuring of such a system is indispensable for a service business to obtain good results. The issue is how to structure organizations of systems to permit a training of high quality human resources and their effective application. Progressive firms often hold a service department in the head office itself and deal as an organization with the question of how to train, secure and apply limited human resources with high levels of specialization. Overseas firms have clear-cut intentions to run serious service businesses and they actively secure technology and human resources through acquisition of firms specializing in such services.

**(6) Synergistic effects: lock-in at the base**

As good results from consolidation of service businesses are based on the premise of hardware (machines) mostly, the action of locking the core machine into the core lies at the base. From there necessary service businesses are “discovered” from a customer perspective for providing total service. Studies show that machine maintenance services actually constitute the mainstay, including the support type service which recently cropped up. It is possible that singular spare parts take up an important position. It can be safely stated that the basics of the consolidation between the hardware and service businesses in the machine industry lie in the search for strategies which could enhance synergistic effects.

**5.5 Change in needs and feasibility of service business consolidation: toward provision of new infrastructure**

Several points are presented below as a follow-up to the preceding discussion regarding the implications and feasibilities of consolidating the service business for the machines industry.

**(1) Consolidation of hardware (machines) and service business is inevitable.**

Given the environment of severe competition, it is difficult even for leading capital goods

manufacturers in the industry to gain profits in many fields through the hardware business, so that business models are sought after in order to collect profits as a total business which has incorporated the service business. Machine manufacturers naturally pioneer in growing fields constantly and deliver competition in the hardware business as well. However, unless the service business is consolidated, machine manufacturers,

when placed in an environment where needs change, might remain mere hardware vendors due

cific forms required by customers (charging exclusively for the frequency of use of medical

to the rise of exclusive service firms, as seen in the – ESCO business and water process fields for example, and might take second billing to overseas firms even in domestic business opportunities.

## **(2) Varying forms of service business consolidation by area and firm**

It is clear now that forms of service business consolidation vary in accordance with capital goods areas and firms.

Firstly, it is clear now that it is feasible to turn the service business into a profitable business in the area of parts, parts materials, and components. This area was originally thought to be incompatible with a service business but now good results can be expected contingent upon the level of understanding of customer needs and the mode of approach.

Secondly, we have the area of equipment relative to societal and industrial bases. Here two additional areas are conceivable. First, a service which would support sophistication of machine application in limited areas and domains by applying IT on the premise of maintenance contracts; and services, which go further than maintenance services, and provide comprehensive support up to operation and administration of facilities, as well as services of outsourcing such as “electricity sale” and “water sale.” The latter category does not necessarily take the form of machine sale, but functions and services generated by machines will be delivered where machines become media and tools. Currently, the former applies in the main domestically and the latter is implemented more extensively overseas.

Thirdly, forms of service business vary in the case of other types of machines. Cases include provision of highly specialized services (diagnostic support and remote repairs of image diagnostic equipment for medical purposes, CAM software for machine tools), provision of services in spe-

equipment = lease and maintenance) and “discovering” the necessity more than the customers and proposing to them. In any event, they include cases developed by thorough understanding of trends among the customers and user industries.

## **(3) Risks and problems awaiting solution**

There are risks and cases where consolidation with service business does not contribute to differentiation and profitability while there are cases with good results as expected. In order to obtain good results from a service business consolidation, what is indispensable, in addition to a machine manufacturing business, is to identify the following: preparations for management resources which are required long-term for the service business from the initial investment to the collection, clarification of customer advantages and constant structuring of intellectual properties to back up the results, competition or solidarity with various firms or M&A. Long-term contracts toward stabilized income are not risk-free. Machine manufacturers have a clear advantage over exclusive service providers in deliveries of spare parts but there are problems in its execution. Also, in order to expand opportunities for a service business and to establish a profitable business, there remain issues regarding additional deregulation and manners of business relationships with customers. While massive data collected by IT application constitute indispensable management resources for executing a service business, handling of the data involve problems with the intellectual property rights.

As stated so far, changes in the management environment gradually affect the necessity for capital goods, and progressive machine manufacturers have responded to such changes and obtained good results through consolidation of machines and service businesses. There is no difference in this regard between domestic or overseas

where a global perspective is indispensable. The issue of which service business should be consolidated and provided varies from area to area in the content and form, and from corporate strategy to corporate strategy.

Additional deregulation and business relationships remain issues in promoting business consolidations and in establishing a profitable business. It can be stated that Japan's capital goods industry, which excels in the respective factors of hardware competitiveness, service technology, richness in intellectual properties, and fineness in

the problem solution, is now required to identify the needs in dealing with domestic and overseas customers and user industries, to consolidate hardware (machines) and services from customer perspectives and to provide services as a new societal and industrial infrastructure. It is hoped that such management bases by the hardware and service consolidation will contribute to the support of competitiveness for the domestic user industry on the one hand, and constitute new markets and business opportunities on the other, and eventually lead to employment opportunities as well.