How Matsushita Electric and Sony Manage Global R&D

A long tradition of conducting R&D overseas has helped these Japanese companies adapt to changing competitive conditions.

Sadanori Arimura

OVERVIEW: As companies transfer their R&D activities abroad, they will have to confront a challenging management issue: how to successfully operate R&D laboratories dispersed around the world. Both Matsushita Electric and Sony seem to have coped with this issue skillfully by introducing new management systems and practices—redefining the mission and goals of their global R&D, assigning two types of projects at the same time, rather than specializing projects among different labs, coordinating not by large-scale committees or meetings but through human relationships among a small number of top R&D managers, drastically changing their organizational structures, and so on. It appears that both companies have already realized some of the anticipated benefits.

Japanese companies have increased their overseas R&D activities significantly during recent years. Spending on these activities rose from ¥44 billion in 1986 to ¥177 billion in 1995 (1). The number of overseas R&D units grew from 276 in 1991 to 510 in 1995 (2).

At the same time, however, Japanese companies have confronted what is for them a new management issue; namely, how to manage R&D labs that are dispersed around the world.

In this article, I shall examine the experience of Matsushita Electric and Sony. Both companies not only started their overseas R&D activities earlier than other Japanese companies, but have recently implemented new management systems and practices in their global R&D management. The information is derived from interviews with parent R&D staff and from corporate documents and published papers.

Three Basic Approaches

It has been suggested that there are three basic approaches to R&D management: top-down, bottom-up and mixed (3, 4, 5). I believe these same approaches can be applied to global R&D management (see “Three Basic Approaches to Global R&D Management,” next page.)

Each approach has its advantages and disadvantages (see Table 1). In the top-down approach, it is easy to plan overseas R&D projects that are consistent with corporate strategy. Also, it is possible to allocate R&D resources effectively and to develop positive tension by imposing challenging projects on overseas labs. On the other hand, foreign R&D managers and researchers may resist objectives and projects that are chosen by the parent managers. Also, the task of the parent R&D managers and staff may exceed their abilities. As a result, they may pay little attention to the need for continuous improvement of overseas R&D objectives and projects.

In the bottom-up approach, it is possible to reduce the burden on parent R&D managers and provide motivation and flexibility for foreign R&D personnel. However, not every overseas R&D project may be consistent with corporate strategy. Also, if overseas labs take a “not invented here” attitude, it will be impossible to carry out coordinated global projects among the different labs. Moreover, if they lack creative researchers and good ideas, these labs may emphasize existing research fields or projects to the detriment of radical innovation.

The mixed approach is the most beneficial. However, it is very difficult to establish such a system, and even when it is possible, considerable time and costs may be incurred in decision-making and coordination.

Experience of U.S. and Swedish Companies

In the late 1970s (Figure 1), American companies employed a more top-down or centralized approach to their global R&D management than European companies (6). Also, the companies with a more top-down approach established a sophisticated coordination and control system, and were willing and able to allocate R&D resources on a worldwide basis. On the other hand, the companies with a more bottom-up or decentralized approach employed an informal and loose coordination and control system that relied on personal relationships between parent and foreign R&D managers. Although these companies were able to carry out overseas R&D...
Three Basic Approaches to Global R&D Management

<table>
<thead>
<tr>
<th>Principal R&amp;D Management Task</th>
<th>Top-Down</th>
<th>Bottom-Up</th>
<th>Mixed</th>
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<tr>
<td>Setting overseas R&amp;D objectives</td>
<td>Parent manager</td>
<td>Foreign manager</td>
<td>Parent manager</td>
</tr>
<tr>
<td>Planning overseas R&amp;D projects</td>
<td>Parent manager</td>
<td>Foreign manager</td>
<td>Foreign manager and R&amp;D committee</td>
</tr>
<tr>
<td>Monitoring and evaluating</td>
<td>Parent manager</td>
<td>Various sponsors</td>
<td>R&amp;D committee and other sponsors</td>
</tr>
<tr>
<td>Sponsor of overseas R&amp;D expenditures</td>
<td>Parent manager</td>
<td>Various sponsors</td>
<td>R&amp;D committee and other sponsors</td>
</tr>
<tr>
<td>Type of R&amp;D communication channel</td>
<td>Hierarchical/formal</td>
<td>Horizontal/informal</td>
<td>Hierarchical/formal</td>
</tr>
<tr>
<td>Nationality of foreign R&amp;D managers</td>
<td>Parent country</td>
<td>Host country</td>
<td>International rotation of managers</td>
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</table>

In the top-down approach, parent R&D managers have major authority and responsibility for global R&D management. For example, they set the overseas R&D objectives, plan the projects, and demand that foreign R&D managers execute their plans as scheduled. Parent R&D managers also establish a hierarchical and formal communication channel between parent labs and overseas labs. Through this information channel, they monitor and evaluate overseas R&D activities. Some or all of the overseas R&D expenses are provided by the parent company. Occasionally, parent R&D personnel may get the top management positions at overseas labs and serve as liaison officers between parent and overseas labs.

The bottom-up approach has the opposite features. Foreign R&D managers and researchers can establish their R&D objectives and projects by themselves; foreign R&D managers can bargain with the various players including, for example, parent company top management, divisions, laboratories, local subsidiaries, host governments, and other companies. Informal communication channels are formed in this way. Also, unless an overseas lab adopts the "not invented here" attitude, the bottom-up approach can foster horizontal communication channels.

As for overseas R&D expenses, its sources are varied and these sponsors monitor and evaluate overseas R&D activities. Parent managers devote little energy to the planning and control of overseas R&D activities. They simply impose minimal direction or restraints on it—for example, definition of the company's R&D policy or culture, or setting the rules for protection of their R&D output.

The mixed approach refers to the process in which parent and foreign R&D managers work together for global R&D management. The mixed approach has many variations compared to the two other approaches. However, the key point is that each player contributes to each task or process of global R&D management. For example, parent R&D managers establish the overseas R&D objectives, and the foreign R&D managers and researchers plan their projects accordingly. Planning staff at the parent labs contribute to forecasts of technological and market trends, stimulating global R&D communication, and so on. Also, R&D committees or meetings may be organized to plan strategic projects or to coordinate overlapping projects. Of course, both parent and foreign R&D managers will participate in these committees or meetings, together with members of other departments, if necessary.—S.A.

In a study of seven U.S. multinational companies, Ronstadt reported a good example of the top-down approach by IBM (7). In the 1960s, IBM decided to develop its 360 product line for the world market. In order to achieve this challenging goal, IBM's senior managers established five R&D units at its major foreign subsidiaries, and assigned development and production to these subsidiaries. As a result, IBM was able to introduce nine new computer models at the same time.

This case demonstrates the two advantages of the top-down approach: efficient use of existing resources, and positive tension by imposing challenging projects on overseas labs. In addition, Ronstadt provided evidence that as time passed, six other U.S. multinational companies introduced the top-down approach to their global R&D management.

Major Swedish multinational companies changed their global R&D management from the bottom-up approach to the mixed approach (8, 9). These companies had applied the bottom-up or decentralized approach to their global R&D management (6). They had respected the autonomy of each overseas lab and employed a loose control system based on informal personal contacts among parent and foreign R&D managers. However, in order to respond to new environmental and internal conditions, these companies implemented new management systems and practices; for example, establishing a new overseas lab with the role of coordinator, assigning specialized R&D tasks among different labs, setting up global R&D committees and meetings, and standardizing the rules and procedures for the R&D process.

Japanese companies currently face the same management problem. The experience of Matsushita Electric and Sony is instructive.
Matsushita Electric: Global R&D Since 1976

Matsushita Electric Industrial Co., Ltd. is one of the world’s most globalized companies, with products marketed in more than 160 countries under such familiar brand names as Panasonic, National, Technics, and Quasar. In 1996, the total sales of Matsushita Electric group were ¥7.676 billion, about half generated in foreign markets. There were 265,397 employees, about 40 percent of whom were outside Japan.

In 1976, Matsushita Electric established its first overseas lab in the United States. By October 1997, it had 13 major labs employing about 300 R&D personnel (10) and other minor labs in foreign countries (see Table 2).

There are two major reasons why Matsushita Electric has globalized its R&D activities. The first is that the company’s manufacturing and sales activities have expanded internationally. Like most other multinational companies, Matsushita Electric’s globalization of R&D followed the globalization of manufacturing and sales. This means that most of the overseas labs were established to deal with the problems that could not be resolved by the latter globalization alone—for example, adapting its exported products for foreign markets, developing new products and technologies to satisfy foreign market needs, utilizing foreign technological information and R&D personnel, providing technological support for the company’s overseas plants, and so on.

The other reason is that Matsushita Electric has had a policy of facilitating R&D globalization. For example, its basic R&D policy is, “Technology for the benefit of mankind.” This policy was the powerful driving force behind the establishment of Matsushita Electric Institute of Technology Taipei Co., Ltd., which was established in response to a request by the Taiwan government that Matsushita Electric contribute to the development of technology-intensive industries in Taiwan. Similarly, Panasonic Singapore Laboratories Pte. Ltd. participates in a national project in Singapore to introduce information and communication technologies throughout the country.

As Matsushita Electric’s globalization of R&D has evolved, however, the answers to the following questions have changed: Who takes the initiative in establishing the overseas labs? Who has the authority and responsibility for managing them? What kind of management approach should be applied to them?

When the company established its overseas labs in the late 1970s and early 1980s, it was each parent lab—not corporate headquarters—that took the initiative. The parent lab exerted every possible effort to establish the overseas lab, and took the authority and responsibility for

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Table 1—Advantages and Disadvantages of Three Basic Approaches to Global R&D Management

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<tr>
<th>Approach</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tr>
<td>Top-Down</td>
<td>- Overseas R&amp;D projects consistent with the corporate strategy.</td>
<td>- Resistance from overseas labs.</td>
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<td></td>
<td>- Efficient use of R&amp;D resources.</td>
<td>- Increasing burden on parent managers.</td>
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<td></td>
<td>- Positive tension to prompt R&amp;D success.</td>
<td>- Neglects continuous improvement of overseas R&amp;D objectives and projects.</td>
</tr>
<tr>
<td>Bottom-Up</td>
<td>- Overseas R&amp;D projects consistent with the local needs.</td>
<td>- Inconsistency between overseas R&amp;D projects and the corporate strategy.</td>
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<tr>
<td></td>
<td>- Reduces burden on parent managers and staff.</td>
<td>- Difficulty in coordinating efforts of different labs.</td>
</tr>
<tr>
<td></td>
<td>- Provides motivation and flexibility to overseas labs.</td>
<td>- Possibility of overemphasizing existing research fields or projects.</td>
</tr>
<tr>
<td>Mixed</td>
<td>- Incorporates merits of top-down and bottom-up approaches.</td>
<td>- Difficulty in establishing this system.</td>
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<td></td>
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<td>- Considerable time and costs to make a decision or to coordinate decision-making process.</td>
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Figure 1.—According to studies on globalization of R&D, American multinationals tended to employ the top-down approach to their global R&D management, while European multinationals have shifted from the bottom-up approach to the mixed approach.
managing it. This organizational structure remained unchanged until 1994.

At this early stage, the parent labs had one common goal: to nurture their own overseas lab, recruiting superior local researchers and engineers, enhancing their capabilities, improving R&D facilities and equipment, formulating and refining intra-management systems, and producing the expected output as soon as possible. To achieve this common goal, each parent lab provided a part of all of the expenses for the overseas lab. Japanese managers, researchers and engineers were sent to the overseas labs to manage or support their activities.

For the planning of projects, there were different patterns depending on the nature of each individual project. In some projects, the parent labs decided the objectives and projects by themselves and assigned them to their overseas labs. They also monitored and evaluated progress. In other projects, the parent labs delegated total authority and responsibility for planning and control to top management at their overseas labs. In still other projects, the planning initiative was given to the overseas labs while the parent labs gave the final approval for the projects and evaluated progress.

It is evident that the above organizational structure and process was useful in nurturing Matsushita Electric’s infant overseas labs. However, it had one disadvantage: Because it was based on a one-to-one relationship between each parent lab and its overseas lab, it was difficult for the system to foster horizontal relationships among the overseas labs. Each parent lab basically had the authority and responsibility for managing its own overseas lab. Also, most of the human capital, funding, and information was allocated via a vertical relationship between each parent and its overseas lab; in other words, a top-down approach.

**Globalization Accelerates**

In the late 1980s, Matsushita Electric’s globalization of R&D proceeded to a new stage of growth, with many new overseas labs established. The company faced drastic changes—for example, a high yen exchange rate and increased competition from Asian countries. Its top management decided to globalize every aspect of the company’s operations in order to respond to these changes. To carry out this policy, the company not only transferred its production and sales units abroad, but also organized its regional headquarters in the United States, Europe and Asia (11, 12, 13). This policy included the globalization of R&D, and each parent lab was encouraged to establish an overseas lab. Eight overseas labs were founded between late 1980s and the early 1990s, some of which were merged or reorganized into new labs after 1996 (Table 2).

Even in this growth stage, the earlier organizational structure was kept; namely, each parent lab took the initiative in establishing an overseas lab and retained the authority and responsibility for managing it. However, two new features were added:

First, an international R&D center was established in 1988 to support the company’s globalization of R&D. This office was a staff department at the corporate headquarters; it provided various services for the establishment and management of overseas labs. Second, Matsushita Electric organized an R&D management subsidiary in the U.S. in 1987 (Panasonic Technologies, Inc. in Table 2), which supervised the company’s labs in the United States.

Then, the company decided to introduce a self-sustained management approach into these overseas labs. Local personnel were appointed to top management at most of these labs, and were delegated a wide range of authority; for example, planning projects, managing human resources and financing. According to one member of the R&D staff, such delegation was aimed at respecting the autonomy of each overseas lab, clarifying operational responsibility, and enhancing the efficiency of R&D activities (14).

The above organizational changes seem to tell us that Matsushita Electric’s overseas labs, especially the U.S. labs, had developed their own capabilities or resources, and the company’s global R&D management had shifted from the top-down approach by each parent lab to the bottom-up approach (Figure 2).

**New Management Structure**

Since 1995, Matsushita Electric’s globalization of R&D has changed drastically. In October 1995, a new top management position was created: “Executive Officer in charge of overseas labs.” One of the parent board members was assigned to this position. In addition, the company formed an overseas R&D office at the level of corporate headquarters to support the new executive. Although the office had its origin in the international R&D center of the previous growth stage, there was one significant difference: The overseas R&D office was organized as line management, while the international R&D center was a staff department.

More important, in order to manage the company’s overseas labs as one group, the executive officer and the office took over the authority and responsibility for managing the overseas labs from each parent lab. By such a transfer, the earlier organizational structure was abolished in favor of having the executive officer and the
<table>
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<tr>
<th>Area</th>
<th>Name</th>
<th>Year</th>
<th>Location</th>
<th>Field of R&amp;D</th>
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<tr>
<td></td>
<td>Speech Technology Laboratory</td>
<td>1981</td>
<td>Santa Barbara, CA</td>
<td>Speech recognition and synthesis.</td>
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<tr>
<td></td>
<td>Kyushu Matsushita Electric Research Laboratory</td>
<td>1991</td>
<td>Research Triangle</td>
<td>Satellite communications and FA/IA software.</td>
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<td></td>
<td>Boston Laboratory²</td>
<td>1993</td>
<td>Cambridge, MA</td>
<td>Laser-assisted manufacturing process technologies.</td>
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<td></td>
<td>Panasonic Information and Networking Technologies Laboratory³</td>
<td>1997</td>
<td>Princeton, NJ</td>
<td>Information, communication and networking.</td>
</tr>
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<td></td>
<td>Panasonic AVC American Laboratories, Inc.⁴</td>
<td>1996</td>
<td>Burlington, NJ</td>
<td>Digital television - video systems.</td>
</tr>
<tr>
<td></td>
<td>Digital Video Compression Corp.</td>
<td>1996</td>
<td>Universal City, CA</td>
<td>Compression for digital moving picture and image.</td>
</tr>
<tr>
<td>Asia</td>
<td>Matsushita Electric Institute of Technology Taipei Co., Ltd.</td>
<td>1981</td>
<td>Taipei, Taiwan</td>
<td>Natural language processing and computing technologies.</td>
</tr>
<tr>
<td></td>
<td>Panasonic Singapore Laboratories Pte. Ltd.⁵</td>
<td>1996</td>
<td>Singapore</td>
<td>Image and audio processing.</td>
</tr>
<tr>
<td></td>
<td>Panasonic European Laboratories GmbH⁶</td>
<td>1996</td>
<td>Langen, Germany</td>
<td>New generation AV systems and mobile communication.</td>
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</table>


overseas R&D office formally hold the authority and responsibility for managing all the company’s overseas labs, except for certain overseas labs under the control of the company’s regional headquarters, foreign subsidiaries and Japanese business divisions (15).

In 1997, the executive and the office defined the common mission for all the overseas labs:

To create new business and develop and market new products which satisfy both global business needs and local market conditions by utilizing the resources of an optimized research environment.

A slogan of operation was also adopted:

Autonomous Responsible Management & Solidarity through Global Collaboration.

As the slogan shows, the executive and the office have two major goals. The first, “Autonomy,” means to reinforce a self-sustained management and its responsibility at each of the overseas labs. To achieve this, they delegated to each overseas lab a wide range of authority in terms of planning projects, managing human resources, financing, use of expenses, selling output, and so on. They have also provided management training programs for overseas R&D directors and managers.

The second goal, “Solidarity,” is to prompt global collaboration among all the company’s labs, including the overseas labs. Needless to say, the new organizational structure makes it easier to establish such a system of collaboration. The global R&D meetings, which are held annually in Japan and overseas, are also useful. The presidents and vice presidents or directors from all of the overseas labs participate in these meetings, exchanging information and building human relationships. Also, a
technical exhibition displaying the output of overseas labs has been opened for the Japanese business divisions and laboratories. This exhibition helps the overseas labs collaborate with the Japanese labs as well as finance their expenses from the Japanese business divisions.

**Reconciling Decentralization and Centralization**

One might wonder that the goals of autonomy and solidarity include contradictory factors: decentralization and centralization. How is it possible to realize both goals at the same time? How should the company’s overseas labs decide which goal to emphasize?

The answers seem to lie in a device invented by the executive officer and the office: dividing the overseas R&D projects into “global projects” and “local contribution projects” (Figure 3).

The global projects are related to the R&D themes necessary to implement the company’s corporate strategy. Generally, these successes need contributions from, or collaboration with, the different overseas labs. Currently, such themes are defined as multimedia, mobile communication and multilanguage, which are derived from matching the current corporate strategies and the existing strengths of overseas labs.

For planning, there are several patterns. In some cases, the executive and the office coordinate existing projects among the different overseas labs. Sometimes, other departments such as Japanese business divisions, laboratories, foreign subsidiaries, or overseas labs, play such a role. In other cases, the overseas labs propose new projects and then the executive and the office approve them as global projects.

The local contribution projects relate to the R&D themes that contribute to the company’s local business or satisfy local market needs. For example, Matsushita Electric and its associated companies have increasingly transferred their manufacturing units to Asian countries. Thus, Panasonic Singapore Laboratories Pte. Ltd. provides technological support for the transferred overseas plants. Similarly, Matsushita Electric Institute of Technology Taipei Co. developed Chinese character input software for the local market. Unlike the global projects, each overseas lab has total authority and responsibility for planning and controlling these types of projects.

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**Figure 2.**—As the globalization of R&D has evolved, Matsushita Electric’s global R&D management has shifted from the top-down approach, to the bottom-up approach, to the mixed approach.

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<thead>
<tr>
<th>Year</th>
<th>1960'</th>
<th>1970'</th>
<th>1980'</th>
<th>1990'</th>
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<tr>
<td>Top-Down</td>
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<td>Mixed</td>
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<td>Bottom-up</td>
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**Figure 3.**—Matsushita Electric’s overseas R&D projects are divided into “global projects” and “local contribution projects”; every overseas lab is allowed to carry out both types simultaneously. Source: corporate document.
In the above division of overseas R&D projects, the most important thing is that every overseas lab is allowed to carry out both the global projects and the local contribution projects simultaneously. I believe that such a combination is the key to coping with both centralization and decentralization in the company’s global R&D management.

The change in Matsushita Electric's global R&D management since 1995 has already produced some of the expected results. For example, in the early stage, most of the company's overseas R&D expenses were provided by the parent labs. However, about 40 percent is currently covered by the overseas labs themselves through contract research from Japanese business divisions, laboratories, foreign subsidiaries, local research institutes, and so on. Also, there are projects which have been successful due to global collaboration among the overseas labs or between the Japanese labs and the overseas labs. Considering the changes in the management system and its results, we can assume that since 1995, the company's global R&D management has shifted from the bottom-up approach to the mixed approach.

Since 1995, Matsushita Electric’s globalization of R&D has changed drastically.

Sony: A Global Culture

As the transistor radio, “Trinitron” color TV, stereo “Walkman,” and so on demonstrate, Sony has globalized its operation based on advanced electronic technologies and their original commercialization. Recently, Sony has also globalized its entertainment businesses, notably music and movies. In 1996, Sony’s total sales were ¥5,663 billion, of which 70 percent represented sales in foreign markets. The number of employees was about 151,000, 57 percent of whom were outside Japan.

Sony established its first overseas R&D unit in San Jose, California in 1977, and the second in Basingstoke, United Kingdom in 1978. Since then, Sony has grown to maintain 11 major labs and other minor labs in foreign

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<tr>
<th>Area</th>
<th>Name</th>
<th>Year</th>
<th>Location</th>
<th>Field of R&amp;D</th>
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<tr>
<td></td>
<td>LSI Systems Lab</td>
<td>1994</td>
<td>San Jose, CA</td>
<td>Semiconductors.</td>
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<td></td>
<td>Sony Intelligent Systems Research</td>
<td>1991</td>
<td>San Jose, CA</td>
<td>Digital signal processing.</td>
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<td></td>
<td>Lab</td>
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<td></td>
<td>Advanced Video Research Lab</td>
<td>1994</td>
<td>San Jose, CA</td>
<td>Advanced TV systems.</td>
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<td></td>
<td>Research Labs San Diego</td>
<td>1991</td>
<td>San Diego, CA</td>
<td>Advanced broadcasting systems (e.g. set top box for digital satellite broadcasting)</td>
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<td></td>
<td>Research Labs Montvale</td>
<td>1990</td>
<td>Montvale, NJ</td>
<td>Telecommunications</td>
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<tr>
<td>Asia</td>
<td>Sony Precision Engineering Center</td>
<td>1987</td>
<td>Singapore</td>
<td>Software for production technology, computer, peripheral devices and components</td>
</tr>
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<td></td>
<td>Sony Systems Design International</td>
<td>1991</td>
<td>Singapore</td>
<td>Application software for CD-ROM</td>
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<td>Europe</td>
<td>Stuttgart Technology Center</td>
<td>1985</td>
<td>Stuttgart, Germany</td>
<td>Advanced broadcasting systems (e.g., set top box for digital satellite broadcasting)</td>
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<td></td>
<td>Basingstoke Products</td>
<td>1978</td>
<td>Basingstoke, U.K.</td>
<td>Broadcasting equipment</td>
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<td></td>
<td>Europe-Advanced Technology Division</td>
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<tr>
<td></td>
<td>Pencoed Digital Communication Division</td>
<td>1992</td>
<td>Pencoed, U.K.</td>
<td>Advanced broadcasting systems (e.g., set top box for digital satellite broadcasting)</td>
</tr>
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<td></td>
<td>Sony Telecom Europe</td>
<td>1990</td>
<td>Brussels, Belgium</td>
<td>Interactive information and telecommunication systems</td>
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Source: corporate document
countries (Table 3). As of August 1996, these labs employed about 500 R&D personnel (16).

Similar to Matsushita Electric, there are two basic reasons why Sony has globalized its R&D activities since the late 1970s. The first is to deal with problems that could not be resolved by the internationalization of manufacturing and sales alone. For example, the company’s earlier overseas labs were established to modify its exported products for local markets, to import advanced technologies from foreign countries, and to provide technological support for the company’s overseas plants.

The second reason is that Sony has a corporate history and culture that encourages globalization of R&D. For example, one of Sony’s main features is that the company was oriented toward internationalization immediately after it was established. In 1953, only eight years after its founding, top management presented a policy of “thinking and producing with global perspective, and making efforts to export its products” (17). To realize this, Sony organized its first foreign sales subsidiary in America in 1960. In 1972, Sony established a TV factory in San Diego, California—the first American overseas plant among Japanese TV manufacturers. Likewise, the company’s globalization of R&D started as a result of this strong orientation toward internationalization.

A Different Path

Although the above reasons are similar to those of Matsushita Electric, Sony seems to have taken a different path in terms of global R&D management (Figure 4). The company’s earlier overseas labs were, if anything, managed by the bottom-up approach. Such an intention is evident in the policy of the then-chairman: Sony’s foreign subsidiaries should not only implement manufacturing and sales, but also financing and R&D by their own efforts (18).

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Figure 4.—Sony’s global R&D management used the bottom-up approach until the early 1980s, but gradually shifted toward the mixed approach in order to realize a global synergy among the different labs.

Under this policy, one of the company’s foreign subsidiaries established its own two labs in the United States. In these labs, local personnel held several of the top management positions and took the lead in planning and controlling the R&D activities. Most of the researchers and engineers were also employed from the local labor market (18,19,20). Likewise, one of the company’s European subsidiaries started its own R&D activities under the leadership of a local director, researchers and engineers (21,22). Although the other earlier overseas labs were organized at the initiative of Japanese divisions or laboratories, and supported by them, most of the managerial authority and responsibility were given to top managers at these overseas labs. The parent divisions or labs also paid little attention to controlling overseas R&D activities.

Such a management approach had not only been applied to the company’s overseas R&D activities, but to its overseas manufacturing and sales as well. In the early 1980s, however, Sony’s top management noticed that this approach was not always beneficial to the company, resulting, for example, in inconsistent sales policy or pricing, increased unsold inventory at foreign subsidiaries, and conflict between the foreign operation and the company’s policy or strategy.

To solve these problems, the company’s top management decided to introduce a more top-down approach into the management of its overseas operations. First, in 1983, Sony reinforced the divisional organization’s system further and assigned to each Japanese division the authority and responsibility for managing its overseas manufacturing, sales and inventory (23). Moreover, Sony established a global “zone management system” in 1986. In this system, Sony’s worldwide market was divided into four major areas—Japan, America, Europe, and Southeast Asia—and regional headquarters were established in each area. The Japanese headquarters—that is, Sony Corporation—assumed the role of planner of the company’s global strategy. Foreign headquarters were expected to coordinate their regional operations under the global strategy (24).

Missions and Goals

Such a process was also applied to the R&D function. In 1988, Sony reorganized its existing Japanese labs and established a new Corporate Research lab consisting of six sub-laboratories. This new lab was given three missions, and the lab itself set six goals in order to accomplish these missions (25).
Missions

1. Set Sony's technological foundation; create the next-generation technologies and contribute to Sony's business.
2. Contribute to technology and science progress in the world.
3. Train talented individual researchers and engineers to a high level of ability.

Goals

1. Clear vision and policy.
2. Clear target and discrimination of strategy from the competitors.
3. Strategic selection and sharp focusing of R&D themes and fair evaluations.
4. Excellent researchers/engineers/managers in every field and in every class in which we are doing R&D.
5. Mobility of technology and human resources inside the worldwide Sony.
6. Internal and external globalization.

The "external globalization" goal means transferring the R&D function abroad and reinforcing the existing overseas labs. In fact, most of the company's major overseas labs have been established since 1988 by green-field investment or reorganization of existing overseas labs. In addition, we should note that the goal of R&D globalization was formally given to the company's Japanese labs. As mentioned, the earlier goal was given to the foreign subsidiaries. However, since 1988, the Japanese labs have also had to globalize their activities by their own efforts.

This change of policy influenced another aspect of Sony's overseas R&D activities. First, the purpose was redefined. As described, the earlier overseas labs aimed to modify exported products for local markets, import advanced technologies from foreign countries, or provide technological support for the company's overseas plants. These goals were, if anything, marginal in terms of R&D.

In their place, Sony established the following goals for its overseas R&D: Create new business to meet local needs; apply more advanced expertise in the local area than elsewhere; establish a global human and information network; contribute to the local society.

Second, the global R&D management system has been changed. In the earlier stage, although the company's overseas labs were established by each of the foreign subsidiaries and Japanese business divisions or labs, they had implemented their activities autonomously and independently. Consequently, Sony did not fully realize a global synergy among the different labs (26).

Sony appears to derive two major benefits from its zone CTO management system.

Zone CTO Management

To resolve this problem, Sony decided to introduce the zone management system into the R&D function by establishing regional R&D head offices in the United States and Europe in 1994. The U.S. head office is Research Laboratories, and the European role was given to Stuttgart Technology Center (see Table 3). Sony also appointed one of the parent board members to Chief Technology Officer at the U.S. office and transferred him to the site. In the European office, a local person took this position.

Sony calls this system the "zone CTO management system" (25), as shown in Figure 5. In this system, the CTO at the Japanese headquarters has responsibility for managing the company's worldwide R&D activities and formulating the global R&D strategy on the basis of corporate strategy. CTOs at the U.S. and European head offices are responsible for coordinating their own regional R&D activities and formulating the regional R&D strategy.

Also, in order to maintain consistency between the global strategy and the regional strategy, global R&D meetings have been held twice a year—once in Japan and once overseas (27). Through these meetings, the three CTOs decide what to do in each region, how to collaborate.

Figure 5.—In 1994, Sony introduced the zone CTO management system in its global R&D management. By introducing such a system, Sony is able to take advantage of a global synergy among the different labs and reduce coordination costs (25).
among the regions, how to allocate R&D expenses regionally, and so on.

Sony appears to derive two major benefits from this zone CTO management system. The first is taking advantage of a global synergy among the different labs. In fact, Sony has already implemented the global R&D projects, which are based on an international division of labor among the different labs (28). The second is reducing coordination costs and gaining flexibility. For example, if the above global projects are planned and implemented with rules and procedures, companies would incur huge coordination costs in terms of time and money. However, the company emphasizes human relationships and teamwork among the three CTOs rather than rules and procedures. Therefore, Sony should be able to reduce coordination costs and gain flexibility in its global R&D management.

Furthermore, Sony’s overseas labs never lose their autonomy, even under the zone CTO management system. For example, each overseas lab is given the authority and responsibility for planning and controlling its own projects to a great degree. Also, each lab can raise its expenses directly from the Japanese headquarters, divisional companies, and foreign subsidiaries. Sony recognizes that such an autonomy is indispensable if its overseas labs are to implement projects suitable for local market needs.

Four Actions

Because Matsushita Electric and Sony have just begun to introduce new management systems and practices into their global R&D management, the systems and practices may not be very sophisticated. However, it is clear that both companies are moving toward the mixed approach.

This approach is the most beneficial for global R&D management; however, it is very difficult to establish because it includes contradictory factors: centralization and decentralization. As Bartlett and Ghoshal suggested (29), coping with both centralization and decentralization is the most challenging goal—not only for global R&D management, but for international business management as well. Most companies and academic researchers still do not know how to realize this goal in a practical way.

Several techniques have been provided for global R&D management, especially for the mixed approach: allocating specialized tasks or projects among different labs, setting various R&D committees or meetings, use of information and communication technologies, and so on (8,9,30,31). However, the approaches taken by both companies seem to go beyond this, as discussed below.

1. Assignment of R&D tasks or projects.—By assigning specialized tasks or projects among different overseas labs, companies are not only able to avoid R&D duplication and uneconomic product differentiation, but they can give each lab autonomy within a particular area. Indeed, such an assignment may produce a temporary advantage for managing R&D labs that are dispersed around the world. In the long term, however, it carries possible disadvantages similar to those of the top-down approach: namely, refusal by overseas labs of the assigned tasks, a decline in motivation and flexibility among foreign R&D personnel, and neglect of continuous improvement on the part of parent R&D managers (see Table 1). Matsushita Electric does not do this; rather, it gives every overseas lab the opportunity to simultaneously implement two types of projects: decentralized projects and centralized or quasi-centralized projects. Moreover, the company seems to believe that even if the former projects cause wasteful duplication of effort, the cost will not exceed the benefit from respecting each overseas lab’s autonomy.

2. R&D committees or meetings.—It is obvious that the more committees and meetings, or the more participants there are, the greater the costs that companies will have to bear. Moreover, as the business cycle and product development lead time are shortened by intensive competition, companies will not be able to tolerate a long and costly coordination process in their global R&D management. Sony’s approach seems to avoid this problem successfully. As the zone CTO management system shows (Figure 5), the company gives three key players major authority and responsibility, and tries to cope with both centralization and decentralization in its global R&D management under their leadership. Given the costs of coordination and the need for making decisions quickly, small teams of top R&D managers may be more appropriate for global R&D management than a multitude of committees and meetings.

3. Information and communication technology.—Both Matsushita Electric and Sony utilize various electronic tools to facilitate global R&D communication, including computer networks, electronic mail, database access, and file transfer. However, as De Meyer, and McDonough and Kahn, point out (32,33), information and communication technology will never be a successful tool for global R&D management without the support of non-electronic communication techniques—face-to-face contact, and a management that encourages collective goals, communication and collaboration among different labs, and so on.
Both companies employ such ordinary techniques. For example, Matsushita Electric emphasizes a common mission for all overseas labs and promotes the goal of global collaboration among different labs. Also, the company’s researchers and engineers, including foreign personnel, frequently contact one another via various electronic tools, or through ad hoc business trips; the top managers at each overseas lab exchange information in person at the formal “global R&D meetings” and via electronic tools.

Similarly, Sony redefined the purpose of its overseas R&D towards higher-level activities, such as “establishing a global human and international network.” The company has also provided communication opportunities for management and researcher/engineer levels respectively. The “global R&D meetings” under the zone CTO management system are useful in stimulating communication among top R&D managers. Sony has also held the “Sony Research Forum” once a year in Japan since 1991, at which all R&D personnel, including overseas members, not only present their technological reports or discuss technological problems but also get the opportunity to build human relationships. Again, we should note that both companies pay attention to the coordination costs that accompany these ordinary communication techniques.

4. Change of organizational structure.—This case study shows that the mixed approach to global R&D management requires a change of organizational structure. Recent studies on global R&D management and international business seem to neglect the importance of this. The importance of a change of organizational structure is manifest in Matsushita Electric’s case. For example, the company’s earlier overseas labs had been managed by each parent lab, and it was difficult to build horizontal relationships among the overseas labs. To resolve this problem, Matsushita Electric established the new organizational structure for its global R&D management, described earlier. If this new structure, with its “Executive Officer in charge of overseas labs” and an overseas R&D office, had not been established, the company’s global R&D management would not have shifted toward the mixed approach.

On the other hand, Sony’s global R&D organization took on a structure similar to a matrix after the formulation of the zone CTO management system. For example, the company’s U.S. Research Laboratories and its sub-laboratories are formally under the control of a local subsidiary, while they are also managed under the zone CTO management system. The CTO at the American office substantially reports directly to these two bosses.

I by no means intend to suggest that either company’s structure is more efficient or suitable for global R&D management. Probably, the structures are different because of the nature of each R&D project, corporate culture and industry. What I wish to indicate is that successful global R&D management needs a change of organizational structure, and that change may be more important than a change of organizational process or of corporate culture.

Finally, we can expect future studies to focus on examining new management systems and practices for successful global R&D management on the basis of more diverse companies in terms of nationality or industry. Their outcome should be helpful to those practitioners who worry about how to manage their R&D labs dispersed around the world.

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References and Notes


11. “Global Kigyo e Kasso, Matsushita-Denki to Matsushita-Denki no Gappai” (Towards a global company: merger of Matsushita Electric...
Sony had massive unsold inventory at its foreign sales subsidiaries in 1982. Consequently, the company’s profitability also declined drastically. At that time, this incident was called “82-year’s shock” or “Sony shock”.

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