

A Study of the Performance of the Japanese Companies' Overseas-based R&D

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1. Outline

In recent years, overseas bases for R&D activities of Japanese firms are increasing. This research has been conducted from a viewpoint of what achievements have been made by R&D activities at overseas bases (hereinafter simply called "the overseas R&D"). The conventional researches concerning the overseas R&D were made mainly to analyze the distribution of the Japanese laboratories established overseas, for example, what industries had their laboratories in what countries. The present research is the first attempt to see how Japanese firms evaluate the achievements of the overseas R&D conducted at their bases substantially for 5 to 10 years.

Since few findings were available on the overseas R&D, at first, the actual situations of the overseas R&D in the electrical machinery manufacturing industry and the pharmaceutical industry were analyzed, and the performance of the overseas R&D was evaluated. Furthermore, the policy implications were searched and the limit of the present research was referred to.

2. Research method

Case studies were conducted with large firms who make the overseas R&D efforts in the electrical machinery manufacturing industry and the pharmaceutical industry. After literatures and statistics were investigated, the representatives of the firms were interviewed. For the survey by interviews, from April to October, 1995, persons (mainly department manager class) in charge of the R&D management division of each head office of 19 major firms in the two industries of electrical machinery manufacturing and pharmaceutical were mainly interviewed. Mainly large firms were surveyed, and the overseas R&D bases mainly controlled by the R&D management division of each head office were surveyed. (On the contrary, the overseas R&D bases controlled by respective divisions of the firms not covered by the present survey are considered to be mostly engaged in the improvement of products and the re-designing tailored for local markets.)

In the interviews, the following questions were mainly asked.

1) Outline of overseas R&D (regions and scales of bases, motives for establishment, etc.)

2) Subjective evaluation by the person in charge of R&D management of the firm, concerning the performance of overseas R&D

"Relative evaluation of performance in comparison between the overseas R&D base and the Japanese R&D base respectively conducting the same kind of R&D of the firm" was asked to be stated in reference to the following six items:

i) Production of research papers, ii) Obtainment of intellectual properties such as patents, iii) Creation of ideas, iv) Development of new products, v) Speeds of achievement of technological goals, vi) Flow-on effects (Note)

Note: The performance in this case is used in the sense of achievements of individual researchers or organization. The contents of the overseas R&D were asked by distinguishing the efforts mainly in the research stage from the efforts mainly in the development stage. The research stage refers to the stage where research is conducted without industrialization and commercialization expected in the near future, and the development stage refers to the stage where research is conducted with industrialization and commercialization expected in the near future. For the research stage, the development of new products was excluded from the questions, and for the development stage, the production of research papers was

excluded.

3. Main findings

(1) Analysis of actual situations

1) The overseas R&D bases are small in scale (Fig. 1). Bases with 39 or less researchers account for more than three fourths.

2) As for the motives for establishing R&D bases, since both the industries face severe technological innovation competition, overseas R&D bases are mostly established to acquire overseas technological development potentials.

3) The overseas R&D bases adopt few Japanese researchers. Most researchers are local staff.

4) As for the countries where R&D bases are established, more than one half of the bases of the electrical machinery manufacturing industry are located in USA. Many of the bases of the pharmaceutical industry are located also in USA. USA is followed by Great Britain and Germany.

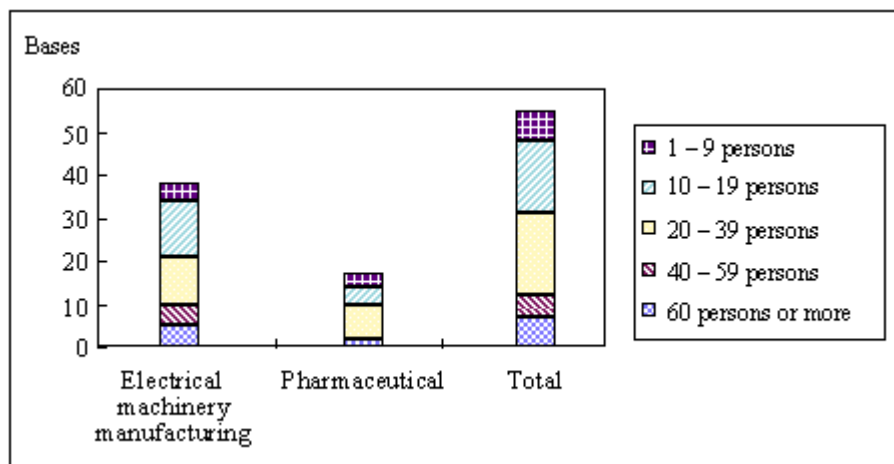


Fig. 1 Number of researchers of R&D base

5) Especially in the pharmaceutical industry, there were many firms who felt a relative advantage of R&D cost in foreign countries compared to Japan.

(2) Evaluation of performance

1) Difference in the R&D stages

The result was "the performance of the overseas R&D mainly in the research stage is more excellent than that at the R&D base of the same kind in Japa", while "the performance of the overseas R&D mainly in the development stage is less excellent than that at the R&D base of the same kind in Japa" (Fig. 2).

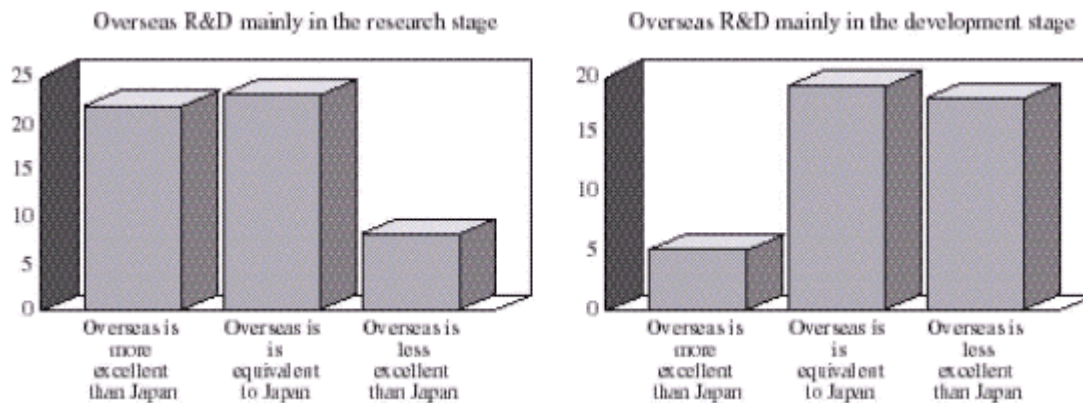


Fig. 2

2) Features of respective items

In the creation of ideas, the performance at the overseas R&D bases is more excellent, and in the patents and the development of new products, the performance at the R&D bases in Japan is more excellent.

(3) As secondary data, the percentage of the papers prepared at the overseas R&D bases in all the papers prepared in foreign languages (mainly English) by the firms rose from 2.8% in 1984 to 6.6% in 1994.

(4) The synergism due to the R&D conducted in both overseas and Japan cannot be seen.

4. Discussion on the causes

The causes for the difference of performance between the research stage and the development stage were discussed in reference to the matters observed in literatures, etc.

(1) Causes for the higher performance in the research stage in overseas:

- 1) The overseas research level is higher in the area concerned.
- 2) Competent researchers are abundantly available and likely to migrate.
- 3) Foreign people are educated to respect creativity more than Japanese people.
- 4) Direct communication with local research firms allows information to be obtained.
- 5) Overseas R&D bases are highly specialized in organization.

(2) Cause for the lower performance in the development stage in overseas:

In the development stage, the cooperative work with the other divisions such as production, planning and marketing of each firm and with the subsidiary companies engaged in experimental manufacture, parts supply, etc. is important. However, the cooperation between those organizations existing in Japan and the overseas R&D bases cannot be made sufficiently as a major cause for the lower performance.

5. Policy implications

Most of the interviewed firms think the overseas R&D will grow further also in future. If the above results express the general trends of overseas R&D of Japanese firms, the policy implications are considered to include improving the foundation for cooperation with overseas research, enriching the basic research in Japan, improving the domestic R&D system and taking care of international friction.

6.Limit and remaining problem

The present survey covered two industries, mainly large firms and overseas R&D bases directly controlled by head offices. More bases are engaged in technologically advanced efforts such as basic research and development of element technologies, than generally imagined for overseas R&D. Therefore, the results are limitative within the scope of the survey.

Larger scale questionnairing is being conducted by Science and Technology Agency for the performance of overseas R&D by Japanese firms, based on the method adopted in the present survey. It is expected that the overseas R&D in other industries or for smaller scale development and improvement controlled by respective divisions of firms will be able to be analyzed based on the results.