

**NISTEP RESEARCH MATERIAL & DATA REPORT No.-49**

**(NISTEP-BETA JOINT STUDY)**

**A COMPARATIVE STUDY ON  
R&D MANAGEMENT  
BETWEEN  
JAPANESE AND FRENCH COMPANIES**

**May 1997**

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# **I Objectives and Executive Summary**

## I-1 Objectives

This comparative study was done as a joint study between National Institute of Science and Technology Policy of Science and Technology Agency (Tokyo, Japan ; hereafter NISTEP) and Bureau d'Economie Théorique et Appliquée of Louis Pasteur Université (Strasbourg, France ; hereafter BETA) under the Memorandum of Understanding (MOU) of both institutes. This study is based on similar surveys which were conducted by both institutes in their respective countries.

In the current business environment, destabilizing factors, which make business ground of manufacturing firms unstable, such as

- downturn in profits brought by saturation of gross demand in market and increment of number of competing firms in the same market,
- drastic change of shares of products in very short time period brought by shortening of product life-cycle times and diversification of products

have been growing rapidly and these growing factors necessarily induce firms to push their research and development (R&D) activities to seek their future survival. Tight competitions of technology development requires each firm to manage its R&D activities in the most efficient manner, and it is inevitable for the firm to construct an R&D strategy to support effective deployments of R&D resources. Generally, when firms become large, coordination between related R&D activities increases multiplicatively. When firms try to perform their R&D activities while adhering to their firm's coherent management guidelines (that is the R&D strategy), a coordinating division in the company becomes a real necessity.

The prior NISTEP study <sup>note 1)</sup>, based on the above understanding, is intended to demonstrate the fact that

**most firms have a specific division which is exclusively in charge of firm's strategy of R&D (hereafter, we call this division as "R&D strategy division")**

in Japanese firms and also to clarify

**characteristic differences between a group with this division and a group without the division**

with regarding existence of this division as an index of implementation of strategic

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note 1) NISTEP conducted a survey from December 1991 to January 1992 with a questionnaire (see Annex 1) of 38 questions on (strategic) management of research and development (R&D) in 149 Japanese firms (mainly manufacturing and with annual expenditure of 1990 on R&D exceeding 10 billion yen). 126 firms answered (response rate 84.6%) and the results were reported in NISTEP REPORT No.29 "THE PRESENT STATE OF JAPANESE CORPORATION'S STRATEGIC R&D MANAGEMENT SYSTEMS (December, 1993)" [1].

R&D management.

As a result, it is showed that **the R&D strategy division is rather familiar among Japanese firms because 65% of the responded firms answered that they had such a division**. Also classification of data according to whether an R&D strategy division exists or not has cleared up characteristic differences of trends of R&D strategy and ways of R&D management between the two groups such that

- **firms with an R&D strategy division more aggressively try to construct global networks through participating in consortia**
- **firms with an R&D strategy division try more to improve employment conditions of researchers and try more to give freedom in order to stimulate innovative ideas.**

Trends in R&D strategies or ways of R&D management based on those strategies are different between countries which have different histories of economic development and social backgrounds. It appears important from this point of view to make a comparison of firms' R&D management between countries. NISTEP sought partners for joint study, with BETA responding. NISTEP and BETA agreed to make a comparison of R&D management of firms between Japan and France based on surveys using NISTEP's questionnaire.

Based on the prior NISTEP study, we took the followings as main objectives of this study.

① **to investigate answers of questions [Do also French companies adopt "an R&D strategy division" ?], and [Is influence of such an autonomous division on R&D management the same order of magnitude as in Japanese firms ?]**

and through investigating this

② **to clarify differences in ways between Japan and France of R&D management and trends in R&D strategies of firms.**

BETA modified the questionnaire of NISTEP by adapting questions to the French context and conducted a survey with it from June to August 1994 with 106 French firms (headquarters are located in France) selected on the basis of number of employees and amount of turnover, obtaining 31 effective responses (response rate 29.2%). As a result, annual expenses on R&D of these companies are larger than 80 MFF. On average, the Japanese responded firms are larger than the French firms in number of employees and amount of turnover.

In section II of this report, we describe the surveys of both countries. In section III, we compare both survey results question by question to clarify differences of R&D management between Japanese and French companies. However because of problems of translation from the NISTEP questionnaire to French one through an English version and other reasons, we have several pairs of questions with slightly different contents and therefore for these pairs of questions it is difficult to make direct comparisons. For Japanese data, we use not only the same data as is used in NISTEP REPORT No.29 but also other data which was not used in the report. We rearranged the data of some questions of the Japanese survey from the original in order to compare it with results from the French survey, as well as omitting data concerning questions which were not used in the French survey. In section IV, we summarize characteristic differences in trends in R&D strategy and ways of R&D management between Japanese and French companies based on the comparisons in section III and consider backgrounds and factors in which these differences originate.

Here we need to note in advance that this comparative study is not intended to compare between Japanese and French firms as a whole, because the numbers of responding companies of both countries are very different and distributions of the responding companies over industry types of respective countries are slightly different from each other. However we may say that this study is for rough comparison of trends in R&D strategy and ways of R&D management **between Japanese big firms and French big firms**. Again, as we described above, we have several pairs of questions which are difficult to directly compare, thus we need to note that this study is not a very systematic one.

## **I-2 Executive Summary**

### **I-2-1 Existence of an R&D Strategy Division and Its Influence**

Concerning adoption of an R&D strategy division, **58% of the responded French firms answered that they have "an R&D strategy division", while about 65 % of the Japanese responded firms answered that they have the division.** {see JQ.5(Figure J-3(a))-FQ.6(Figure F-3(a))}. Taking the fact that the responded Japanese firms are larger than the French firms and therefore the Japanese firms have more necessity of having the R&D strategy division (a coordinating division through a company), we may say as follows,

<p><b>①-1. The R&amp;D strategy division seems to be a rather popular division also among French companies. ( see A-1. of IV-1.)</b></p>
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This division is generally thought to coordinate growing complicated R&D activities of a company with enlargement of size of the company and to contribute to efficient and effective deployments of limited research resources. Above result shows that significant rates of the firms of both countries have already introduced this coordinating division in order to survive the very highly competitive business environments.

This R&D strategy division mainly belongs to the president or the board of directors in both countries {see JQ.5(Figure J-3(b)) - FQ.6(Figure F-3(b))}, therefore it has a large influencing power on R&D activities within the firm. Actually, the companies with this division in both countries set up overall R&D strategies or research plans for the whole company at higher rate than the companies without the R&D strategy division {see JQ.7(Figure J-8(a)) - FQ.12(Figure F-8(a)) and JQ.6(Figure J-9(a)) - FQ.11(Figure F-9(a))}.

We are able to extract the following functions or roles of the R&D strategy division by summarizing characteristic points on R&D management of companies with the R&D strategy division compared with those without the division for their respective countries (see Table 5. in IV-1.).

**In Japanese firms,**

- J- ① to stimulate aggressive deployments of R&D activities in diversified fields**
- J- ② to support firm's R&D activities in organized ways while balancing opinions from each division**
- J- ③ to support improvement in efficiency of investment in R&D and reduction of R&D costs**
- J- ④ to support improved treatment of researchers in firms and to respect researchers' freedom for innovation**
- J- ⑤ to support investigation of various internal and external environment factors for R&D activities.**

**In French firms,**

- F- ① to stimulate aggressive deployments of R&D activities in diversified fields**
- F- ② to support firm's R&D activities in organized ways while balancing opinions from each division**
- (F- ②' the power of influence of sales and marketing divisions grows weak and other divisions increase in power)**
- F- ③ to support respecting researchers' freedom for innovation**
- F- ④ to support investigation of various internal and external environment factors for firm's R&D activities**



From above, with regards to the influence of the R&D strategy division on R&D management in French companies, we may summarize as below.

**①-2. Influence of the R&D strategy division within French firms is quite similar to the Japanese case, such as stimulating aggressive deployments of R&D activities, balancing opinions from each division, supporting investigation of various internal and external environment factors and respecting researchers' freedom. Also, for French firms with an R&D strategy division, the power of sales and marketing divisions to influence R&D activities tends to become weak . ( see A-2. of IV-1.)**

From these ①-1. and ①-2., we may see that both Japanese and French firms are making efforts to manage efficient and effective deployments of their R&D resources by utilizing a company wide coordinating division in order to deal with a highly competitive business environment. Even in the companies that answered that they did not have such a division, other divisions of the company may have the same roles as those of the R&D strategy division. In the French firms with an R&D strategy division, a trend towards weakening of the influence of sales and marketing divisions can be seen. This could be understood as the R&D strategy division has substituted for some of the roles of sales and marketing divisions (i.e. collecting information of sales situation of their products and their competitiveness and analyzing it / making approaches to other divisions on the basis of its own analysis).

### **I-2-2 Characteristic Differences in Ways of R&D Management between Japanese and French Companies**

The firms have to draw on their resources for their R&D management in order to deal with destabilization of the business environment such as drastic changes of shares of product within a very short time period brought by appearance of new technologies in current tight competitions of technology development. In this common situation of business to all developing countries, the way how to deal with it depends on social backgrounds and history of economic development of each country.

We found several differences in ways of R&D management etc. between Japanese and French companies (including confirmation of results of other studies) in this comparative study. In IV-2., we summarize the main differences between Japanese and French firms and consider the backgrounds and factors in which these differences originate. Due to this, we could pick up differences of / national R&D systems / firms' business competition environment / firms' ways to raise operation funds / mobility of

employment between companies (or education system for employees) / between both countries as main backgrounds and factors.

**(1) Differences originate in Differences of National R&D Systems**

Difference of attitude towards basic research between Japanese and French firms is thought to be mainly relating to differences of national R&D systems between both countries.

**②-1-1. Japanese firms are engaging in basic research more aggressively than French firms are. {see JQ.22(Figure J-4) - FQ.7(Figure F-4) and B-1. in IV-2.}**

Because of the clear role-sharing aspect of the national R&D system of France, with the government sector for basic research and the private sector for application research and development, French firms generally are not so interested in engaging in basic research. In Japan by contrast, contribution of the government sector to basic research has been a small portion and the private sector has been leading national R&D activities, accordingly Japanese firms have been engaging in basic research to some extent.

In France, economic recovery from the damage of World War II was achieved while maintaining a relatively well-balanced R&D system (between basic research and application (or development)). Historically the government of France has attached much importance to basic research and has led big national projects. However it has been recognized that an over-concentration of basic research in the government sector impedes diffusion of technological know-how to various industries <sup>note 2)</sup>. Other studies in France [2][3] show that basic research in French firms is not so active as in Japanese firms. Under these circumstances, the big consortia-type R&D programs for high technology development, which the European Union has been promoting so far, have been supporting the R&D activities of not only French firms but also European firms. This is the basic background of the following result.

**②-1-2. French firms feel more necessity to participate in international consortia and they are more aggressively participating in them than Japanese firms. {see JQ.14(Figure J-14(a),(b)) - FQ.13(Figure F-14(a),(b)) and B-4. in IV-2.}**

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note 2) Since 1980's it has been recognized that R&D activities (especially basic research) of the private sector have not been sufficient (this recognition has been shared with other western European countries), with the government making much effort to support them. Since the last ten years the European Union has been emphasizing the growing opportunities of big R&D programs note 2) to be continued

for high technology development such as the BRITE-EURAM program (for new materials and manufacturing systems) or the ESPRIT program (devoted to network technologies). These programs give opportunities to some companies to develop risky R&D with other partners that they can not realize by themselves. Most of these R&D programs are quite ambitious including sometimes more than 10 partners with a total amount of fund exceeding 100 Millions of French Francs. In order to be included in such a program, in addition to pure scientific considerations, the research is expected to have pre-competitive character (far from marketability considerations). Also, participating companies are required to provide their own investment funds (generally the same amount as the EU fund received). Compared with Japan, the European R&D programs provide new important sources of funding that assist national and private companies investment efforts. end of note 2)

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On the contrary, Japan has a history of rapid economic growth after World War II, which was led strongly by manufacturing industries with a simple strategy of "producing better things with lower prices and shorter periods" using a basis of imported technologies. In this growth period, Japan could not afford to pay much attention to basic research. This Japanese way of industrial growth has developed so-called "simultaneous engineering" with close contact between the design (or engineering) division and the production division. This engineering method is very useful in improving products with shorter periods and lower prices. However, the contribution of Japan to creation of new technologies has been very small compared with the US or European countries. Actually, Japanese ratio of investment in basic research versus total R&D investment has been relatively small. In addition, the government R&D expenditure versus national total R&D expenditure has been small compared with several European countries or the US, which means national R&D activities of Japan have been led mainly by the private sector (see B-1. in IV-2.). In this circumstance, Japanese firms necessarily have been engaging in basic research with keeping main R&D activities on application research or development.

Because Japan has often been accused of "a free ride on technology imported into Japan" -especially in late 1980's- and because in most of the manufacturing technology areas Japan has already caught up the US or European countries, it is recognized that the present national R&D system of Japan has to be changed from one based on application (or development) to a well-balanced one incorporating more basic research <sup>note 3)</sup>.

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note 3) see next page

note 3) In recent years, because of the globalization of industry and intensive economic competitions and because of high wages of labor in Japan, people of Japan have been anxious that the hollowing-out (to mainly Asian countries) of industry would rapidly proceed, producing a rise in the unemployment rate. In addition to this, people in Japan have started to recognize that the unprecedented speed of aging of the population will cause a loss in social vitality in the near future. On the basis of this recognition, the Japanese parliament unanimously enacted "Science and Technology Basic Law" in November 1995, which aims to promote the nation's R&D activities creating new technologies or challenging unknown fields in science and technology. The Japanese government set up its "Science and Technology Basic Plan" in July 1996 to stimulate the actual policies to promote creative R&D activities, which includes construction of a new R&D system, expansion of various types of funds, improvement of R&D infrastructure and education system and, so on. end of note 3)

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## **(2) Differences originate in Differences of Firms' Business Competition**

### **Environment**

Business competition environment of Japanese firms is much harder than US or European firms because Japanese firms are generally competing with many internal competitors in the same business field in addition to overseas competitors. In tight business competitions, the emergence of new technologies sometimes changes a company's share of the market drastically within a very short time period, which makes Japanese companies much sensitive to technology trends. The problems that Japanese firms confront is anticipation of the consumer's needs for the next few years and the commitment of their R&D resources in accordance with this anticipation.

Based on this background, Japanese companies accordingly have the most interest in "limiting which research field are to be invested in", when they consider improvement in efficiency of R&D. Therefore, in their setting-up process of R&D strategies, "importance of technology for the future of company" and "market needs" become the most important factors.

#### **②-2. In Japanese companies,**

**a. "limiting which research fields are to be invested in" is thought to be the most important matter to improve efficiency of R&D.**

**{see JQ.12(Figure J-21(b)) - FQ.25(Figure F-21(b)) and B-8. in IV-2.}**

**b. "importance of technology for the future of company" and "market needs" are the factors most seriously considered in their setting-up process of R&D strategies. {see JQ.19(Figure J-7(a)) - FQ.10(Figure F-7(a)) and B-2. in IV-2.}**

### **(3) Differences originate in Differences of Firms' Ways to Raise Operational Funds**

Main financing source of French firms is the money market, which means that the large part of capital is coming from financial assets such as actions or bonds. This financial structure gives stockholders a great influencing power on management of companies. In France, because of people's understanding that firms are owned by stockholders and that they decide the management direction (this may be the same in other European countries or US), the PDGs manage their companies on behalf of stockholders and make their best effort to improve profitability within a limited short time period. The PDGs are always pressured for cost effective management of their business and they need to show the propriety of their investment plans with objective data. By contrast, the financial structure of Japanese firms is generally based on credits coming from banks and financial institutions. Because most of large stockholders are related companies or banks, the influence of other stockholders is not very large.

It is understood that the following results for the French firms with respect to requiring improvement in efficiency of R&D investment come from the financial structure of French firms.

#### **②-3-1. French companies more seriously consider**

##### **a. effort of connecting R&D results with productions (rigorous evaluation of marketability of the research themes)**

{see JQ.12(Figure J-21(b)) - FQ.25(Figure F-21(b)) and B-8. in IV-2.}

##### **b. evaluating efficiency of investment in R&D activities**

{see JQ.9(Figure J-22) - FQ.27(Figure F-22) and B-9. in IV-2.}

**than Japanese companies.**

As a whole, French firms have more centralized system for senior management matters (including R&D management) than Japanese firms. Their main concern is to improve profitability of business within a short time period. Actually, "cost competitiveness of products" is the second place of serious consideration factors {see JQ.19(Figure J-7(a)) - FQ.10(Figure F-7(a)) and B-2. in IV-2.} at the time of setting up of their R&D strategies. Thus in French firms, the sales and marketing divisions, which have much information on company turnover and cost competitiveness of products, have a large influence on R&D management, with the following result :

#### **②-3-2. In French firms, the R&D division is in most frequent contact with the sales and marketing divisions.**

{see JQ.17(Figure J-11(a)) - FQ.22(Figure F-11(a)) and B-3. in IV-2.}

In the case of Japanese firms, influencing power of stockholders is not so large as in the French firms' case, which make top management people of Japanese firms have more freedom from stockholders than French firms. Also there exists the understanding that firms are for the firms' employees. They have interests in future growth of their firms as well as in improvement of profitability within a short period (see (2) **Differences originate in the Differences of Firms' Business Competition Environment**). Taking the fact into account that competitions in technology development have been becoming opaque because of the ending of the catch up process of Japanese manufacturing industries in relation to the US or European industries and that possibility of drastic change of market shares of their products has become large, (which comes from shortening of product life-cycle time), top management people of Japanese firms necessarily have strong interests also in R&D activities which produce new technologies. This is the origin of the impetus for Japanese firms' engaging in basic research (see ②-1-1.), with the following results :

**②-3-3. In Japanese firms,**

**a. setting up of R&D strategies is done with being important technologies for the future as a main axis** (see ②-2. b.) (in French firms, the main axis is "capability of R&D division".)

see JQ.19(Figure J-7(a)) - FQ.10(Figure F-7(a)) and B-2. in IV-2.}

**b. position of the head of R&D division has been becoming higher in the hierarchy and cases of top management people being the heads of R&D division can be often seen**

{see JQ.13(Figure J-15(a),(c)) - FQ.19(Figure F-15(a),(c)) and B-9. in IV-2.}

The aggressive attitude of Japanese companies to move into new business areas has been influenced also by the fact that after growing by acquisition of foreign technologies, they could create massively new business areas by themselves.

**(4) Differences originate in Differences of Mobility of Employment between Companies (or Education System for Employees)**

In management of a company, we often need to take care of mobility of employees between the companies. Mobility of people is closely related to employment system and education system for employees and to ways in how people obtain their capabilities.

In Japan, companies have been maintaining the life-long employment system (it is said that this system is giving way recently, however) and it is generally recognized that employees have to change their specialties when undergoing personnel rotation within

the same companies. Thus the result shown below for Japanese companies is quite natural.

**②-4-1. The R&D division of Japanese firms is most frequently in contact with the manufacturing division.**

{see JQ.17(Figure J-11(a)) - FQ.22(Figure F-11(a)) and B-3. in IV-2.}

This has been a main source of the simultaneous engineering system, which has been the basic force of growth of Japanese companies.

We have large differences between the two countries in the company education systems for employees and in the ways as to how people obtain further knowledge. In the case of Japanese firms, people have a kind of consensus that firms should educate or train their employees (including researchers) over a long time. By contrast in France, researchers and engineers are mainly the elite (see B-2. in IV-2.) and in seeking better conditions they often change the companies for which they work, which means that the mobility of researchers and engineers between companies is larger than in Japan (see B-2. in IV-2.). However the mobility within a company is not as large. With this in mind, the following result can be stated.

**②-4-2. French firms tend to place researchers and engineers in the same personnel stream as administrative staffs, while Japanese firms give specific career tracks to researchers or engineers.**

{see JQ.34(Figure J-16) - FQ.20(Figure F-16) and B-6. in IV-2.}

In French companies, they do not treat researchers and engineers with giving specific career tracks. By contrast, Japanese firms try to improve positions of excellent researchers and engineers and to increase their loyalty to the firms by providing specific career tracks.

In Japan, it is very difficult to obtain capable persons from outside a firm, because of the very small mobility of employees between firms. No matter what kind of technologies they choose for the future of firms, Japanese firms have to educate or train their employees by themselves to make them capable researchers or engineers. In general, the education or the training of employees within a company is quite costly (a very big investment) and takes a long time. Then for Japanese companies, in order not to lose this big investment, they have to pay attention to picking the technologies important for the future of their companies (see ②-2. b.). Top management people of Japanese companies are taking care to improve researchers' freedom in research to stimulate innovative research because they need to compete heavily in technology development

with the constraint of very small mobility of any capable people. Thus the following result:

**②-4-3. Japanese firms have more positive attitude towards accepting personal research (or to give a free hand to researchers). In French firms, researchers are requested to adhere to annual research plans.**

**{see JQ.35(Figure J-17(a)) - FQ.21(Figure F-17(a)) and B-7. in IV-2.}**

By contrast in French firms, they need to set up their R&D strategies with mobile researchers or engineers of their R&D division, also with the possibility of looking for capable persons outside companies, which necessarily brings the following:

**②-4-4. At the time of setting up their R&D strategies in French firms, the most important factor is "capability of R&D division".**

**{see JQ.19(Figure J-7(a)) - FQ.10(Figure F-7(a)) and B-2. in IV-2.}**

Moreover, because of the long-standing traditions of French firms, the social background such as conservative attitude of people against any kind of change, and the gap between manufacturing people and researchers or engineers, the role of each division within a firm has been steadily fixed, with the result that the top management people of French firms are concerned with the problem of technology transfer within their firms. This provides an explanation for the following result:

**②-4-5. French firms seriously consider "smooth transfer of technology" as a measure to improve efficiency of R&D.**

**{see JQ.12(Figure J-21(b)) - FQ.25(Figure F-21(b)) and B-8. in IV-2.}**

Because of above restrictions (i.e. large mobility of employees between companies and a hierarchical gap within firms), French companies have a little bit of a hesitant attitude towards (or a lack of dynamism for) going into new technology areas, which is one of the reasons for losing international competitiveness of French companies. However, as seen in ②-1-2., French firms are aggressive in participating in international consortia, seeking a possible way of acquiring technical complementarities. This point is a common understanding not only in France but also in other western European countries. The big R&D programs, which the EU has promoted so far, have been giving opportunities for European companies to participate in consortia. As we will see later (see question FQ.13), one of the quick solutions of the problem of mobilization of



necessary know-how is to increase cooperation between European companies by sharing research resources and by compensating to the handicap of insufficient level of R&D expenditure regarding increasing complexity of technology required (threshold effect).

In addition to aggressive participation in international consortia, in large size French companies a new movement has started based on a more reactive and anticipated model by using flexible organizational forms such as matrix or technology transfer teams.

From above results of comparison we may review the R&D management of Japanese companies and French companies as in the following table.

**Overview of the R&D Management of Japanese and French Companies (1)**

Items	Japanese Firms	French Firms	Background and Factors
basic research activities of the firms	relatively more engaging in basic research with keeping main R&D activities on application research or development	less engaging in basic research but aggressively participating in consortia	difference of national R&D system
main axes for setting up R&D strategy	"importance of technology for the future of company" and "market needs"	"capability of R&D division" and "cost competitiveness of products"	differences of / firms' business competition environment / mobility of employees / influencing power of stockholders coming from the financial structure of firms
pursuit of efficiency of investment in R&D	no obvious attitude towards pursuing efficiency of individual investment in R&D	obvious attitude towards pursuing efficiency of individual investment in R&D	differences of influencing power of stockholders coming from the financial structure of firms
measures most seriously concerned for improvement of efficiency of investment in R&D	"limiting which research fields are to be invested in" is most serious factor	"effort of connecting R&D results with productions (rigorous evaluation of marketability of research themes)" and "smooth transfer of technologies" are most serious factors	differences of / firms' business competition environment / mobility of employees / influencing power of stockholders coming from the financial structure of firms

**Overview of the R&D Management of Japanese and French Companies(2)**

Items	Japanese Firms	French Firms	Background and Factors
position of the head of R&D division	1. position of the head of R&D division has been moved to higher levels of the hierarchy 2. cases of top management people being the head of R&D division can be often seen	1. position of the head of R&D division has not been changed 2. cases of top management people being the head of R&D division can not often be seen	differences of firms' business competition environment and concerns of top management people coming from the financial structure of firms
contact between the R&D division and other divisions	the R&D division is most frequently in contact with the manufacturing division	the R&D division is most frequently in contact with the sales and marketing divisions	differences of mobility of employees and financial structure of firms
treatment of researchers and engineers	mostly giving specific positions	mostly placing in the same personnel stream as administrative staffs	differences of mobility of employees
freedom of research in a firm	positive attitude to respect freedom of researchers and to accept personal research can be seen	strong attitude to make researchers adhere annual research plan can be seen	differences of mobility of employees

## **II Surveys**

## II-1 Questionnaires

The questionnaires used in this comparative study are not the ones which were designed taking circumstances of both countries into account in advance. NISTEP originally designed a survey questionnaire and BETA modified it so as to be able to keep response from French firms.

The NISTEP questionnaire (see Annex 1) was designed based on an assumption that **most firms have a specific division which is exclusively in charge of firm's strategy of R&D ("R&D strategy division") in order to deal with very unstable business environment**, and it has 38 questions such as "changes in position of the head of R&D division", "method of formulation of R&D budget plan", "degree of contacts between R&D division and other divisions" and "employment conditions for researchers and engineers", and so on.

BETA's questionnaire (see Annex 2) follows more or less the same structure as the NISTEP questionnaire with keeping basic aims of survey. However, some adaptation to the French context was required. Main adaptation was relating translation of different hierarchical levels for R&D function. The following table shows a rough comparison

Comparison of hierarchical levels in companies	
JAPAN	FRANCE
<b>Executive Officer (member of the Board of Directors)</b>	<b>la Direction Générale (the Board of Directors)</b>
President (Shacho)	le Président Directeur Général (le PDG)
Vice President (Fuku-Shacho)	le Vice-Président
Executive Director (Senmu-Torishimariyaku)	le Directeur Général (General Director)
Managing Director (Jomu-Torishimariyaku)	membre du Comité de Direction (member of the Board of Management)
Director (Torishimariyaku)	(Directeur Divisionnel)

(Table to be continued)

Comparison of hierarchical levels in companies	
JAPAN	FRANCE
<b>Lower Level than Executive Officer</b>	<b>Lower Level than la Direction Générale</b>
General Manager (Bucho)	(Directeur Divisionnel) Directeur Fonctionnel Directeur Opérationnel Cadre
Manager (Kacho)	Chef du Service

of hierarchical levels in companies of both countries. The French hierarchical levels are a little bit less linear than those of Japanese. It does not mean that there is not hierarchy at all, but distinction between *Directeur Fonctionnel* (e.g. *Directeur* of Finance) and the one of a business area (*Directeur Divisionnel* (e.g. *Truck Division*)) in terms of hierarchical level depends on types organization in companies. In a pure functional type of organization, different functions are under the authority of the Board of Management, and in this case "Functional Director (*Directeur Fonctionnel*)" is higher hierarchy than "Operational Director (*Directeur Opérationnel*)". In a divisional structure, a company is divided in several areas corresponding to different geographical markets or type of clients (e.g. civil or military). In this case, general functions such as Sales or Finance are duplicated in each division and "Divisional Director (*Directeur Divisionnel*)" possesses a strong position. The third type is a Matrix Organization, which is a combination of the two types described above with crossing business areas or projects and scientific specialities (e.g. electronics - mechanics). In a matrix structure characterizing an "organization by projects", there is not really hierarchy between "Functional Director (*Directeur Fonctionnel*)" and "Operational Director (*Directeur Opérationnel*)".

Also we need a correspondence of naming of company organization of both countries. In NISTEP REPORT No.29, "Business headquarters" represents one large portion of company organization corresponding to "Department" in which several "Divisions" such as the Sales Division, the Manufacturing Division etc. are included. The French word "*Division (Secteur)*" is more usual to characterize a business area in a company such as the *Car Division* or the *Truck Division* and it corresponds to "Department" in NISTEP way. The French word "*Service*" is normally used as the *Service* of Sales, the *Service* of Marketing and the *Service* of Finance so on, which is usually translated into "Department". In this report we use the word "Division" for the French word "*Service*".

The table shown below summarises a rough comparison of naming of organization.

Comparison of naming of organization in companies	
JAPAN	FRANCE
Business headquarters (Department)	Division (Secteur)
Division	Service

Another adaptation came from differences between Japanese accounting and budgeting system and French reference.

Because several similar questions are presented in the original NISTEP questionnaire, which make French firms feel reluctant to fill out questionnaire, BETA reduced the number of questions from 38 to 27. Moreover some questions that BETA considered to be important have been introduced. For some pairs of questions, contents are a little bit different from each other because of translation from the original NISTEP questionnaire. Finally BETA tied up questions into the following chapters (see Annex 2).

- |  |
|--|
| <ol style="list-style-type: none"> <li>1. Interviewee and his company</li> <li>2. R&amp;D organization</li> <li>3. R&amp;D strategy</li> <li>4. R&amp;D budget</li> <li>5. R&amp;D personnel management</li> <li>6. Relations between R&amp;D department and the company</li> <li>7. R&amp;D evaluation</li> </ol> |
|--|

We summarize the correspondence of questions between both questionnaires in Annex 3.

## II-2 Conduct of Surveys

NISTEP conducted the survey from December 1991 to January 1992 and BETA did from June to August 1994. NISTEP sent the questionnaires by mail to an executive officer while BETA sent it to a *Directeur* (General Manager) both in charge of R&D in each firm followed by a systematic telephone call to improve participation. Moreover, both in mailing and by phone, we emphasized confidentiality through the fact that only aggregate data would be presented in the final report.

Figure-1 shows time schedule of the surveys and this comparative study.

## II-3 Companies Surveyed and Profile of Responded Companies

149 Japanese firms surveyed by NISTEP were selected based on their annual expenditure in R&D of 1990 (137 exceeding 10 billion yen, 12 between 7.5 to 10 billion yen ; based on quarterly reports of companies issued by Toyo-keizai-shinpousha). We obtained 126 responses (this number changes a little question by question ) among 149 surveyed companies.

BETA selected 106 French national firms (headquarters are located in France) which are the largest in terms of number of employees and turnover on the base of the following documents :

- Atlas des regions (1993),
- L'Expansion review,
- Usine Nouvelle (special issue on technology, 1993),
- Kompass (French repertoire of national firms, 1994).

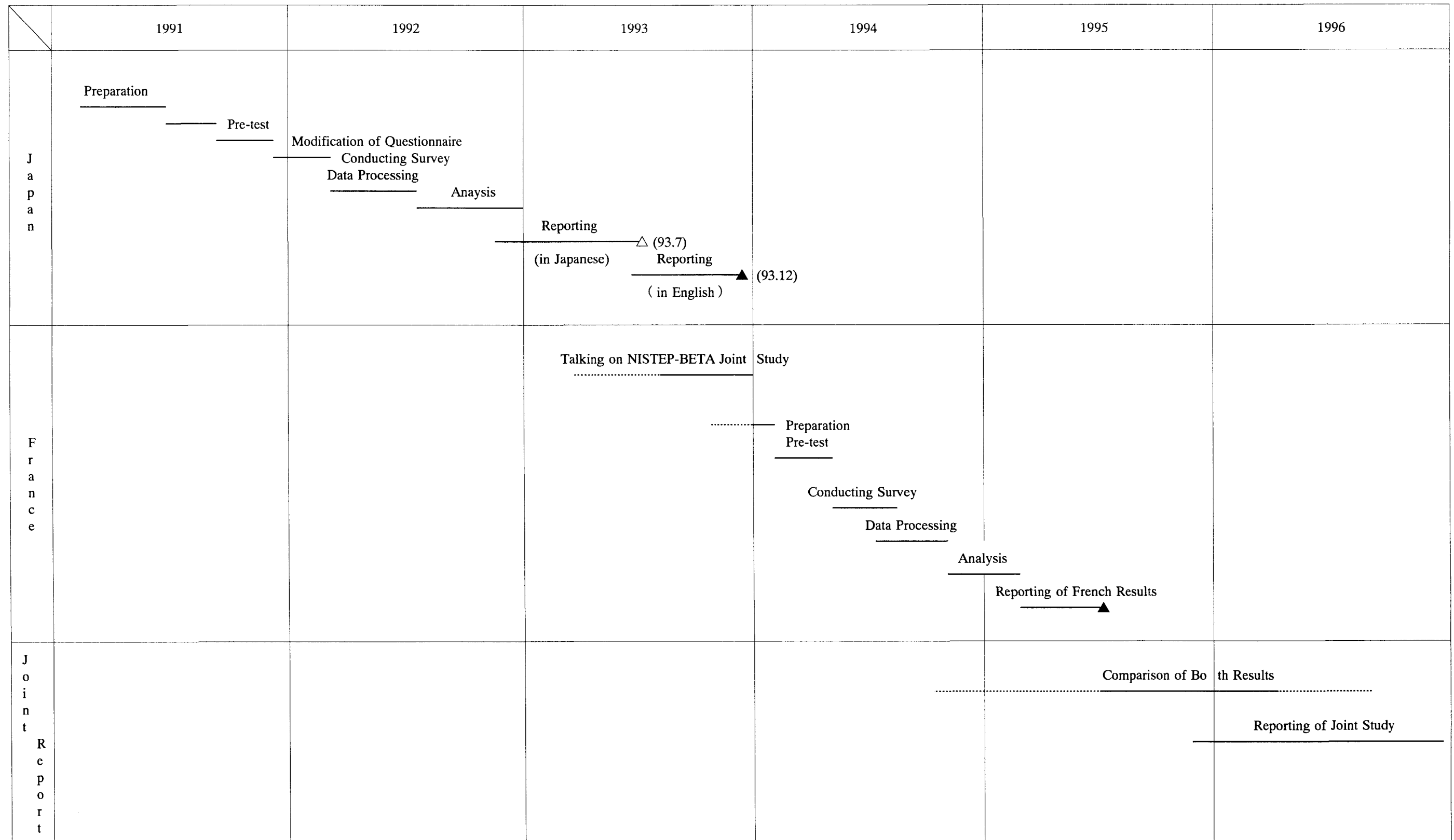
We obtained 56 answers finally. However among these 56 answers, 25 were considered as definitely negative answers. The effective answers were 31 (response rate is 29.2%). As a result, annual investments in R&D activities of these firms exceed 80MFF.

Table-1 and Table-2 show comparisons of Japanese and French responded companies in terms of turnover and number of employees. In these tables, classification-1 by turnover and classification-1 by number of employees are the ones of BETA. As we see, according to these classifications, distributions of Japanese firms have excessive concentration in some sections. Then we introduced classification-2 by turnover and classification-2 by number of employees in order to make the distributions of Japanese firms well balanced. These tables show that, in general, the Japanese firms have larger turnover and larger number of employees than the French firms. That is, the average size of responded companies of Japan is quite larger than the one of France. As for classification by industry, the standard Japanese classification is different from the French one (see Table-3). Therefore it seems to be difficult to make some comparisons with classification by industry. Figure-2 shows the distributions of responded companies in both countries on some industry classification, which is showing almost the same



Figure 1. Time Schedule of "COMPARATIVE STUDY ON R&D MANAGEMENT SYSTEMS BETWEEN JAPANESE AND FRENCH COMPANIES"

(calendar year)



**Table-1 Responded Companies Classified by Turnover**

(1FF ≡ 20Yen)

Japan (1990)				France (1993)	
classification-1		classification-2		classification-1	
< 40BY(2,000MFF)	0	< 200BY(10,000MFF)	15	< 2,000MFF(40BY)	2
40-200BY (2,000-10,000MFF)	15			2,000-10,000MFF (40-200BY)	14
200-1,000BY (10,000-50,000MFF)	75	200-500BY (10,000-25,000MFF)	44	10,000-50,000MFF (200-1,000BY)	4
		500-1,000BY (25,000-50,000MFF)	31		
1,000-2,000BY (50,000-100,000MFF)	16	1,000-2,000BY (50,000-100,000MFF)	16	50,000-100,000MFF (1,000-2,000BY)	3
>2,000BY(100,000MFF)	18	>2,000BY(100,000MFF)	18	>100,000MFF(2,000BY)	3
total			124	total	26

**Table-2 Responded Companies Classified by Number of Employees**

Japan (1990)				France (1993)	
classification-1		classification-2		classification-1	
< 1,000	1	< 5,000	26	< 1,000	3
1,000-10,000	70	5,000-10,000	45	1,000-10,000	14
10,000-50,000	45	10,000-25,000	35	10,000-50,000	5
		25,000-50,000	10		
>50,000	7	>50,000	7	>50,000	5
total			123	total	27

Table-3 Responded Companies Classified by Industry Type

(1/2)

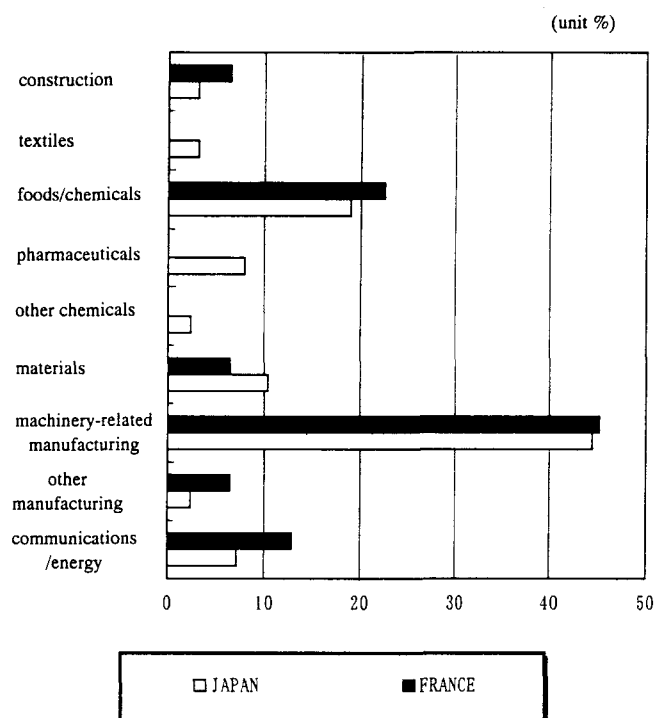
JAPAN			FRANCE			
Total		126	Total	31		
Construction		4	Construction	2		
Consumption -related Manufacturing Industries	Textiles	4	Agro-chemicals (Foods/Chemicals)	7		
	Foods	4				
	Sub-total	8				
Material-related Manufacturing Industries	Chemicals	15			Materials	2
	Petroleum / Rubber	5				
	Pharmaceuticals	10				
	Paints and other chemicals	3				
	Glass and other ceramics	3				
	General steel	5				
	Non-ferrous metals and electric wire	5				
Sub-total	46					

**Table-3 Responded Companies Classified by Industry Type**

(2/2)

JAPAN			FRANCE	
Machinery -related Manufacturing Industries	Industrial and other machinery	8	Mechanicals	6
	Motor vehicles	14		
	Domestic appliances and component parts	10		
	Heavy electrical equipment	6	Aero / Defense	8
	Communication equipment	4		
	Ship-building	3		
	Metering and other electrical equipments	5		
	Precision machinery	6		
Sub-total	56			
Other Manufacturing Industries	3	Diversified holding	2	
Communications / Public Utilities	Broadcasting Communications Electric Power , Gas	9	Energy	4

**Figure 2. Distributions of Responded Companies on Industry Classifications**



trend of distributions with French samples being lacking in textiles and pharmaceuticals.

#### II-4 Differences between Both Surveys

The following table (Table-4) shows differences between both surveys.

**Table-4 Differences between Both Surveys**

	Japan (NISTEP)	France (BETA)
1. time of conducting surveys	December 1991 ~ January 1992	June 1994 ~ August 1994
(surveyed firms)	149	106
(responded firms)	126	31
2. response rates	84.6%	29.2%
3. sizes of responded companies	taking averages, the Japanese companies are larger than the French ones in terms of turnover and number of employees	

### **(Influence of time difference of conducting surveys)**

Japan recorded relatively high economic growth since the end of 1980's to 1991 (this is called as bubble economy period), however since 1992 through the present year Japan has been having minus or very low growth of economy. The time when NISTEP conducted the survey was at the end of bubble economy period. And accusation to Japan of "a free ride on technology" from US or European countries was the most severe in that period. Because of this intense accusation, Japanese firms generally had aggressive attitude toward (basic) R&D activities.

Since 1992, Japan has been having a recession of economy, and Japanese firms have been trying to reduce any kinds of expense (including R&D expenditure). Recently we see a trend of accelerating deployment of their R&D activities to foreign countries for reduction of R&D cost. However, in this circumstance, still top management people recognize that R&D is an important factor of their company strategies in severe worldwide competition of technology development.

On the other hand, France has been having very low or minus economic growth in 1990's. The time when BETA conducted the survey was in this recession period. Also the time was just after the liberalization of European market concerning most of industrial products and services (except for energy, energy partly liberalized since this year) which was one important step of the European Union. Therefore business activities between European firms were ready to become more severe at this time, and generally French companies were thought to be negative to investment in R&D activities. It was a period of doubt and postponement concerning investment in general as a response of uncertainty of this new situation.

Taking above things into account, attitude of Japanese companies to R&D has an exaggeration on positive aspect whereas French firms has a little bit negative attitude toward R&D.

### **(Influence of difference of response rates)**

As for the response rate, we have a large distinction of 84.6% for the NISTEP's survey vs. 29.2% for the BETA's. When universities conduct this kind of survey over private companies, normal response rate is around 30%. Considering this, the response rate of BETA's survey seems to be an average one. On the contrary the NISTEP survey has very high response rate, however this value is consistent with ones of other surveys conducted by government organizations or by news media.

### **(Influence of sizes of responded companies)**

As for sizes of responded companies, the Japanese companies are larger than the French ones in terms of turnover and number of employees. In general, the larger

company has the less contacts between each division within a company because of the more complexity of organization. In these circumstances, a specific division, which deals with works covering overall company such as a formulation of its R&D strategy, would be necessary. Moreover the larger company has the more decentralized organization system. Conversely speaking, the smaller company has the more centralized system. Taking these into account, the Japanese firms have "an R&D strategy division" in higher rate and the French firms are more centralized.

### **III Comparison of the Survey Results**



## **III-1 The Respondents and the Responded Firms**

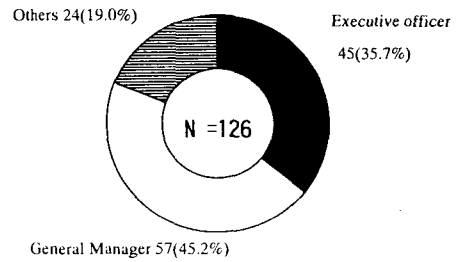
Hereafter, for each corresponding pair of questions, we show Japanese (NISTEP) results in left-hand pages and French (BETA) results in right-hand pages. The NISTEP results are the ones from the NISTEP REPORT No.29 and the rearranged data for a comparison with the BETA results (these data are not presented in the REPORT) and NISTEP comments. And in right-hand pages, we presented comments of BETA in addition to the data of BETA survey.

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.1 What is your position in your company ?

1. Executive Officer 2. General Manager 3. Other

**Figure J-1 Position of Respondents**



**III-1-1 Position of the respondents (JQ.1)**

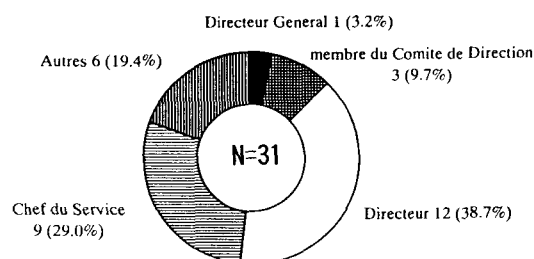
We obtained 126 responses from 149 companies. The questionnaire was sent to the executive officer who was taking responsibility of R&D activities of each company. As a result, we had 45 responses (35.7%) from the executive officers, 57 (45.2%) from the general managers and 24 (19.0%) from others (see Figure J-1).

< BETA-NISTEP COMPARATIVE STUDY >  
BETA (FRANCE)

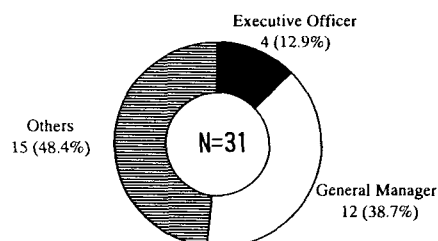
FQ.1 What is your position in your company ?

1. General Manager or Manager (Cadre)
2. General Director (Directeur Général)
3. Other

**Figure F-1(a) Position of Respondents**



**Figure F-1(b) Position of Respondents  
(Translated Data in Japanese System)**



### III-1-1 Position of the respondents (FQ.1)

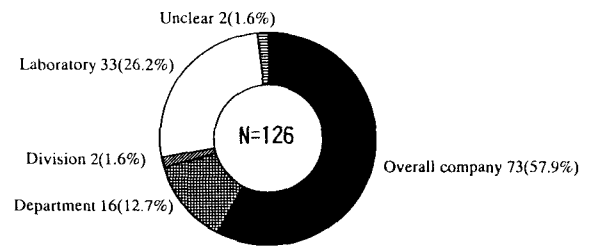
Figure F-1(a) and F-1(b) show result of the above question in the BETA survey. A direct comparison between Japanese and French answers concerning positions of the respondents is difficult. Two categories of French respondents (*Directeur Général* and *membre du Comité de Direction*) correspond to Executive Officer category in Japan. These two categories represent about 13% of the answers that we can compare directly with 35.7% of Japanese result. Likewise, French category of *Directur* represents about 39% is what the Japanese consider as General Manager. Then, we can deduce that the persons in the companies who answered the questionnaire generally occupied lower hierarchical level positions than those of Japanese companies. Even if the questionnaire was generally sent to the General Manager of R&D division (*Directeur de R&D*), only one reached *Directeur Général*. Several factors may explain this result such as a more decentralized structure of decision making in France. This is may be the most plausible explanation. But we can also observe an extreme saturation of such kind of mailing procedures in the large French companies. Finally, an argument of simple lack of interest vis-a-vis the R&D strategic management could be evoked. We think that it does not really make sense because the decision of rejection was always coming from the top hierarchy.

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ. 2 In which section of your company are you involved  
in R&D strategy development ?

- |                    |               |
|--------------------|---------------|
| 1. Overall company | 2. Department |
| 3. Division        | 4. Laboratory |

**Figure J-2 Sections where Respondents are  
Involved in R&D Strategy Development**



**III-1-2 Sections where respondents are involved in R&D strategy development (JQ.2)**

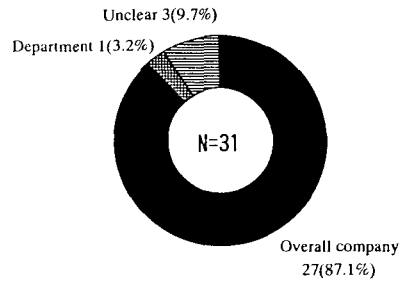
Figure J-2 shows the sections where the respondents are involved in R&D strategy development. Although 2/3 of respondents are the general managers or lower hierarchical members (as we described in the previous question), 58% of respondents are involved in R&D strategy development for overall company.

**< BETA-NISTEP COMPARATIVE STUDY >**  
**BETA (FRANCE)**

FQ.2 In which section of your company are you involved  
in R&D strategy development ?

1. Overall company
2. Division (Vorte service)
3. Department (Vorte division ou secteur)
4. Laboratory

**Figure F-2 Sectins where Respondents are  
Involved in R&D Strategy Development**



**III-1-2 Sections where respondents are involved in R&D strategy development (FQ.2)**

Figure F-2 shows the result of the above question in France, and it shows that 87% of respondents are involved in R&D strategy development for overall company. This result gives an idea of the difference of respondent's influence between French and Japanese companies. French firms appear more flexible, open-minded and decentralized as long as R&D strategy development is concerned. In France, "white collars" in large organizations are more (or have the feeling to be) involved in R&D strategy development.

Operations seem to be compartmentalized in Japanese firms where respondents seem to be more implied at the laboratory level or in a particular division except for the Executive officer and the general managers.

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ. 4 What are the approximate values of your company's proceeds, rate of ordinary profits, R&D expenditure, number of employees, number of researchers, rate of new products, rate of proceeds for new products, number of patent requests, number of papers submitted to journals.

	1985	1990
Proceeds		
R. of ordinary profits		
R&D expenditure		
Employees		
Researchers		
R. of new products (‡)		
R. of proceeds for N.P.		
Patent requests		
N. of papers		

(‡) The rate of new products

= N. of variety new products/ N. of variety all products

In the case where your company already has a special accounting method, please calculate the above data and explain the method.

Also, please describe below what the term "new products"

means in your company. ....

**Table J-1(a) Responded Companies Classified by Turnover**  
 (1FF ≙ 20Yen)

Japan (1990)			
< 40BY(2,000MFF)	0	< 200BY(10,000MFF)	15
40-200BY (2,000-10,000MFF)	15		
200-1,000BY (10,000-50,000MFF)	75	200-500BY (10,000-25,000MFF)	44
		500-1,000BY (25,000-50,000MFF)	31
1,000-2,000BY (50,000-100,000MFF)	16	1,000-2,000BY (50,000-100,000MFF)	16
>2,000BY(100,000MFF)	18	>2,000BY(100,000MFF)	18
total			124

**Table J-1(b) Responded Companies Classified by Number of Employees**

Japan (1990)			
< 1,000	1	< 5,000	26
1,000-10,000	70	5,000-10,000	45
		10,000-25,000	35
10,000-50,000	45	25,000-50,000	10
		>50,000	7
total			123

**III-1-3 Some general information on the responded firms (JQ.4)**

Table J-1(a) and Table J-1(b) show classified data of 1990 in terms of turnover and number of employees for the responded companies. In NISTEP REPORT No.29, we only have data classified by R&D expenditure and do not have these classifications. In these tables, classifications of left-hand side correspond to the BETA's, however we have over concentrations in certain subdivisions. Therefore we introduced new subdivisions for Japanese data to make the distribution balanced, and we use classifications of right-hand side for Japanese data.

According to the response data, the rate of R&D expenditure vs. turnover is in the range of 0.43%~14.31% and its average is 5.32%. And for 11 companies, the rate exceeds 10%.

< BETA-NISTEP COMPARATIVE STUDY >  
BETA (FRANCE)

FQ.3 What are the values of the following items of your company ?

	1987	1992
Turnover		
N. of employees		
R&D expenditure		
N. of researchers		
N. of new products / N. of all products		
R. of turnover for NP		
N. of patent requests		

Please describe the definition of "new product" in your company.

.....

**Table F-1(a) Responded Companies**  
**Classified by Turnover**  
(1FF ≈ 20Yen)

France (1993)	
< 2,000MFF(40BY)	2
2,000-10,000MFF (40BY-200BY)	14
10,000-50,000MFF (200-1,000BY)	4
50,000-100,000MFF (1,000-2,000BY)	3
>100,000MFF(2,000BY)	3
<b>total</b>	<b>26</b>

**Table F-1(b) Responded Companies**  
**Classified by Number of Employees**

France (1993)	
< 1,000	3
1,000-10,000	14
10,000-50,000	5
>50,000	5
<b>total</b>	<b>27</b>

III-1-3 Some general information on the responded firms (FQ.3)

Each firm did not provide enough information to above question except for turnover and number of employees. Especially about R&D expenditure and number of researchers, many firms did not want to answer. It may be the first information about the organization of R&D in French firms. The lack of answers shows that personnel management in R&D is not considered to be important for the development of the firm yet.

Table F-1(a) and Table F-1(b) present classifications of responded companies in terms of turnover and number of employees on the basis of the data of 1992. Although the number of the answers are limited, we may summarize

- number of employees in the R&D division tends to decrease on average
- number of employees : 400 to 146,000
- R&D expenditure/turnover : 0.19% to 24.13% (average 6.01% ; 3 firms devote more than 20%)
- number of researchers : 20 to 6,200
- on average, 6.34% of the employees work in R&D (only 4 firms have more than 10%)

## **III-2 R&D Activities and General Organization of R&D**



**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.5 Does your company have a separate division that deals only with R&D strategy ?

1. Yes      2. No

(For those who answered "No", please go on to JQ.6.)

SQ.1 What is the name of this division ?

SQ.2 What section does that division belong to ?

1. President                      2. Business Hdqrs.  
 3. Business Div.                4. Laboratory

SQ.3 Please describe the history of this division

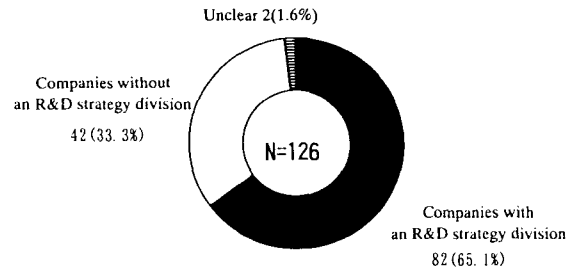
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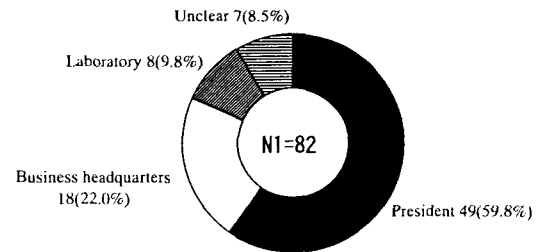
SQ.4 What has been the history of this division in terms of employees and budget ?

	1980	1990
Employees		
Budget		

**Figure J-3(a) Existence of an R&D Strategy Division**



**Figure J-3(b) Section to Which the R&D Strategy Division Belongs**



**III-2-1 Existence of an R&D strategy division (JQ.5)**

In order to confirm need for strategic R&D management systems among Japanese companies, we asked each company whether it has a separate division specially responsible for R&D strategy (i.e. "an R&D strategy division") or not.

As shown in Figure J-3(a), among 126 responded companies, 82 (65.1%) have an R&D strategy division and 42(33.3%) do not. This division belongs to office of the president in 49 cases (59.8%), to business headquarters in 18 cases (22.0%) and to laboratory in 8 cases (9.8%) of 82 companies with this division (see Figure J-3(b)).

Hereafter we regard "existence of an R&D strategy division" as one index that shows level of implementation of strategic R&D management in companies and we use this for classifications of various data in order to analyze the trends.

(to be continued)

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA (FRANCE)**

FQ.6 Does your company have a separate division that deals only with R&D strategy ?

1. Yes    2. No (Please go on to question FQ.7)

- What is the name of this division ?

- What section does this division belong to ?

1. President
2. Board of Directors (*La Direction Générale*)
3. Business Headquarters (Une division opérationnelle)
4. Laboratory

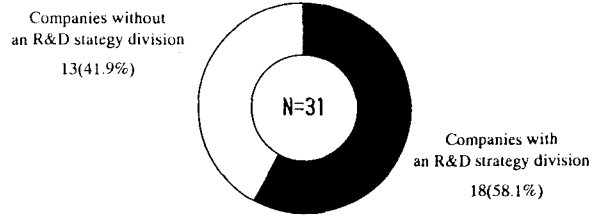
- Please describe the history of this division below.

.....  
 .....

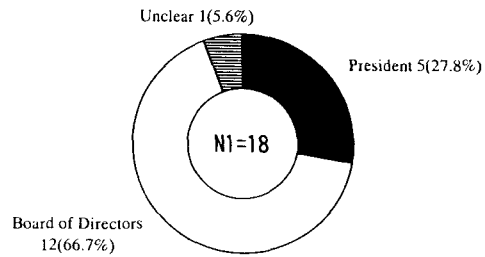
- What has been the history of this division in terms of employees and budget ?

	1982	1992
Employees		
Budget		

**Figure F-3(a) Existence of an R&D Strategy Division**



**Figure F-3(b) Section to Which the R&D Strategy Division Belongs**



**III-2-1 Existence of an R&D strategy division (FQ.6)**

Figure F-3(a) and Figure F-3(b) show the results of French survey. As we see in Figure F-3(a), 58% of the responded French companies admit to have an R&D strategy division. When we compare the data classified by number of employees for both countries (see Figure J-3(e) and Figure F-3(e)), the R&D strategy division seems to be rather popular also in French firms. The fact that there is no specific division for R&D strategy does not automatically mean that firms neglect the R&D strategy, but the existence of such a division stresses the fact that R&D is important in the strategy at stake.

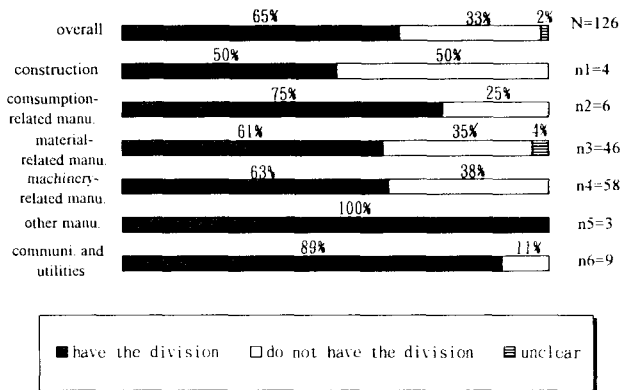
In addition, more than 94% of these divisions depend on the top management (27.8% for the PDG and 66.7% for Board of Directors; see Figure F-3(b)). This shows a certain degree of decentralization of French firms' system relating to R&D strategy compared with Japanese firms where the strategic division in charge of R&D is in most of the cases attached to the office of the president.

(to be continued)

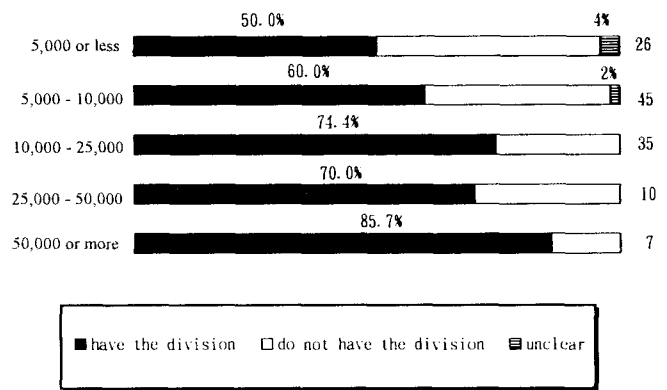
**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

(JQ.5)

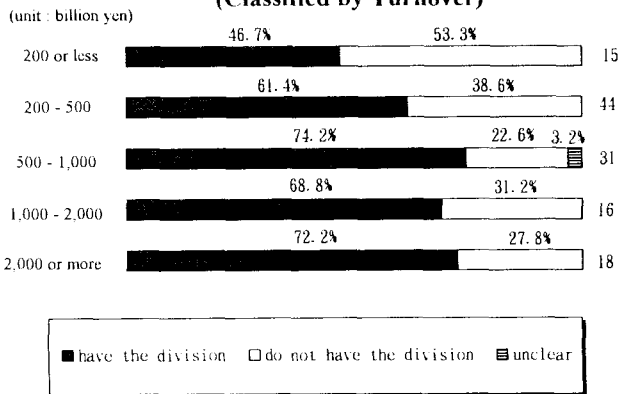
**Figure J-3(c) Existence of an R&D Strategy Division  
 (Classified by Industry Type)**



**Figure J-3(e) Existence of an R&D Strategy Division  
 (Classified by Number of Employees)**



**Figure J-3(d) Existence of an R&D Strategy Division  
 (Classified by Turnover)**



**Figure J-3(f) Existence of an R&D Strategy Division  
 (Classified by R&D Exp./Turnover)**

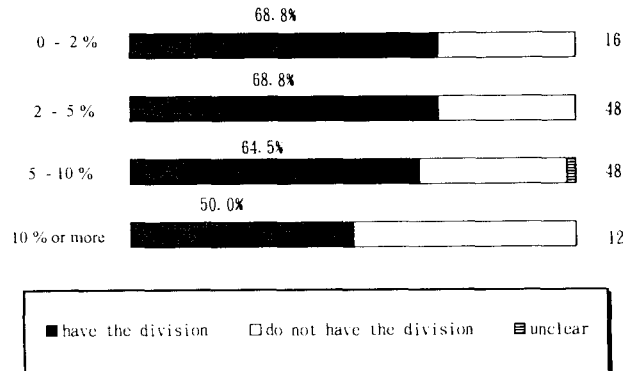


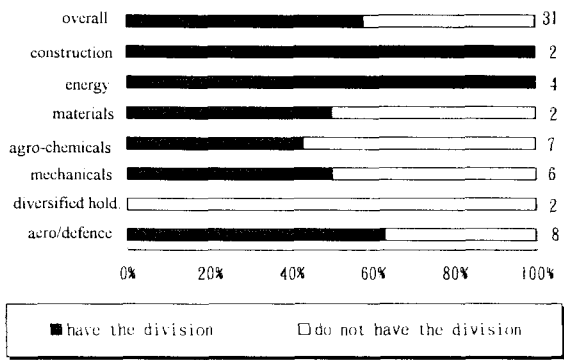
Figure J-3(c), Figure J-3(d), Figure J-3(e) and Figure J-3(f) show classified data of "existence of an R&D strategy division" in terms of business activities, turnover, number of employees and R&D expenditure vs. turnover. (In NISTEP REPORT No.29, classified data corresponding to figures Figure J-3(d), Figure J-3(e) and Figure J-3(f) are not presented. Here we rearranged the original data for the comparison with the French data.)

We may not see clear correlations between existence of an R&D division with R&D expenditure vs. turnover. On the contrary in the classification by turnover and number of employees, we may see a relation that company with the larger turnover and the more employees has the R&D strategy division in the higher rate.

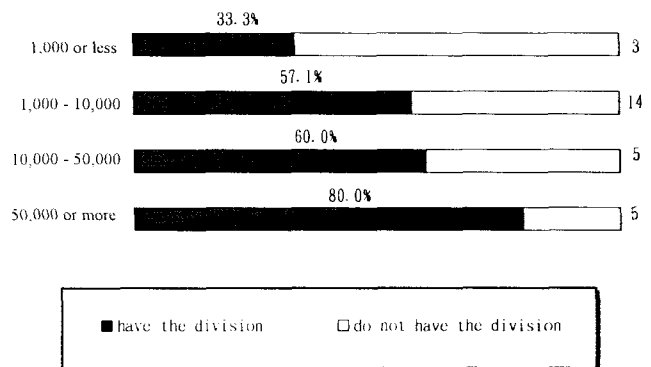
**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA (FRANCE)**

(FQ.6)

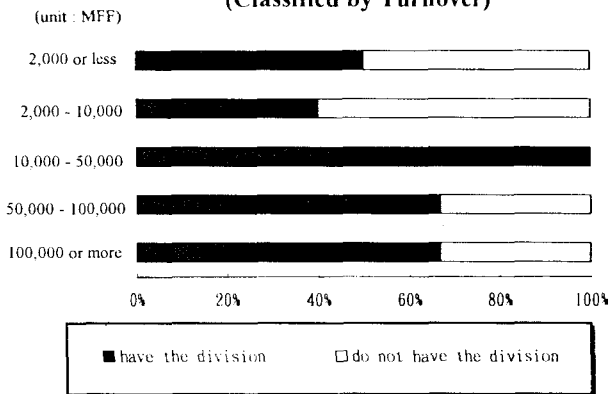
**Figure F-3(c) Existence of an R&D Strategy Division  
 (Classified by Industry Type)**



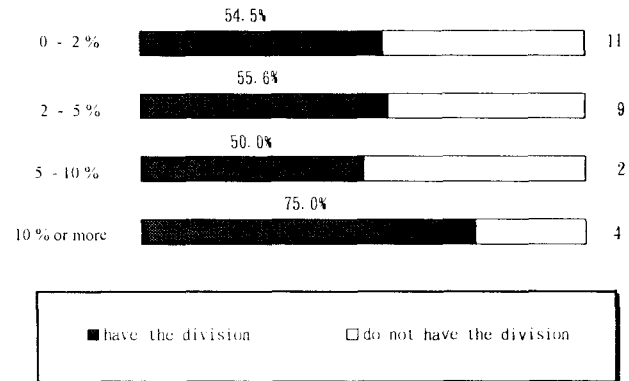
**Figure F-3(e) Existence of an R&D Strategy Division  
 (Classified by Number of Employees)**



**Figure F-3(d) Existence of an R&D Strategy Division  
 (Classified by Turnover)**



**Figure F-3(f) Existence of an R&D Strategy Division  
 (Classified by R&D Exp./Turnover)**



The French firms with an R&D strategy division are mainly big firms with a turnover of more than 10,000MFF and with more than 50,000 employees (see Figure F-3(d) and Figure F-3(e)). Most of the time, economic arguments for such an organization are related to reducing the complexity generated by the size of the company.

As far as business activities and R&D expenditure vs. turnover are concerned, it is difficult to have acceptable results due to the size of the sample (see Figure F-3(c) and Figure F-3(f)). However our sample seems to show that the R&D strategy division often exists in sectors of construction and energy. Aeronautics and electronics also seem to be domains where such a division has often been created.

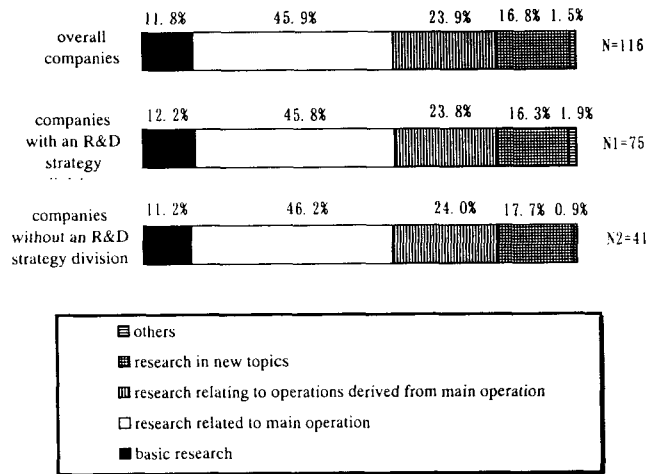
In French firms, the "R&D strategy division" is a recent creation (1972 for the oldest, 1985 for most firms). The members of this R&D strategy division mainly consist of members of R&D division, technical management and of board of directors. They were created to coordinate several structures linked to the R&D division.

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ. 22 Based upon the following classification of research activities (with number of themes) , what is the percentage of each category for your company ?

- |   |   |
|---|---|
| 1. Basic research   | % |
| 2. Research related to main operations                        | % |
| 3. Research related to operations derived from main operation | % |
| 4. Research in new topics                                     | % |
| 5. Other ( )  | % |

**Figure J-4 Breakdown of R&D Activities  
(According to Number of Research Themes)**



III-2-2 Breakdown of R&D activities based on the number of research themes (JQ.22)

We asked each company to show a breakdown of their research activities (percentage of each research category) based on number of themes. We took simple average of responded percentage of each category, and we show the results in Figure J-4.

As seen in this figure, we have a breakdown for overall companies of 11.8% for basic research, 45.9% for research on main operations, 23.9% for research relating to main operations, and 16.8% for research concerning new topics so on. The percentage for basic research presented here is a little bit higher than 10% (listed value in the statistics of Management and Coordination Agency of Japanese Government), which is probably able to be attributed to the fact that companies surveyed in this study are all major companies. The Figure J-4 shows almost no difference between the companies with an R&D strategy division and those without the division.

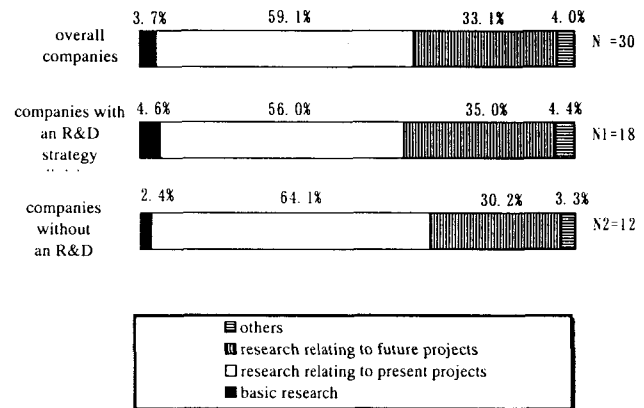
(to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.7 What is the distribution of number of research themes on the following categories in your company ?

- 1. Basic research %
- 2. Research relating to the present projects %
- 3. Research relating to the future projects %
- 4. Other %

**Figure F-4 Breakdown of R&D Activities (According to Number of Research Themes)**



III-2-2 Breakdown of R&D activities based on the number of research themes (FQ.7)

As for this question, content of question was changed from the one of NISTEP because of ambiguous expression. Therefore direct comparison between both results is impossible. However a comparison of classified results by basic research (research not relating to business) and others (research relating to business) is effective. Figure F-4 presents result of the French survey.

In all companies, basic research has little importance in comparison with other categories. When the R&D strategy division exists, basic research seems to be more important (4.6% instead of 2.4% for companies without the R&D strategy division) but the value is too small to draw significant comments.

This result confirms results of several studies (see e.g. reference [3]) which noticed that French firms do not develop basic research as Japanese firms do. It appears that Japanese companies would like to develop this activity more strongly in the future. This result also confirms the fact that in France the government sector has been dedicating itself to basic research and therefore the private sector does not need to attach much importance on it.

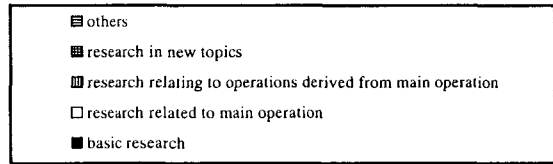
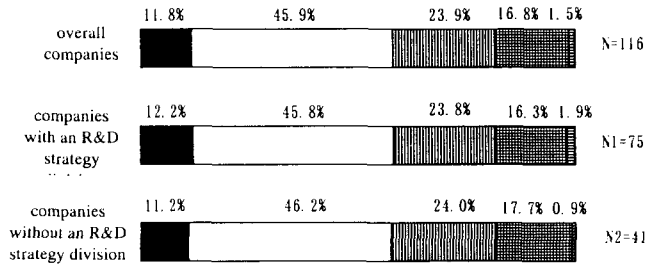
Research in French firms is above all focused on present operations (projects) and when the R&D strategy division does not exist, weight of the present (to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ. 22 Based upon the following classification of research activities (with number of themes) , what is the percentage of each category for your company ?

- 1. Basic research %
- 2. Research related to main operations %
- 3. Research related to operations derived from main operation %
- 4. Research in new topics %
- 5. Other ( ) %

**Figure J-4 Breakdown of R&D Activities**  
**(According to Number of Research Themes)**

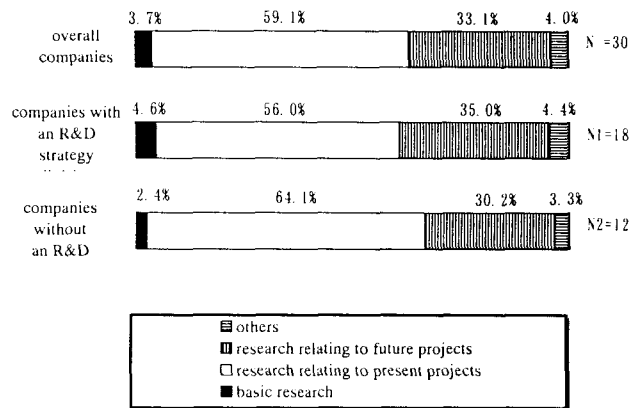


<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.7 What is the distribution of number of research themes on the following categories in your company ?

- 1. Basic research %
- 2. Research relating to the present projects %
- 3. Research relating to the future projects %
- 4. Other %

**Figure F-4 Breakdown of R&D Activities**  
(According to Number of Research Themes)



projects is even more pronounced (64.1% without the R&D strategy division / 56.0% with the division). When the R&D strategy division exists, the firms give more weight to the future : 35.0% of research themes are relating to the future operation. Maybe this preference for the future could be explained by a better planning of operations, and it is also a link with research strategy with longer term when the R&D strategy division exists. But the common thinking now in large size companies is that they have to develop high reactivity to the very changing environment. Number of companies notify horizons of planning R&D of 3 years no more. In such a strategy, the crucial problem is to maintain expertise and technological know-how in a sufficient proportion (notion of critical mass) in order to be able to start new markets very quickly. This result will be reinforced later when we will consider the period of company research.



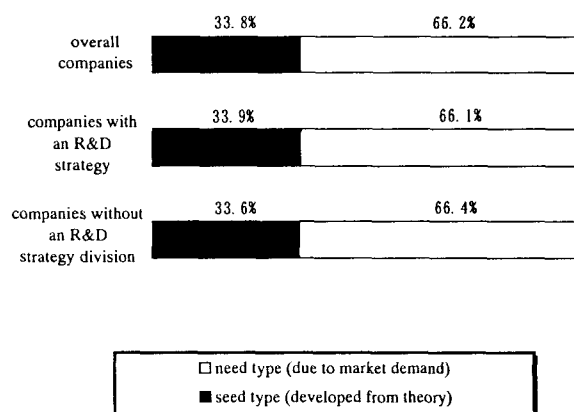
**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ. 25 If we categorize the research themes into "seeds" type and "need" type, what is the percentage of each category in your company ?

(Number of themes of each category / Total number of themes)

Seed type (developed from theory)      %  
 Needs type (due to market demand)      %

**Figure J-5 Breakdown of Research Themes**  
**(According to Origin)**



**III-2-3 Breakdown of research themes according to origin (JQ.25)**

We asked each company to show a breakdown of their research activities (percentage of each research category) with research categories of "seeds type" (technology push type) or "needs type" (demand pull type) based on number of themes. We took simple average of the responded percentage of each category, and the results are shown in Figure J-5.

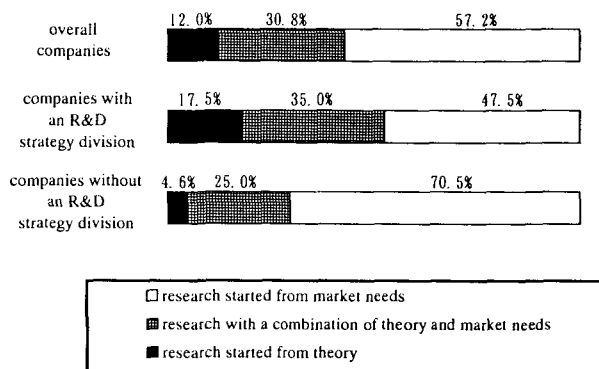
As seen in this figure, we have a breakdown of 1/3 for "seeds type" and 2/3 for "needs type" regardless of the existence of an R&D strategy division. This shows that Japanese firms are devoting themselves to "seeds type" (technology push type) research to some extent.

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.8 If we categorize the research themes (by number of themes) with their origin, what is the percentage of each of the followings in your company ?

- 1. Research started from theory %
- 2. Research started from market needs %
- 3. Research with a combination of theory and market needs %

**Figure F-5 Breakdown of Research Themes**  
(According to Origin)



III-2-3 Breakdown of research themes according to origin (FQ.8)

As for this question, we took the third category which is a combination of theory and market needs. Therefore direct comparison between Japanese and French results is impossible. Figure F-5 presents the results of the French survey.

A majority of companies carry out research based on market needs, but when an R&D strategy division exists, research based on theory (17.5% for the firms with an R&D strategy division / 4.6% for the firms without the division) and research based on theory and on market needs are more important. It seems to be logical since theoretical research or a combination of theory with market needs requires more organization and research strategy in long term planning.

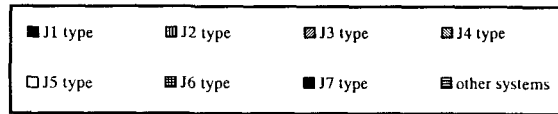
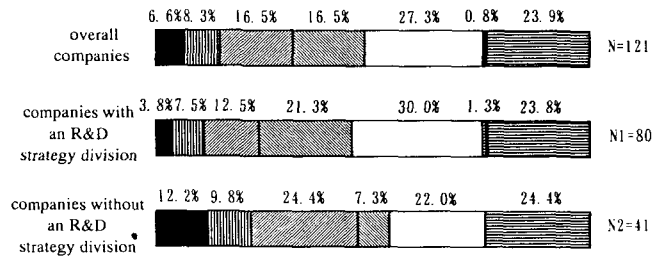
**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ. 3 To which of the following types of structure does the R&D organization of your company correspond ? Please choose the number of the type. If you can not find the appropriate type, please describe the R&D organization of your company in the space provided.

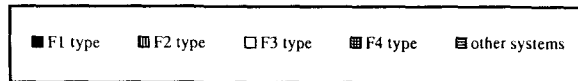
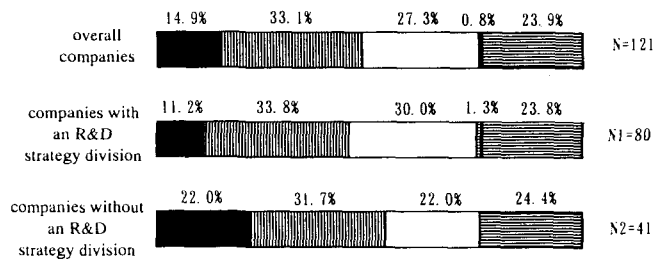
(for detail, see next next page)

- J1: Independent Single Laboratory Structure  
Department
- J2: Single Laboratory controlled under an R&D Department
- J3: Independent Multiple Laboratories Structure
- J4: Multiple Laboratories controlled under an R&D Department
- J5: J4+Multiple Laboratories controlled under Business Departments
- J6: Multiple Laboratories controlled under Business Departments
- J7: Independent Company System
- J8: Other System

**Figure J-6(a) Types of R&D Organization**



**Figure J-6(b) Types of R&D Organization (According to BETA's Classification)**



**III-2-4 Types of R&D organization (JQ.3)**

We asked each company to show its type of R&D organization by using the type classification proposed by T. FUKUI (1989; see reference [4]). In NISTEP REPORT No.29, only raw data of this question is presented. Figure F-6(a) presents rearranged result of this question and Figure F-6(b) shows the same result by using the BETA's classification of type of R&D organization for a comparison with the French result. Correspondence between the FUKUI's type classification (hereafter, "J types") and the BETA's (hereafter, "F types") is shown in page 56.

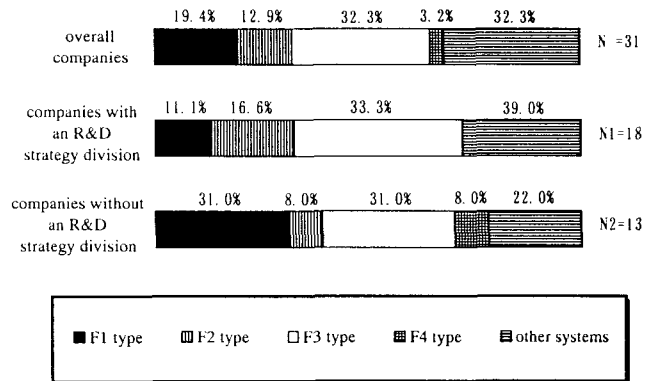
We see that companies with an R&D strategy division have more often types J4 and J5 than those without an R&D strategy division do. This is consistent with the statement of FUKUI (i.e. the type J4 is suitable for companies of which future business operation is led by R&D department and the J5 can be seen in those of large size with diversified operation). These types are generalized pattern of R&D organization for the strategic management of R&D. The types J1 and J2 can be seen in the companies of relatively small size and with single operation (by FUKUI) and these two types can be seen in the companies without an R&D strategy division, because the R&D strategy division is not necessary so much for these companies.

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.9 To which of the following types does the R&D organization of your company correspond ?

1. One isolated laboratory or one R&D department independent from operation divisions (F1)
2. One or several laboratories / R&D departments independent from operation divisions (F2)
3. One R&D department coupled with several laboratories integrated in operation divisions (F3)
4. Externalized research with independent company (F4)
5. Other systems

**Figure F-6 Types of R&D Organization**



III-2-4 Types of R&D organization (FQ.9)

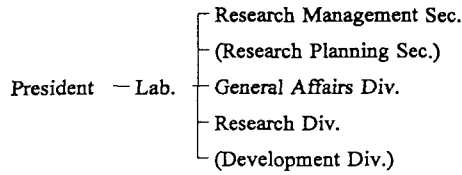
In this question, different types of R&D organization were proposed. Types F1 and F2 correspond to a combined type of J1 and J2 and a combination of types J3 and J4 respectively. And types F3 and F4 correspond to type J5 and type J7 respectively. The Japanese type J6 was deleted in this question. The result of the BETA's survey is shown in Figure F-6.

When an R&D strategy division does not exist, it seems that firms often have one laboratory or one R&D department. Logically, when there are several laboratories, the R&D strategy division exists. We see this trend in both Japanese and French results. Existence of an R&D strategy division is related to level of complexity of the organization. In our sample, companies with an R&D strategy division appear more integrated.

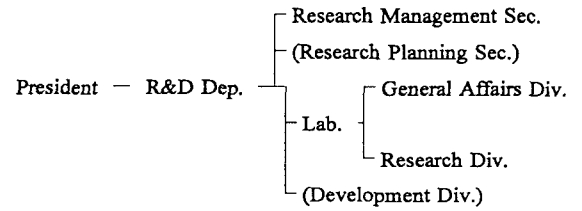
We can also notice that only companies without the R&D strategy division use externalized research (8%). This result is astonishing because one of the new strategic goals of dynamic and modern organization (e.g. car industry) corresponds to an externalization of a certain amount of R&D activities (modularization).

One third of French firms have an R&D department and several laboratories : research is more segmented in different structures.

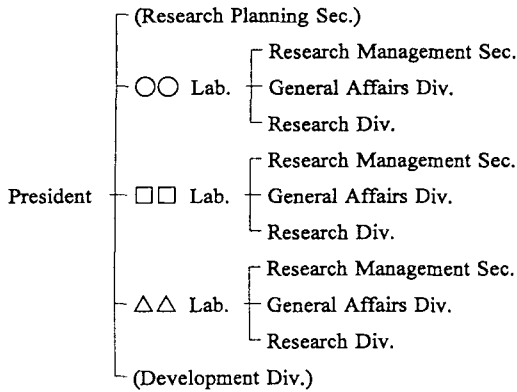
1. Independent Single Laboratory Structure



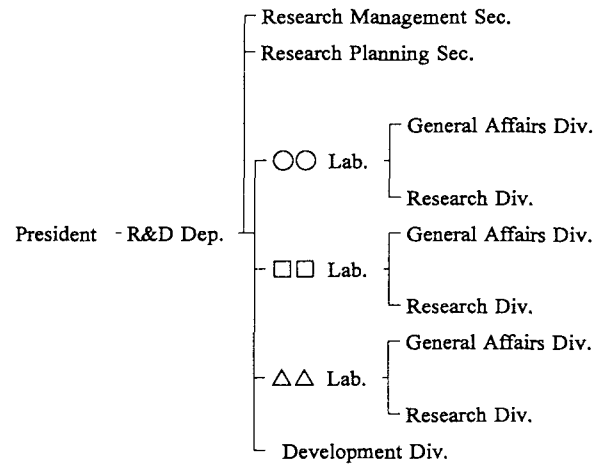
2. Single Laboratory controlled under an R&D Department



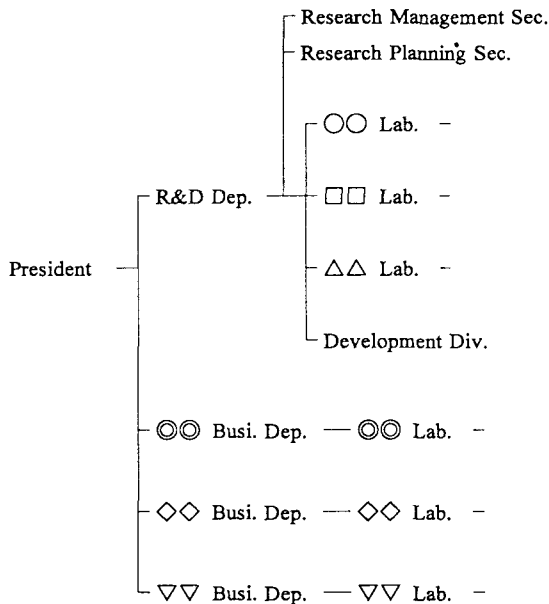
3. Independent Multiple Laboratories Structure



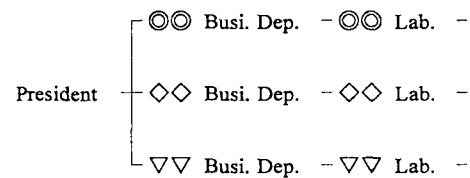
4. Multiple Laboratories controlled under an R&D Department



5. 4.+ Multiple Laboratories controlled under Business Departments



6. Multiple Laboratories controlled under Business Departments



7. Independent Company System

8. Other Systems

Note 1: Those in parentheses do not necessarily exist.

## **III-3 Management of R&D**

# **III-3-1 Internal Management**

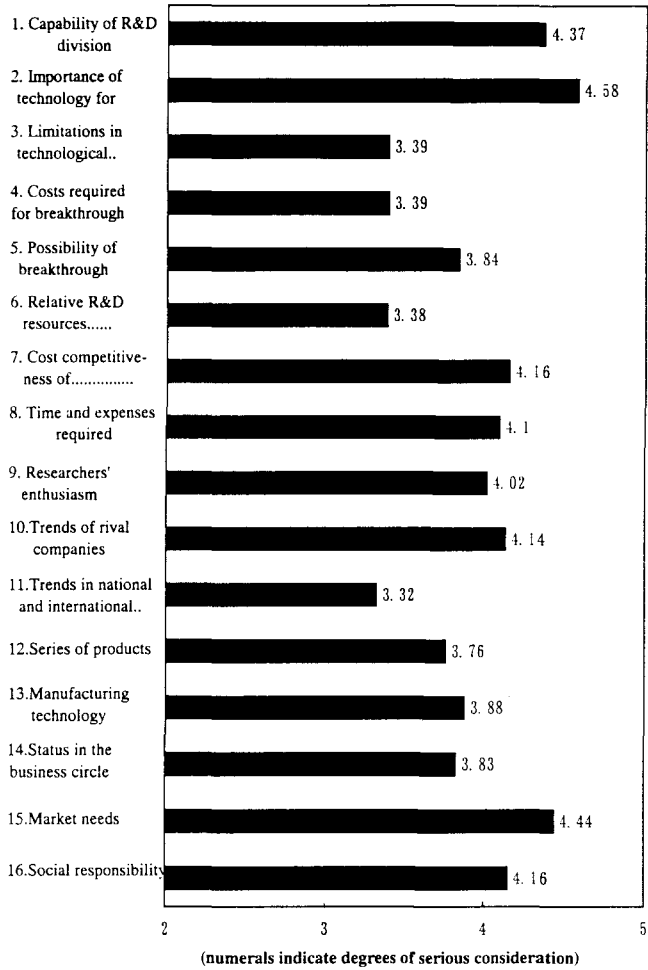
<NISTEP-BETA COMPARATIVE STUDY>

NISTEP (JAPAN)

JQ.19 How much do the following factors weigh when making up the overall R&D strategy of your company ?  
(1=very important, 2=important, 3=cannot say either way, 4=not very important, 5=not important)

1. Capability of R&D division	1	2	3	4	5
2. Importance of technology for your company's future	1	2	3	4	5
3. Limitations in technological know-how	1	2	3	4	5
4. Costs required for breakthrough	1	2	3	4	5
5. Possibility of breakthrough	1	2	3	4	5
6. Relative R&D resources spending in comparison with rival companies	1	2	3	4	5
7. Cost competitiveness of products	1	2	3	4	5
8. Time and expenses required	1	2	3	4	5
9. Researchers' enthusiasm	1	2	3	4	5
10. Trends of rival companies	1	2	3	4	5
11. Trends in national and international projects	1	2	3	4	5
12. Series of products	1	2	3	4	5
13. Manufacturing technology	1	2	3	4	5
14. Status in the business circle	1	2	3	4	5
15. Market needs	1	2	3	4	5
16. Social responsibility (Environmental problems)	1	2	3	4	5

Figure J-7(a) Considerations in making up an R&D strategy



III-3-1-1 Considerations in making up an R&D strategy (JQ.19)

In this question we presented 16 factors which are thought to be seriously considered in making up process for an R&D strategy and we asked each company to indicate relative weight of each factor with a scale from 1 to 5 as shown above. Figure J-7(a) shows results concerning this question for overall companies. Here, we define a "degree of serious consideration (DSC)" of each factor as follows,

$$DSC = \{5x (\text{No. of responded companies for the weight 1}) + \dots + 1x (\text{No. of responded companies for the weight 5})\} / \text{Total number of responded companies.}$$

As shown in Figure J-7(a), the top five factors with large value of DSC are the followings.

- 1st. Importance of technology for your company's future (DSC 4.58)
- 2nd. Market needs (DSC 4.44)
- 3rd. Capability of R&D division (DSC 4.37)
- 4th. Cost competitiveness of products (DSC 4.16)
- 5th. Social responsibility (environmental problems etc.) (DSC 4.16)

(to be continued)

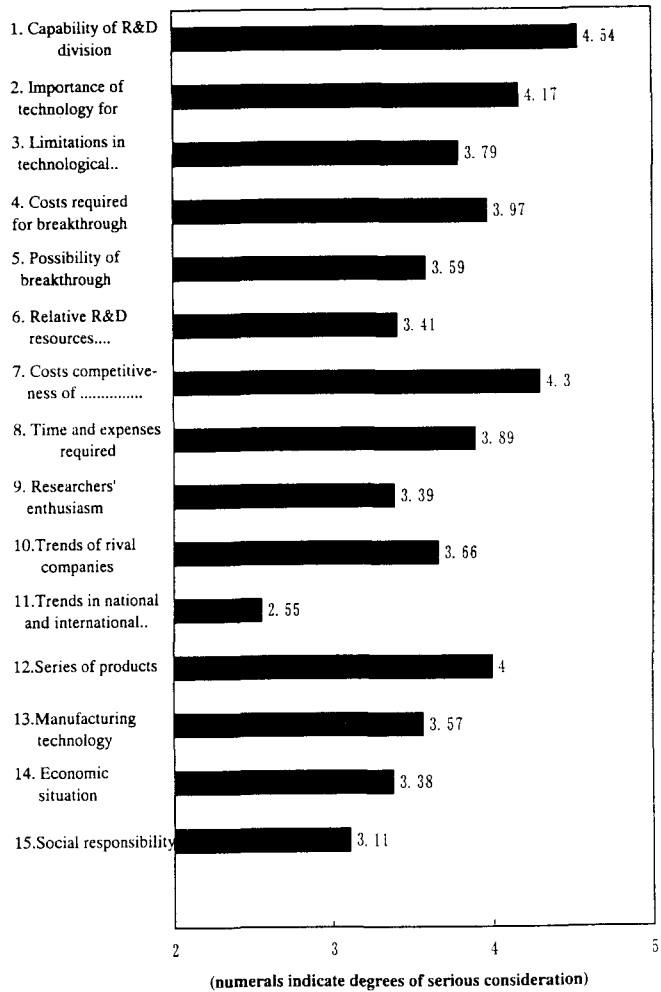


<BETA-NISTEP COMPARATIVE STUDY>  
BETA(FRANCE)

FQ.10 How much do the following factors weigh in making up R&D strategy of your company ?  
(1=very important, 2=important, 3=cannot say either way, 4=not very important, 5=not important)

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Capability of R&D division   | 1 | 2 | 3 | 4 | 5 |
| 2. Importance of technology for your company's future                 | 1 | 2 | 3 | 4 | 5 |
| 3. Limitations in technological know-how                              | 1 | 2 | 3 | 4 | 5 |
| 4. Costs required for breakthrough                                    | 1 | 2 | 3 | 4 | 5 |
| 5. Possibility of breakthrough  | 1 | 2 | 3 | 4 | 5 |
| 6. Relative R&D resources spending in comparison with rival companies | 1 | 2 | 3 | 4 | 5 |
| 7. Cost competitiveness of products                                   | 1 | 2 | 3 | 4 | 5 |
| 8. Time and expenses required   | 1 | 2 | 3 | 4 | 5 |
| 9. Researchers' enthusiasm  | 1 | 2 | 3 | 4 | 5 |
| 10. Trends of rival companies   | 1 | 2 | 3 | 4 | 5 |
| 11. Trends in national and international projects                     | 1 | 2 | 3 | 4 | 5 |
| 12. Series of products  | 1 | 2 | 3 | 4 | 5 |
| 13. Manufacturing technology  | 1 | 2 | 3 | 4 | 5 |
| 14. Economic situation  | 1 | 2 | 3 | 4 | 5 |
| 15. Social responsibility (Environmental problems)                    | 1 | 2 | 3 | 4 | 5 |

Figure F-7(a) Considerations in making up an R&D strategy



III-3-1-1 Considerations in making up an R&D strategy (FQ.10)

This question is basically the same as the NISTEP's one. The distinction between the items 10 and 14 of the Japanese question was not relevant for the French case. After a first test of the French version of questionnaire, we decided to blend those two items into the item 10. Trends of rival companies. For French companies, "status in the business circle" and "trends of rival companies" appear very close. Also for the items market needs (15) and social responsibility (16) of Japanese question, French top management people consider that providing solutions to market needs is part of social responsibility of a company beside environmental pollution for instance. Then, we decided to add a new item (item No. 14 of French question) coming from a suggestion of some respondents referring to "economic situation".

The definition of "degree of serious consideration (DSC)" is the same as the one in the previous page. Figure F-7(a) presents result of BETA's survey, which shows the top five factors with large value of DSC among the French companies are as follows,

1st. Capability of R&D division (DSC 4.54)

2nd. Cost competitiveness of products (DSC 4.30)

(to be continued)

<NISTEP-BETA COMPARATIVE STUDY>

NISTEP (JAPAN)

JQ.19 How much do the following factors weigh when making up the overall R&D strategy of your company ?  
 (1=very important, 2=important, 3=cannot say either way, 4=not very important, 5=not important)

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Capability of R&D division   | 1 | 2 | 3 | 4 | 5 |
| 2. Importance of technology for your company's future                 | 1 | 2 | 3 | 4 | 5 |
| 3. Limitations in technological know-how                              | 1 | 2 | 3 | 4 | 5 |
| 4. Costs required for breakthrough                                    | 1 | 2 | 3 | 4 | 5 |
| 5. Possibility of breakthrough  | 1 | 2 | 3 | 4 | 5 |
| 6. Relative R&D resources spending in comparison with rival companies | 1 | 2 | 3 | 4 | 5 |
| 7. Cost competitiveness of products                                   | 1 | 2 | 3 | 4 | 5 |
| 8. Time and expenses required   | 1 | 2 | 3 | 4 | 5 |
| 9. Researchers' enthusiasm  | 1 | 2 | 3 | 4 | 5 |
| 10. Trends of rival companies   | 1 | 2 | 3 | 4 | 5 |
| 11. Trends in national and international projects                     | 1 | 2 | 3 | 4 | 5 |
| 12. Series of products  | 1 | 2 | 3 | 4 | 5 |
| 13. Manufacturing technology  | 1 | 2 | 3 | 4 | 5 |
| 14. Status in the business circle                                     | 1 | 2 | 3 | 4 | 5 |
| 15. Market needs  | 1 | 2 | 3 | 4 | 5 |
| 16. Social responsibility (Environmental problems)                    | 1 | 2 | 3 | 4 | 5 |

**Figure J-7(b) Considerations in making up an R&D Strategy (classified by existence of an R&D strategy division)**

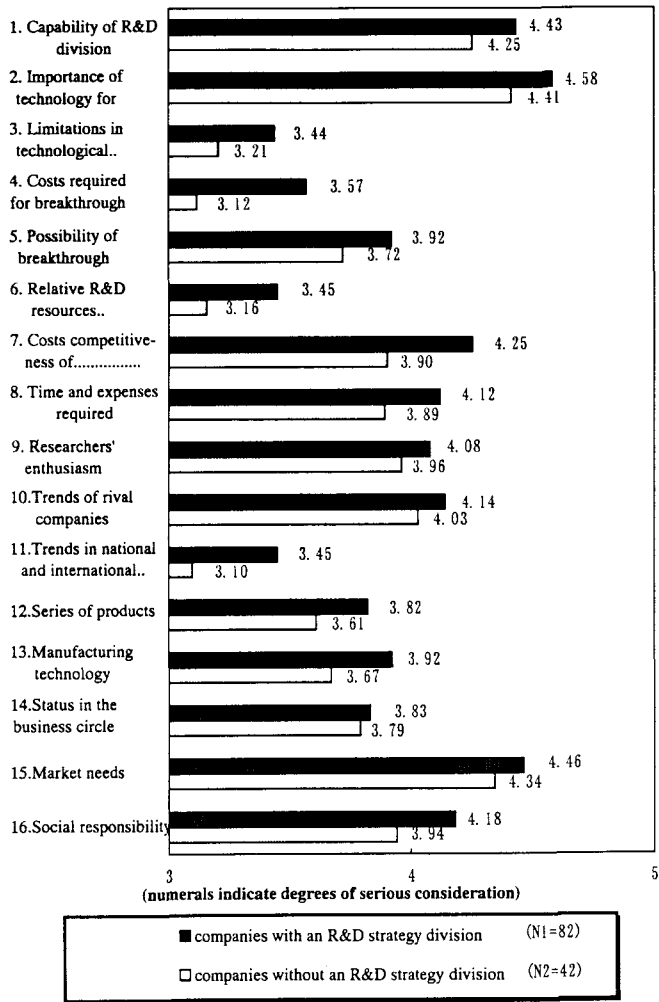


Figure J-7(b) shows classified data of this question by existence of an R&D strategy division. We see that the companies with an R&D strategy division take all factors more seriously in making up the R&D strategy than those without the division do (the average value of DSCs for the companies with an R&D strategy division is larger than the value for those without the division by 0.22). And paying attention to the large difference of DSCs between both groups, the top three factors, for which the companies with an R&D strategy division have larger DSC than those without the division do, are the following.

- 1st. Cost required for breakthrough (difference of DSCs : 0.45)
- 2nd. Trends in national and international projects (difference of DSCs : 0.35)
- 3rd. Cost competitiveness of products (difference of DSCs : 0.35)

The top three factors with large value of DSC for both groups are the same as the ones for overall companies.

From these, we may say that the companies with an R&D strategy division are taking various factors of R&D environment more into consideration in making up the R&D strategy. (to be continued)

<BETA-NISTEP COMPARATIVE STUDY>

BETA(FRANCE)

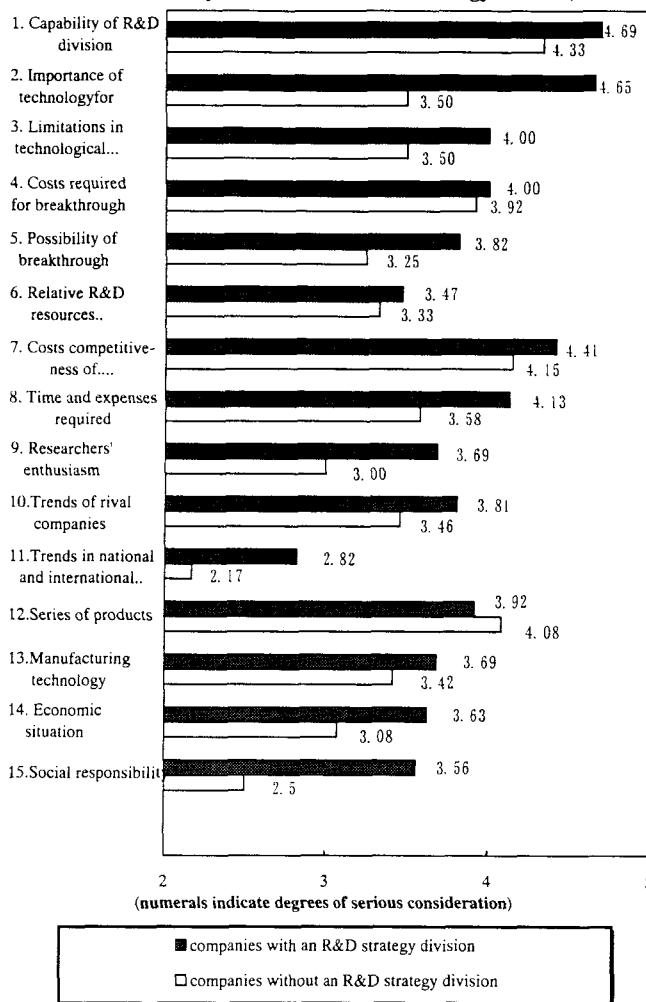
FQ.10 How much do the following factors weigh in making up R&D strategy of your company ?

(1=very important, 2=important, 3=cannot say either way, 4=not very important, 5=not important)

1. Capability of R&D division	1	2	3	4	5
2. Importance of technology for your company's future	1	2	3	4	5
3. Limitations in technological know-how	1	2	3	4	5
4. Costs required for breakthrough	1	2	3	4	5
5. Possibility of breakthrough	1	2	3	4	5
6. Relative R&D resources spending in comparison with rival companies	1	2	3	4	5
7. Cost competitiveness of products	1	2	3	4	5
8. Time and expenses required	1	2	3	4	5
9. Researchers' enthusiasm	1	2	3	4	5
10. Trends of rival companies	1	2	3	4	5
11. Trends in national and international projects	1	2	3	4	5
12. Series of products	1	2	3	4	5
13. Manufacturing technology	1	2	3	4	5
14. Economic situation	1	2	3	4	5
15. Social responsibility	1	2	3	4	5

(Environmental problems)

**Figure F-7(b) Considerations in making up an R&D Strategy (classified by existence of an R&D strategy division)**



3rd. Importance of technology for your company's future (DSC 4.17)

4th. Series of product (DSC 4.00)

5th. Costs required for breakthrough (DSC 3.97).

French firms give more weight to "capability of R&D division" than they do to "importance of technology for your company's future" or to "cost competitiveness of product". These three factors can be seen in the top five factors of Japanese case, however Japanese firms take "importance of technology for your company's future" as the first priority and "market needs" the second, which seems to show the dynamism and future-oriented character in the R&D management of Japanese firms. On the contrary in French companies, they seem to be more devoted to cost arguments and they place "market needs" in twelfth position. Japanese firms attach more importance to factors "market needs" and "social responsibilities (environmental impact as negative externalities)" which are considered as secondary by French firms.

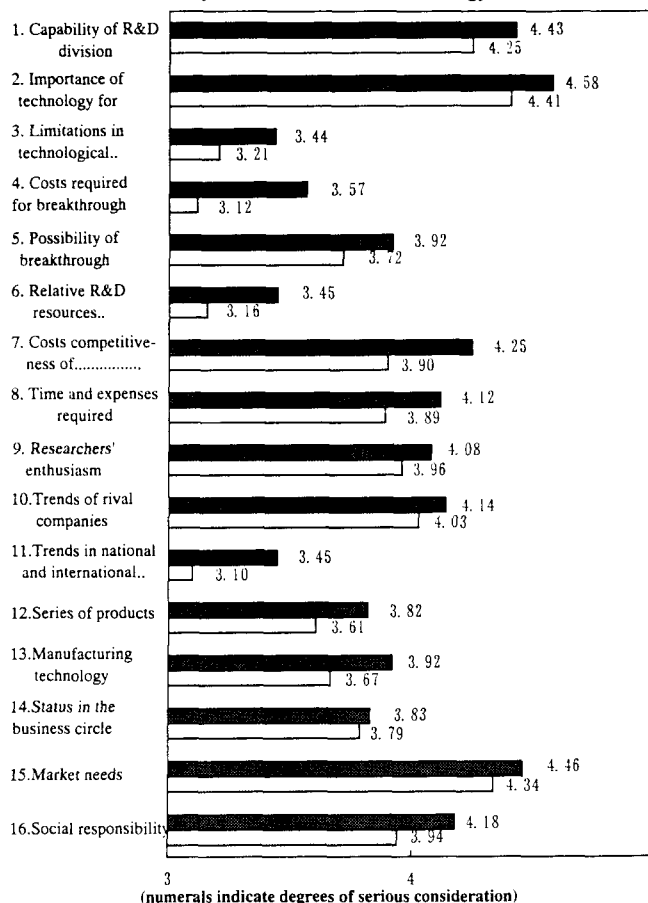
Figure F-7(b) shows classified data of this question by existence of an R&D strategy division. As in the NISTEP result, we see that companies with an R&D strategy division take most of the presented factors (to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.19 How much do the following factors weigh when making up the overall R&D strategy of your company ?  
 (1=very important, 2=important, 3=cannot say either way, 4=not very important, 5=not important)

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Capability of R&D division   | 1 | 2 | 3 | 4 | 5 |
| 2. Importance of technology for your company's future                 | 1 | 2 | 3 | 4 | 5 |
| 3. Limitations in technological know-how                              | 1 | 2 | 3 | 4 | 5 |
| 4. Costs required for breakthrough                                    | 1 | 2 | 3 | 4 | 5 |
| 5. Possibility of breakthrough  | 1 | 2 | 3 | 4 | 5 |
| 6. Relative R&D resources spending in comparison with rival companies | 1 | 2 | 3 | 4 | 5 |
| 7. Cost competitiveness of products                                   | 1 | 2 | 3 | 4 | 5 |
| 8. Time and expenses required   | 1 | 2 | 3 | 4 | 5 |
| 9. Researchers' enthusiasm  | 1 | 2 | 3 | 4 | 5 |
| 10. Trends of rival companies   | 1 | 2 | 3 | 4 | 5 |
| 11. Trends in national and international projects                     | 1 | 2 | 3 | 4 | 5 |
| 12. Series of products  | 1 | 2 | 3 | 4 | 5 |
| 13. Manufacturing technology  | 1 | 2 | 3 | 4 | 5 |
| 14. Status in the business circle                                     | 1 | 2 | 3 | 4 | 5 |
| 15. Market needs  | 1 | 2 | 3 | 4 | 5 |
| 16. Social responsibility (Environmental problems)                    | 1 | 2 | 3 | 4 | 5 |

**Figure J-7(b) Considerations in making up an R&D Strategy (classified by existence of an R&D strategy division)**



(numerals indicate degrees of serious consideration)

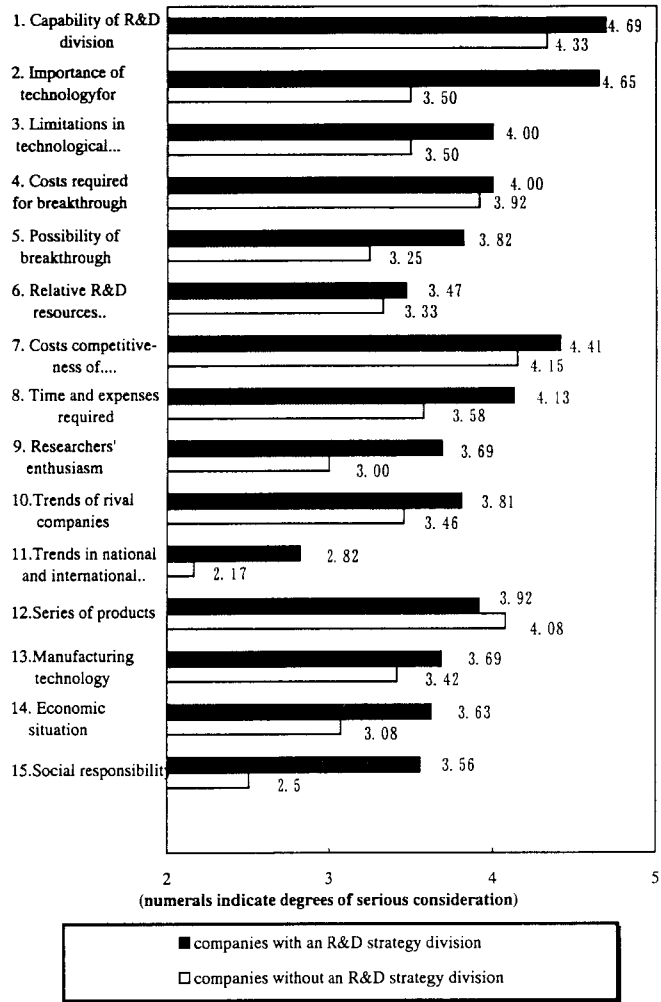
■ companies with an R&D strategy division (N1=82)  
 □ companies without an R&D strategy division (N2=42)

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA(FRANCE)**

FQ.10 How much do the following factors weigh in making up R&D strategy of your company ?  
 (1=very important, 2=important, 3=cannot say either way, 4=not very important, 5=not important)

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Capability of R&D division   | 1 | 2 | 3 | 4 | 5 |
| 2. Importance of technology for your company's future                 | 1 | 2 | 3 | 4 | 5 |
| 3. Limitations in technological know-how                              | 1 | 2 | 3 | 4 | 5 |
| 4. Costs required for breakthrough                                    | 1 | 2 | 3 | 4 | 5 |
| 5. Possibility of breakthrough  | 1 | 2 | 3 | 4 | 5 |
| 6. Relative R&D resources spending in comparison with rival companies | 1 | 2 | 3 | 4 | 5 |
| 7. Cost competitiveness of products                                   | 1 | 2 | 3 | 4 | 5 |
| 8. Time and expenses required   | 1 | 2 | 3 | 4 | 5 |
| 9. Researchers' enthusiasm  | 1 | 2 | 3 | 4 | 5 |
| 10. Trends of rival companies   | 1 | 2 | 3 | 4 | 5 |
| 11. Trends in national and international projects                     | 1 | 2 | 3 | 4 | 5 |
| 12. Series of products  | 1 | 2 | 3 | 4 | 5 |
| 13. Manufacturing technology  | 1 | 2 | 3 | 4 | 5 |
| 14. Economic situation  | 1 | 2 | 3 | 4 | 5 |
| 15. Social responsibility (Environmental problems)                    | 1 | 2 | 3 | 4 | 5 |

**Figure F-7(b) Considerations in making up an R&D Strategy (classified by existence of an R&D strategy division)**



more seriously in making up the R&D strategy than those without the division do. The top two factors with large difference of DSCs between both groups are "Importance of technology for your company's future (difference of DSCs : 1.15)" and "Social responsibilities (difference of DSCs : 1.06)". These show that the French companies with an R&D strategy division appear more sensitive to the future development of technology and the social responsibilities.

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.7 Does your company develop a research strategy / vision

for the whole company ?

1. Yes    2. No

(For those who answered "No", please go on to JQ.8.)

SQ.1 In general, approximately how long does the research

strategy of your company cover ?

1. 3 years    2. 5 years    3. 10 years

4. more than 15 years

SQ.2 Who is the main person in charge of developing the

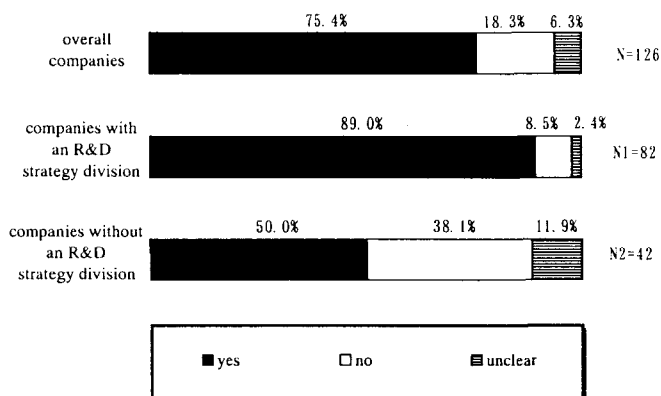
research strategy ?

1. Researcher            2. Research leader  
 3. Manager of research management  
 4. Head of the division of research management  
 5. Director for the division of research management  
 6. President

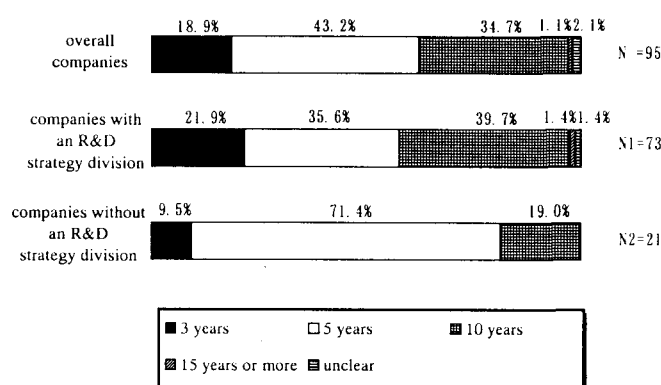
SQ.3 Who provides the final approval of the research strategy ?

1. President  
 2. Director for the division of research management  
 3. Other director  
 4. Head of the division of research management

**Figure J-8(a) Setting up a Company Research Strategy**



**Figure J-8(b) Period of the Company Research Strategy**



**III-3-1-2 Setting up a research strategy for whole company (JQ.7)**

We asked each company whether they develop a research strategy for whole company and if they do, we asked how long it covers / who is the main person in charge of developing it / and who provides the final approval of it.

Of the 126 responded companies, 95(75.4%) answered that they develop a company research strategy, while 23(18.3%) replied that they do not (see Figure J-8(a)). Among the 95 companies which develop a company research strategy, 41(43.2%) answered that their company strategies cover a period of 5 years, and 33(34.7%) chose ten years (see Figure J-8(b)).

When we look at classified result by existence of an R&D strategy division in Figure J-8(a), the companies with the division develop their company research strategies in apparently higher rate than those without the division do.

We see a considerable difference as to the periods the strategies cover (see Figure J-8(b)). Responses of the companies with an R&D strategy division are widely and evenly spread among "3 years", "5 years" and "10 years", whereas more than 70% of those without the division chose a period of "5 years". Some portion of this difference might be explained by the fact that the companies with an R&D division consist of 72 firms (to be continued)

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA(FRANCE)**

FQ.12 Does your company develop a research strategy for the whole company ?

1. Yes      2. No (Please go on to FQ.13.)

- In general, approximately how long does the research strategy of your company cover ?

1. 3 years    2. 5 years    3. 10 years  
 4. more than 10 years

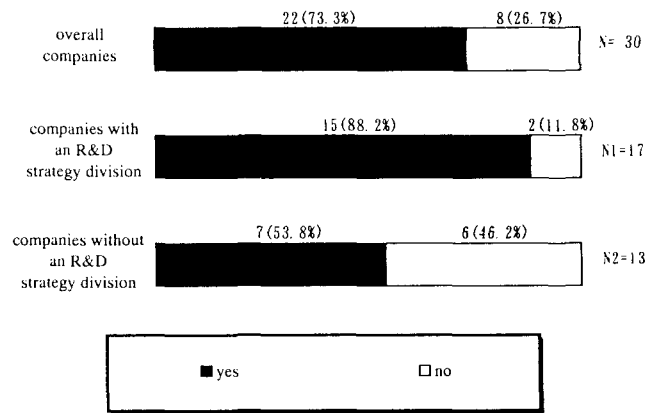
- Who is the main person in charge of developing the research strategy ?

1. Researcher  
 2. Research Director  
 3. Head of the division of research management  
 4. Manager of the division of research management  
 5. President

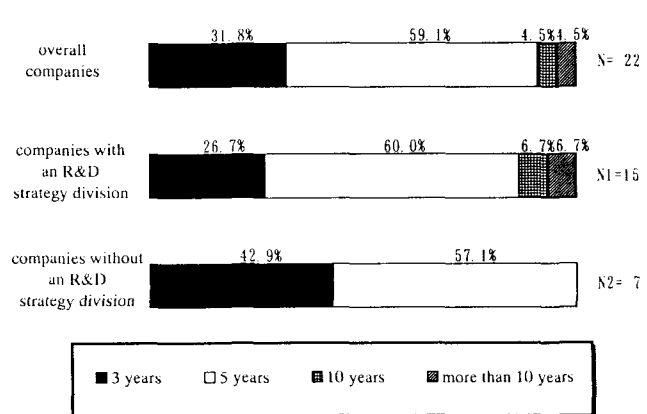
- Who provides the final approval of the research strategy ?

1. President  
 2. Head of the division of research management  
 3. Manager of the division of research management  
 4. Other manager

**Figure F-8(a) Setting up a Company Research Strategy**



**Figure F-8(b) Period of the Company Research Strategy**



**III-3-1-2 Setting up a research strategy for whole company (FQ.12)**

We made slight modifications of this question on coverage period of strategy (we took "more than 10 years" instead of "more than 15 years" ; because French firms generally do not take such a long period). We also had French hierarchical positions for the main person of developing research strategy and the person of decision making. The hierarchical order from the lowest is 1. Researcher < 4. Manager of the division of research management < 3. Head of the division of research management < 2. Research Director < 5. President.

As for development of a strategy for whole company, French and Japanese results are more or less equivalent ; 46.2% of the French firms without an R&D strategy division (versus 38.1% for Japanese firms) admit not developing a research strategy (see Figure J-8(a) and Figure F-8(a)).

When the R&D strategy division exists coverage period of strategy can be longer than 10 years, while existence of that division is supposed to lead with long term strategy. However, long term projects are not so common : more than a half of the firms with the division chose a period of 5 years. When the R&D strategy division does not exist, the strategy is programmed over 3 or 5 years (slightly more on 5 years), while in Japan, a period of 5 years is the mostly chosen (see Figure J-8(b) and Figure F-8(b)).

(to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.7 Does your company develop a research strategy / vision for the whole company ?

1. Yes    2. No

(For those who answered "No", please go on to JQ.8.)

SQ.1 In general, approximately how long does the research strategy of your company cover ?

1. 3 years    2. 5 years    3. 10 years  
 4. more than 15 years

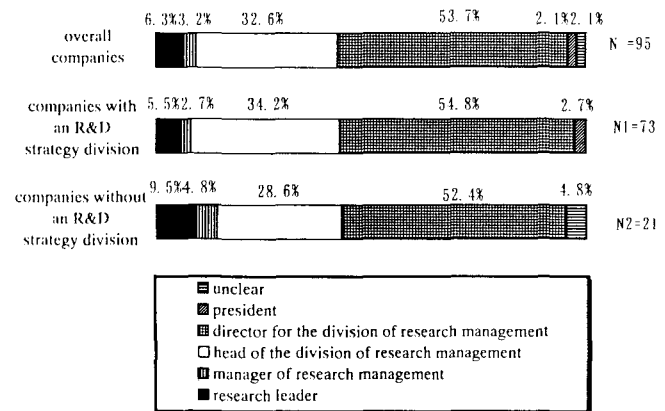
SQ.2 Who is the main person in charge of developing the research strategy ?

1. Researcher            2. Research leader  
 3. Manager of research management  
 4. Head of the division of research management  
 5. Director for the division of research management  
 6. President

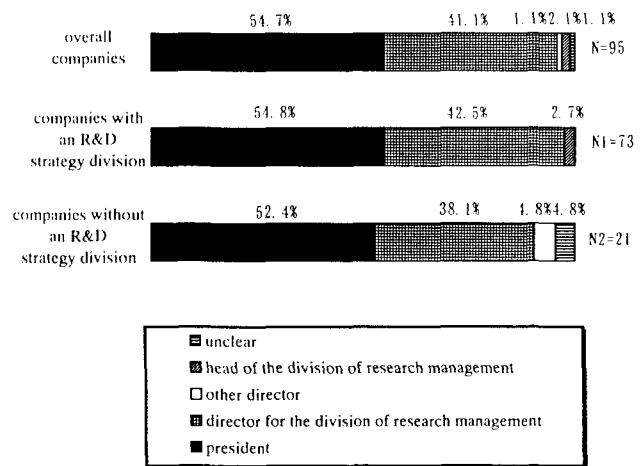
SQ.3 Who provides the final approval of the research strategy ?

1. President  
 2. Director for the division of research management  
 3. Other director  
 4. Head of the division of research management

**Figure J-8(c) Responsibility of Developing the Research Strategy**



**Figure J-8(d) Approving Authority for the Research Strategy**



(vs. 21 for those without the division) and they covers broader range of business activities. This broader coverage of activities (i.e. broader coverage of product's life-cycle) cause a widely spread responses on the periods of company research strategy to some extent.

Although the responses of the companies with an R&D strategy division are fairly evenly spread, more than 40% of them replied that their research strategies cover 10 years or more. And considering the fact that 70% of the companies without an R&D division chose a period of "5 years", we may say that the companies with an R&D strategy division generally develop longer company strategies than those without the division.

As for responsible person for developing the company research strategy, 51(53.7%) chose "director (one of executive officers) for research management", 31(32.6%) for "head of research management" (see Figure J-8(c)). And as for the approving of the company research strategy, 52(54.7%) for "president" and 39(41.1%) for "director for research management division" (see Figure J-8(d)). We do not see much differences in the responses concerning the main person in charge of developing the company strategy and the approval of it between two groups.



<BETA-NISTEP COMPARATIVE STUDY>  
BETA(FRANCE)

**Figure F-8(c) Responsibility of Developing Research Strategy**

FQ.12 Does your company develop a research strategy for the whole company ?

1. Yes      2. No (Please go on to FQ.13.)

- In general, approximately how long does the research strategy of your company cover ?

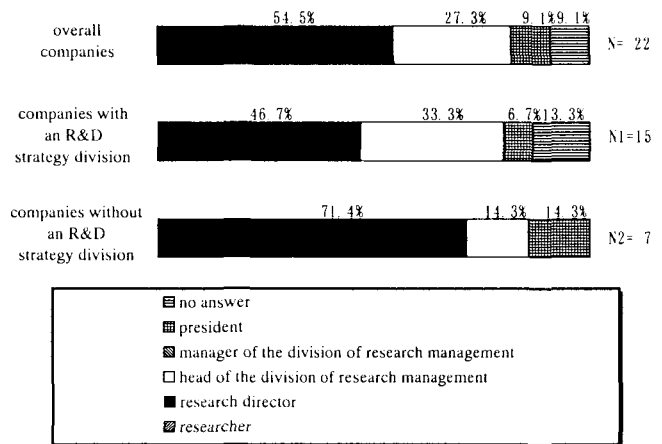
1. 3 years    2. 5 years    3. 10 years  
4. more than 10 years

- Who is the main person in charge of developing the research strategy ?

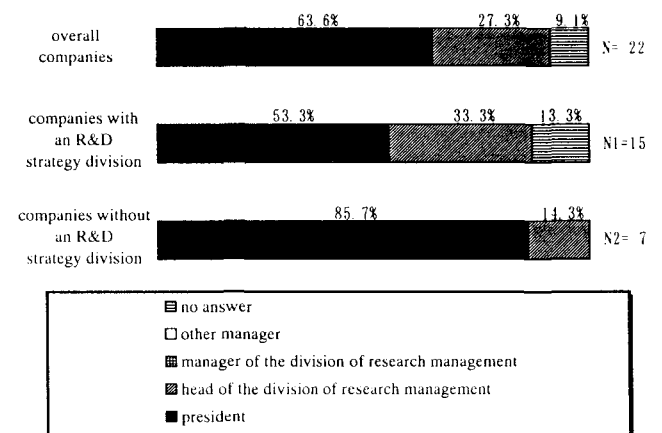
1. Researcher  
2. Research Director  
3. Head of the division of research management  
4. Manager of the division of research management  
5. President

- Who provides the final approval of the research strategy ?

1. President  
2. Head of the division of research management  
3. Manager of the division of research management  
4. Other manager



**Figure F-8(d) Approving Authority for the Research Strategy**



Influence of the R&D strategy division is marked in France and in Japan. However, it seems to have different consequences. In Japan, extension of coverage period of the strategy is more pronounced (for 10 years periods ; 39.7% for companies with the division vs. 19.0% for companies without the division). On the contrary in France, the division does not emphasize to extend coverage period of the strategy.

As for responsible person for developing the company research strategy, "research director" is mostly chosen ; 46.7% for the firms with an R&D strategy division, 71.4% for the firms without the division. And when the strategy division exists, "head of research management division" is more involved in developing the company research strategy (33.3% against 14.3% : see Figure F-8(c)).

Concerning approval for the strategy, in the case of firms without the division mostly the president (85.7%) does, while in the case of firms with the division "head of research management division" is more involved (33.3%) in final decision process.

Japanese results are more homogenous and existence of an R&D strategy division does not make sense from this point of view.

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.6 Does your company develop a research plan for the whole company ?

1. Yes      2. No

(For those who answered "No", please go on to JQ.7.)

SQ.1 In general, approximately how long does the research plan of your company cover ?

1. 3 years    2. 5 years    3. 10 years  
4. more than 15 years

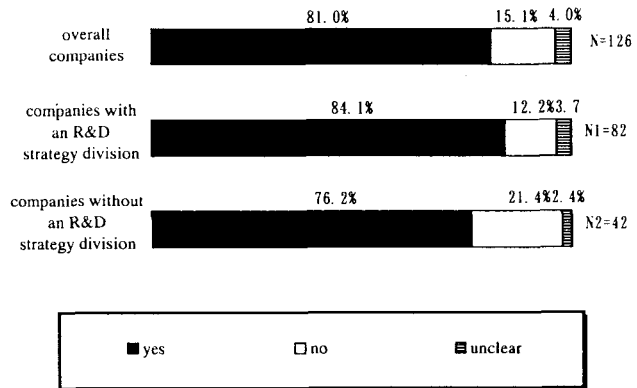
SQ.2 Who is the main person in charge of developing the research plan ?

1. Researcher                      2. Research leader  
3. Manager of research management  
4. Head of the division of research management  
5. Director for the division of research management  
6. President

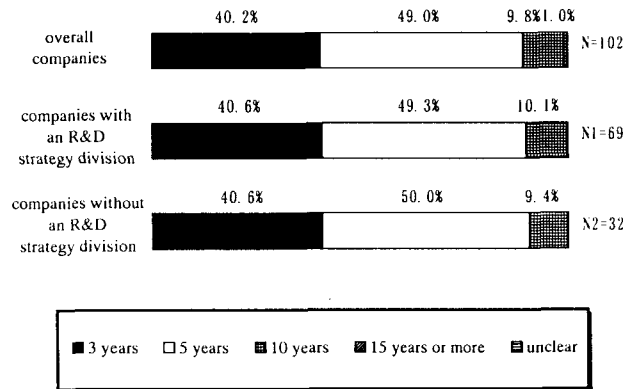
SQ.3 Who provides the final approval of the research plan ?

1. President  
2. Director for the division of research management  
3. Other director  
4. Head of the division of research management

**Figure J-9(a) Setting up a Company Research Plan**



**Figure J-9(b) Period of the Company Research Plan**



III-3-1-3 Setting up a research plan for whole company (JQ.6)

We asked each company whether they develop a research plan for whole company and if they do, we asked how long it covers / who is the main person in charge of developing it / and who provides the final approval of it.

Of the 126 responded companies, 102(81.0%) answered that they develop a company research plan, while 19(15.1%) replied that they do not (see Figure J-9(a)). Among the 102 companies which develop a company research plan, 50(49.0%) answered that their research plans cover a period of 5 years, 41(40.2%) chose 3 years and 10(9.8%) for 10 years (see Figure J-9(b)).

When we look at classified result by existence of an R&D strategy division in Figure J-8(a), the companies with the division develop their company research plans in a little bit higher rate than those without the division do. And we do not see any difference as to the periods the plans cover (see Figure J-9(b)).

(to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA(FRANCE)

FQ.11 Does your company develop a research plan for the whole company ?

1. Yes    2. No (Please go on to FQ.12.)

- In general, approximately how long does the research plan of your company cover ?

1. 3 years    2. 5 years    3. 10 years  
4. more than 10 years

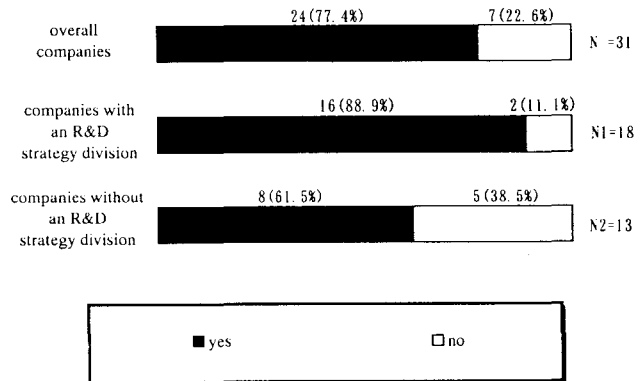
- Who is the main person in charge of developing the research plan ?

1. Researcher  
2. Research Director  
3. Head of the division of research management  
4. Manager of the division of research management  
5. President

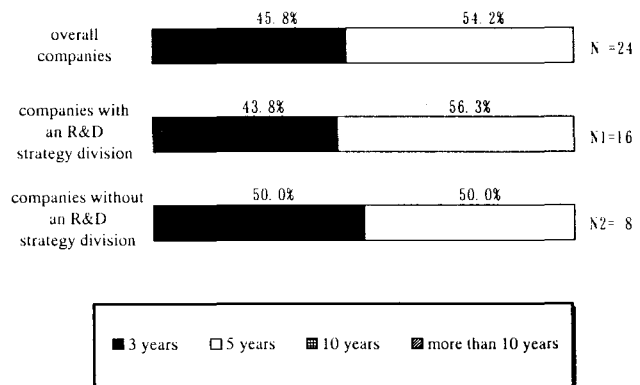
- Who provides the final approval of the research plan ?

1. President  
2. Head of the division of research management  
3. Manager of the division of research management  
4. Other manager

**Figure F-9(a) Setting up a Company Research Plan**



**Figure F-9(b) Period of the Company Research Plan**



III-3-1-3 Setting up a research plan for whole company (FQ.11)

We made the same modifications for this question as the question FQ.12.

As for development of company research plans, 77.4% of the responded companies answered positively. And when an R&D strategy division exists, we see the clearer tendency (88.9% against 61.5% in Figure F-9(a)). The comparison between both survey results on this point shows that the existence of an R&D strategy division has more influence on development of research plan in French firms than in Japanese firms (see Figure F-9(a) and Figure J-9(a)).

Concerning periods of research plan, the companies with an R&D strategy division slightly more prefer to 5 years rather than 3 years (see Figure F-9(b)).

(to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.6 Does your company develop a research plan for the whole company ?

1. Yes    2. No

(For those who answered "No", please go on to JQ.7.)

SQ.1 In general, approximately how long does the research plan of your company cover ?

1. 3 years    2. 5 years    3. 10 years  
 4. more than 15 years

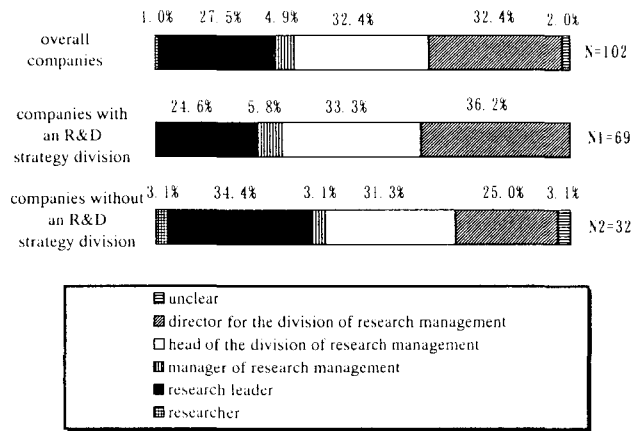
SQ.2 Who is the main person in charge of developing the research plan ?

1. Researcher    2. Research leader  
 3. Manager of research management  
 4. Head of the division of research management  
 5. Director for the division of research management  
 6. President

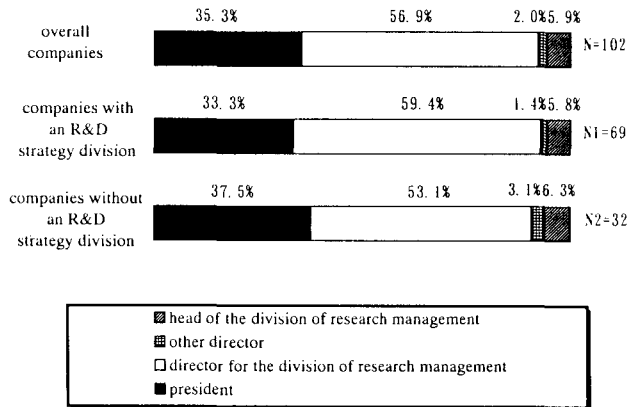
SQ.3 Who provides the final approval of the research plan ?

1. President  
 2. Director for the division of research management  
 3. Other director  
 4. Head of the division of research management

**Figure J-9(c) Responsibility of Developing the Research Strategy**



**Figure J-9(d) Approving Authority for the Research Plan**



Among the companies which develop a company research plan, as for the main person in charge of developing company research plan, 33(32.4%) chose "head of research management", while the same number chose "director (one of executive officer) for research management" (see Figure J-9(c)). And as for the approving of company research plan, 58(56.9%) for "director for research management" and 36(35.3%) for "president" (see Figure J-9(d)).

Looking at classified data by existence of an R&D strategy division, in Figure J-9(c) we see a trend that the companies with the division answer higher hierarchical positions for the responsible person for developing the company research plan than those without the division. On the contrary as for the approval of the research plan, the companies with the division have a larger percentage for "director for research management division" than those without the division (see Figure J-9(d)), which means that the companies with the division have slightly decentralized system compared with those without the division.

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA(FRANCE)**

FQ.11 Does your company develop a research plan for the whole company ?

1. Yes    2. No (Please go on to FQ.12.)

- In general, approximately how long does the research plan of your company cover ?

1. 3 years    2. 5 years    3. 10 years  
 4. more than 10 years

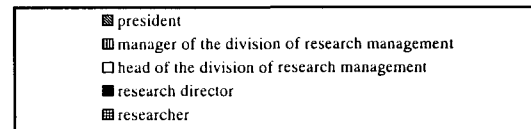
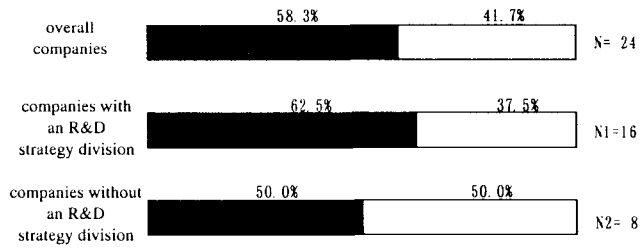
- Who is the main person in charge of developing the research plan ?

1. Researcher  
 2. Research Director  
 3. Head of the division of research management  
 4. Manager of the division of research management  
 5. President

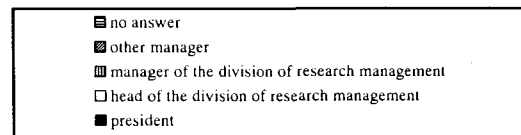
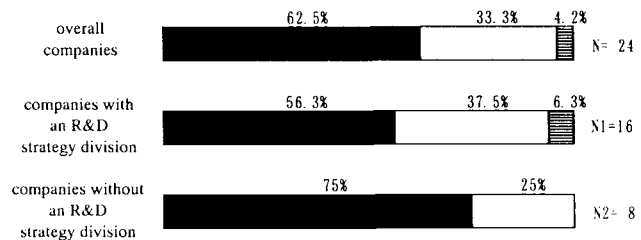
- Who provides the final approval of the research plan ?

1. President  
 2. Head of the division of research management  
 3. Manager of the division of research management  
 4. Other manager

**Figure F-9(c) Responsibility of Developing the Research Plan**



**Figure F-9(d) Approving Authority for the Research Plan**



Responsibility of developing the company research plan rests mainly with "research director" (58.3%) and "head of the research management division" (41.7%).

Finally, the decision is mainly given by the president (62.5% for French firms vs. 35.3% for Japanese firms) who does not participate in the elaboration of the research plan, while in Japanese results we see that the decision for the research plan is made mainly by "director (a member of executive officers) for the research management division" (56.9%). This shows a centralized structure of the French firms on decision making.

When we see the classified data of approval of research plan (see Figure F-9(d)), we may see that the companies with an R&D strategy division have slightly decentralized structure of decision making concerning research plan.

## **III-3-2 Relationships between the R&D Division and Other Divisions**

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

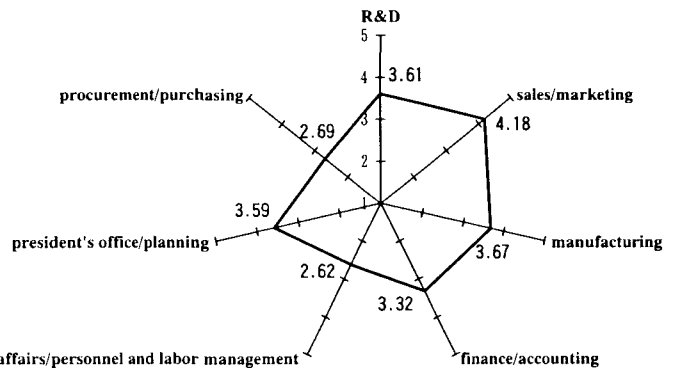
JQ.16 In general, how much influence and say does each of the following divisions have when making joint decisions that may affect the overall performance of your company ?

(1=little or no , 2=some , 3=considerable , 4=a great deal of, 5=extremely high degree of )

1. R&D	1	2	3	4	5
2. Sales / Marketing	1	2	3	4	5
3. Manufacturing	1	2	3	4	5
4. Finance / Accounting	1	2	3	4	5
5. General affairs / Personnel and Labor management	1	2	3	4	5
6. President's office / Planning	1	2	3	4	5
7. Procurement / Purchasing	1	2	3	4	5

**Figure J-10(a) Influence of Each Division on Matters Affecting Overall Company Performance**

(numerals indicate degrees of influence)



**III-3-2-1 Influence of each division on matters affecting performance of overall company**

(JQ.16)

To ascertain level of influence that the R&D division have on senior management, we asked each company to indicate relative degree of influence of each division on matters that affect performance of the company with a scale from 1 to 5 (1 = little or no influence, 2 = some influence, 3 = considerable influence, 4 = great deal of influence, 5 = extremely high degree of influence).

Figure J-10(a) shows degree of influence (hereafter, DI) of each division with the following definition,

$$DI = \{1x (\text{No. of responded companies for the scale 1}) + \dots + 5x (\text{No. of responded companies for the scale 5})\} / \text{Total number of responded companies.}$$

The larger value of DI indicates the greater influence. As can be seen, the sales and marketing has the greatest influence (DI = 4.18) followed by the manufacturing (DI = 3.67), the R&D (DI = 3.61) and the president's office and planning (DI = 3.59) so on. The R&D division is the third place for the overall companies.

When we see classified data by existence of an R&D strategy division (see Figure J-10(b)), we can say that each division of the companies (to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

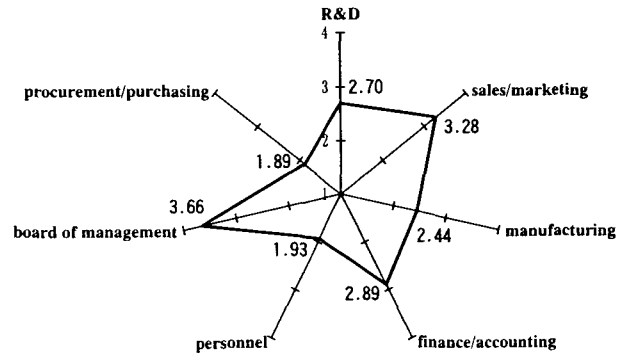
FQ.5 In general, how much influence does each of the following divisions have when making joint decisions that may affect the overall performance of your company ?

(1=little or no , 2=some , 3=a great deal of, 4=extremely high degree of )

1. R&D	1	2	3	4
2. Sales / Marketing	1	2	3	4
3. Manufacturing	1	2	3	4
4. Finance / Accounting	1	2	3	4
5. Personnel	1	2	3	4
6. Board of management	1	2	3	4
7. Procurement / Purchasing	1	2	3	4

**Figure F-10(a) Influence of Each Division on Matters Affecting Overall Company Performance**

(numerals indicate degree of influence)



III-3-2-1 Influence of each division on matters affecting performance of overall company

(FQ.5)

We made slight modifications adapting the French context ("Board of management" instead of "President's office / Planning") and changing the scale from 5 to 4. Results are shown in Figure F-10(a) and F-10(b) with the similar definition of DI to the Japanese one.

This question deals with the problem of access structure to strategic decision for different functional divisions. It gives an idea on how the process of decision is structured. The extreme figures could be on the one hand an access of strategic decision exclusively reserved to the corporate planning staff, and on the other hand a total decentralized structure of decision with direct access to every division. The Japanese and French situations are of course between two unrealistic structures.

It is important to recall the fact that the answers express the point of view of R&D people or board of management. Indeed, the results could be different if the answers were given by other functional division. If the answers from the divisions with relatively low degree of influences (procurement / purchasing and personnel) was comparable, results are radically divergent for the main influencing division. Influence of Japanese divisions on strategic decision is more homogenous compared with the French one. (to be continued)



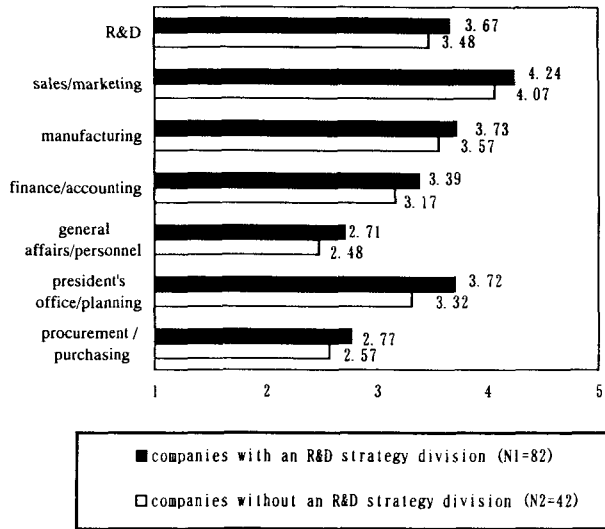
<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.16 In general, how much influence and say does each of the following divisions have when making joint decisions that may affect the overall performance of your company ?

(1=little or no , 2=some , 3=considerable , 4=a great deal of, 5=extremely high degree of )

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. R&D   | 1 | 2 | 3 | 4 | 5 |
| 2. Sales / Marketing                                   | 1 | 2 | 3 | 4 | 5 |
| 3. Manufacturing                                       | 1 | 2 | 3 | 4 | 5 |
| 4. Finance / Accounting                                | 1 | 2 | 3 | 4 | 5 |
| 5. General affairs / Personnel and<br>Labor management | 1 | 2 | 3 | 4 | 5 |
| 6. President's office / Planning                       | 1 | 2 | 3 | 4 | 5 |
| 7. Procurement / Purchasing                            | 1 | 2 | 3 | 4 | 5 |

**Figure J-10(b) Influence of Each Division on Matters Affecting Overall Company Performance (classified by existence of an R&D strategy division)**



with the R&D strategy division has larger DI value than the same division of the companies without the R&D strategy division. Differences of DI between the companies with an R&D strategy division and the companies without are 0.17 for the sales and marketing, 0.16 for the manufacturing and 0.19 for the R&D so on.

This appears that the companies with an R&D strategy division have a tendency of picking up information and opinions from the various divisions and reflecting them in their decision-making process of senior management.

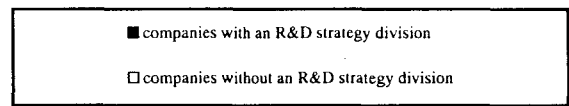
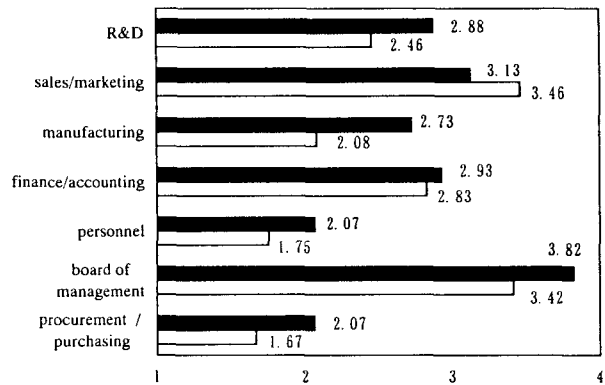
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**BETA (FRANCE)**

FQ.5 In general, how much influence does each of the following divisions have when making joint decisions that may affect the overall performance of your company ?

(1=little or no , 2=some , 3=a great deal of, 4=extremely high degree of )

1. R&D	1	2	3	4
2. Sales / Marketing	1	2	3	4
3. Manufacturing	1	2	3	4
4. Finance / Accounting	1	2	3	4
5. Personnel	1	2	3	4
6. Board of management	1	2	3	4
7. Procurement / Purchasing	1	2	3	4

**Figure F-10(b) Influence of Each Division on Matters Affecting Overall Company Performance (classified by existence of an R&D strategy division)**



In the French case, board of management arrives in the first position while it is in fourth position for the Japanese respondents. The sales and marketing are both powerful and this is confirming the fact that a general tendency of all over the world is the research of commercial differentiation due to severe competition. Another characteristic point of the French results is the relatively middle position of the manufacturing division confirming the fact that production is considered as a downstream activity in the process of creation of new ideas while Japanese place it in the center of the organization as in a simultaneous engineering process. This point will be confirmed in the part III-3-2 concerning the relationships between the R&D division and other divisions.

In a comparison between the US and Japanese firms, M. AOKI [5] shows that the hierarchy structure is much more pronounced in Japanese organization but the decision process exhibits more autonomies at each level. In this sense, the Japanese management introduces a greater autonomy in the decision, and above all uses horizontal forms or links providing cross-fertilization and consensus process. We have here a confirmation on one dimension of such a phenomenon between Japanese and French companies. It proves that hierarchy and decision making process have powerful cultural roots requiring non linear and multidimensionnal analysis to be apprehended.

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**NISTEP (JAPAN)**

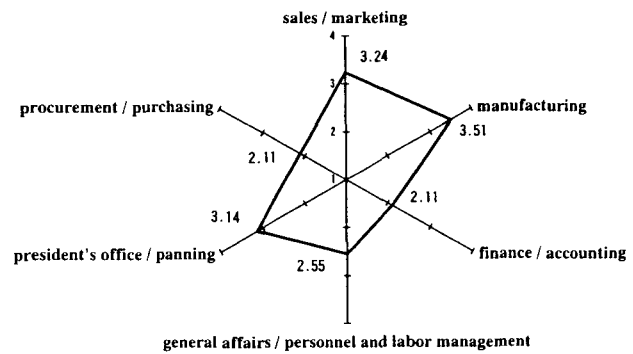
JQ.17 How often does the R&D division have meetings with the following divisions ?

**Figure J-11(a) Frequency of Contacts between R&D Div. and Other Div.**

(1=little or no contact, 2=once a half year,  
 3=monthly, 4=weekly, 5=daily)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

(numerals indicate degrees of contact)



**III-3-2-2 Frequency of contacts between the R&D division and other divisions (JQ.17)**

In order to clarify relative degrees of contact between the R&D division and other divisions of the company (sales / marketing, manufacturing, finance / accounting, general affairs / personnel and labor management, president's office / planning, procurement / purchasing), we asked each company to indicate how often the R&D division comes into contact with other divisions with a scale from 1 to 5.

Figure J-11(a) presents frequencies of contact between the R&D division and other divisions by "degree of contact (hereafter, DC)" defined as follows,

$DC = \{1x \text{ (No. of responded companies for the weight 1)} + \dots + 5x \text{ (No. of responded companies for the weight 5)}\} / \text{Total number of responded companies.}$

(As we see in the above definition, the larger value of DC means the more frequent contact.)

The manufacturing division has the most frequent contact with the R&D division (DC 3.51), followed by the sales / marketing (DC 3.24) and the president's office / planning (DC 3.14) so on.

(to be continued)

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BETA (FRANCE)

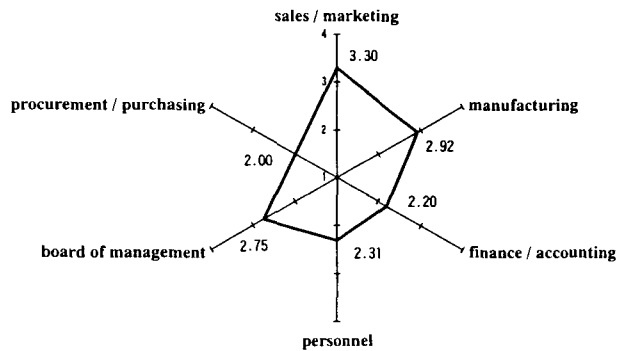
FQ.22 How often does the R&D division have meetings with the following divisions ?

(1=little or no contact, 2=once a quarter year, 3=monthly, 4=weekly, 5=daily )

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. Personnel	1	2	3	4	5
5. Board of management	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

Figure F-11(a) Frequency of Contacts between R&D Div. and Other Div.

(numerals indicate degrees of contact)



III-3-2-2 Frequency of contacts between R&D division and other divisions (FQ.22)

We made slight modifications ("once a quarter year" instead of "once a half year" for the scale 2 and "Board of management" for "President office / Planning"), and asked each company to indicate how often the R&D division comes into contact with other divisions with a scale from 1 to 5. The definition of "degree of contact (DC)" is the same as the one for Japanese result. Figure F-11(a) presents frequencies of contact between the R&D division and other divisions for the French survey.

In the results of the French survey, the sales / marketing divisions have the most frequent contact with the R&D division (DC 3.30), followed by the manufacturing division (DC 2.92) and the board of management (DC 2.75) so on.

The situation is quite the same but in Japan the relationship between the R&D division and the president's office and, above all, the contacts between the researchers and the manufacturing division are more intense. This link between "R&D and manufacturing" proves that management methods such as simultaneous engineering are more developed in Japan. Problems of manufacturization are early incorporated in the stage of product development. This fact characterizes the Japanese R&D system as an "early engineering" as opposed to a more common

(to be continued)

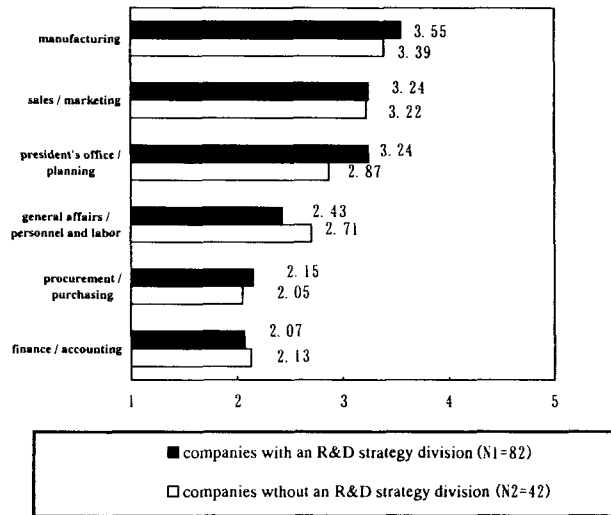
**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.17 How often does the R&D division have meetings with the following divisions ?

**Figure J-11(b) Frequency of Contacts between R&D Div. and Other Div. (classified by existence of an R&D strategy division)**

(1=little or no contact, 2=once a half year, 3=monthly, 4=weekly, 5=daily)

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Sales / Marketing                                | 1 | 2 | 3 | 4 | 5 |
| 2. Manufacturing                                    | 1 | 2 | 3 | 4 | 5 |
| 3. Finance / Accounting                             | 1 | 2 | 3 | 4 | 5 |
| 4. General affairs / Personnel and Labor management | 1 | 2 | 3 | 4 | 5 |
| 5. President's office / Planning                    | 1 | 2 | 3 | 4 | 5 |
| 6. Procurement / Purchasing                         | 1 | 2 | 3 | 4 | 5 |



Looking upon classified data by existence of an R&D strategy division (see Figure J-11(b)), the R&D division of the companies with the strategy division has more frequent contact with other divisions except for the finance / accounting and the general affairs / personnel and labor management than the R&D division of those without the strategy division do. Especially difference of DC concerning the president's office / planning between both groups is the largest (difference of DC : 0.37, and DC for the companies with the R&D strategy division is larger).

On the other hand, for the companies without the strategy division, the R&D division tends to maintain closer contact with especially the general affairs / personnel and labor management divisions compared with those with the strategy division (difference of DC : 0.28).

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BETA (FRANCE)

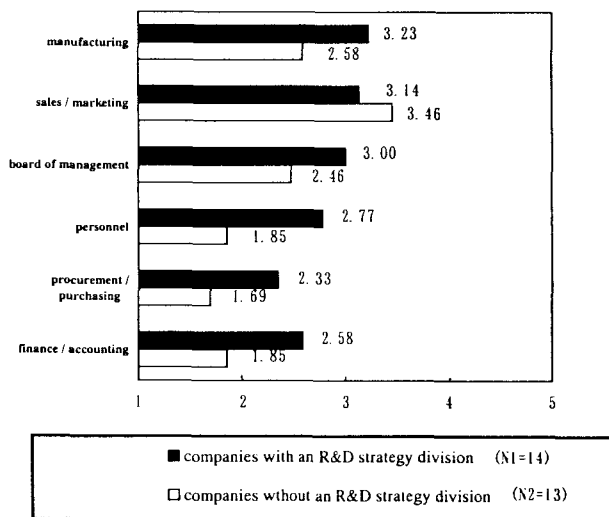
FQ.22 How often does the R&D division have meetings with the following divisions ?

(1=little or no contact, 2=once a quarter year, 3=monthly, 4=weekly, 5=daily )

- |                             |   |   |   |   |   |
|-----------------------------|---|---|---|---|---|
| 1. Sales / Marketing        | 1 | 2 | 3 | 4 | 5 |
| 2. Manufacturing            | 1 | 2 | 3 | 4 | 5 |
| 3. Finance / Accounting     | 1 | 2 | 3 | 4 | 5 |
| 4. Personnel                | 1 | 2 | 3 | 4 | 5 |
| 5. Board of management      | 1 | 2 | 3 | 4 | 5 |
| 6. Procurement / Purchasing | 1 | 2 | 3 | 4 | 5 |

**Figure F-11(b) Frequency of Contacts between R&D Div. and Other Div.**

(classified by existence of an R&D strategy division)



system of "waiting" or "sequential engineering".

Looking upon classified data by existence of an R&D strategy division (see Figure F-11(b)), the R&D division of the companies with the strategy division has more frequent contact with other divisions except for the sales / marketing than the R&D division of those without the strategy division do. The order of the divisions according to the value of DC is the manufacturing (DC 3.23), the sales / marketing (DC 3.14) and the board of management (DC 3.00) for the companies with the strategy division, and on the other hand, it is the sales / marketing (DC 3.46), the manufacturing (DC 2.58) and the board of management (DC 2.46) for those without the strategy division. Here we see that the existence of the R&D strategy division has an effect of moderating the influence of the sales / marketing divisions.

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.33 To what extent does each statement listed below

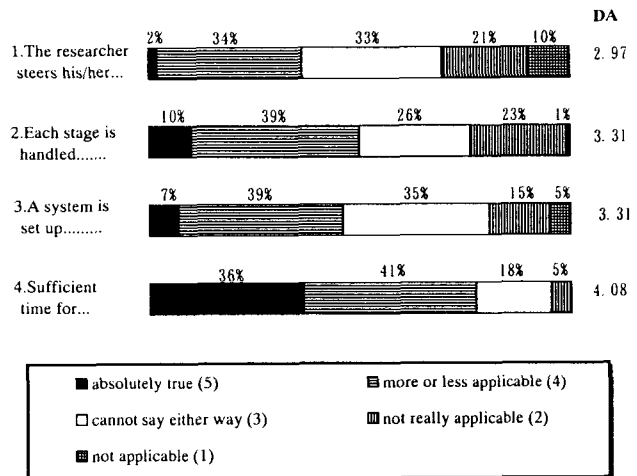
correctly describe the technology transfer within your company from research to development or production stages ?

(1=absolutely true, 2=more or less applicable, 3=cannot say

either way, 4=not really applicable, 5=not applicable)

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. The researcher steers his/her own projects through development to production.   | 1 | 2 | 3 | 4 | 5 |
| 2. Each stage is handled by one person in charge, and followed up by another for the next stage.   | 1 | 2 | 3 | 4 | 5 |
| 3. A system is set up for smooth transfer between each stage by taking opinions of the R&D and the sales / marketing divisions into account. | 1 | 2 | 3 | 4 | 5 |
| 4. Sufficient time for transfer and close communication between the different stages are necessary.  | 1 | 2 | 3 | 4 | 5 |

**Figure J-12(a) Technology Transfer within a Firm**



III-3-2-3 Technology transfer from research to development or production (JQ.33)

In this question, we listed several statements describing technology transfer from research to development or production within a company, and asked each company to show to what extent each statement is applicable for the company with a scale of 1 to 5. Here, we assumed that the "statement no. 1." corresponds to a typical (traditional) style for technology transfer of Japanese firms ; the "statement no. 2." is a typical example of the European and American flow ; the "statement no. 3." indicates a highly strategy-oriented management. And we proposed the "statement no. 4." in order to clarify awareness of each company of need for sufficient time and close liaison for coordination with the company strategy at technology transfer from research to development or production.

We calculated an average "degree of applicability (hereafter DA : the larger value means the more applicable statement)" for each statement by the following definition.

DA= {5x (No. of responded companies for the weight 1) + . . . + 1x (No. of responded companies for the weight 5)} / Total number of responded companies.

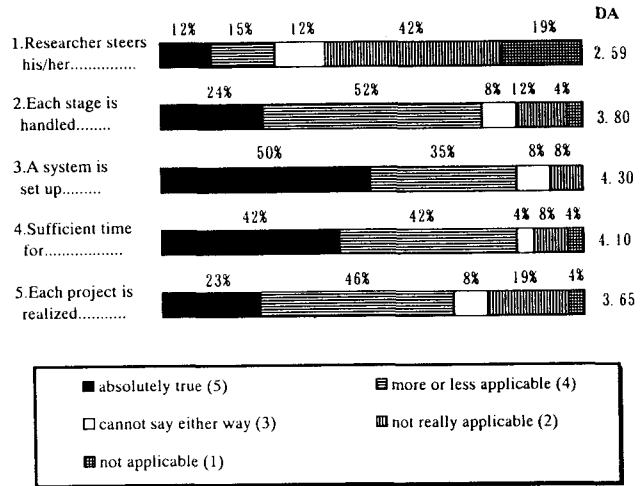
Figure J-12(a) shows the result for overall companies, from which we see that the style of technology transfer in Japanese firms is the "division of work (European or American)" style (DA 3.31) rather than the traditional (to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.23 To what extent does each statement listed below

- correctly describe the technology transfer within your company from research to development of product stages?  
(1=absolutely true, 2=more or less applicable, 3=cannot say either way, 4=not really applicable, 5=not applicable)
1. The researcher steers his/her own projects through development to production. 1 2 3 4 5
2. Each stage is handled by one person in charge, and followed up by another for the next stage. 1 2 3 4 5
3. A system is set up for smooth transfer between each stage by taking opinions of the R&D and the sales / marketing divisions into account. 1 2 3 4 5
4. Sufficient time for transfer and close communication between the different stages are necessary. 1 2 3 4 5
5. Each project is realized by a special group consisting of the members from the R&D, the Marketing and the Manufacturing division etc.. 1 2 3 4 5

**Figure F-12(a) Technology Transfer within a Firm**



III-3-2-3 Technology transfer from research to development or production (FQ.23)

We added one more statement (5.) in this question, with an assumption that in some case a special group consisting of the members from the R&D division, the marketing and the manufacturing so on carry out a project. Figure F-12(a) shows the result for overall companies, where we use the same definition of DA as Japanese one.

French firms give slightly negative answers to the statement 1. (DA 2.59) whereas they give positive answers to the statement 2. (DA 3.80). That is, in French firms, researchers cannot follow their projects from the beginning to the manufacturing stage whereas it is often the case in Japan. It confirms our former argument in terms of internal organization (Japanese "early (simultaneous) engineering" versus European "waiting (sequential) engineering"). The difference on this point between French firms and Japanese is certainly due to the difference of mobility of employees within the firm (in France, the mobility is less, that is the employees want to keep the same jobs). And from the fact that the statement 5. has a value of 3.65 for DA, we see that this type of management for technology transfer seems to be rather common in French firms.

As far as the sales / marketing divisions are concerned, there is a major difference between French and Japanese attitude (to be continued)



**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.33 To what extent does each statement listed below

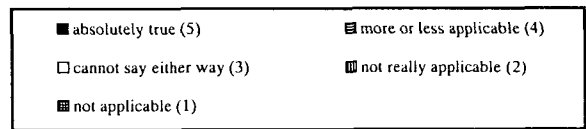
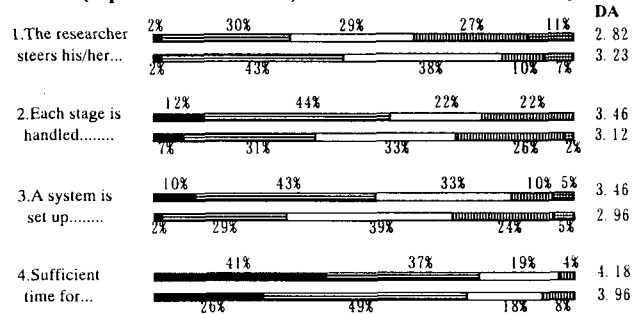
correctly describe the technology transfer within your company from research to development or production stages ?

(1=absolutely true, 2=more or less applicable, 3=cannot say

either way, 4=not really applicable, 5=not applicable)

- |  |           |
|--|-----------|
| 1. The researcher steers his/her own projects through development to production.   | 1 2 3 4 5 |
| 2. Each stage is handled by one person in charge, and followed up by another for the next stage.   | 1 2 3 4 5 |
| 3. A system is set up for smooth transfer between each stage by taking opinions of the R&D and the sales / marketing divisions into account. | 1 2 3 4 5 |
| 4. Sufficient time for transfer and close communication between the different stages are necessary.  | 1 2 3 4 5 |

**Figure J-12(b) Technology Transfer within a Firm**  
**(classified by existence of an R&D strategy division)**  
**{top: with the division, bottom: without the division}**



Japanese one (DA 2.97). And they have very high degree of awareness of need for sufficient time and close liaison (DA 4.08).

Figure J-12(b) shows classified data of this question by existence of an R&D strategy division. Here we see some differences between both groups.

The statement 1. (the traditional style of technology transfer), is more applicable to the companies without the strategy division (DA: 3.23, while DA of the those with the strategy division is 2.82). As for the statement 2. (the division of work style), the companies with the strategy division have more preference (DA : 3.46 vs. 3.12 for those without the strategy division). And for the statement 3. (a highly strategy-oriented management), the companies with the strategy division tend to choose (DA : 3.46 vs. 2.96 for those without the strategy division). Concerning awareness of need for sufficient time and close liaison for coordination with the company strategy at technology transfer from research to development or production (the statement 4.), the companies with the strategy division have higher degree of applicability (DA : 4.18 vs. 3.96 for those without the strategy division).

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.23 To what extent does each statement listed below

correctly describe the technology transfer within your company from research to development of product stages?

(1=absolutely true, 2=more or less applicable, 3=cannot say

either way, 4=not really applicable, 5=not applicable)

1. The researcher steers his/her own projects 1 2 3 4 5

through development to production.

2. Each stage is handled by one person in 1 2 3 4 5

charge, and followed up by another for the next stage.

3. A system is set up for smooth transfer 1 2 3 4 5

between each stage by taking opinions of the R&D and the sales / marketing divisions into account.

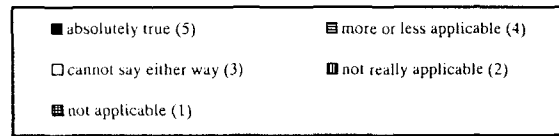
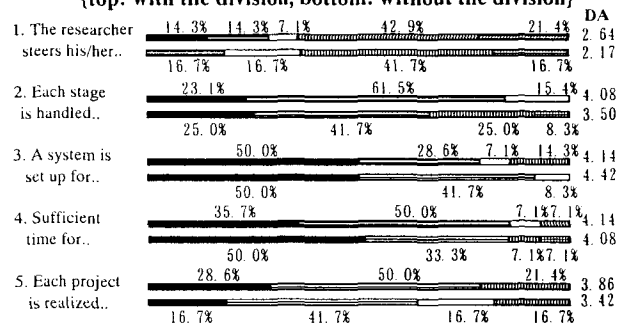
4. Sufficient time for transfer and close 1 2 3 4 5

communication between the different stages are necessary.

5. Each project is realized by a special 1 2 3 4 5

group consisting of the members from the R&D, the Marketing and the Manufacturing division etc..

**Figure F-12(b) Technology Transfer within a Firm (classified by existence of an R&D strategy division)**  
{top: with the division, bottom: without the division}



(for the statement 3.; DA(France)=4.30 vs. DA(Japan)=3.31). One more time, commercial aims appear more important in French firms.

When we see the classified data of this question by existence of an R&D strategy division (see Figure F-12(b)), we find that the special group for realizing a project is more common in the firms with an R&D strategy division.

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

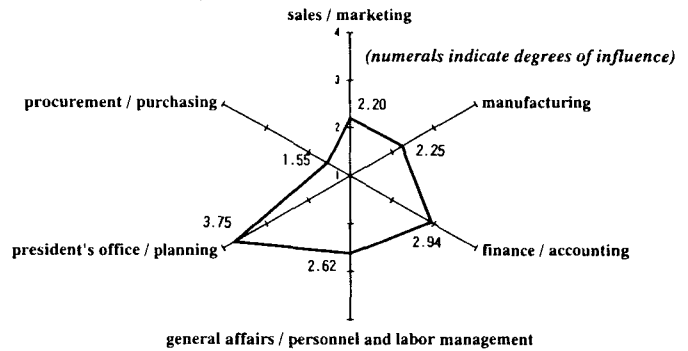
JQ.18 In determining the following elements of the overall R&D strategy, how much influence (say) does each division have ?

(1) On institution of laboratories

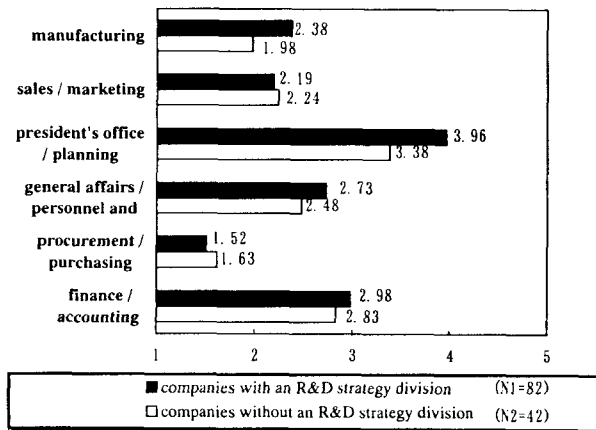
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure J-13(a) Influence of Each Division in Setting up of Research Strategy (1) On institution of laboratories**



**Figure J-13(b) Influence of Each Division in Setting up of Research Strategy (1) On institution of laboratories (classified by existence of an R&D strategy division)**



**III-3-2-4 Influence of each division in setting up R&D strategy (JQ.18)**

In this question, we listed four specific examples of element of R&D strategy ((1) institution of laboratories, (2) hiring of new graduates, (3) selection of areas of research, and (4) preparation of research budget plans) and asked each company to indicate degree of influence of each division with a scale from 1 to 5.

We calculated "degree of influence (hereafter DI : the larger value means having the more influence)" of each division by the following definition.

$$DI = \{1x (\text{No. of responded companies for the weight 1}) + \dots + 5x (\text{No. of responded companies for the weight 5})\} / \text{Total number of responded companies.}$$

(1) On setting up laboratories

Figure J-13(a) shows results of this question and we find that the division which has the largest influence is the president's office / planning division (DI 3.75), followed by the finance / accounting (DI 2.94) and the general affairs / personnel and labor management (DI 2.62) so on.

When we see classified data by existence of an R&D strategy division (see Figure J-13(b)), the division which has the largest (to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

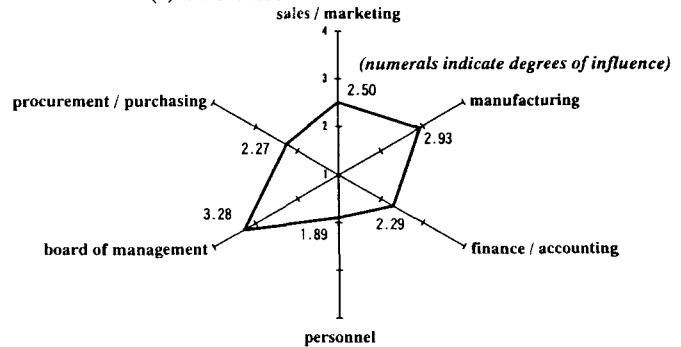
FQ.14 In determining the following elements of the R&D strategy, how much influence does each division have ?

(1) On elaboration of research facilities

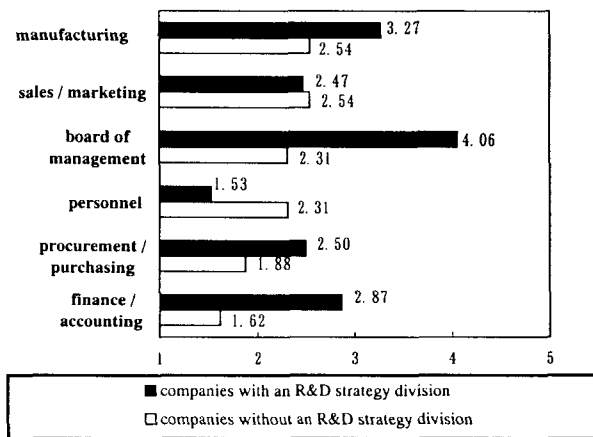
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. Personnel	1	2	3	4	5
5. Board of management	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure F-13(a) Influence of Each Division in Setting up Research Strategy (1) On elaboration of research facilities**



**Figure F-13(b) Influence of Each Division in Setting up Research Strategy (1) On elaboration of research facilities (classified by existence of an R&D strategy division)**



III-3-2-4 Influence of each division in setting up R&D strategy (FQ.14)

We used almost the same question, and asked each company to indicate degree of influence of each division with a scale from 1 to 5. Here, we had differences between French and Japanese questions on the first example of the element of R&D strategy (in the French question we used "elaboration of research facilities" instead of "institution of laboratories") and on the divisions (in the French question "Board of management" is used for "President's office / Planning divisions"). We calculated "degree of influence (DI)" of each division by the same definition as Japanese one.

(1) On elaboration of research facilities

Figure F-13(a) shows the results of the question on this item for overall companies and we find that the division which have the largest influence is the board of management (DI 3.28), followed by the manufacturing (DI 2.93) and the sales / marketing (DI 2.50) so on. A characteristic difference between the French and Japanese results is that the procurement / purchasing have certain influence but the personnel division has little in the French results, while the situation is opposite in the Japanese. In general, the answers show that the influence of the different division in Japan seems to be more (to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

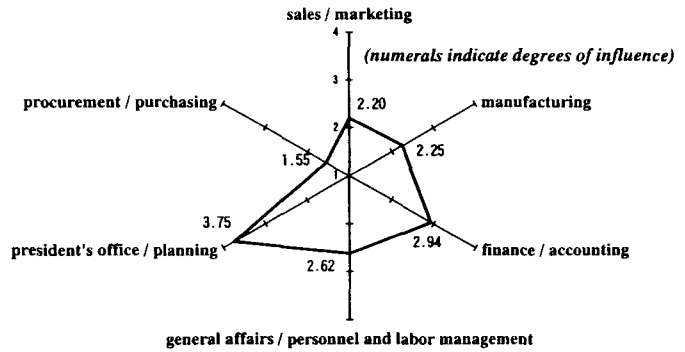
JQ.18 In determining the following elements of the overall R&D strategy, how much influence (say) does each division have ?

(1) On institution of laboratories

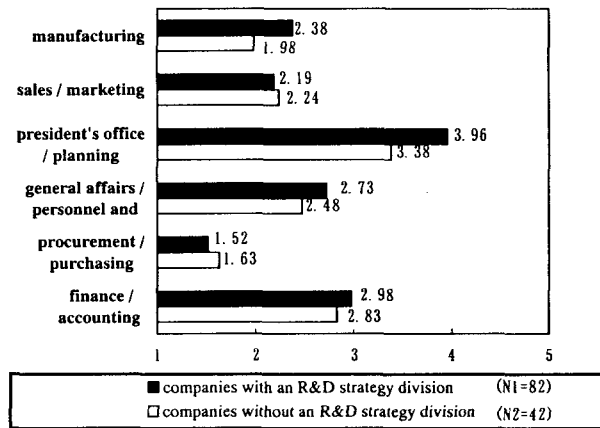
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure J-13(a) Influence of Each Division in Setting up of Research Strategy (1) On institution of laboratories**



**Figure J-13(b) Influence of Each Division in Setting up of Research Strategy (1) On institution of laboratories (classified by existence of an R&D strategy division)**



influence is the president's office / planning for both groups and the difference of DI for this division between both groups is the largest (0.58 ; the companies with the strategy division have larger value). The division which has the next large difference of DI between both groups is manufacturing (0.40 ; the companies with the strategy division have larger value).

(to be continued)

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BETA (FRANCE)

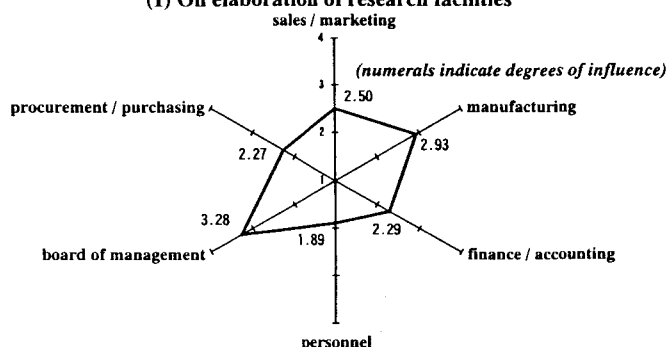
FQ.14 In determining the following elements of the R&D strategy, how much influence does each division have ?

(1) On elaboration of research facilities

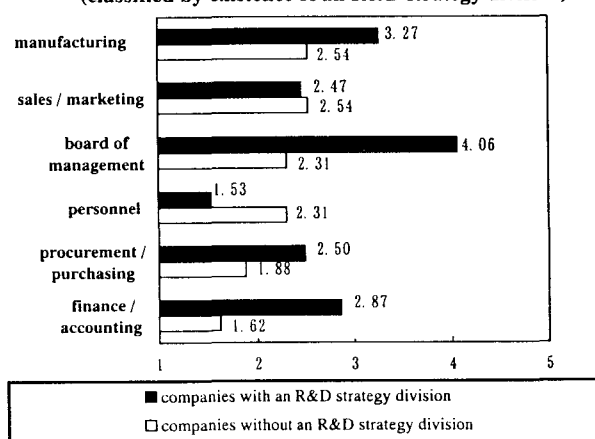
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. Personnel	1	2	3	4	5
5. Board of management	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure F-13(a) Influence of Each Division in Setting up of Research Strategy (1) On elaboration of research facilities**



**Figure F-13(b) Influence of Each Division in Setting up Research Strategy (1) On elaboration of research facilities (classified by existence of an R&D strategy division)**



hierarchically organized with a prominence to the president' office / planning divisions and the finance one. The importance of the sales and manufacturing divisions in France may be explained by a strong tendency of decreasing production costs (by using e.g. value analysis) due to the pressure of international competitions.

When we see classified data by existence of an R&D strategy division (see Figure F-13(b)), the R&D strategy division seems to have more influence in French firms than in Japanese firms (differences of DI between both groups are quite larger than those of Japanese). Especially the difference of DI for the board of management is very large (1.75).

(to be continued)

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**NISTEP (JAPAN)**

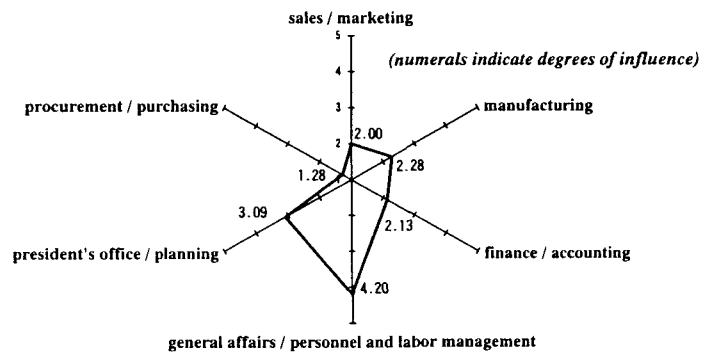
JQ.18 In determining the following elements of the overall R&D strategy, how much influence(say) does each division have ?

(2) On hiring of new graduates

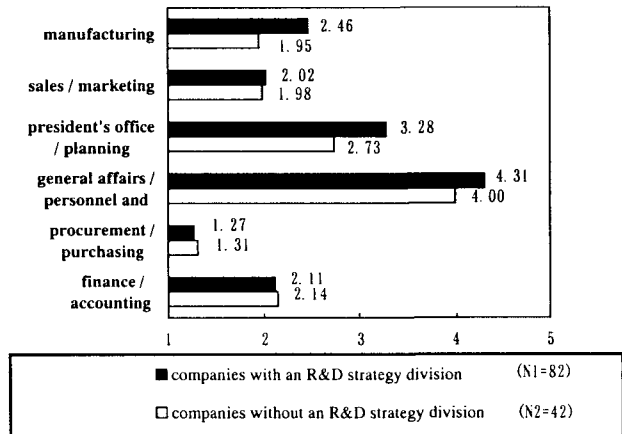
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Sales / Marketing                                | 1 | 2 | 3 | 4 | 5 |
| 2. Manufacturing                                    | 1 | 2 | 3 | 4 | 5 |
| 3. Finance / Accounting                             | 1 | 2 | 3 | 4 | 5 |
| 4. General affairs / Personnel and Labor management | 1 | 2 | 3 | 4 | 5 |
| 5. President's office / Planning                    | 1 | 2 | 3 | 4 | 5 |
| 6. Procurement / Purchasing                         | 1 | 2 | 3 | 4 | 5 |

**Figure J-13(c) Influence of Each Division in Setting up of Research Strategy (2) On hiring new graduates**



**Figure J-13(d) Influence of Each Division in Setting up Research Strategy (2) On hiring of new graduates (classified by existence of an R&D strategy division)**



(2) On hiring of new graduates

In the results for overall companies (see Figure J-13(c)), the general affairs / personnel and labor management divisions have the largest influence on hiring of new graduates (DI 4.20), followed by the president's office / planning divisions (DI 3.09) so on.

As can be seen in Figure J-13(d), which shows classified data by existence of an R&D strategy division, above trend is the same for both of the companies with / without the strategy division, where the companies with the strategy division have larger value of DI (difference of DI ; 0.31). The divisions which have large differences of DI between both groups are the president's office / planning (0.55 ; the companies with the strategy division have larger value) and the manufacturing (0.51 ; the same).

(to be continued)

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BETA (FRANCE)

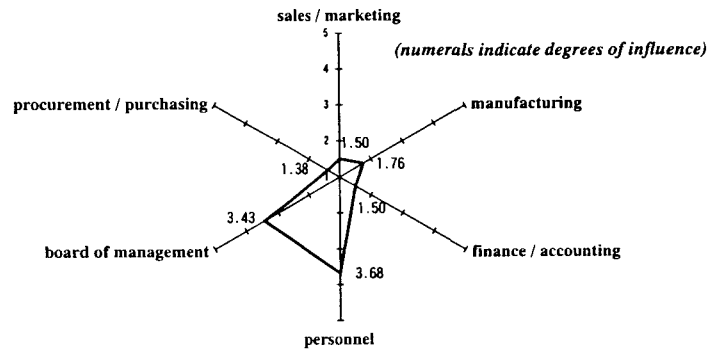
FQ.14 In determining the following elements of the R&D strategy, how much influence does each division have ?

(2) On hiring of new graduates

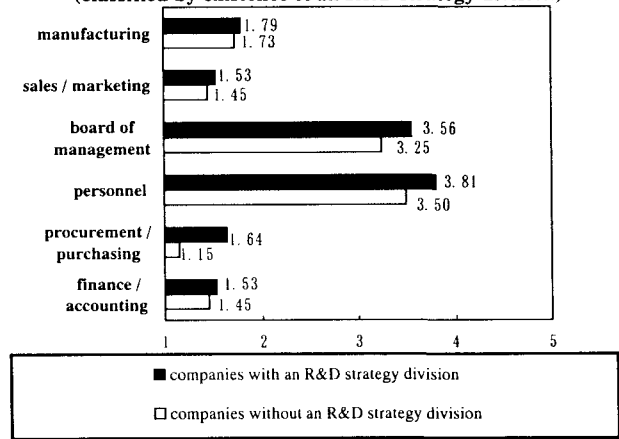
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. Personnel	1	2	3	4	5
5. Board of management	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure F-13(c) Influence of Each Division in Setting up of Research Strategy  
(2) On hiring of new graduates**



**Figure F-13(d) Influence of Each Division in Setting up Research Strategy  
(2) On hiring of new graduates  
(classified by existence of an R&D strategy division)**



(2) On hiring of new graduates

From the results for overall companies (see Figure F-13(c)), the hiring of new graduates is made by the personnel (DI 3.68) and by the board of management (DI 3.43) like in Japan. From this point of view, the structure of deciding process on hiring of new graduates is more or less the same in Japan and in France.

As can be seen in Figure F-13(d), which shows the classified data by the existence of an R&D strategy division, although the existence of the strategy division has some effects (DIs of the board of management and of the personnel division for the companies with the strategy division are both larger than those for companies without the division), it has no impact to change the overwhelmingly large influence of these two divisions.

(to be continued)



<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

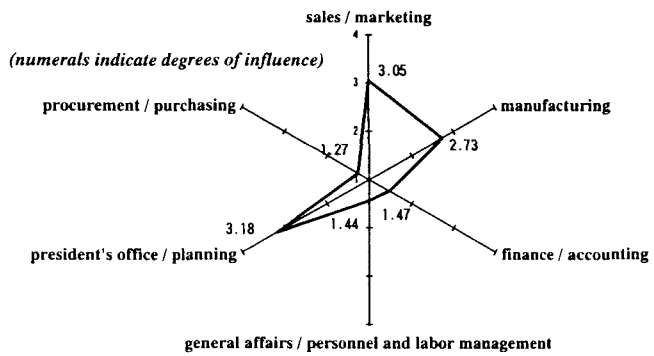
JQ.18 In determining the following elements of the overall R&D strategy, how much influence(say) does each division have ?

(3) On selection of areas of research

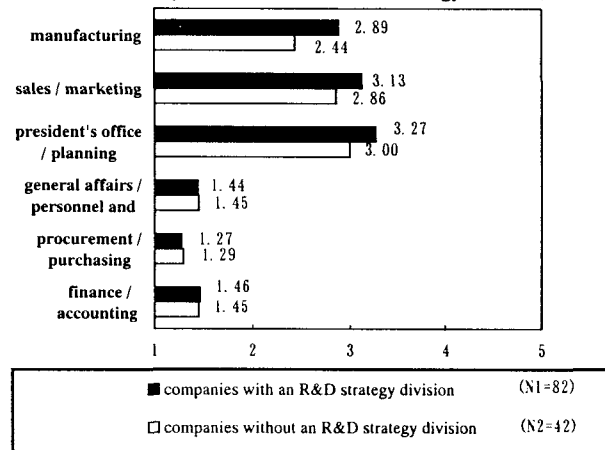
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure J-13(e) Influence of Each Division in Setting up of Research Strategy (3) On selection of research domains**



**Figure J-13(f) Influence of Each Division in Setting up Research Strategy (3) On selection of research domains (classified by existence of an R&D strategy division)**



(3) On selection of areas of research

In the results for overall companies (see Figure J-13(e)), the president's office / planning divisions have the largest influence on selection of areas of research (DI 3.18), followed by the sales / marketing divisions (DI 3.05) and the manufacturing division (DI 2.73) so on.

In Figure J-13(f), which shows the classified data by the existence of an R&D strategy division, we find that above trend is the same for both of the companies with / without the strategy division, where the companies with the strategy division have larger value of DI (difference of DIs ; 0.27). The divisions which have large differences between DIs of both groups are the manufacturing (0.45 ; the companies with the strategy division have larger value) and the sales / marketing (0.27 ; the same).

(to be continued)

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA (FRANCE)**

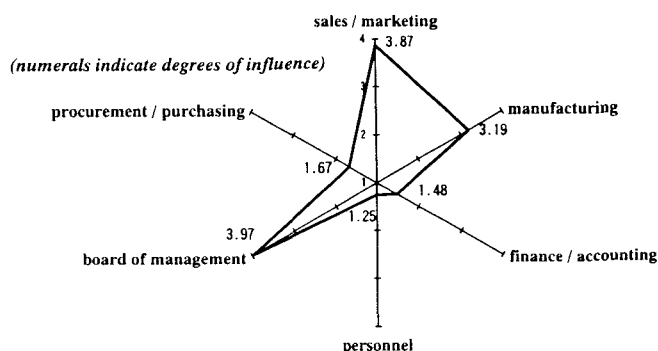
FQ.14 In determining the following elements of the R&D strategy, how much influence does each division have ?

(3) On selection of areas of research

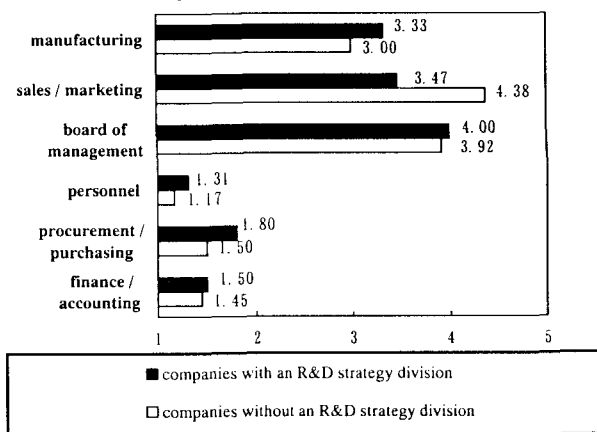
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. Personnel	1	2	3	4	5
5. Board of management	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure F-13(e) Influence of Each Division in Setting up of Research Strategy**  
**(3) On selection of research domains**



**Figure F-13(f) Influence of Each Division in Setting up Research Strategy**  
**(3) On selection of research domains**  
**(classified by existence of an R&D strategy division)**



(3) On selection of research domains

In the results for overall companies (see Figure F-13(e)), the board of management have the largest influence on selection of areas of research (DI 3.97), followed by the sales / marketing divisions (DI 3.87) and the manufacturing division (DI 3.19) so on. This situation is similar in the Japanese results.

When we see Figure F-13(f), which shows classified data by existence of an R&D strategy division, we find that in the companies without the strategy division the sales and the marketing divisions have the largest influence (DI 4.38), while the board of management has the largest in the companies without the strategy division.

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**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

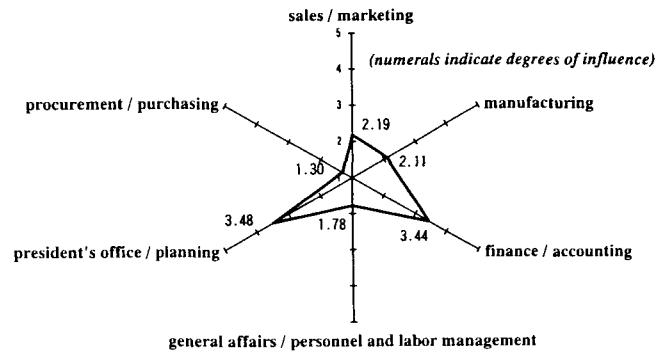
JQ.18 In determining the following elements of the overall R&D strategy, how much influence(say) does each division have ?

(4) On preparation of research budget plans

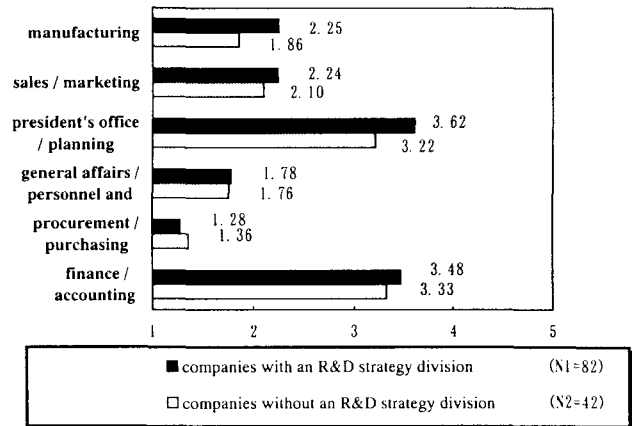
(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)

1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Figure J-13(g) Influence of Each Division in Setting up of Research Strategy (4) On preparation of research budget plans**



**Figure J-13(h) Influence of Each Division in Setting up Research Strategy (4) On preparation of research budget plans (classified by existence of an R&D strategy division)**



(4) On preparation of research budget plans

In the results for overall companies (see Figure J-13(g)), the president's office / planning divisions have the largest influence on preparation of research budget plans (DI 3.48), followed by the finance / accounting (DI 3.44) and the sales / marketing divisions (DI 2.19) so on.

As we see in Figure J-13(h), which shows classified data by existence of an R&D strategy division, the divisions with the largest influence are the president's office / planning for the companies with the strategy division and the finance / accounting for the companies without the strategy division. The divisions which have large differences of DI between both groups are the president's office / planning (0.40 ; the companies with the strategy division have larger value) and the manufacturing (0.39 ; the same).

From the results concerning (1) ~ (4), in general, in the companies with the R&D strategy division the president's office / planning divisions and the manufacturing division have larger influences (or says) on setting up R&D strategy than in those without the strategy division. Moreover in the companies with the strategy division the overall influence of each division is larger, which indicates that they are making effort to take the opinions of each division into account for the setting up the R&D strategy.

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BETA (FRANCE)

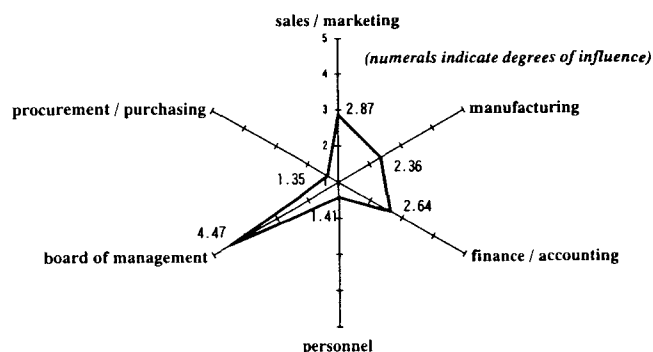
**Figure F-13(g) Influence of Each Division in Setting up of Research Strategy**

FQ.14 In determining the following elements of the R&D strategy, how much influence does each division have ?

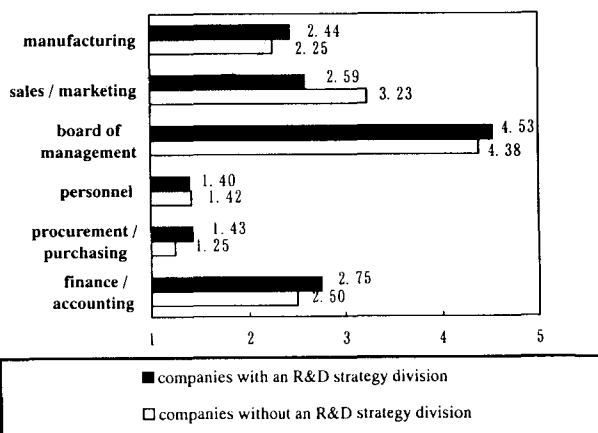
**(4) On preparation of research budget plans**

(4) On preparation of research budget plans

(1=little or no influence, 2=some influence, 3=considerable influence, 4=a great deal of influence, 5=extremely high degree of influence)



**Figure F-13(h) Influence of Each Division in Setting up Research Strategy**  
**(4) On preparation of research budget plans**  
**(classified by existence of an R&D strategy division)**



(4) On preparation of research budget plans

In the results for overall companies (see Figure F-13(g)), the board of management have overwhelmingly large influence on preparation of research budget plans (DI 4.47), followed by the sales / marketing divisions (DI 2.87) and the finance / accounting (DI 2.64) and so on. We see a different trend from Japanese results where the finance / accounting divisions have almost the same influence as the president's office / planning divisions.

When we see Figure F-13(h), which shows classified data by existence of an R&D strategy division, we can notice that the existence of the strategy division has very little influence on the budget decision. However the marketing division plays an important part especially if there is no strategic division in the firm. This is to be linked with the importance given to marketing forecasts in the R&D budget decision.

From the results concerning (1) ~ (4), in general, the board of management has the largest influence in every aspect for determining the R&D strategy. And in France, the sales and the marketing divisions have large influence on the matters, which are directly connected with the future orientation of the company, such as selection of research domains and preparation of research budget plans. Conversely speaking the existence of the R&D strategy division has a effect of attenuation of influence of the sales and the marketing divisions.

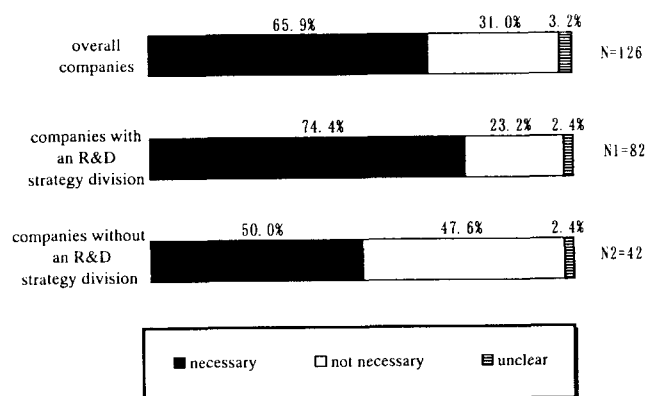
### **III-3-3 Research Consortia**

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.14 Does your company feel it necessary to participate in research consortia ? (except for those sponsored by government)

1. Yes                      2. No

**Figure J-14(a) Necessity of Consortia**



**III-3-3 Research consortia (JQ.14)**

In this question we asked each company whether they feel necessity to participate in research consortia, whether they have ever participated in a research consortium, and if so, in a typical case what motivated them to participate, and what the nationalities of the partner companies. The consortia in this context refers only to private sector consortia, and excludes government-initiated consortia or consortia established with public funding.

**(1) Necessity of research consortia**

As shown in Figure J-14(a), out of the 126 responded companies, 83(65.9%) feel necessity of participating in research consortia, while 39(31.0%) do not. And the companies with an R&D strategy division feel much more necessity (74.4%) than those without the strategy division (50.0%).

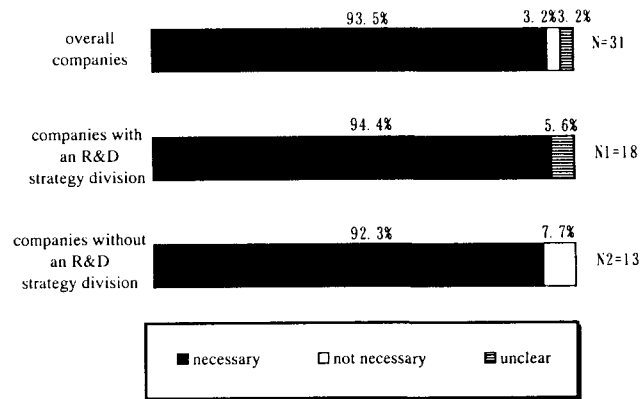
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<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.13 Does your company feel it necessary to participate in research consortia ? (except for those sponsored by government)

1. Yes                      2. No

**Figure F-14(a) Necessity of Consortia**



III-3-3 Research consortia (FQ.13)

We made partial amendments of this question taking French context into account, however the main structure is the same.

(1) Necessity of research consortia

Participation in consortia is a real necessity for French firms. As shown in Figure F-14(a), more than 90% of the responded companies feel necessity of participating in research consortia. It is related to the efforts made by the firms to facilitate technological transfers.

This necessity is less obvious in Japan when an R&D strategy division does not exist. There are no doubts on the fact that since the last ten years large size companies in Europe have been receiving strong incentive to participate to industrial consortia. In most of European R&D programmes, creating a consortia with foreign companies is a necessary condition. In the business of Space this phenomenon started very early in the 1970's in Europe under the influence of the European Space Agency (ESA) around the competition of Ariane's series of launchers and several satellites. Collaborations had been pushed in the 1980's by the different programmes of the European Community (e.g. BRITE-EURAM or ESPRIT) in high technology sector. BETA's studies [6] on economic impacts of such R&D programmes demonstrates that the collaboration between European companies initiate new collaborations on other European programmes or private R&D researchers. But the shapes of these collaborations are variables from a simple exchange of ideas to a real common industrial structure such the Airbus industry. It seems that for Japanese the notion of consortia covers strong links than in Europe without this graduation of structural shapes.

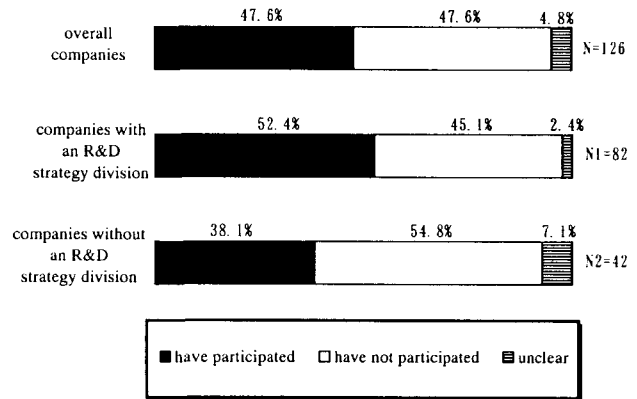
<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

(JQ.14)

SQ.1 Has your company ever participated in research consortia ? If possible, please write the name of the project.

- 1. Yes    Name of project .....
- 2. No

**Figure J-14(b) Participation in Consortia**



(2) Participation in research consortia

Figure J-14(b) shows the results of this question, where 60(47.6%) replied they have participated in research consortia and the same number answered not. And the companies with an R&D strategy division have more experience of participation (52.4%) than those without the strategy division (38.1%).

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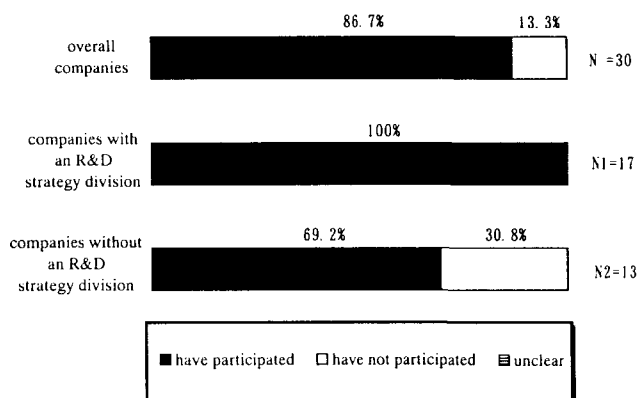


<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

(FQ.13)

- Has your company ever participated in research consortia ?  
1. Yes    2. No    (please go on to FQ.14)

**Figure F-14(b) Participation in Consortia**



(2) Participation in research consortia

Figure F-14(b) shows the results of this question. French firms positively participate in research consortia, which is consistent with the fact that they feel a real necessity of it. Especially all of the companies having an R&D strategy division responded that they have experience of participation in contrast with the Japanese results.

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NISTEP (JAPAN)

(JQ.14)

SQ.3 What was your motivation? Please choose from below

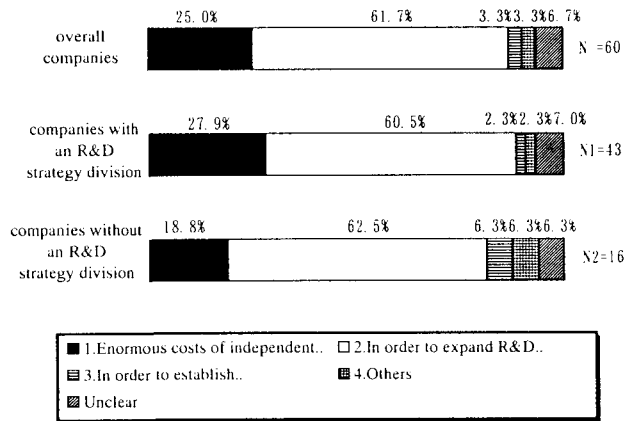
according to the experience of your company.

(multiple answers are possible)

1. Enormous costs of independent research activity
2. In order to extend R&D capability of your company
3. In order to establish overseas business strongpoints
4. Other ( )

1st	2nd	3rd	4th
-----	-----	-----	-----

**Figure J-14(c) Motivation of Participating in Consortia**



**(3) Motivation of participating in research consortia**

With proposing three factors, we asked the companies, that have experience of participating in research consortia, about the motivation of participation for their typical cases. In this question, we made multiple answers possible, and we took the answer with the first priority of each company and show the result in Figure J-14(c).

Among 60 companies, that responded to this question, 37(61.7%) chose "to expand R&D capability of the company" for the motivation factors, 15(25.0%) chose "because of enormous cost of independent research activity". Thus a desire to extend their own R&D capability is the main motivation factor of participating in research consortia.

This desire is common to the companies with an R&D strategy division and those without the strategy division. However the companies with the strategy division are a little bit sensitive to the cost because their responses for "enormous cost of research activity" is the rate of 27.9%, while it is 18.8% for the companies without the strategy division.

(to be continued)

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BETA (FRANCE)

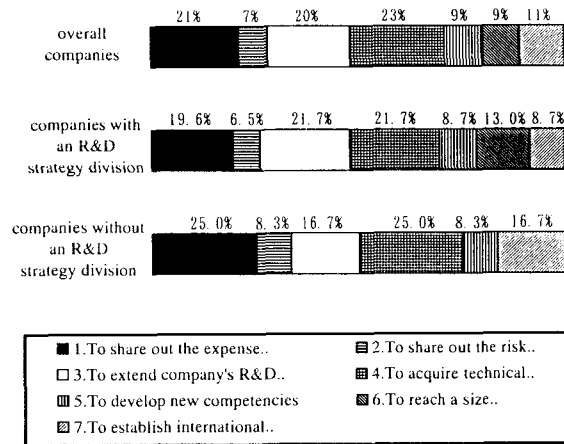
(FQ.13)

- What was the motivation among the followings ?

(multiple answers are possible)

1. To share out the expenses of research
2. To share out the risk of research
3. To extend company's R&D capability
4. To acquire technical complementarities
5. To develop new competences
6. To reach a size required at international level
7. To establish international links
8. Other ( )

**Figure F-14(c) Motivation of Participating in Consortia**



**(3) Motivation of participating in research consortia**

We used more detailed factors than the Japanese one for this sub question. This is because among French firms it is recognized that research consortia are really necessary for their business and many detailed studies on research consortia have been already done. Therefore a comparison between both countries is less obvious since we did not choose the same argumentation.

In Figure F-14(c), we see that the motivations of participating in research consortia for the French firms are more varied than those of the Japanese firms and main factors are the following.

- To share out the expenses of research
- To extend company's R&D capability
- To develop new competence
- To acquire technical complementarities (maybe this is linked with the will of French firms to obtain technological transfers).

More particularly, the French firms with an R&D strategy division show the will to reach a size required at international level, while the Japanese firms consider such consortia for "to extend the capability of their firms".

(to be continued)

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NISTEP (JAPAN)

(JQ.14)

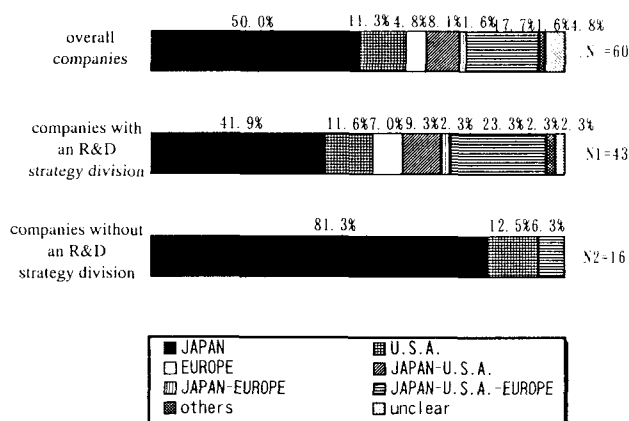
(For those who answered "Yes"

SQ.2 Were the partner companies of the consortia Japanese or European / American ?

(If your company has had multiple experiences, please describe the most "typical" case.)

1. Japanese    2. American    3. European  
4. J/A        5. J/E        6. J/E/A        7. Other

**Figure J-14(d) Nationalities of Participating Companies**



(4) Nationalities of participating companies

We asked the companies, that have experience of participating in research consortia, about the nationalities of partner companies. As shown in Figure J-14(d), among the companies with the experience of participation, 30(50.0%) replied that their partners are Japanese companies, while 27(45.0%) answered that the participating companies include at least one overseas company.

When we see the classified data, we find a characteristic trend of the companies with an R&D strategy division that the nationalities of their partner companies are much more diversified than those of the companies without the strategy division. This means that the companies with the strategy division are aggressively trying to construct global networks. On the other hand the companies without the strategy division do not seem to consider seriously about it.

From the overall results of this question, it can be seen that the companies with an R&D strategy division are effectively incorporating research consortia into their business strategy (such as their tendency to consider research consortia as a means of reducing research cost) and they are actively constructing global networks through research consortia.

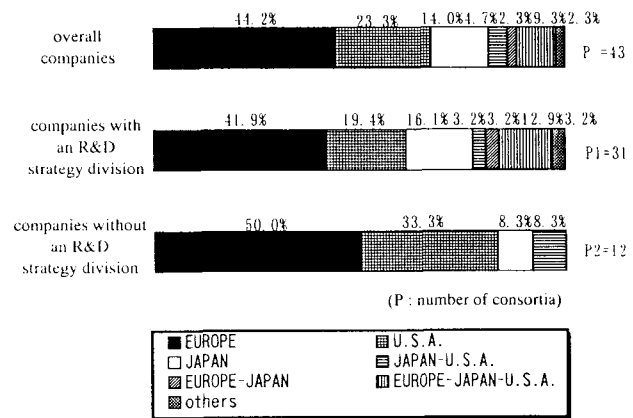
<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

(FQ.13)

- Were the partner companies of the consortia European, Japanese or American ? (If your company has had multiple experiences, please describe the most "typical" case.)

1. European    2. American    3. Japanese  
4. USA/CEE    5. CEE/Japan    6. USA/ Japan/CEE  
7. Other

**Figure F-14(d) Nationalities of Participating Companies**



**(4) Nationalities of participating companies**

French firms participate in consortia with European firms at first (see Figure F-14(d)). This is because of geographical reason and we see the similar trend in Japanese firms that Japanese firms often have consortia with Japanese firms.

Concerning nationalities of firms in consortia, firms with an R&D strategy division show a higher degree of internationalism. This is the same as in the case of Japanese firms, however the differences are more marked for Japanese firms. And we can observe more consortia involving only American firms when an R&D strategy division does not exist.

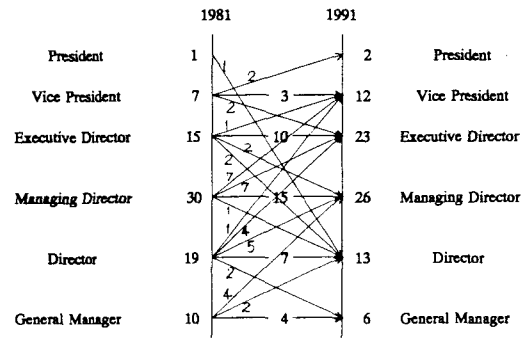
## **III-4 Human Resources Management at R&D Level**

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

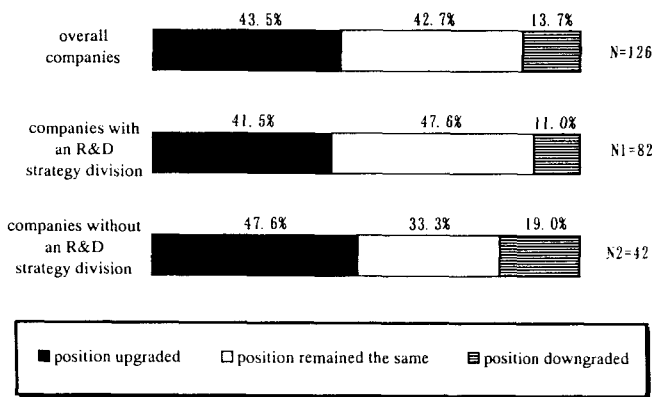
JQ.13 What is / was the hierarchical position of the head of R&D division currently / 10 years ago ?

- |                       |                      |
|-----------------------|----------------------|
| 1. President          | 2. Vice-president    |
| 3. Executive director | 4. Managing director |
| 5. Director           | 6. General manager   |
| present .....         | 10 years ago .....   |

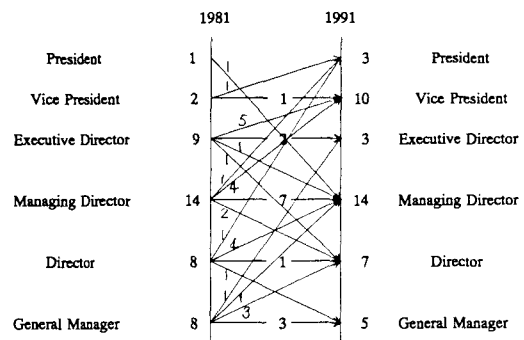
**Figure J-15(a) Changes in the Position of R&D Division Head**  
 (for firms with an R&D strategy division N = 82)



**Figure J-15(c) Changes in the Position of R&D Division Head**  
 (comparison between 1981 and 1991)



**Figure J-15(b) Changes in the Position of R&D Division Head**  
 (for firms without an R&D strategy division N = 42)



**III-4-1 Changes in the position of the R&D division head (since 1981 to 1991) (JQ.13)**

In order to confirm a trend that relative influence of the R&D division within senior management has been increasing, we asked each company to indicate the position of its R&D division head in 1981 and 1991. Figure J-15(a) and Figure J-15(b) show results of this question, where we see that, in general, the position of the R&D division head had been shifted to upper hierarchical level over this ten-year period (1981-1991).

In Figure J-15(c), we see differences of trend between the firms with an R&D strategy division and those without. The rate of "position unchanged" among the firms with the strategy division is larger than that among those without the division. This could be understood by considering that, in the firms with the strategy division, senior management people have recognized the importance of R&D activities from the early stages. We also see that the rates of "position upgraded" and "position downgraded" among the firms without the strategy division are both larger than those among the firms without strategy. This seems to show that the firms without the strategy division have been making more trial and error; some firms have made systematic responses to the severe business environment and some not.

(to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA(FRANCE)

FQ.19 What was / is the hierarchical position of the head of R&D division of 10 years ago / present ?

- |                        |                                     |
|------------------------|-------------------------------------|
| 1. President (PDG)     | 2. Vice-president                   |
| 3. General director    | 4. Member of board<br>of management |
| 5. Functional director | 6. Operating director               |
| 7. Other               |                                     |
| 1983 .....             | 1993 .....                          |

Figure F-15(a) Changes in the Position of R&D Division Head  
(for firms with an R&D strategy division N<sub>1</sub> =14)

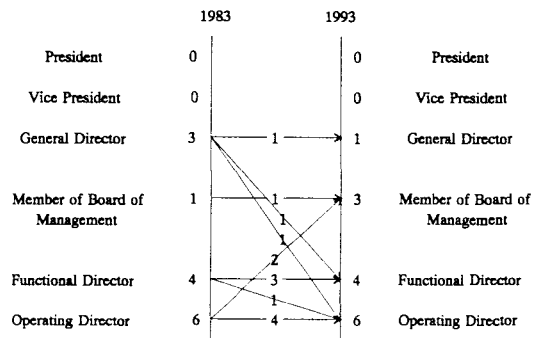


Figure F-15(c) Changes in the Position of R&D Division Head  
(comparison between 1983 and 1993)

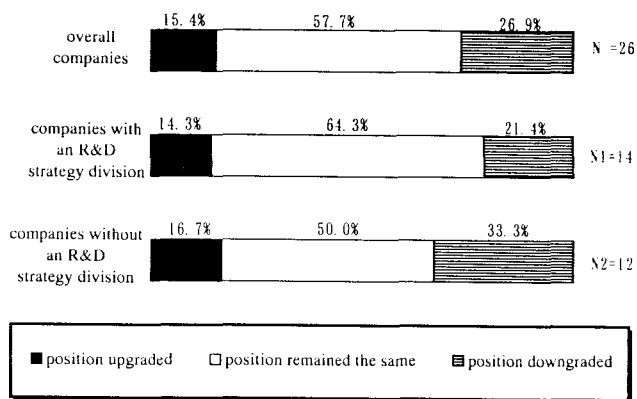
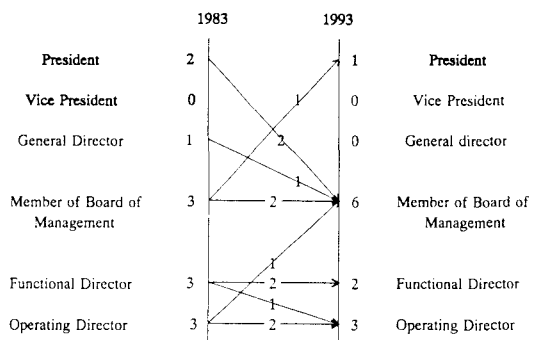


Figure F-15(b) Changes in the Position of R&D Division Head  
(for firms without an R&D strategy division N<sub>2</sub> =12)



III-4-1 Changes in the position of the R&D division head (since 1983 to 1993) (FQ.19)

We modified the question used by NISTEP to adopt the French context and asked each company to indicate the position of its R&D division head in 1983 and 1993. Figure F-15(a) and Figure F-15(b) show results of this question.

As seen in Figure F-15(a), in French firms, in general, the positions of their R&D division head are less linked to the hierarchy of president (PDG), vice-president and general director. And people in lower hierarchical position are taking responsibility of the R&D division compared with Japanese firms. We may see the evolution in French firms since 1984 as an autonomization of the R&D division.

In Figure F-15(b), we see a difference between the companies with an R&D strategy division and those without the strategy division. For the former group, it seems that the leadership of the R&D division belongs to operating and functional director while, if the R&D strategy division exists, the responsibility of the R&D division rests with a member of managing board. This difference between the two groups might be explained by a degree of maturity in matters of R&D organization in the firms. The situation of the companies without the strategy division could be seen as a stage in the development of the firm which could lead to the situation of the companies with the strategy division. (to be continued)



<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.13 What is / was the hierarchical position of the head of R&D division currently/ 10 years ago ?

- |                       |                      |
|-----------------------|----------------------|
| 1. President          | 2. Vice-president    |
| 3. Executive director | 4. Managing director |
| 5. Director           | 6. General manager   |
- present ..... 10 years ago .....

Figure J-15(a) Changes in the Position of R&D Division Head  
(for firms with an R&D strategy division N = 82)

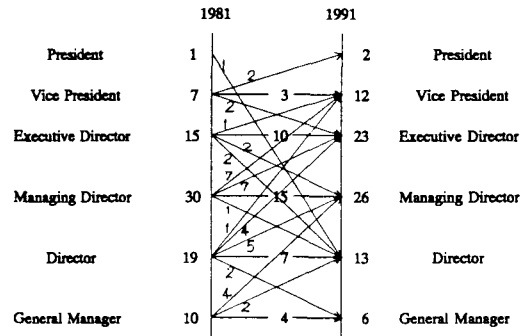


Figure J-15(c) Changes in the Position of R&D Division Head  
(comparison between 1981 and 1991)

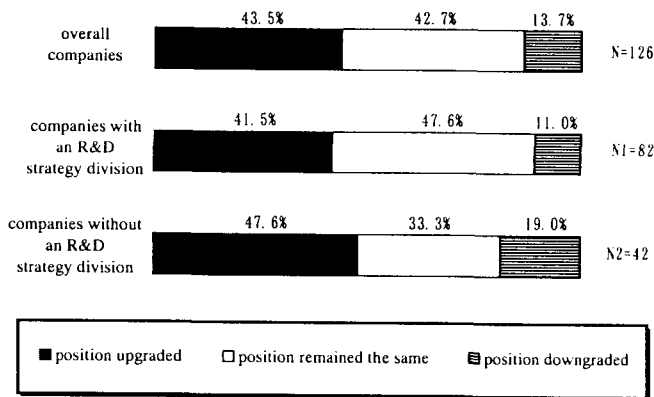
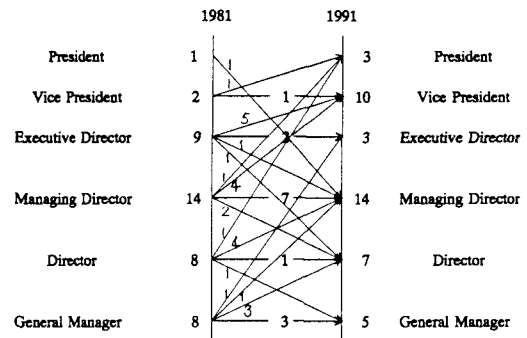


Figure J-15(b) Changes in the Position of R&D Division Head  
(for firms without an R&D strategy division N = 42)



<BETA-NISTEP COMPARATIVE STUDY>  
BETA(FRANCE)

FQ.19 What was / is the hierarchical position of the head of R&D division of 10 years ago / present ?

- |                        |                                     |
|------------------------|-------------------------------------|
| 1. President (PDG)     | 2. Vice-president                   |
| 3. General director    | 4. Member of board<br>of management |
| 5. Functional director | 6. Operating director               |
| 7. Other               |                                     |
| 1983 .....             | 1993 .....                          |

Figure F-15(a) Changes in the Position of R&D Division Head  
(for firms with an R&D strategy division N = 14)

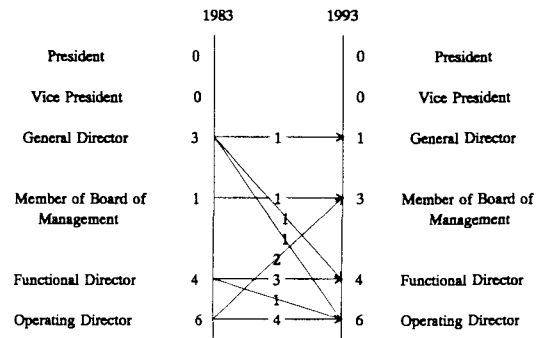


Figure F-15(c) Changes in the Position of R&D Division Head  
(comparison between 1983 and 1993)

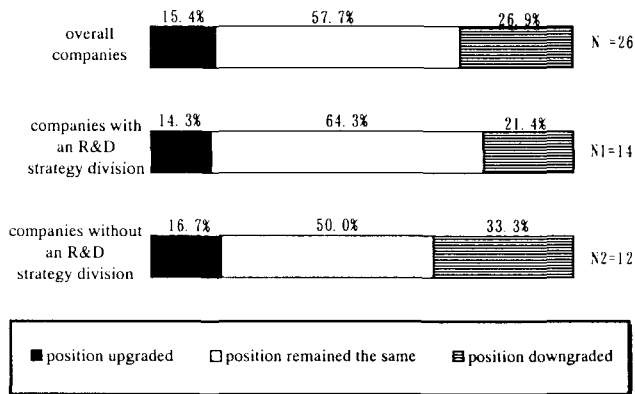
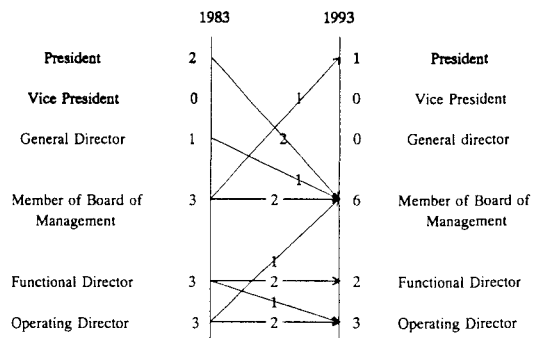


Figure F-15(b) Changes in the Position of R&D Division Head  
(for firms without an R&D strategy division N = 12)



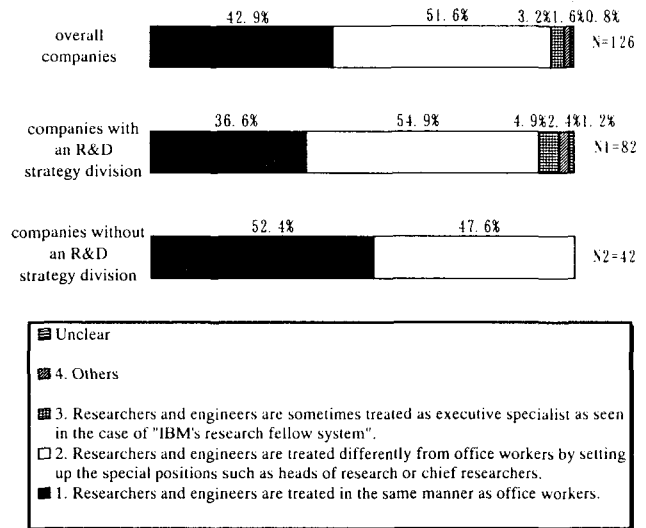
Another source of explanation of the differences observed between Japan and France could be the general higher internal mobility of Japanese employees independently to the R&D division. Indeed, the percentage of positions unchanged in French companies is 57.7% against 42.7% only in Japan. This has to be related with some observations on the relatively high degree of mobility characterizing Japanese organizations notified by some researchers (see e.g. [5]). But in any case this argument could not completely explain the phenomenon observed as a whole and especially the fact that the direction of the R&D division in the last ten years take two different ways by increasing hierarchical level in Japan and the opposite way in France.

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.34 Which of the following sentences is best applicable to the situation of your company concerning treatment of researchers and engineers ?

1. Researchers and engineers are treated in the same manner as office workers.
2. Researchers and engineers are treated differently from office workers by setting up the special positions such as heads of research or chief researchers.
3. Researchers and engineers are sometimes treated as executive specialist as seen in the case of "IBM's research fellowship system".
4. Other ( )

**Figure J-16 Treatment of Researchers and Engineers**



**III-4-2 Treatment of researchers and engineers (JQ.34)**

We listed three statements describing about treatment of researchers and engineers in companies, and asked each company to indicate which is most applicable to its situation. As shown in Figure J-16, among the responded 126 firms, 54(42.9%) replied on 1. (Researchers and engineers are treated in the same system as office workers), 65(51.6%) on 2. (Researchers and engineers are treated differently from office workers by setting up the special positions such as heads of research or chief researchers) and 4(3.2%) on 3. (Researchers and engineers are sometimes treated as executive specialist as seen in the case of "IBM's research fellow system").

We see some differences between the results for the companies with an R&D strategy division and for those without the division. The firms with the strategy division have replied in higher rate on 2., and 4 companies which replied on 3. all belong to this group.

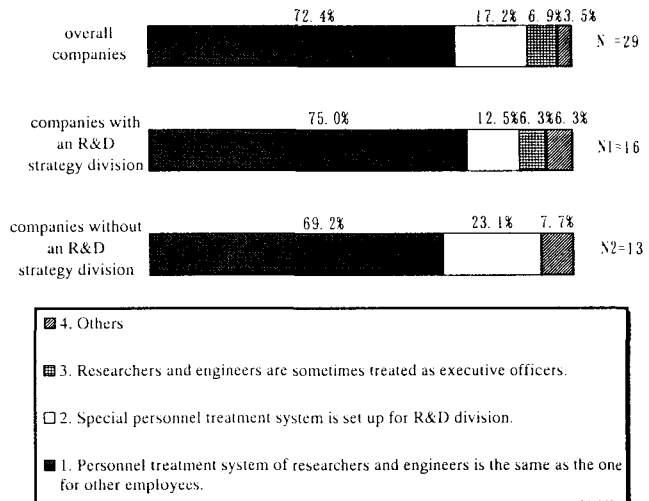
From these, we could say that the companies with the strategy division have been more positively investigating the treatment of researchers and engineers.

<BETA-NISTEP COMPARATIVE STUDY>  
BETA(FRANCE)

FQ.20 Which of the following sentences is best applicable to the situation of your company concerning treatment of researchers and engineers ?

1. Personnel treatment system of researchers and engineers is the same as the one for other employees.
2. Special personnel treatment system is set up for the R&D division.
3. Researchers and engineers are sometimes treated as executive officers.
4. Other ( )

**Figure F-16 Treatment of Researchers and Engineers**



III-4-2 Treatment of researchers and engineers (FQ.20)

We used quite similar statements to Japanese ones for this question, and asked each company to indicate which is most applicable to its situation.

As shown in Figure F-16, more than 2/3 of the responded firms replied on 1. (Personnel treatment system of researchers and engineers is the same as the one for other employees.), which means that in most cases, researchers and engineers are considered the same as other employees in the firms. Only 1/4 of them gives specialist positions to researchers and engineers (about 24% of them answered on 2. (Special personnel treatment system is set up for R&D division.) and on 3. (Researchers and engineers are sometimes treated as executive officers.)).

When an R&D strategy division exists, the anonymity of researchers among other employees is more pronounced (75.0% versus 69.2% for the companies without the strategy division). And the companies without the strategy division seem to give more or less specific positions to their researchers and engineers.

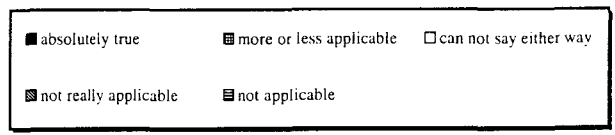
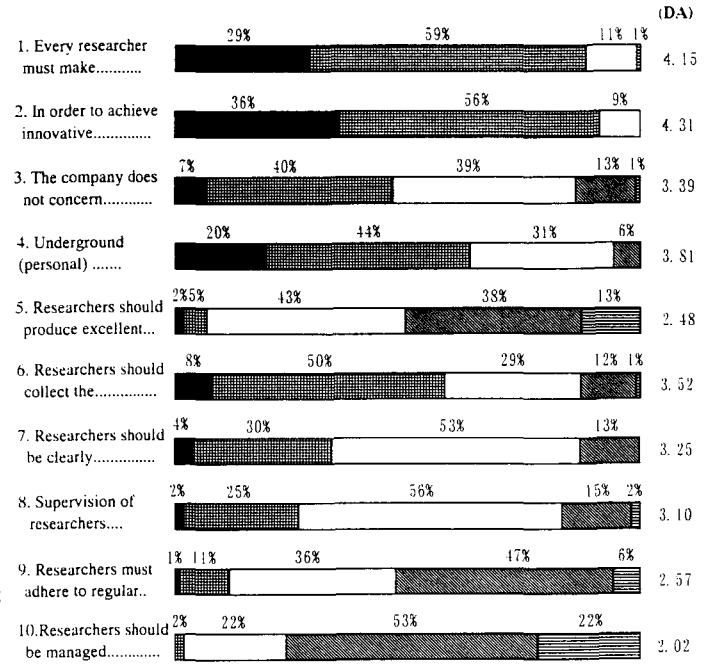
In Japan, researchers and engineers seem to be more often considered as specific employees. For all of responded companies, in Japan only 42.9% of them answer that researchers and engineers have the same status as other employees (versus 72.4% in France).

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.35 About your company's attitude towards research and researchers ; How much is each statement described below applicable to your company ?  
 (1=absolutely true, 2=more or less applicable, 3=can not say either way, 4=not really applicable, 5=not applicable)

**Figure J-17(a) Attitudes towards Research and Researchers**

1. Every researcher must make it his/her job to adhere to the annual research plan. 1 2 3 4 5
2. In order to achieve innovative research, giving a free hand to researchers is very important. 1 2 3 4 5
3. The company does not concern itself in the research process as long as good research results are forthcoming. 1 2 3 4 5
4. Underground (personal) research should be accepted positively. 1 2 3 4 5
5. Researchers should produce excellent research results no matter how much time it takes. 1 2 3 4 5
6. Researchers should collect the information necessary for their research by themselves. 1 2 3 4 5
7. Researchers should be clearly distinguished and treated differently from engineers. 1 2 3 4 5
8. Supervision of researchers impedes their abilities in developing new ideas and concepts. 1 2 3 4 5
9. Researchers must adhere to regular working hours. 1 2 3 4 5
10. Researchers should be managed in the same way as office workers. 1 2 3 4 5



**III-4-3 Attitudes towards research and researchers (JQ.35)**

Here we proposed 10 statements describing about firm's attitude towards researchers and engineers, and asked each company how much each statement is applicable to it with a scale from 1 to 5. Figure J-17(a) shows the results for all of responded companies. We used the same definition of average "degree of applicability (DA : the larger value means the more applicable statement)" for each statement as the one defined in III-3-2-2.

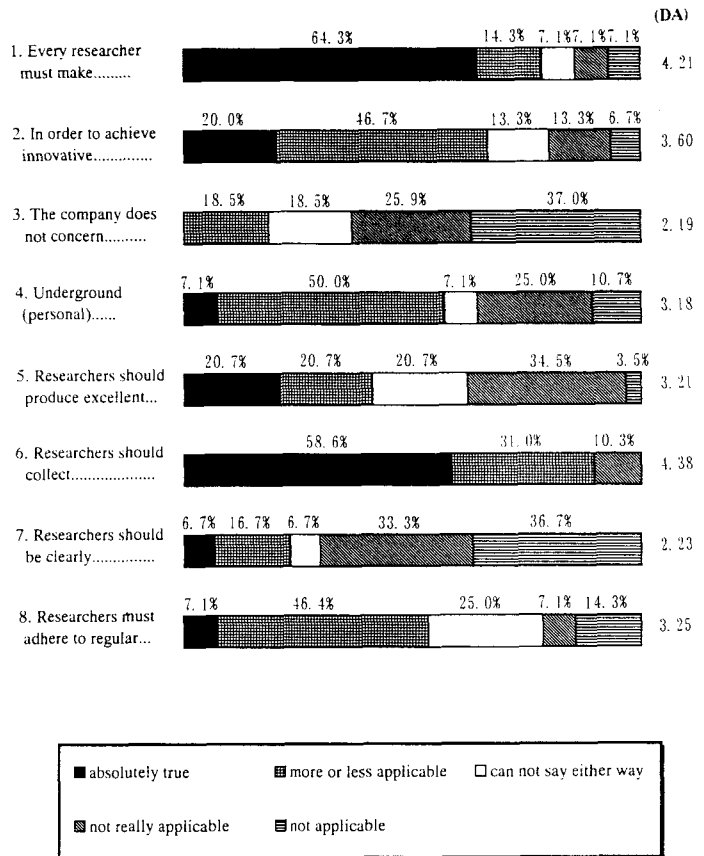
We could see a dilemma of firms that they understand the statement "In order to achieve innovative research, giving a free hand to researchers is very important (DA 4.31)" very well, however they feel necessity of supervision of researchers (because they give a relatively low DA value (3.10) to "Supervision of researchers impedes their abilities in developing new ideas and concepts"). The fact that although they give very negative answers to "Researchers should be managed in the same way as office workers" (DA 2.02), actually about 40% of them replied on "Researchers and engineers are treated in the same manner as office workers" in JQ.34 shows a gap between the ideal and the real. (to be continued)

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA(FRANCE)**

FQ.21 About your company's attitude towards research and researchers ; How much is each statement described below applicable to your company ?  
 (1=absolutely true, 2=more or less applicable, 3=can not say either way, 4=not really applicable, 5=not applicable)

1. Every researcher must make it his/her job to adhere to the annual research plan. 1 2 3 4 5
2. In order to achieve innovative research, giving a free hand to researchers is very important. 1 2 3 4 5
3. The company does not concern itself in the research process as long as good research results are forthcoming. 1 2 3 4 5
4. Underground (personal) research should be accepted positively. 1 2 3 4 5
5. Researchers should produce excellent research results no matter how much time it takes. 1 2 3 4 5
6. Researchers should collect the information necessary for their research by themselves. 1 2 3 4 5
7. Researchers should be clearly distinguished and treated differently from engineers. 1 2 3 4 5
8. Researchers must adhere to regular working hours. 1 2 3 4 5

**Figure F-17(a) Attitudes towards Research and Researchers**



**III-4-3 Attitudes towards research and researchers (FQ.21)**

In this question, we deleted the 8th and 10th statements of Japanese question because these two statements are very similar to the 2nd statement and the question FQ.20 respectively. We used the same definition for average "degree of applicability (DA)" as the Japanese.

Figure F-17(a) shows the results of this question for all of responded firms. Here we see that for companies the first goal of researchers is to respect the research plan (DA 4.21 for the statement 1.). And researchers are free in their jobs (DA 3.60 for the statement 2.) and can take time (DA 4.38 for the statement 6.). However the company wants to be informed about the results : only 18.5% answer "The company does not concern itself in the research process as long as good results are forthcoming," and most of them have negative attitudes (DA 2.19).

In Japanese firms, they emphasize the freedom of researchers to stimulate "innovative research" and place the statement "The company does not concern itself in the research process as long as good results are forthcoming." in relatively high position (4th in DA). From these the Japanese firms trust researchers more than the French firms.

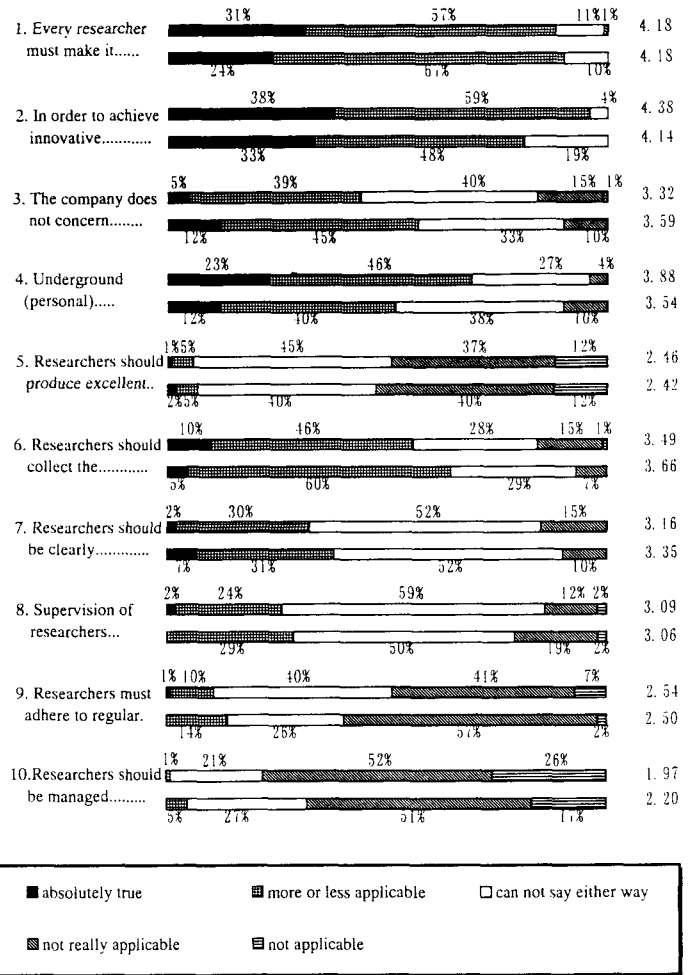
These two questions (FQ.20 and FQ.21) prove that (to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.35 About your company's attitude towards research and researchers ; How much is each statement described below applicable to your company ?  
 (1=absolutely true, 2=more or less applicable, 3=can not say either way, 4=not really applicable, 5=not applicable)

1. Every researcher must make it his/her job to adhere to the annual research plan. 1 2 3 4 5
2. In order to achieve innovative research, giving a free hand to researchers is very important. 1 2 3 4 5
3. The company does not concern itself in the research process as long as good research results are forthcoming. 1 2 3 4 5
4. Underground (personal) research should be accepted positively. 1 2 3 4 5
5. Researchers should produce excellent research results no matter how much time it takes. 1 2 3 4 5
6. Researchers should collect the information necessary for their research by themselves. 1 2 3 4 5
7. Researchers should be clearly distinguished and treated differently from engineers. 1 2 3 4 5
8. Supervision of researchers impedes their abilities in developing new ideas and concepts. 1 2 3 4 5
9. Researchers must adhere to regular working hours. 1 2 3 4 5
10. Researchers should be managed in the same way as office workers. 1 2 3 4 5

**Figure J-17(b) Attitudes towards Research and Researchers**  
 (classified by the existence of an R&D strategy division)  
 {top: with the division, bottom: without the division} (DA)



From these, we could see the groping of firms for the balance between "supervision of researchers" and "giving a free hand to researchers (for keeping them as sources of new technology)".

When we see the classified data of this question by existence of an R&D strategy division (see Figure J-17(b)), we have clear differences for the following statements.

- Underground (personal) research should be accepted positively. (DDA=0.34)
- In order to achieve innovative research, giving a free hand to researchers is very important. (DDA=0.24)
- The company does not concern itself in the research process as long as good research results are forthcoming. (DDA=-0.27)

(Here, DDA= (DA for the firms with an R&D strategy division) - (DA for those without).)

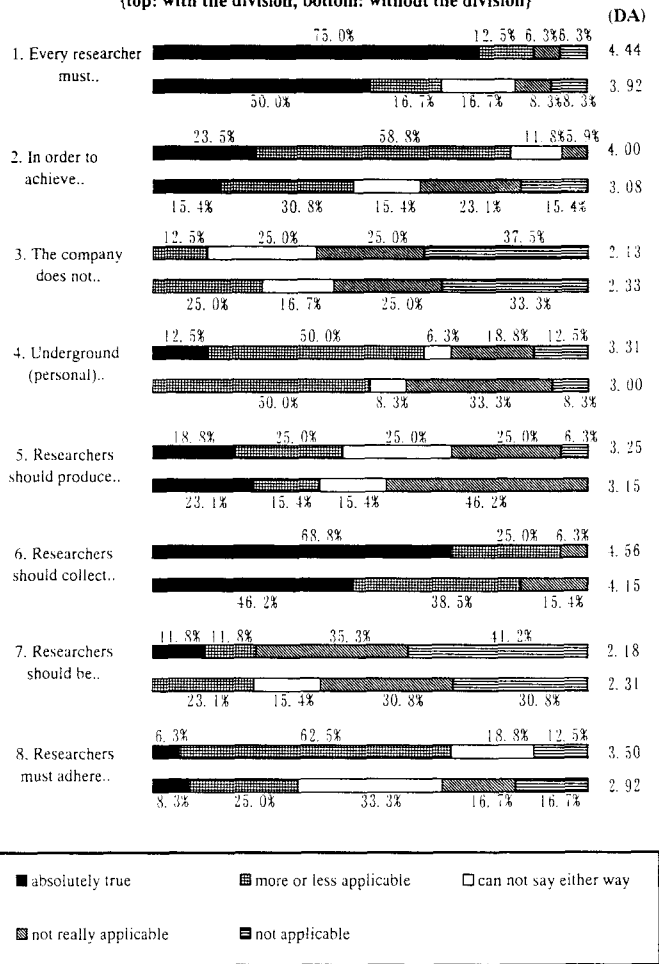
From these, we could understand that the firms with the strategy division have been making more efforts to give freedom to researchers and to keep their autonomous conditions with making researchers adhere to the basic rules of firms.

**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA(FRANCE)**

FQ.21 About your company's attitude towards research and researchers ; How much is each statement described below applicable to your company ?  
 (1=absolutely true, 2=more or less applicable, 3=can not say either way, 4=not really applicable, 5=not applicable)

1. Every researcher must make it his/her job to adhere to the annual research plan.      1   2   3   4   5
2. In order to achieve innovative research, giving a free hand to researchers is very important.      1   2   3   4   5
3. The company does not concern itself in the research process as long as good research results are forthcoming.      1   2   3   4   5
4. Underground (personal) research should be accepted positively.      1   2   3   4   5
5. Researchers should produce excellent research results no matter how much time it takes.      1   2   3   4   5
6. Researchers should collect the information necessary for their research by themselves.      1   2   3   4   5
7. Researchers should be clearly distinguished and treated differently from engineers.      1   2   3   4   5
8. Researchers must adhere to regular working hours.      1   2   3   4   5

**Figure F-17(b) Attitude towards Research and Researchers**  
 (classified by existence of an R&D strategy division)  
 (top: with the division, bottom: without the division)



in France companies do not generally give specific enough positions to researchers. The lack of confidence in research results and the lack of freedom in R&D show one more time the centralized organization in French firms.

When we see the classified data of this question by existence of an R&D strategy division (see Figure F-17(b)), we have clear differences for the following statements.

- In order to achieve innovative research, giving a free hand to researchers is very important. (DDA=0.92)
- Researchers must adhere to regular working hours. (DDA=0.58)
- Every researcher must make it his/her job to adhere to the annual research plan. (DDA=0.52)

(Here, DDA= (DA for the firms with an R&D strategy division) - (DA for those without).)

From these, as in the case of Japan, we could understand that the firms with the strategy division have been making more efforts to give freedom to researchers and to keep their autonomous conditions with making researchers adhere to the basic rules of firms.



## **III-5 R&D Budget and Evaluation**

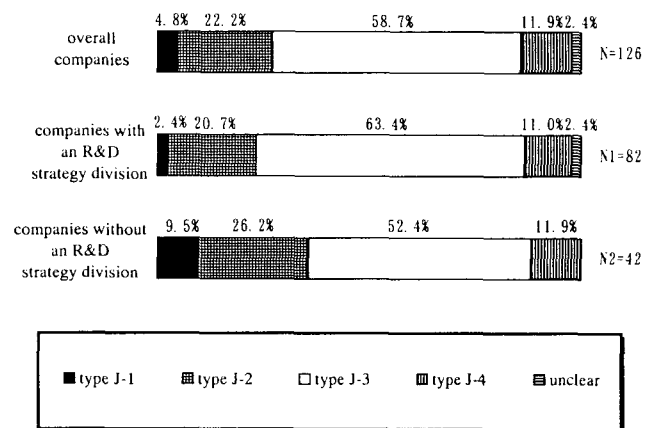
## **III-5-1 R&D Budget**

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.37 In your company, which of the following procedures are taken when planning the R&D budget ? Please choose the most applicable answer.

1. Based on the initial research plan, each research group appropriates its own budget by simply adding together expenses of individual projects. (type J-1)
2. After each research group appropriates its own budget, the R&D management division uniformly reduces or increases the amount requested taking into account limits of the total budget. (type J-2)
3. After each research group appropriates its own budget, the R&D management division makes slight adjustments and appropriates additional funds for important themes. (type J-3)
4. Based on the budget size of the previous year, and taking various subjective data into account, the R&D management division evaluates the budget needs of each research group and allocates funds based on the priority of individual research group. (type J-4)
5. The R&D management division does the same as above, but it is generally influenced by the opinion of the marketing division. (type J-5)

**Figure J-18 Procedures of Developing R&D Budget Plan**



**III-5-1 Procedures of developing R&D budget plan (JQ.37)**

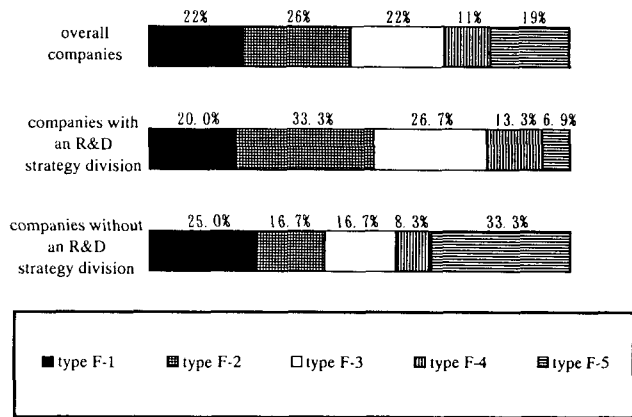
In order to clarify current situation of implementing strategic R&D management in the firms, we asked each company about the way of developing its R&D budget plan with proposing 5 types of procedure for it. Here the type J-1 "Based on the initial research plan, each research group appropriates its own budget by simply adding together expenses of individual projects." is thought to indicate that developing process of budget plan is largely decentralized and has no strategic management systems in it. The type J-2 "After each research group appropriates its own budget, the R&D management division uniformly reduces or increases the amount requested taking into account limits of the total budget.", we thought, indicates a lacking of strategic outlook of R&D management system. And the type J-3 "After each research group appropriates its own budget, the R&D management division makes slight adjustments and appropriates additional funds for important themes." corresponds to the R&D management having a strategic outlook to some extent, while the type J-4 "Based on the budget size of the previous year, and taking various subjective data into account, the R&D management division evaluates the budget needs of each research group and allocates funds based on the priority of individual research group." indicates that the R&D management have a strategic outlook. We proposed (to be continued)

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.17 How does your company develop the R&D budget plan ?

1. Within the framework of the research plan, each research group appropriates its own budget. (type F-1)
2. After each research group appropriates its own budget, the R&D management division makes slight adjustments of the budget requested. (type F-2)
3. After each research group appropriates its own budget, the R&D management division makes slight adjustments and appropriates adequate funds for important themes. (type F-3)
4. Based on the evaluation of performance up to the previous year, the R&D management division allocates the budget of each research group. (type F-4)
5. The R&D management division does the same as above, but taking opinions of the marketing division into account. (type F-5)

**Figure F-18 Procedures of Developing R&D Budget Plan**



III-5-1 Procedures of developing R&D budget plan (FQ.17)

We used a similar question as the Japanese (each procedure type F-i {i=1 ~ 5} corresponds to the type J-i) and we show the results in Figure F-18. From this figure, we see that in French companies the budget development processes are more diversified and they use uniform distribution (type F-2) as well as the adjustment according to research interests (type F-3). Japanese firms prefer the third (corresponding to type F-3).

The existence of an R&D strategy division logically introduces strategic aspects in the budget planification since firms try to favor research fields considered to be important. In France, the R&D strategy division have almost no influence on the response rates on the procedure of type F-1 (Within the framework of the research plan, each research group ...). This does not appear in Japan since the existence of such a division decreases the weight of research groups in the development process of budget plans.

Moreover, the absence of the strategic division leads to a budget management based on the previous results (8.3% for the type F-4 and 33.3% for the type F-5 and in total 41.6%). This management based on the past integrates however the anticipation of the marketing division before deciding of the final budget distribution, which is consistent with the great weight attached to the marketing division in French firms. (to be continued)

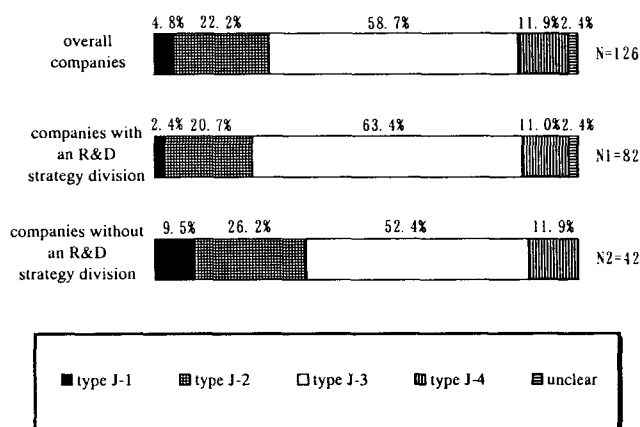
## <NISTEP-BETA COMPARATIVE STUDY>

### NISTEP (JAPAN)

JQ.37 In your company, which of the following procedures are taken when planing the R&D budget ? Please choose the most applicable answer.

1. Based on the initial research plan, each research group appropriates its own budget by simply adding together expenses of individual projects. (type J-1)
2. After each research group appropriates its own budget, the R&D management division uniformly reduces or increases the amount requested taking into account limits of the total budget. (type J-2)
3. After each research group appropriates its own budget, the R&D management division makes slight adjustments and appropriates additional funds for important themes. (type J-3)
4. Based on the budget size of the previous year, and taking various subjective data into account, the R&D management division evaluates the budget needs of each research group and allocates funds based on the priority of individual research group. (type J-4)
5. The R&D management division does the same as above, but it is generally influenced by the opinion of the marketing division. (type J-5)

**Figure J-18 Procedures of Developing R&D Budget Plan**



the type J-5 considering the European (or US) situation where the sales and the marketing divisions have very strong influence on budget plan.

As shown in Figure J-18, we had 6(4.8%), 28(22.2%), 74(58.7%), 15(11.9%), and no responses on the types J-1, J-2, J-3, J-4, and J-5, respectively. And the procedure type J-3 is the most popular one and more than 70% of responded firms answer the types J-3 or J-4. We believe that these companies have relatively advanced strategic (or well organized) management systems of R&D.

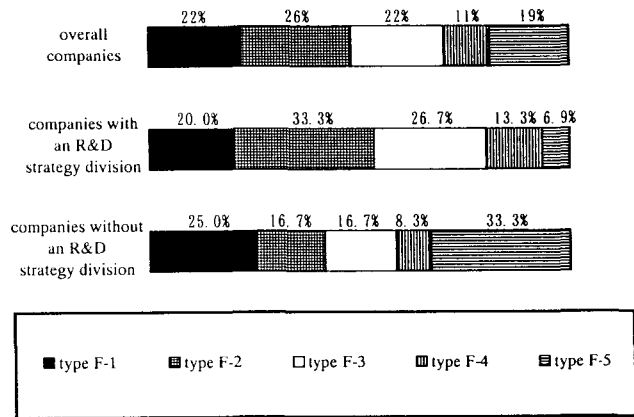
Some differences can be seen between the results of the companies with an R&D strategy division and those without the division. The former group has lower response rates on the types J-1 and J-2 and has higher response rate on the type J-3. This seems to show that the companies with the strategy division have more strategic (or better organized) R&D management systems in the process of developing the budget plans from the view point of making budget adjustment based on the fixed company strategy.

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.17 How does your company develop the R&D budget plan ?

1. Within the framework of the research plan, each research group appropriates its own budget . (type F-1)
2. After each research group appropriates its own budget, the R&D management division makes slight adjustments of the budget requested. (type F-2)
3. After each research group appropriates its own budget, the R&D management division makes slight adjustments and appropriates adequate funds for important themes. (type F-3)
4. Based on the evaluation of performance up to the previous year, the R&D management division allocates the budget of each research group. (type F-4)
5. The R&D management division does the same as above, but taking opinions of the marketing division into account. (type F-5)

**Figure F-18 Procedures of Developing R&D Budget Plan**



This approach for budget plans could be compared with the accounting approach based on past results. So, French firms are more influenced by the past and by the present in their decisions. On the contrary, in Japanese firms, budget decisions are made based on anticipation on future research fields considered as important. There entails a greater flexibility in redeploying research axes in Japan. The existence of an R&D strategy division gives more importance to future objectives in matters of R&D budget management.

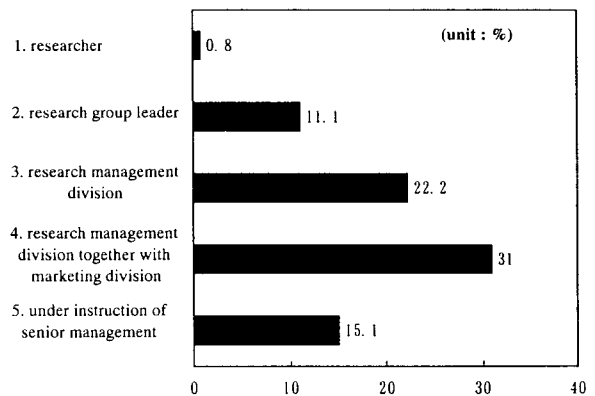
## **III-5-2 R&D Efficiency and Evaluation**

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

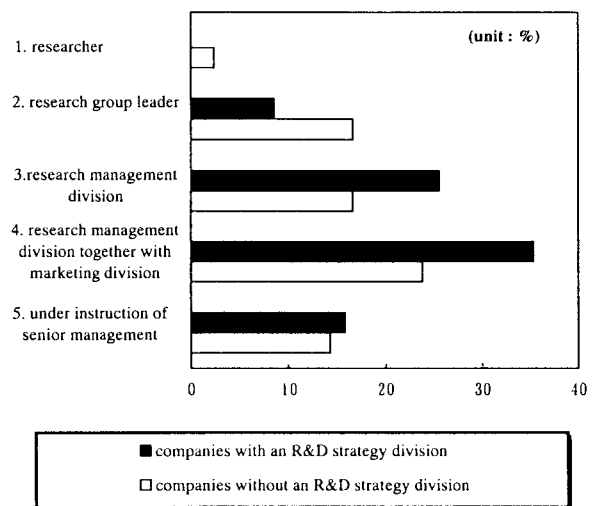
JQ.30 In order to deal with changes in the R&D environment (trends of rival companies, changes in size of the market, emergence of alternative technology and so on), who (or what division) of your company reviews the R&D strategy ?

1. A researcher reviews the strategy at his/her own discretion.
2. The research group leader reviews the strategy at his/her own discretion.
3. The research management division gives appropriate instructions.
4. The research management division and the marketing division review the strategy together.
5. Reviews are carried out under instruction of senior management.
6. Other ( )

**Figure J-19(a) Reviewing of R&D strategy (overall companies)**



**Figure J-19(b) Reviewing of R&D Strategy (classified by existence of an R&D strategy division)**



**III-5-2-1 Review of R&D strategy in response to changes in the R&D environment (JQ.30)**

Proposing 5 options for the answer, we asked each company about the reviewing process of the R&D strategy in response to changes in the R&D environment. In this question we assumed that the statement 1. indicates no systematic response to changes in the environment, the statement 2. for almost no systematic response, the statement 3. for systematic response to some extent, and the statement 4. for systematic and strategic response. The statement 5., we assumed that, indicates that senior management makes the final decision of reviewing the R&D strategy based upon a systematic debating on it.

We had 126 responses in total for this question. As seen in Figure J-19(a), we had the largest number 39(31.0%) on the statement 4. followed by 28(22.2%) on the statement 3. and 19(15.1%) on the statement 5. From this we may say that about 70% of the responded companies have systematic or strategic reviewing process (at least to some extent).

When we see the classified data by existence of an R&D strategy division (see Figure J-19(b)), the companies with an R&D strategy division have apparently higher rates of replies on the statements 3. and 4, which seems to show more systematic (or strategic) reviewing process of them.

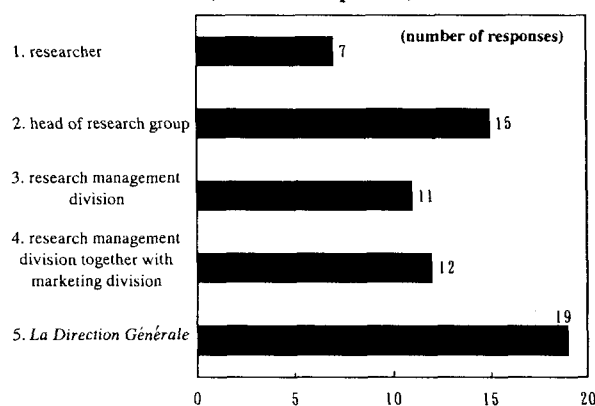


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BETA (FRANCE)

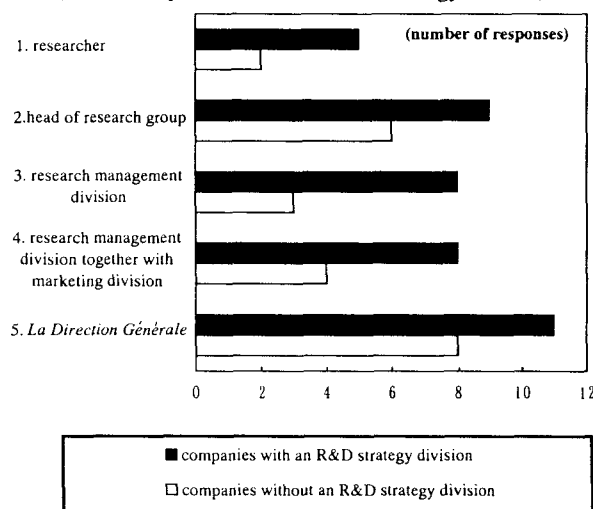
FQ.15 In order to deal with changes in the R&D environment (trends of rival companies, changes in size of the market, emergence of alternative technology and so on), does your company review the R&D strategy? If yes, who (or what division) of your company does it?

1. A researcher himself / herself
2. Head of research group
3. Research management division
4. Research management division together with marketing division
5. Board of Directors (*La Direction Générale*)

**Figure F-19(a) Reviewing of R&D strategy (overall companies)**



**Figure F-19(b) Reviewing of R&D Strategy (classified by existence of an R&D strategy division)**



III-5-2-1 Review of R&D strategy in response to changes in the R&D environment (FQ.15)

With a similar question to the Japanese one, we asked each company about reviewing process of the R&D strategy in response to changes in the R&D environment. Figure F-19(a) and (b) show the results of this question (in this question, multiple answers are allowed).

As seen in Figure F-19(a), in French firms, board of directors (*La Direction Générale*) and the head of research group take new decisions in matters of reviewing the R&D strategy. Once more time, these answers show the centralization of management in French firms.

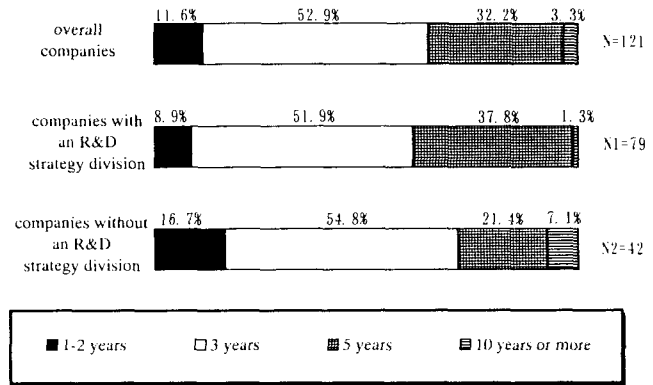
When we see the classified data by existence of an R&D strategy division (see Figure F-19(b)), in the companies with the R&D strategy division, influence of these two persons is more important and the R&D management division and the marketing division have more weight on decisions. The researchers have very little influence on new decisions in the companies without the strategy division.

<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.21 How long is the standard period of one research theme in your company ?

- 1. 1~ 2 years
- 2. 3 years
- 3. 5 years
- 4. 10 years or more

Figure J-20 Standard Period of Research Themes



III-5-2-2 Standard period of research themes (JQ.21)

We asked each company about the standard period of one research theme, proposing 4 options for the answer. As seen in Figure J-20, we had more than a half (52.9%) of responses with 3 years, followed by 32.2% with 5 years. Japanese companies seem to consider 3 years as the standard period of research themes.

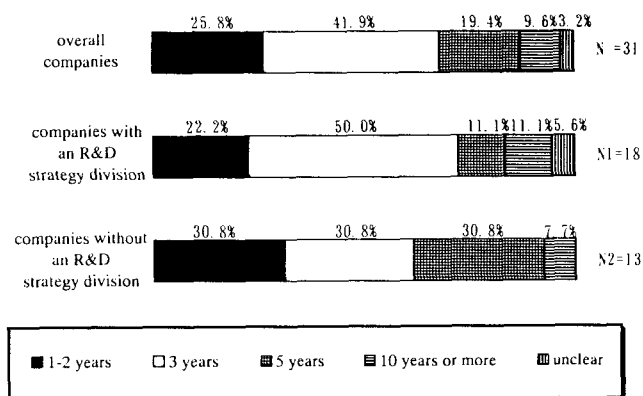
The companies with an R&D strategy division are generally taking longer period than those without the division. This is consistent with the results that the companies with an R&D strategy division generally have research strategies or research plans with longer periods.

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

FQ.24 How long is the standard period of one research theme in your company ?

- 1. 1~ 2 years
- 2. 3 years
- 3. 5 years
- 4. 10 years

**Figure F-20 Standard Period of Research Themes**



III-5-2-2 Standard period of research themes (FQ.24)

We asked each company about the standard period of one research theme with a similar question to the Japanese. As seen in Figure F-20, we had the most replies with 3 years, followed by 1~2 years and 5 years.

The companies with an R&D strategy division tend to have 3 year periods. And we notice that a 10 year periods tends to increase when the R&D strategy division exists.

<NISTEP-BETA COMPARATIVE STUDY>

NISTEP (JAPAN)

JQ.12 Does your company feel it necessary to improve efficiency

of its R&D ?

1. Yes                      2. No

( For those answered "Yes")

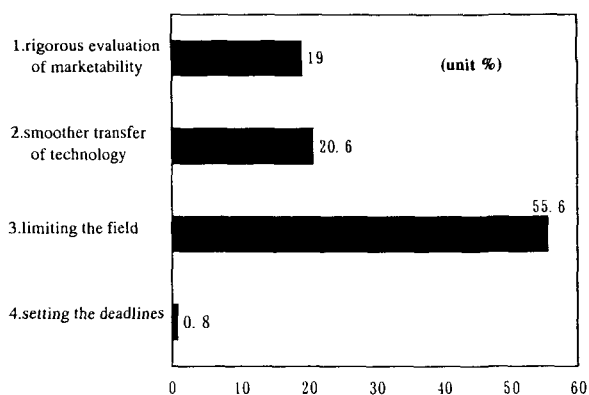
SQ.1 Please rate, in importance to your company, the following measures for improving efficiency in R&D.

(Multiple selections are possible.)

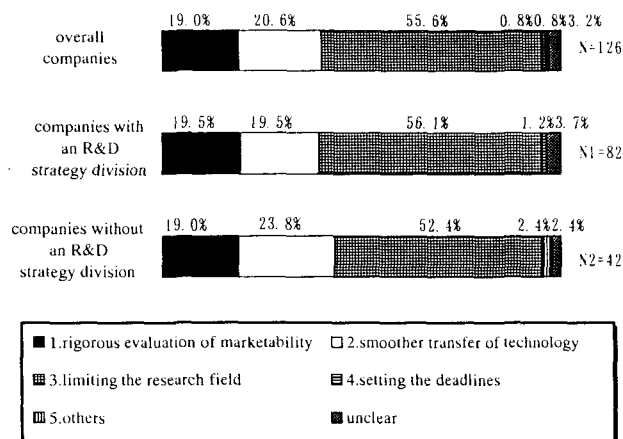
1. Rigorous evaluation of marketability of the research themes
2. Smoother transfer of technology from research to development / manufacturing
3. Limiting which research fields are to be invested in
4. Setting deadlines on individual research projects
5. Other (                      )

1st	2nd	3rd	4th
-----	-----	-----	-----

**Figure J-21(a) Measures to Improve R&D Efficiency**



**Figure J-21(b) Measures to Improve R&D Efficiency**



III-5-2-3 Improving efficiency of R&D activities (JQ.12)

As the R&D environment becomes more severe and the uncertainty of R&D increases, top management people are becoming more convinced of improving of efficiency of their R&D activities. In the question above, all of responded companies answered that they feel necessity to improve efficiency of R&D. We proposed the measures to improve efficiency of R&D as in SQ.1., and asked to indicate the measures in the order of importance for the company. Figure J-21(a) and (b) show the results with taking answers of the first priority.

As seen in Figure J-21(a), more than a half of responded companies answered with "Limiting which research fields are to be invested in" as the first priority. This reflects today's R&D environment where companies are forced to have extension of research periods and to increase funds for their R&D activities. The measure with which the second most of responded companies replied as the first priority is "Smoother transfer of technology from research to development / manufacturing". This, we think, is a surprising response of Japanese companies, for Japanese companies are said to be superior in detailed know-how of realization of products (based on application researches) with short periods and low costs.  
(to be continued)

<BETA-NISTEP COMPARATIVE STUDY>

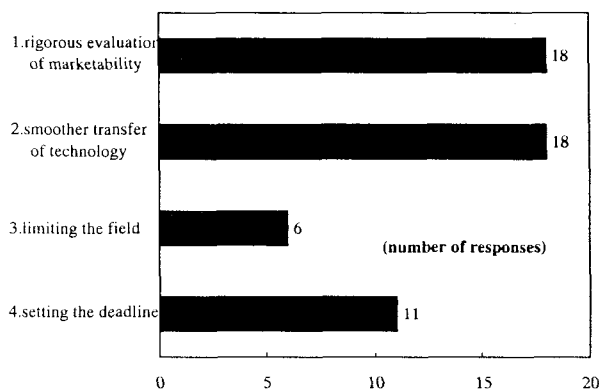
BETA (FRANCE)

**Figure F-21(a) Measures to Improve R&D Efficiency**

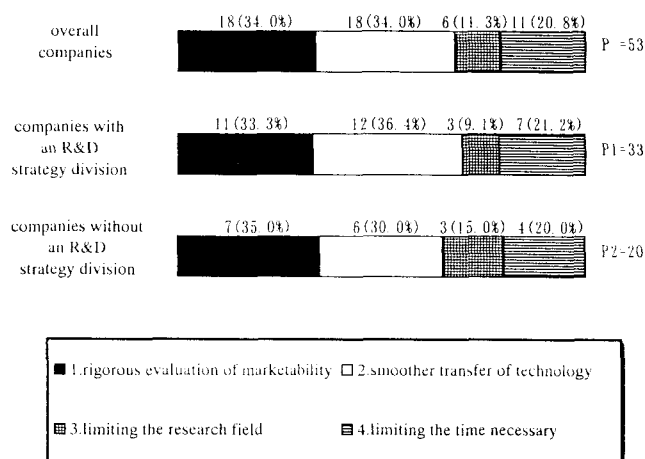
FQ.25 What has to be prior for improving efficiency of R&D

activities ?

1. Rigorous evaluation of marketability of the research themes
2. Smoother transfer of technology from research to development / manufacturing
3. Limiting which research fields are to be invested in
4. Limiting the time necessary to develop projects



**Figure F-21(b) Measures to Improve R&D Efficiency**



**III-5-2-3 Improving efficiency of R&D activities (FQ.25)**

With a similar question, we asked to indicate the priority order of measures. French firms place higher priority on "Rigorous evaluation of marketability of the research themes" and "Smoother transfer of technology from research to development / manufacturing" (see Figure F-21(a) and (b)). On the contrary in Japanese firms, these two measures do not have much weight but "Limiting which research fields are to be invested in" has the highest priority.

Several studies (e.g. [3]; B. BOBE [1990] or [7]; K.B. CLARK - T. FUJIMOTO [1991]) concerning R&D management emphasize how Japanese industrial strategies anticipate modifications of the consumer satisfaction. R&D is perceived as a simulation of the production-consumer process. Moreover, Japanese attitudes toward industrial strategy pretend that foreigner competition on internal market is already strong. Then, for the next few years a crucial problem is the determination of a minimal scope of activity corresponding to the diversification of the consumer's needs. Our result that Japanese firms place the highest priority on "Limiting which research fields are to be invested in" is consistent with these features of Japanese firms. (to be continued)

**<NISTEP-BETA COMPARATIVE STUDY>**  
**NISTEP (JAPAN)**

JQ.12 Does your company feel it necessary to improve efficiency

of its R&D ?

1. Yes                      2. No

( For those answered "Yes")

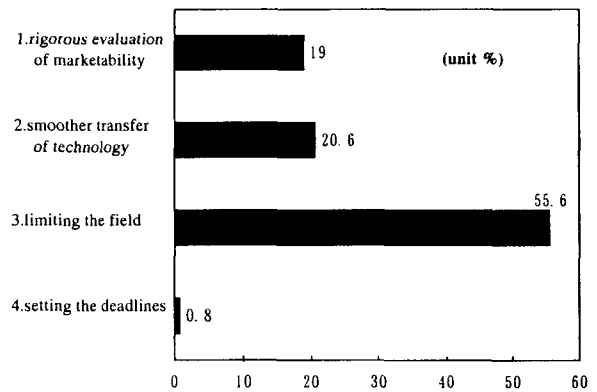
SQ.1 Please rate, in importance to your company, the following measures for improving efficiency in R&D.

(Multiple selections are possible.)

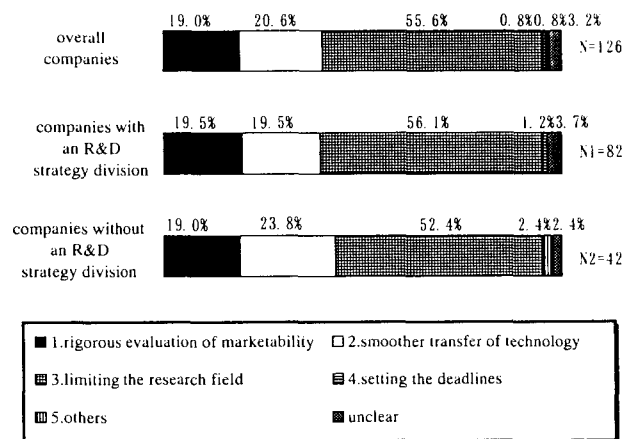
1. Rigorous evaluation of marketability of the research themes
2. Smoother transfer of technology from research to development / manufacturing
3. Limiting which research fields are to be invested in
4. Setting deadlines on individual research projects
5. Other (                      )

1st	2nd	3rd	4th
-----	-----	-----	-----

**Figure J-21(a) Measures to Improve R&D Efficiency**



**Figure J-21(b) Measures to Improve R&D Efficiency**



Japanese companies still seem to regard technology transfer from research level to development and manufacturing as the point to be improved.

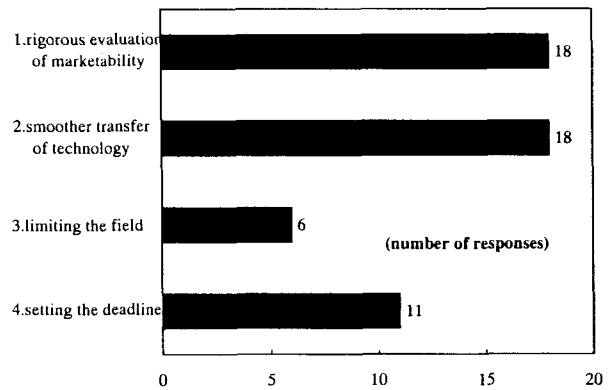
The companies with an R&D strategy division have a higher response rate for "Limiting which research fields are to be invested in", while they have a lower rate for "Smoother transfer of technology from research to development / manufacturing" (see Figure J-21(b)).

<BETA-NISTEP COMPARATIVE STUDY>  
BETA (FRANCE)

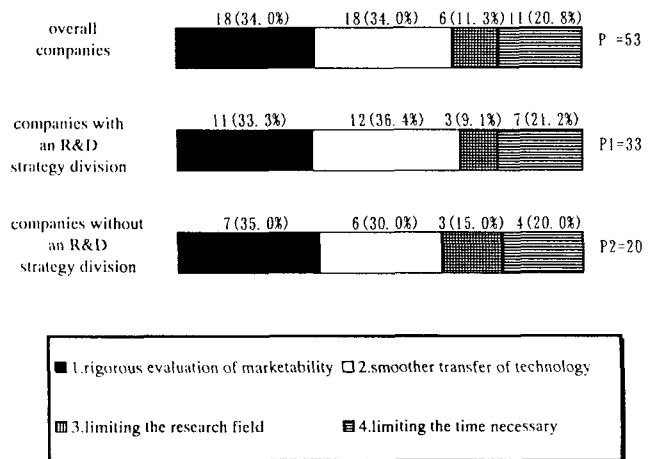
FQ.25 What has to be prior for improving efficiency of R&D activities ?

1. Rigorous evaluation of marketability of the research themes
2. Smoother transfer of technology from research to development / manufacturing
3. Limiting which research fields are to be invested in
4. Limiting the time necessary to develop projects

**Figure F-21(a) Measures to Improve R&D Efficiency**



**Figure F-21(b) Measures to Improve R&D Efficiency**



French firms are concerned with the elaboration of rules such as "Limiting the time necessary to develop projects" whereas Japanese firms seem to be less concerned with this.

As far as the Japanese firms are concerned, they do not want to diversify too much and they give less weight, apparently, to commercial goals through piloting research. On the other hand, French firms try to find measures allowing more technology transfers and R&D choices guided by applications on the market.

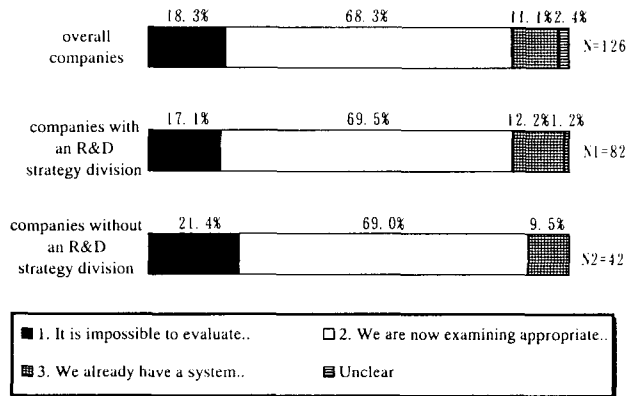
<NISTEP-BETA COMPARATIVE STUDY>  
NISTEP (JAPAN)

JQ.9 This question is relating to evaluating R&D activities in terms of efficiency of investment. Which do you think is most applicable to your company ?

1. It is impossible to evaluate the efficiency of investment in R&D activities.
2. We are now examining appropriate methods to evaluate the efficiency of investment in R&D activities.
3. We already have a system for evaluating the efficiency of investment in R&D activities. (Please describe the method briefly in the space below.)

.....  
.....

**Figure J-22 Evaluating Efficiency of Investment in R&D**



**III-5-2-4 Evaluating efficiency of investment in R&D activities (JQ.9)**

We think that top management people have various opinions about evaluating the efficiency of investment in R&D activities. Taking this into account, we set the above question and asked each company about its view of evaluating the efficiency of their R&D activities. The results of this question are shown in Figure J-22, where we see that 23(18.3%) replied with "It is impossible to evaluate the efficiency of investment in R&D activities.", 86(68.3%) with "We are now examining appropriate methods to evaluate the efficiency of investment on R&D activities." and 14(11.1%) with "We already have a system for evaluating the efficiency of investment on R&D activities.". Some companies are using calculating method with Return on Investment (ROI).

Among the companies answered with "It is impossible to evaluate the efficiency of investment in R&D activities.", some, we believe, have the way of thinking that time and cost required for evaluating the efficiency would not worth the value of evaluation. And this way of thinking seems to be in subconscious of the companies answered with others. However, according to the results of this question, about 80% of the responded companies are already evaluating the efficiency or examining appropriate methods.

And the companies with an R&D strategy division seem to be advanced in evaluating the efficiency, for they have a lower response rate for "It is impossible to evaluate ....." and a higher rate for "We already have a system .....".



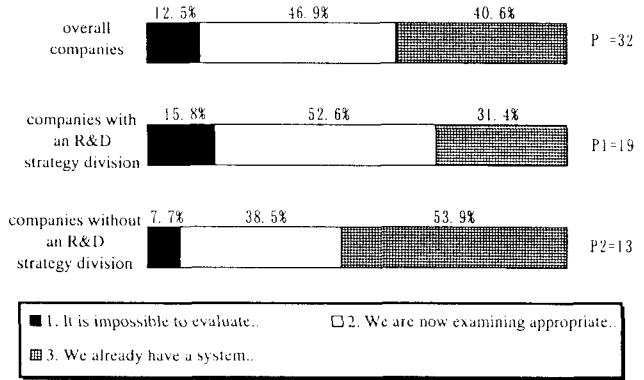
**<BETA-NISTEP COMPARATIVE STUDY>**  
**BETA (FRANCE)**

FQ.27 Concerning evaluation of R&D activities in terms of efficiency of investment, which is most applicable to your company ?

1. It is impossible to evaluate the efficiency of investment in R&D activities.
2. We are now examining appropriate methods to evaluate the efficiency of investment in R&D activities.
3. We already have a system for evaluating the efficiency of investment in R&D activities. (Please describe the method briefly in the space below.)

.....  
 .....

**Figure F-22 Evaluating Efficiency of Investment in R&D**  
 (P:number of responses)



**III-5-2-4 Evaluating efficiency of investment in R&D activities (FQ.27)**

We asked each company about its view of evaluating the efficiency of their R&D activities with the same question as the Japanese one. The results of this question are shown in Figure F-22. Many firms declare they have not yet found methods to evaluate the efficiency of their R&D investments. A few firms have developed a method but there is no real homogeneity and each firm seems to have its own method.

When the R&D strategy division does not exist, the companies seem to have more frequently settled a method to evaluate their investments (53.9% against 31.4% for the companies without the strategy division). It could be due to the fact that the R&D strategy division creates a new organizational complexity in the corporation requiring new tools of evaluation not yet invented or adapted.

According to the answers, the evaluation remain mainly calculating methods : number of new products, number of hours devoted to the project in comparison with the economic results of new products, improvement of the financial results (real expenses, Net Present Value, Return on Investment)... Sometimes, firms try to follow a kind of "development guide" of research or define indicators. Some companies measure their efficiency through the achievement of new research contracts.

Finally, most companies, which have developed a method of evaluation, try also compare their technological results with those of their competitors and attach great importance to the quality image of their products on the market.

## **IV Summary and Considerations**

The objectives of this study are

① to investigate answers of questions [Do also French companies adopt "an R&D strategy division" ?], and [Is influence of such an autonomous division on R&D management the same order of magnitude as in Japanese firms ?]

and through this

② to clarify differences between Japan and France in ways of R&D management and trends in R&D strategies of firms.

#### IV-1. Adoption of "an R&D Strategy Division" and Influence of It in French

##### Firms

As for adoption of "an R&D strategy division", 58% of the responded French firms answered that they have "an R&D strategy division", while about 65 % of the Japanese responded firms answered that they have the division {JQ.5(Figure J-3(a))-FQ.6(Figure F-3(a))}. Taking into account the fact that percentage of French companies with having an R&D strategy division is almost the same as the one of Japanese firms in spite that the average size of the responded French firms is quite smaller than the Japanese (that is, the necessity of this kind of division in French firms is much less than in Japanese firms) , we may say as follows,

(Adoption of "an R&D strategy division" in the French firms)

A-1. The R&D strategy division seems to be a rather popular division also among French companies.

This division is generally thought to coordinate growing complication of R&D activities throughout a company when the company gets larger and to contribute to efficient and effective deployments of limited research resources. It is understood that this division is necessary for maintaining competitiveness in technology development. The R&D strategy division mainly belongs to senior management people (the president or the board of directors) in both Japanese and French companies {see JQ.5(Figure J-3(b))-FQ.6(Figure F-3(b))}, and it is thought that this division has a large influencing power on R&D activities of the companies. Actually, companies with this division in both countries set up their R&D strategies or research plans for whole company at a higher rate than companies without the R&D strategy division {see JQ.7(Figure J-8(a))-FQ.12(Figure F-8(a)) and JQ.6(Figure J-9(a))-FQ.11(Figure F-9(a))}.

We summarize characteristic points of companies with the R&D strategy division

compared with those without the division for respective countries in Table 5., from which we are able to extract the following functions of the R&D strategy division:

In Japanese firms,

- J-① to stimulate aggressive deployments of R&D activities in diversified fields
- J-② to support firm's R&D activities in organized ways while balancing opinions from each division
- J-③ to support improvement in efficiency of investment in R&D and reduction of R&D costs
- J-④ to support improved treatment of researchers in firms and to respect researchers' freedom for innovation
- J-⑤ to support investigation of various internal and external environment factors for firm's R&D activities.

In French firms,

- F-① to stimulate aggressive deployments of R&D activities in diversified fields
- F-② to support firm's R&D activities in organized ways while balancing opinions from each division  
(F-②' the influencing power of sales and marketing divisions becomes weak and other divisions increase in power)
- F-③ to support the researchers' freedom for innovation
- F-④ to support investigation of various internal and external environment factors for firm's R&D activities.

We may see in these results that both Japanese and French firms are making efforts to deal with the severe business environment.

From the above, the influence of the R&D strategy division on R&D management can be summarized below:

(Influence of the R&D strategy division on R&D management in French companies)

A-2. Influence of the R&D strategy division within French firms is quite similar to the Japanese case, such as stimulating aggressive deployment of R&D activities, balancing opinions from each division, supporting investigation of various internal and external environment factors and respecting researchers' freedom in research. Also, for French firms with an R&D strategy division, the power of sales and marketing divisions to influence R&D activities tends to become weak.

In the French survey, some answers stated that the R&D strategy division consists of members from the R&D division, the research management division and the board of directors, from which we may see that this division is organized to coordinate between R&D activities and business management. As we describe in IV-2., in French firms the sales and marketing divisions have the main roles for business management such as collecting and analyzing the information on cost competitiveness of products, and in general these divisions have a large power to influence business matters. Taking into account the fact that the influence of these divisions becomes weak for companies with the R&D strategy division, we may conclude the R&D strategy division has substituted for some of the roles of the sales and marketing divisions.

**Table 5. Characteristic points of companies with an R&D strategy division (1)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
a. Breakdown of R&D activities		
a-1. types of activity (basic / present / future ; based on the number of themes) {Fig. J-4 / Fig. F-4}	almost no difference	firms with an R&D strategy division (RDS firms, hereafter in this table) have slight preference for research for the future
a-2. research themes according to the origin {Fig. J-5 / Fig. F-5}	almost no difference	RDS firms have slight preference for research started from theory and research with a combination of theory and market needs (i.e. preference for more complicated research)
b. Types of R&D organization		
- operating multiple laboratories {Fig. J-6 (b) / Fig. F-6}	RDS firms operate multiple laboratories at higher rate	RDS firms operate multiple laboratories at higher rate
c. Considerations when making up R&D strategies		
- investigating environment factors {Fig. J-7(b) / Fig. F-7(b)}	emphasis on all of 16 factors	emphasis on most of factors (14 factors)
d. Setting up research strategies for whole company		
d-1. setting up research strategies {Fig. J-8(a) / Fig. F-8(a)}	RDS firms set up research strategies at higher rate	RDS firms set up research strategies at higher rate

**Table 5. Characteristic points of companies with an R&D strategy division (2)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
d-2. periods of research strategy {Fig. J-8(b) / Fig. F-8(b)}	RDS firms are taking longer periods	RDS firms are taking slightly longer periods
d-3. responsible person for setting up research strategies {Fig. J-8(c) / Fig. F-8(c)}	almost no difference	RDS firms have tendency of dispersion of responsible person in various hierarchical positions
d-4. person making final decision of research strategies {Fig. J-8(d) / Fig. F-8(d)}	almost no difference	RDS firms have more cases with transfer of final decision to lower hierarchical positions than the president
e. Setting up research plans for whole company		
e-1. setting up research plans {Fig. J-9(a) / Fig. F-9(a)}	RDS firms set up research plans at slightly higher rate	RDS firms set up research plans at much higher rate
e-2. periods of research plan {Fig. J-9(b) / Fig. F-9(b)}	almost no difference	almost no difference
e-3. responsible person for setting up research plans {Fig. J-9(c) / Fig. F-9(c)}	RDS firms have tendency that person in higher position takes responsibility	RDS firms have slight tendency to entrust lower position with responsibility

**Table 5. Characteristic points of companies with an R&D strategy division (3)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
<p>e-4. person making final decision of research plans {Fig.J-9(d) / Fig.F-9(d)}</p>	<p>RDS firms have slight tendency to entrust lower position than the president with making final decision</p>	<p>RDS firms have slight tendency to entrust lower position than the president with making final decision</p>
<p>f. Influence of each division on matters affecting performance of overall company {Fig.J-10(b) / Fig.F-10(b)}</p>	<p>in RDS firms, each division has more influence</p>	<p>in RDS firms, each division (except for the sales / marketing divisions) has more influence (i.e. weakening of influence of the sales /marketing divisions can be seen)</p>
<p>g. Frequency of contacts between the R&amp;D division and other divisions {Fig. J-11(b) / Fig. F-11(b)}</p>	<p>in RDS firms, the R&amp;D division has closer contacts with the president office / planning and the manufacturing division</p>	<p>in RDS firms, the R&amp;D division has closer contacts with all other divisions except for the sales / marketing (i.e. weakening of influence of the sales / marketing divisions can be seen)</p>



**Table 5. Characteristic points of companies with an R&D strategy division (4)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
h. Influence of each division when setting up R&D strategies		
h-1. setting up laboratories (elaboration of research facilities) {Fig. J-13(b) / Fig. F-13(b)}	in RDS firms, the president office / planning, the manufacturing and the general affairs / personnel and labor management have more influence	in RDS firms, the board of management, the finance / accounting, the manufacturing, and the procurement / purchasing have more influence
h-2. hiring of new graduates {Fig. J-13(d) / Fig. F-13(d)}	in RDS firms, the general affairs / personnel and labor management, the president office / planning and the manufacturing have more influence	in RDS firms, the personnel and labor management and the board of management have more influence
h-3. selection of research domains {Fig. J-13(f) / Fig. F-13(f)}	in RDS firms, the president office / planning, the sales / marketing and the manufacturing have more influence	in RDS firms, the manufacturing has more influence ; the sales / marketing have less influence
h-4. preparation of research budget plans {Fig. J-13(h) / Fig. F-13(h)}	in RDS firms, the president office / planning, the finance / accounting, the manufacturing and the	in RDS firms, the board of management, the manufacturing and the finance / accounting have more
(h-4. to be continued)		

**Table 5. Characteristic points of companies with an R&D strategy division (5)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
h-4. preparation of research budget plans {Fig. J-13(h) / Fig. F-13(h)}	sales / marketing have more influence	influence ; the sales / marketing have less influence
i. Consortia		
i-1. necessity of consortia {Fig. J-14(a) / Fig. F-14(a)}	RDS firms feel more necessity	almost no difference
i-2. experience of participation {Fig. J-14(b) / Fig. F-14(b)}	RDS firms have more experience	RDS firms have more experience
i-3. motivation of participation {Fig. J-14(c) / Fig. F-14(c)}	RDS firms are slightly sensitive to costs of R&D	RDS firms are slightly sensitive to international deployment
i-4. nationalities of partner companies {Fig. J-14(d) / Fig. F-14(d)}	RDS firms have partners with more variety of nationalities	RDS firms have partners with more variety of nationalities
j. Changes in the position of the R&D division head (1981-1991(Japan) ; 1983-1993(France)) {Fig. J-15(c) / Fig. F-15(c)}	RDS firms more announced with no change in the position of the R&D division head	RDS firms more announced with no change in the position of the R&D division head
k. Treatment of researchers and engineers {Fig. J-16 / Fig. F-16}	RDS firms have slightly higher tendency towards treating researchers and engineers as specialists	RDS firms have slightly higher tendency towards treating researchers and engineers in the same personnel stream as other employees

**Table 5. Characteristic points of companies with an R&D strategy division (6)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
<p>l. Attitudes towards research and researchers {Fig. J-17(b) / Fig. F-17(b)}</p>	<p>RDS firms are making more efforts to give freedom to researchers while keeping researchers adhering to the basic rules of the company</p>	<p>RDS firms are making more efforts to give freedom to researchers while keeping researchers adhering to the basic rules of the company</p>
<p>m. Procedures of developing R&amp;D budget plan {Fig. J-18 / Fig. F-18}</p>	<p>RDS firms have slightly higher preference for method no. 3 (slight adjusting and additional funds on important themes)</p>	<p>RDS firms have preference for type F-2 (slight adjusting) and also slightly higher preference for type F-3 (slight adjusting and adequate funds on important themes)</p>
<p>n. Reviewing R&amp;D strategy in response to changes in the R&amp;D environment {Fig. J-19 / Fig. F-19}</p>	<p>RDS firms have tendency of reviewing by research management division and its cooperation with other divisions</p>	<p>RDS firms have more participation of each hierarchical level when reviewing</p>
<p>o. Standard period of research themes {Fig. J-20 / Fig. F-20}</p>	<p>RDS firms have higher preference for 5 years period research</p>	<p>RDS firms have concentration on 3 years period research, with a uniform distribution of 1~2, 3 and 5 year-periods for firms without the division</p>

**Table 5. Characteristic points of companies with an R&D strategy division (7)  
(compared with those without the division, broken down by country)**

Items	Japanese firms	French firms
<p>p. Improving efficiency of investment on R&amp;D {Fig. J-21(a) / Fig. F-21(a)}</p>	<p>RDS firms have slight preference to choose limiting field of investment</p>	<p>RDS firms have slight preference to choose smoother transfer of technology</p>
<p>q. Evaluation of efficiency of investment on R&amp;D {Fig. J-22 / Fig. F-22}</p>	<p>RDS firms are examining appropriate methods for evaluation and already evaluating the efficiency at higher rate</p>	<p>RDS firms have slight tendency for giving up evaluation and lower rate of already evaluating the efficiency</p>

#### IV-2 Differences of R&D Management between Japanese and French Companies

Here we pick up major differences of R&D management between Japanese and French companies from the comparisons in paragraph III and consider the backgrounds and factors in which the major differences originate.

(Basic research activities of the firms)

B-1. Japanese firms are engaging in basic research more aggressively than French firms are. {JQ.22(Figure J-4)-FQ.7(Figure F-4)}
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To the questions asking about research activities classified by themes aiming at business and ones not aiming at business (basic research themes), the responded companies of both countries answered as above. This point could be thought to originate mainly in the differences between the national R&D systems of Japan and France.

France, as a whole, has been paying more attention to basic research than Japan, and the national R&D system of France has a clear role-sharing aspect with the government sector for basic research and the private sector for application and development. Because of this R&D system of France, top management people of French firms do not seem to have an aggressive concern with participating in basic research by themselves. BETA studies on economic evaluation of the BRITE-EURAM and the ESPRIT programs [2] confirm the fact that most of the firms participating in these programs are more on the side of applied research and the development phase than on basic research. A French government study [3] on R&D management in several companies in France and Japan confirms this relative deficiency concerning basic research even in several large French companies. In a sample of 14 large firms, only 9 of them claimed to have basic research activities. Of course, such a phenomenon is reinforced even more for small and medium size companies.

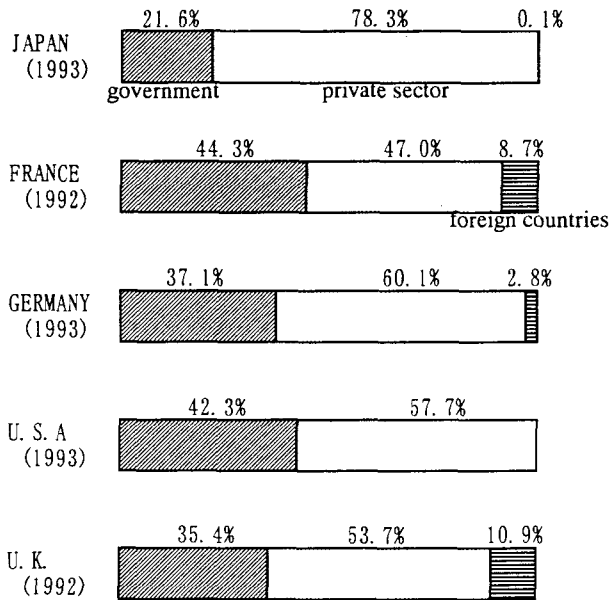
By contrast in Japan, because the contribution of the government sector to basic research has been so small, Japanese firms necessarily have been engaging in basic research in conjunction with the catch up process in manufacturing industries. Also a severe accusation of "a free ride on technology" from the US and European countries in late 1980's has pushed Japanese firms' concerns more on basic research.

Figure-3, Figure-4 and Figure-5 show the rates of payment and usage of national R&D expenditure classified by research sectors and rates of nation's R&D expenditure classified by types of research activity for certain selected countries (this data is from "White Paper on Science and Technology of Japan (1995) [8]" ; original data is based on the OECD reports). In Figure-3 and Figure-4, we see that the rate of payment of R&D expenditure from the Japanese government (1992) is obviously low compared with the cases of France or other countries and therefore R&D activities of Japan have

been led mainly by the private sector. As has been said, the rate of expenditure on basic research of Japan is low compared with France and other selected countries (Figure-5).

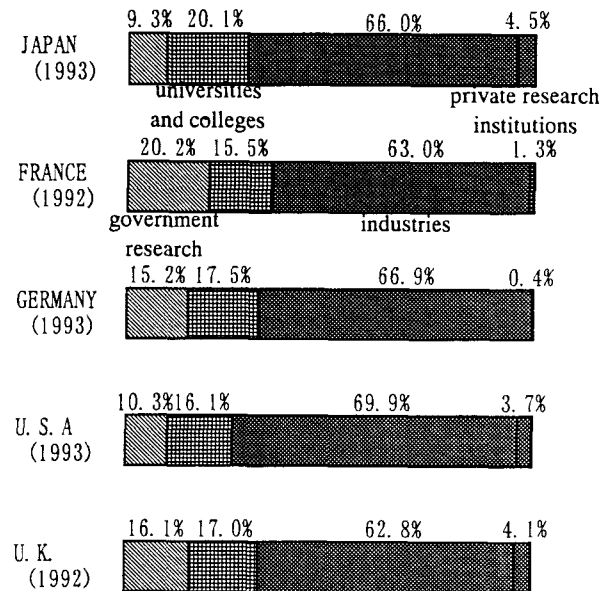
**Figure-3 Share of R&D Expenditure Financing by Sector in Some Selected Countries**

(From White Paper on Science and Technology of Japan, 1995)



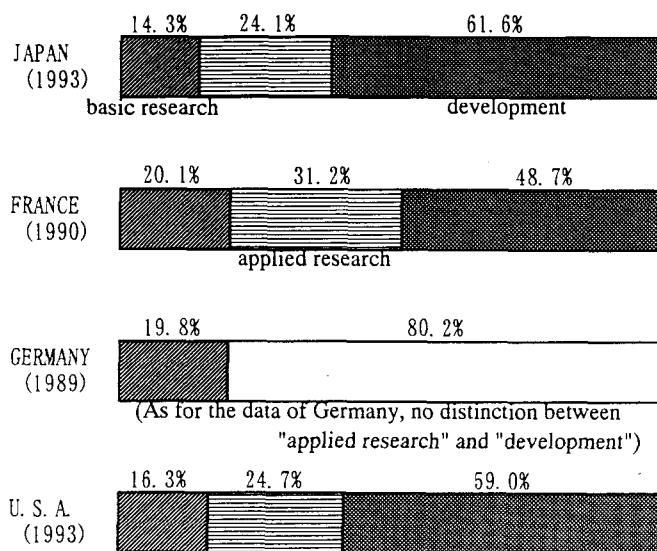
**Figure-4 Share of R&D Expenditure Performance by Sector in Some Selected Countries**

(From White Paper on Science and Technology of Japan, 1995)



**Figure-5 R&D Expenditure by Type of Research Activity in Some Selected Countries**

(From White Paper on Science and Technology of Japan, 1995)



(Factors considered when making up a company's R&D strategy)

B-2. When making up a company's R&D strategy, French firms pay most serious consideration to "capability of R&D division" and "cost competitiveness", whereas Japanese firms consider "importance of technology for the future of company" and "market needs". {JQ.19(Figure J-7(a))-FQ.10(Figure F-7(a))}

The top three factors to be seriously considered when making up a company's R&D strategy are [ 1st : capability of R&D division, 2nd : cost competitiveness of products, 3rd : importance of technology for the future of company ] for the French firms and [ 1st : importance of technology for the future of company, 2nd : market needs, 3rd : capability of R&D division ] for the Japanese firms.

It is thought to be related to the mobility of employees that in the French companies "capability of R&D division" is seriously considered in the first place. Many engineers and researchers in French companies are elite with high academic careers <sup>note 4)</sup> and they have chances of being directly promoted to higher hierarchical positions even at very young ages. Their salary system is the one where they are paid by the year based on assessment of their annual duties [9]. These people, in general, move to other companies seeking reasonable employment conditions for their capabilities. This means larger mobility of engineers or researchers in French companies than Japanese companies. When French firms try to decide on their R&D strategies under these circumstances, "how many capable researchers (or engineers) can be used in the R&D division (capability of R&D division)" is the most important matter. For French companies, "cost competitiveness of products" is the second factor to be seriously considered, and this is thought to be influenced by serious concerns of top management people with improvement in profitability. This point could be understood as arising from the market economy type financial structure of French companies, that is, the large influencing power of stockholders on senior management of companies. As shown above, in the French result, "importance of technology for the future of company" is in the third place (although "importance of technology for the future of company" is also considered relatively serious), which makes the attitude of French firms towards new technologies relatively hesitant compared with Japanese companies.

In Japan, because companies have adopted the life-long employment system, which has the characteristic of a very small mobility of people between firms (and also between firms and government research organizations), they have almost no chance to obtain necessary (capable) researchers or engineers from other firms or other research

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note 4) The elite with high academic careers are generally "cadres", with a *ingenieur diplome* (graduated *grandes ecoles d'ingenieur*) or *maitrise*.

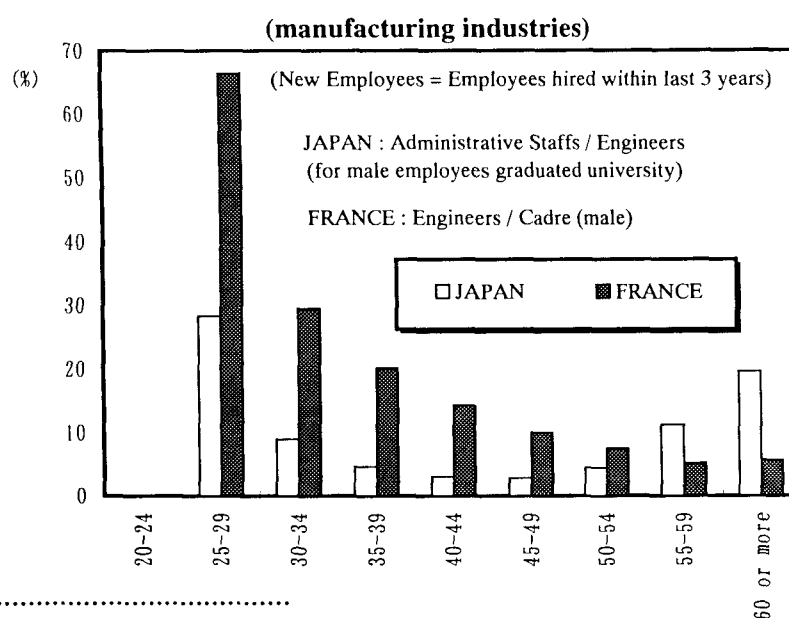
organizations. Therefore, to obtain capable people from outside the company can not be given a high priority.

In Japan, many companies are competing in the same business field, which causes very tough competition in product development. This circumstance necessarily makes top management people be seriously concerned with promising technologies and it also makes "importance of technology for the future of company" be a main axis when setting up R&D strategies. That Japanese firms at the time of setting up R&D strategies consider seriously "importance of technology for the future of company", is thought to be influenced significantly from the above highly competitive business environment of Japan. Also we may see that Japanese companies are very sensitive to "market needs".

Because of difficulties in acquiring capable (or well trained) people from outside companies, Japanese firms consider seriously the education or training of their employees <sup>note 5)</sup>. Actually, "capability of R&D division" is the third factors to be seriously considered at the time of setting up R&D strategies. Once a firm selects a new technology as a key element for its R&D strategy, the firm tries to collect necessary R&D people by personnel exchange within the firm and tries to educate or train new employees.

Here we show the data concerning mobility of engineers of Japan and France in Figure-6 [9], from which we may see that engineers of French firms have more chances to change their companies than engineers of Japanese firms in every group from the second half of their 20's through 40's.

**Figure-6 Comparison of Rates of New Employees by Age Group between JAPAN and FRANCE (1986)**



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note 5) see next page.



note 5) Also in French companies, employees of technician hierarchy have chances to be promoted to *cadres* after having various experiences in the same company. This means that also in French companies education or training is thought to be an important matter. However a large point of difference between the French promotion system for elites and the Japanese one is that it is not based on training or education within a company but on careers planned by the individuals themselves changing the companies they work for over time.

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end of note 5)

(Degree of contact of the R&D division with other divisions)

B-3. The R&D division has the most frequent contact with the sales and marketing divisions in French firms, however in Japanese firms it has the closest relation with the manufacturing division.                   {JQ.17(Figure J-11(a))-FQ.22(Figure F-11(a))}
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As we describe later, top management people of French firms are most seriously concerned with improvements in company profits because of the very large influencing power of stockholders. Under these circumstances, the R&D division in French firms inevitably contacts most frequently with the sales and marketing divisions, which hold key information concerning company turnover and cost competitiveness of products, etc.. Another argument as to why the link between the R&D division and the sales and marketing is so privileged comes from the particular economic situation prevailing when the survey in France was done. The growth in industrial sectors was very low and companies were looking for ways of maintaining their market positions, indeed they were trying to win market share from their competitors. In such a situation, the strategy was much more aggressive and emphasized short term profits by quick readjustments on the marketing side.

For Japanese firms, which have a history of rapid growth with incremental innovation of manufacturing technologies, the manufacturing division still has the largest influence on the R&D division. Of course this also arise from the personnel rotations within a company in Japan, which is one aspect of the life-long employment system of Japanese companies. In general, researchers and engineers of Japanese companies stay very long in the same companies and thus often have experience of engaging in manufacturing job. They easily understand the situation of the manufacturing division, which also helps with the smooth transfer of technology. Therefore, beyond the job-tenure argument, the more internal mobility oriented system as compared to the external French one, creates natural links between people belonging to different divisions and provides propitious conditions for cross-fertilization inside the

organization. Moreover, management methods such as quality circles which are massively used in Japan facilitate the circulation of ideas across organizational frontiers of the company.

The economic situation for Japanese companies at the time of the Japanese survey was characterized by a relatively strong growing period. Under these conditions, firms' strategies were devoted to rapid reactivity in order to penetrate new markets. Delays of conception and production had to be reduced in order to be the first in the new technology <sup>note 6</sup>).

(Participation in international consortia)

B-4. With regards to participation in international consortia, French firms feel a real necessity and have more opportunities to participate in such than Japanese firms.

{JQ.14(Figure J-14(a), (b))-FQ.13(Figure F-14(a),(b))}

As described in B-2., we see that French firms seem to be hesitant to move into new technology areas because they have to set up their R&D strategies under the condition of a large mobility of employees. The large mobility of employees makes top management people of French companies consider "capability of R&D division" first even if they understand "importance of technology for the future of company". This lack of dynamism of going into new technology areas is thought to be one reason of the losing international competitiveness of French companies. In compensation for this, French firms have been trying to seek ways of going into new technology areas by participating in international consortia without changing their R&D systems much. The big consortia-type R&D programs, which the EU has been promoting for more than 10 years, have been providing opportunities for not only French companies but also European companies to participate in consortia. These consortia have been contributing to the transfer of necessary know-how. Presently in the European Union member countries, firms are able to take new turns for business expansion without paying attention to country borders because of the liberalization of the European market with most industrial products. With this in mind, it is not inconceivable that French firms may regain the power to compete globally after participating in these consortia.

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note 6) Scholars in technological management (e.g. CLARK - FUJIMOTO 1991 [7]) report that at this time in the car industry, the average time length for designing a new car was around 18 months in Japan while it was often twice that in the western European countries. As we mention in this study, at this time Japanese companies have developed more a kind of earlier engineering based on management tools emphasizing the overlapping of phases and horizontal links such as simultaneous engineering.

(Position of the head of R&D division)

B-5-1. In Japanese firms, the president or the vice-president often holds also the position of the head of R&D division, while in French companies, they normally do not hold that position. {JQ.13(Figure J-15(a),(b))-FQ.19(Figure F-15(a),(b))}

B-5-2. In the decade from the beginning of 1980's, in Japanese firms, the position of the head of R&D division had been moved upward, while in French companies, it had not been changed. {JQ.13(Figure J-15(c))-FQ.19(Figure F-15(c))}

The result B-5-1. shows differences between Japanese and French companies of the concerns of top management people with R&D activities or restrictions on their management of companies, which mainly arise from the differences in financial structures of companies in both countries.

The characteristic point of the financial system of a Japanese firm is that it is based on credits coming from banks and financial institutions. Then, the contacts linking companies and banks are mainly based on the ability to pay the interest. In such an economy, the financial director is seeking cheaper sources of funds (that is, the firms have chances to select banks or financial institutions). General figures exhibit this financial structure of Japan with around 70% of capital coming from banks and similar institutions (the rates of capital coming from stockholders are low in general). As for the stockholders of Japanese companies, most of the large stockholders are related companies and main banks, thus the stockholders' audit system of Japanese companies does not have much influence on the senior management of companies, which allows the presidents a relatively large free hand. Therefore, in Japanese firms, the presidents generally have a great interest also in the long-term growth of their firms (actually Japanese firms are more aggressively dedicated to basic research that needs a long time before reaching the production stage as in B-1.) as well as in improvement of short-term profits, which is thought to be the main reason to the results in B-5-1. (That is, in Japanese firms, the president or the vice-president often holds the position of the head of R&D division).

On the contrary, firms of western European countries and the US have generally the largest part of capital coming from financial assets such as actions or bonds, not from debt banking. As owners of the company, stockholders can directly influence the orientation of the strategy particularly for investments [10]. The role of the financial director is more slanted towards trying to sell assets on the markets at as high a price as possible. This effect reinforces without doubt the former argument leading to a larger free hand in the management of companies in Japan. This circumstance necessarily makes the PDGs of French firms have the most interest in improving short-term profit.

Therefore in French firms, they do not seem to regard the R&D strategy as a matter with top priority among firms' strategies. This is reflected in the above fact that the president or the vice-president normally does not hold the position of the head of R&D division with this position being assigned to lower hierarchy levels.

The result B-5-2. (that in the decade from the beginning of 1980's, in Japanese firms, the position of the head of R&D division has moved upwards) is related to the unpredictable situation of tight competition in technology development. Because the catch-up process of Japanese manufacturing industries in comparison to the US or western European industries has finished, many Japanese firms have become front-runners in competitions of technology development and they have begun to be confronted with unpredictable situations such as drastic changes in the market share of products due to the emergence of new technologies. Under these circumstances top management people have to be greatly concerned with R&D, which raises the relative position of the R&D division within a firm.

(Treatment of researchers and engineers)

B-6. French firms tend to place researchers and engineers in the same personnel stream as administrative staff, while Japanese firms provide specific career tracks to researchers or engineers. {JQ.34(Figure J-16)-FQ.20(Figure F-16)}
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This result relates to the mobility of employees and to the education (or training) system in firms for employees in both countries. In Japan, because the acquisition of capable people from outside companies is difficult, each firm has to educate or train employees for its own R&D activities. This education (or training) by firms takes a very long time and costs much. Therefore in order to avoid losing capable employees<sup>note 7)</sup>, Japanese firms are generally trying to improve the positions of excellent researchers and engineers and to raise their loyalty to their firms by providing specific career tracks to them (and also higher salaries depending on their abilities and time length of working for the firm).

As described in B-2., engineers and researchers in French companies are mainly "*cadres*" with high academic careers. In France, they have a common understanding that these people should gain their research or engineering abilities by themselves by changing companies for which they work in order to seek reasonable employment

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note 7) In Japan, in general it is not many cases that the salaries of transferred people are improved. However sometimes firms pick up capable employees from other companies.

conditions for their capabilities. Firms normally employ well educated (or well trained) researchers (or engineers) under a contract basis. As a result, French firms are not in the position to provide them specific career tracks.

(Freedom of research in firms)

B-7. Japanese firms give more freedom to researchers or engineers and place more confidence in their research activities. In French firms, researchers and engineers are required to adhere to annual plans at first.

{JQ.35(Figure J-17(a))-FQ.21(Figure F-17(a))}

In the developed countries, in addition to slowdown in growth of gross demand, diversification of products has been progressing and the life-cycle times of products have been shortened by tight technology competitions. Under these circumstances, emergence of a new technology sometimes gives rise to a drastic change of firms' shares in the market, which makes the business ground very unstable. Generally it is said that technological innovation often originates in the free ideas of researchers, which makes firms try to maintain a creative atmosphere (i.e. freedom of researchers) within the firms.

For Japanese firms, as we described in B-2. and B-6., there is almost no chance to obtain capable researchers familiar with new technologies from outside the firm. Thus firms have to obtain new technologies by themselves through their R&D activities. Japanese firms seem to have the basic thought that they want to stimulate innovative research in their firms at any rate, which can be seen in the fact that they are favorable to give free hand to researchers or they tend to accept unofficial (personal) research positively. This point is also related to the great concern of the top management people with R&D as we described in B-5.

By contrast in France, as we described in B-6., firms normally employ well educated (or well trained) researchers (or engineers). When the firms start R&D activities in new technologies, they try to employ excellent researchers or engineers familiar with the new technologies. This situation and the centralized management system of French firms seem to make the PDG request researchers to keep time schedules for research - at least at first in the project.

(Measures to improve efficiency of R&D)

B-8. In Japanese firms, "limiting research fields to be invested in" is most seriously considered as a measure to improve efficiency of R&D, while in French firms, "rigorous evaluation of marketability of the research themes" and "smoother transfer of technology" are most seriously considered.

{JQ.12(Figure J-21(b))-FQ.25(Figure F-21(b))}

For this result, we may have several points to consider.

In French firms, top management people are strongly restricted by stockholders to very cost effective management of their business. This situation necessarily forces senior management to make maximum efforts to connect results between invested research and production. Therefore, "rigorous evaluation of marketability of research themes" is regarded as indispensable. In French firms, there lies a hierarchical gap between researchers and manufacturing people, which sometimes impedes the smooth transfer of technologies within the firms. Top management people recognize this point, and they regard "smoother transfer of technology" as one of the issues to be most seriously considered for improving efficiency of R&D. Presently in France in large size companies, a new movement has started based on more reactive and anticipated models by using flexible organization forms such as matrix or technological transfer teams.

In Japan, "smooth transfer of technology" is not regarded as a serious issue. This can be understood from the well known fact that Japanese firms have been developed the system of simultaneous engineering, which is work cooperation between the engineers (or researchers) and the manufacturing people. Another basic situation in Japanese firms which maintains smooth transfer of technology within the firms comes from the Japanese employment system (the life-long employment system). Under this employment system, an employee sometimes works in the R&D division and sometimes works in the manufacturing division within the same firm and they normally continue to work for that firm until they retire. Therefore researchers or engineers know problems of manufacturing division well, which also help the smooth transfer of technology.

We may pick up two influencing factors for the fact that in Japanese firms "limiting research fields to be invested in" is the factor most seriously considered as a measure to improve efficiency of R&D. The first one is, for a short term matter, highly competitive business environment of Japan as we described in B-2.. Under these circumstances, Japanese companies have put emphasis on dealing with anticipating consumers' needs for the next few years, which means emphasizing the deployment of research resources in limited research fields. The second one is, from a long term viewpoint, the education (or training) of employees within the firms. Japanese companies recognize that it is important to foster capable researchers (or engineers) who are the driving forces of future development of the companies. Therefore, "to which research field they make a commitment of limited research resources" is a basic thesis for Japanese companies, which results in the above characteristic points when dealing with R&D management in Japanese companies.

(Evaluation of efficiency of investment in R&D)

B-9. French firms have already been evaluating their efficiency of investment in R&D by quantitative methods to a much higher rate than in Japanese companies.

{JQ.9(Figure J-22)-FQ.27(Figure F-22)}

The stockholders of French firms claim the PDGs must make efforts to manage every business activity of their firms in the most cost-effective manner. The R&D activities of firms are not exceptions, and it is thought that the PDGs should have some objective and quantitative methods to evaluate the efficiency of their investments in R&D. This is also partly due to the fact that in the country of the philosophers Descartes and Pascal, decision making has to be justified rationally. It means that every investment decision starts with evaluating the future profit for the company in financial terms as much as possible. There is a strong temptation when evaluating R&D projects to apply the same financial criteria as those used commonly for classical investments, even if their degrees of precision of what could be the future benefit is not so good. Financial criteria such as Return on Investment (future benefit / R&D expenditure) or Net Present Value (based on the Cash-flow analysis) sound great to the ears of the people in charge of strategic decisions. We know that Japanese attitude deals more easily with a more intuitive procedure where organizational learning and continuous progress (notion of "Kaizen") are more important than forecast on profit [11]. Researchers of MIT in this field show clearly that Japanese companies use normally the same type of financial tools as western countries use but in a different way more devoted to long term periods and ability to survive in the future. In our questionnaire we find a very large proportion of companies in Japan stating that no criteria can effectively evaluate R&D strategy. French companies are more optimistic on this point even if sometimes the nature of the criteria used is not revealed.

The remarks we described above have to be slightly corrected by the fact that economic situations of the two countries at the time of these surveys were actually different characterized by a relatively strong growing and optimistic period in Japan around 1991 and a weak growth (indeed recession) period for France in 1994.

## **V Concluding Words**



Under the present situation where globalization of industry and megacompetition have been progressing through out the world, firms in developed countries have to deal with R&D at least to some extent for their survival. Since R&D has many unknown factors, in order to compete intensively in R&D with close observation of costs and benefits, it is indispensable for each company to have an R&D strategy for efficient and effective deployment of R&D resources. It is generally recognized that in order to implement a firm's R&D strategy a division coordinating R&D activities through out a company is really necessary (in this report, we called this division as "R&D strategy division"). We confirmed this supposition for Japanese firms at first. Also, functions of this division in accordance with its purpose such as supporting aggressive deployments of R&D activities in various fields has also been found.

It could be thought that the existence of the above coordinating division (the R&D strategy division) and its functions would not differ between countries much while the trends in R&D strategy and ways of R&D management of firms in various countries would be diversified depending on cultural backgrounds, social and economic development histories of the countries, and so on. From this point of view, it is important to classify differences in ways of R&D management of firms according to country.

In this study, we investigated Japanese and French firms, which have not been often samples for comparative studies on R&D management so far. The social developments, cultural backgrounds, economic growths and geographical circumstances of Japan and France are largely different with respect to each other, which affects the trends in R&D strategy and ways of R&D management of firms in both countries.

Actually, in this comparative study, we found that the R&D strategy division is rather familiar aspect of the organization of firms in both countries with almost the same roles of supporting aggressive deployments of firm's R&D activities in diversified fields, supporting the firm's R&D activities in an organized way coordinating opinions of each division, and so on. As for the R&D management of firms, we found several characteristic differences between both countries, which are thought to have originated in differences in the national R&D system, firms' business competition environment, firms' way of raising operational funds and differences in mobility of employees (or education (or training) system for employees). Japanese companies are strongly competitive internationally in several fields of manufacturing, which is thought to have come from an R&D management where the main axis is based on a flexible personnel rotation system with the premise of life-long employment system. Recently in Japanese firms, the life-long employment system has been under discussion and is giving way. The values of people have also been changing from one biased towards jobs in their firms to one with greater emphasis on personal life. Taking this into account, sooner or

later Japanese companies necessarily will have to confront the same problems that European companies are presently facing and the degree of technology directed management in Japanese companies may be decreased. By contrast, firms in the EU member countries including France have been feeling that the competitiveness of their products is not enough compared with Japan or the US. For these firms, seeking a harmonization of improvement in their international competitiveness (making more reactive) and keeping traditional benefits which people have received up to now will be an advanced task. With these dynamics in mind, the ways of R&D management which we have clarified in this study and the backgrounds and factors in which differences of R&D management originate may suggest ways for firms of both countries to deal with problems confronted at present or in the future.

Finally, the questionnaires of surveys are to roughly compare trends in R&D strategy and ways of R&D management between Japanese and French firms and are not intended to focus on specific themes. They were not ones designed in advance to take into account differences in the situations of Japan and France and they have several pairs of questions with slightly different contents because of translation, etc.. Therefore we could not make a systematic comparison. We hope that this study will be one of reference for further detailed studies.

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As is stated in section I, this comparative study was a joint study between NISTEP and BETA under the Memorandum of Understanding (MOU) of both institutes (concluded by Mr. Fujio Sakauchi (former Director General of NISTEP) and Dr. Adrien Schmitt (President of Universite Louis Pasteur Strasbourg)). We would like to note that Mr. Jiro Shibata (former Deputy Director General of NISTEP), Mr. Alain Quevreux (Adjoint au Chef du Departement, Homme, Travail et Technologies, Ministere de la Recherche et de l'Espace (at that time)) and Ms. Monique Flasaquier of ULP made great efforts to start this joint study. Here we would like to express our great thanks not only to all members who took care of this joint study at both institutes but also to the French companies for their very kind cooperation with the BETA survey.

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## **Annex 1 The Questionnaire of NISTEP**

# INTERNATIONAL COMPARISON STUDY OF R&D MANAGEMENT SYSTEMS

National Institute of Science and Technology Policy  
Science and Technology Agency

1. We hope you are willing to participate in this research study that seeks to compare R&D management systems of Japanese, American and European firms. The questions seek information about your company's R&D strategy, R&D management system, and management situation. Because we would like to collect accurate data, please have this questionnaire filled out by someone who can give subjective responses - if possible by the head officer responsible for the R&D division.

We understand that this information is confidential, and are taking every precaution to protect you and your company. The responses to this questionnaire will be reported only in statistical reports, thereby protecting individual responses.

2. Upon finishing this questionnaire:

- (1) Please use the enclosed envelope to return the questionnaire.
- (2) Please return this questionnaire by \*\*\*\*\*.

Thank you in advance for your cooperation.

your company			
your name		your department	

**Q.1** What is your position in your company ?

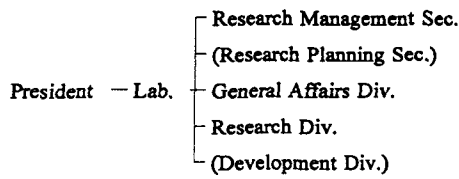
1. Executive officer    2. General manager    3. Other

**Q.2** In which section of your company are you involved in R&D strategy development ?

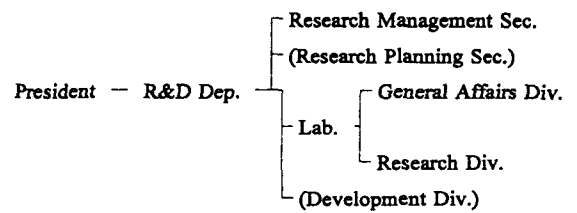
1. Overall company    2. Department  
3. Division    4. Laboratory

**Q.3** To which of the following types of structure does the R&D organization of your company correspond ? Please choose the number of the type. If you cannot find the appropriate type, please describe the R&D organization of your company in the space provided.

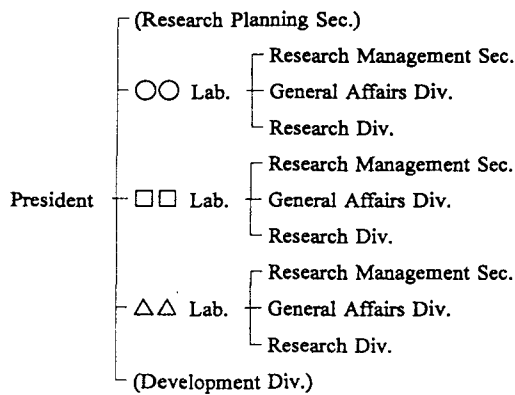
### 1. Independent Single Laboratory Structure



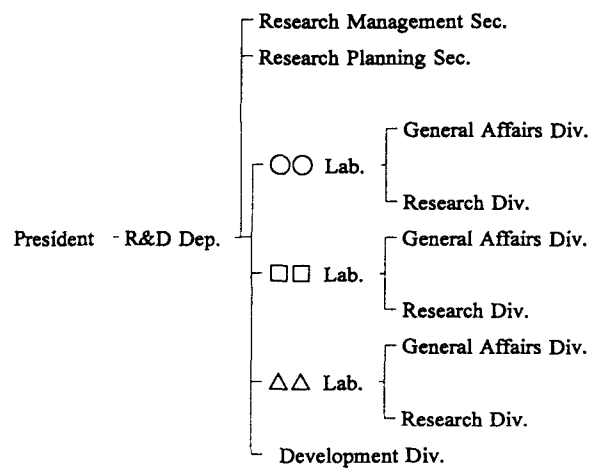
### 2. Single Laboratory controlled under an R&D Department



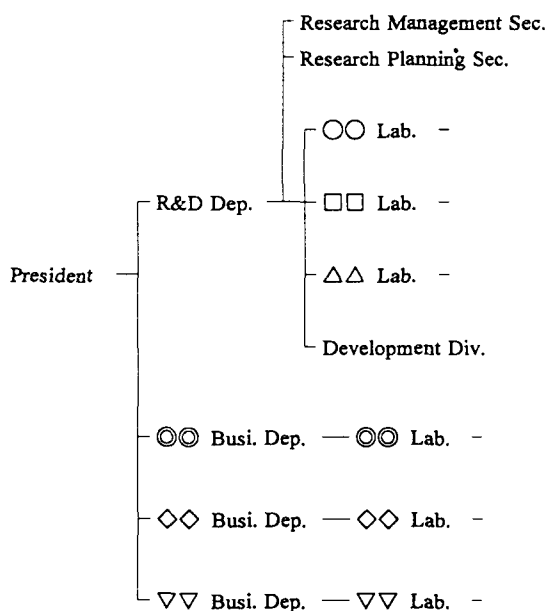
### 3. Independent Multiple Laboratories Structure



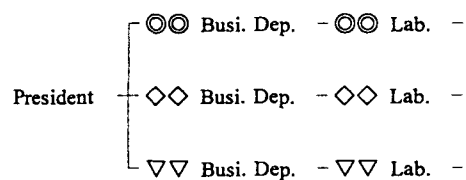
### 4. Multiple Laboratories controlled under an R&D Department



### 5. 4.+ Multiple Laboratories controlled under Business Departments



### 6. Multiple Laboratories controlled under Business Departments



### 7. Independent Company System

### 8. Other Systems

Note 1: Those in parentheses do not necessarily exist.

**Q.4** What are the approximate values of your company's proceeds, rate of ordinary profits, R&D expenditure, number of employees, number of researchers, rate of new products, rate of proceeds for new products, number of patent requests, number of papers submitted to journals.

	1985	1990
Proceeds		
R. of ordinary profits		
R&D expenditure		
Employees		
Researchers		
R. of new products *		
R. of proceeds for NP		
Patent requests		
Number of papers submitted to journals		

\* The rate of new products = N. of variety new products / N. of variety all products.  
("New products" refers to products that require new technology.)

In the case where your company already has a special accounting method, please calculate the above data and explain the method. Also, please describe below what the term "new products" means in your company.

.....  
 .....  
 .....

**Q.5** Does your company have a separate division that deals only with R&D strategy ?

1. Yes    2. No (For those who answered "No", please go on to **Q.6.**)

**SQ.1** What is the name of this division ?



SQ.2 What section does this division belong to ?

1. President    2. Business Hdqrs.    3. Business Div.    4. Laboratory

SQ.3 Please describe the history of this division chronologically below.

.....  
.....  
.....  
.....

SQ.4 What has been the history of this division in terms of employees and budget ?

	1980	1990
employees		
budget		

Q.6 Does your company develop a research plan for the whole company ?

1. Yes    2. No (For those who answered "No", please go on to Q.7.)

SQ.1 In general, approximately how long a horizon does the research plan of your company cover ?

1. 3 years    2. 5 years    3. 10 years    4. more than 15 years

SQ.2 Who is the main person in charge of developing the research plan ?

1. Researcher    2. Research leader  
3. Manager of research management  
4. Head of the division of research management  
5. Director for the division of research management  
6. President

SQ.3 Who provides the final approval of the research plan ?

1. President  
2. Director for the division of research management  
3. Other director  
4. Head of the division of research management

**Q.7** Does your company develop a research strategy / vision for the whole company?

1. Yes      2. No (For those who answered "No", please go on to **Q.8**.)

**SQ.1** In general, approximately how long does the research strategy of your company cover ?

1. 3 years    2. 5 years    3. 10 years    4. more than 15 years

**SQ.2** Who is the main person in charge of developing the research strategy ?

1. Researcher            2. Research leader  
3. Manager of research management  
4. Head of the division of research management  
5. Director for the division of research management  
6. President

**SQ.3** Who provides the final approval of the research strategy ?

1. President  
2. Director for the division of research management  
3. Other director  
4. Head of the division of research management

**Q.8** What percentage of the total R&D budget is used for the R&D of new theme ?

**Q.9** This question is relating to evaluating R&D activities in terms of efficiency of investment. Which do you think is most applicable to your company ?

1. It is impossible to evaluate the efficiency of investment in R&D activities.  
2. We are now examining appropriate methods to evaluate the efficiency of investment in R&D activities.  
3. We already have a system for evaluating the efficiency of investment in R&D activities. (Please describe the method briefly in the space below.)

.....  
.....

**Q.10** In the main market of your company's business, how frequently does your company introduce newproducts ?

very low                  medium                  very high  
 1   2   3   4   5   6   7

--

**Q.11** Does your company feel it necessary to change the lineup of products handled by your company ?

very low                  medium                  very high  
 1   2   3   4   5   6   7

--

**Q.12** Does your company feel it necessary to improve efficiency of its R&D ?

1. Yes      2. No

(For those answered "Yes")

**SQ.1** Please rate, in importance to your company, the following measures for improving efficiency in R&D. (Multiple selections are possible.)

1. Rigorous evaluation of marketability of the research theme
2. Smoother transfer of technology from research to development / manufacturing
3. Limiting which research fields are to be invested in
4. Setting deadlines on individual research projects
5. Other [                                  ]

1st	2nd	3rd	4th
-----	-----	-----	-----

**Q.13** What is / was the hierarchical position of the head of R&D division currently / 10 years ago ?

- |                       |                      |
|-----------------------|----------------------|
| 1. President          | 2. Vice-president    |
| 3. Executive director | 4. Managing director |
| 5. Director           | 6. General manager   |

10 years ago	present

**Q.14** Does your company feel it necessary to participate in research consortia ?  
 (except for those sponsored by government)

1. Yes      2. No

--

**SQ.1** Has your company ever participated in research consortia ? If possible, please write the name of the project.

1. Yes      the name of the project .....
2. No

(For those answered "Yes")

**SQ.2** Were the partner companies of the consortia Japanese or European / American ?  
 (If your company has had multiple experiences, please describe the most "typical" case.)

1. Japanese    2. American    3. European
2. J/A          5. J/E          6. J/E/A      7. Other

--

**SQ.3** What was your motivation ? Please choose from below according to the experience of your company. (Multiple answers are possible.)

1. Enormous costs of independent research activity
2. In order to extend R&D capability of our company
3. In order to establish overseas business strongpoints
4. Other [            ]

1st	2nd	3rd	4th
-----	-----	-----	-----

**SQ.4** Was the project successful ?

1. Yes    the reason it succeeded was .....

.....

.....

2. No    the reason it failed was .....

.....

.....

**Q.15** The following sentences describe business strategies and underlying values or belief. To what extent does each sentence correctly describe your company's business and R&D strategies ? Please circle the appropriate number.

	definitely true			definitely incorrect	
	1	2	3	4	5
1. Your company consistently seeks high market share and tries to take advantage of cost efficiencies in every market.	1	2	3	4	5
2. Your company exploits the advantage of being a "follower" and tries to reduce risks on the development of new products and/or markets.	1	2	3	4	5
3. Your company concentrates resources in a few strategic market segments.	1	2	3	4	5
4. The pursuit of stockholders' benefits is thought to be the prime goal of your company.	1	2	3	4	5
5. Your company competes head-on with competitors.	1	2	3	4	5
6. Your company does not hesitate to divest from weak businesses.	1	2	3	4	5
7. Diversification targets are restricted to those product lines which have close commonality with the existing technological base.	1	2	3	4	5
8. Your company selects advantageous markets but pursues coexistence with competitors.	1	2	3	4	5
9. Your company has been actively developing foreign markets.	1	2	3	4	5
10. Strategy formulation in your company is based upon systematic research data and sophisticated analytical methods.	1	2	3	4	5
11. Your company is always an innovator which actively takes risks on the development of new product and / or market.	1	2	3	4	5
12. Your company has actively acquired new businesses.	1	2	3	4	5

	definitely true			definitely incorrect	
	1	2	3	4	5
13. The recruitment of managerial personnel and technological experts are based upon long-range personnel planning rather than immediate needs.	1	2	3	4	5
14. Diversification targets are restricted to those product lines in which existing strengths in marketing can be applied.	1	2	3	4	5
15. Information is sought extensively even on businesses unrelated to present markets.	1	2	3	4	5
16. Your company aims to produce high quality products with high-added value in order to rely on a brand marketing strategy.	1	2	3	4	5
17. Your company emphasizes accumulating a diverse base of knowledge more than making better use of existing knowledge.	1	2	3	4	5
18. The basic strategy of your company is inseparable from the unique values and belief of the present C. E. O. or the original founder.	1	2	3	4	5
19. The fulfillment of various social responsibilities is clearly built into the corporate strategy of your company.	1	2	3	4	5
20. Your company has been actively investing in foreign production subsidiaries.	1	2	3	4	5
21. Voluntary recommendations made by lower-level managers are frequently followed by senior executives.	1	2	3	4	5
22. The intuitive judgment of experienced executives plays a major role in formulating strategy.	1	2	3	4	5

**Q.16** In general, how much influence and say does each of the following divisions have when making joint decisions that may affect the overall performance of your company ?

	little or no	considerable		extremely high degree	
		some		a great deal	
1. R&D	1	2	3	4	5
2. Sales / Marketing	1	2	3	4	5
3. Manufacturing	1	2	3	4	5
4. Finance / Accounting	1	2	3	4	5
5. General affairs / Personnel and Labor management	1	2	3	4	5
6. President's office / Planning	1	2	3	4	5
7. Procurement / Purchasing	1	2	3	4	5

**Q.17** How often does the R&D division have meetings with the following divisions ?

	little or no	monthly		daily	
		2 times a year		weekly	
1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

**Q.18** In determining the following elements of the overall R&D strategy, how much influence (say) does each division have?

(1) On setting up of laboratories

	little or no	considerable		extremely high degree	
		some		a great deal	
1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

(2) On hiring new graduates

	little or no		considerable		extremely high degree
		some		a great deal	
1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

(3) On selection of areas of research

	little or no		considerable		extremely high degree
		some		a great deal	
1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5

(4) On preparing research budget plans

	little or no		considerable		extremely high degree
		some		a great deal	
1. Sales / Marketing	1	2	3	4	5
2. Manufacturing	1	2	3	4	5
3. Finance / Accounting	1	2	3	4	5
4. General affairs / Personnel and Labor management	1	2	3	4	5
5. President's office / Planning	1	2	3	4	5
6. Procurement / Purchasing	1	2	3	4	5



**Q.19** How much do the following factors weigh in making up R&D strategy of your company ?

	very important	important	can not say either way	not very important	not important
1. Capability of the R&D division	1	2	3	4	5
2. Importance of technology for your company's future	1	2	3	4	5
3. Existence of limitation in technological know-how	1	2	3	4	5
4. Costs required for breakthrough	1	2	3	4	5
5. Possibility of breakthrough	1	2	3	4	5
6. Relative R&D resources spending in comparison with rival companies	1	2	3	4	5
7. Cost competitiveness of product	1	2	3	4	5
8. Time and expenses required	1	2	3	4	5
9. Researchers' enthusiasm	1	2	3	4	5
10. Trends of rival companies	1	2	3	4	5
11. Trends in national and international projects	1	2	3	4	5
12. Series of products	1	2	3	4	5
13. Manufacturing technology	1	2	3	4	5
14. Status in the business circle	1	2	3	4	5
15. Market needs	1	2	3	4	5
16. Social responsibility (Environmental problems)	1	2	3	4	5

**Q.20** This question is related to evaluation of the results of research. How are research results evaluated in your company ? If possible, please describe qualitative or quantitative methods used in evaluating research and how often it is done.

.....

.....

.....

**Q.21** How long is the standard period of one research theme in your company ?

1. 1-2 years    2. 3 years    3. 5 years    4. 10 years or more

**Q.22** Based upon the following classification of research activities (with number of themes), what is the percentage of each category for your company ?

- |   |         |
|---|---------|
| 1. Basic research (blue sky)                                      | ..... % |
| 2. Research related to main operations                            | ..... % |
| 3. Research related to operations derived<br>from main operations | ..... % |
| 4. Research in new topics   | ..... % |
| 5. Other [                      ]                                 | ..... % |
| Total   | 100 %   |

**Q.23** Concerning types of research activity, what are the percentages of the followings in your company ?

- |  |         |
|--|---------|
| 1. Individual research                                     | ..... % |
| 2. Cooperative research (with individuals in other groups) | ..... % |
| 3. Group research  | ..... % |
| 4. Project done outside your company                       | ..... % |
| 5. Research completely dependent on outside sources        | ..... % |
| 6. Other [                      ]                          | ..... % |
| Total  | 100 %   |

**Q.24** What percentages of R&D people is involved in each of the following research activities ?

- |  |         |
|--|---------|
| 1. Research efforts within your company      | ..... % |
| 2. Research based on introduced technologies | ..... % |
| 3. Research on prototypes                    | ..... % |
| 4. Other [                      ]            | ..... % |
| Total  | 100 %   |

**Q.25** If we categorize the research themes into "seeds" type and "needs" type, what is the percentage of each category in your company ?

(Number of themes of each category / Total number of themes)

- |                                    |         |
|------------------------------------|---------|
| Seeds type (developed from theory) | ..... % |
| Needs type (due to market demand)  | ..... % |
| Total                              | 100 %   |

**Q.26** If we categorize the research activities of your company into basic research, applied research (development of new products, modification of existing products), development of new production methods and improvement of manufacturing processes, what is the percentage of research in each category based on the number of employees devoted to it ?

1. Basic	(1) Academic research	..... %
	(2) Research on new technology	..... %
2. Applied	(1) Research on development of new products	..... %
	(2) Research on modification of existing products	..... %
3. Development of production methods		..... %
4. Improvement of manufacturing process		..... %
5. Other	[ ]	..... %
		Total 100 %

**Q.27** For the research themes currently handled in your company, what percentage was proposed by each of the following category ?

1. Researchers	..... %
2. Research leaders	..... %
3. Research groups	..... %
4. R&D managing divisions	..... %
5. Officers responsible for R&D	..... %
6. Sales division	..... %
7. Marketing division	..... %
8. President / CEO	..... %
Total 100 %	

**Q.28** How many themes were proposed, and how many actually ended being investigated ?

1. Number of (annual) total proposals	.....themes
2. Number of themes actually handled	.....themes

**Q.29** At the time of evaluating whether a particular research theme should be chosen, how does your company track trends in technology which can not be found from open patents or documents ?

.....  
.....  
.....

**Q.30** In order to deal with changes in the R&D environment (trends of rival companies, changes in size of the market, emergence of alternative technology and so on), who (or what division) of your company reviews the R&D strategy ?

1. A researcher reviews strategy at his/her own discretion.
2. The research group leader reviews strategy at his/her own discretion.
3. The research management division gives appropriate instructions.
4. The research management division and the marketing division review strategy together.
5. Reviews are carried out under instructions of senior management.
6. Other [    ]

**Q.31** Does your company commission sources outside of the company to set up research strategies ?

1. Commission of outside sources
2. Commission of associated companies
3. Our company never commissions outside sources.

(For those who answered 1 or 2.)

**SQ.1** Which portion of the R&D strategy of your company is commissioned to outside sources to develop ? (Multiple answers are possible.)

.....        .....        .....        .....

1. All parts of the company R&D strategy
2. The Long term part of the company R&D strategy
3. The part of the R&D strategy concerning new research fields
4. The part of the R&D strategy relating to setting up laboratories abroad for research and development





**Q.35** About your company's attitude towards research and researchers : How much is each statement described below applicable to your company ?

	absolutely true	more or less	can not say either way	not really	not applicable
1. Every researcher must make it his/her job to adhere to the annual research plan.	1	2	3	4	5
2. In order to achieve innovative research, giving a free hand to researchers is very important.	1	2	3	4	5
3. The company does not concern itself in the research process as long as good research results are forthcoming.	1	2	3	4	5
4. Underground (personal) research should be accepted positively.	1	2	3	4	5
5. Researchers should produce excellent research results no matter how much time it takes.	1	2	3	4	5
6. Researchers should collect the information necessary for their research by themselves .	1	2	3	4	5
7. Researchers should be clearly distinguished and treated differently from engineers.	1	2	3	4	5
8. Supervision of researchers impedes their abilities in developing new ideas and concepts.	1	2	3	4	5
9. Researchers must adhere to regular working hours.	1	2	3	4	5
10. Researchers and office workers should be managed in the same way as office workers.	1	2	3	4	5

**Q.36** Please describe the evaluation system of your company used for selecting themes by giving examples of themes chosen in the past.

.....  
 .....

.....  
**Q.37** In your company, which of the following procedures are taken when planning the R&D budget ? Please choose the most applicable answer.

1. Based on the initial research plan, each research group appropriates its own budget by simply adding together expenses of individual projects.
2. After each research group requests its own budget, the R&D management division uniformly reduces or increases the amount requested taking into account limits of the total budget.
3. After each research group requests its own budget, the R&D management division makes slight adjustments and appropriates additional funds for important themes.
4. Based on the budget size of the previous year, and taking various subjective data into account, the R&D management division evaluates the budget needs of each research group and allocates funds based on the priority of individual research groups.
5. The R&D management division does the same as above, but it is generally influenced by the opinion of the marketing division.

**Q.38** If you have ever seen any differences in the R&D management or treatment of R&D by top management between your company and U.S. / European companies, please share them with us in the space below.

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**Again, thank you very much for your thoughtful cooperation.**

## **Annex 2 The Questionnaire of BETA**



# LES SYSTEMES DE MANAGEMENT DE LA R&D

Etude des entreprises françaises et comparaison internationale

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## INTRODUCTION

Nous vous remercions de bien vouloir participer à une étude qui a pour but de comparer les systèmes de management de la R&D, européen, américain et japonais. L'enquête présente permettra de rassembler des informations sur la stratégie de R&D, le système de gestion de la R&D des entreprises.

Comprenant l'importance de ces renseignements pour votre entreprise, nous nous engageons à respecter strictement leur confidentialité. Les réponses à ce questionnaire seront retranscrites sous forme de statistiques, protégeant la confidentialité des réponses individuelles.

Après avoir rempli ce questionnaire, veuillez- nous le retourner avec l'enveloppe ci-jointe :

Laurent Bach et Gilles Lambert

Bureau d'Economie Théorique et Appliquée

E N Q U E T E R & D

38, Boulevard d'Anvers - 67000 Strasbourg

pour tous contacts

tel: 88 41 52 12 / 88 41 52 09 - fax : 88 61 37 66

Merci d'avance pour votre participation.

# L'INTERLOCUTEUR ET SON ENTREPRISE

Société :	
Nom :	Service :
Adresse :	
tel:	fax:

Q1 - Quelle est votre position dans l'entreprise :   
 1. Cadre    2. Directeur Général    3. Autres

Q2 - A quel niveau êtes-vous impliqué pour la stratégie de développement de la R&D ?  
 1. Toute la Société    2. Votre service    3. Votre division ou secteur    4. Un laboratoire

Q3 - Quels sont les chiffres suivants concernant votre entreprise ?

	1987	1992
Chiffre d'affaires		
Nombre d'employés		
Dépenses en R&D		
Personnel en R&D		
Nombre de nouveaux produits/ Nombre total de produits		
Chiffre d'affaires lié aux nouveaux produits		
Nombre de demandes de brevets		

Expliquer ce que signifie pour vous le terme de nouveau produit :

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**Q4 - Dans quelle mesure les propositions ci-dessous décrivent-elles les stratégies de votre société et soulignent ses valeurs?**

	vrai	.	.	.	.	faux
1- La société recherche impérativement des grandes parts de marché et essaie d'améliorer la rentabilité sur chaque marché.	1	2	3	4	5	
2- La société concentre ses ressources dans quelques segments de marchés stratégiques.	1	2	3	4	5	
3- Le but de la société est de réaliser des produits de haute qualité avec une haute valeur ajoutée en liaison avec une stratégie marketing non centrée sur le prix.	1	2	3	4	5	
4- La société exploite les avantages d'être un suiveur et réduit les risques sur le développement de nouveaux produits ou marchés.	1	2	3	4	5	
5- La société innove et prend activement des risques sur le développement de nouveaux produits ou marchés.	1	2	3	4	5	
6- La société acquiert activement de nouvelles activités.	1	2	3	4	5	
7- La société cherche à se diversifier.	1	2	3	4	5	
8- La diversification se limite aux produits correspondants à votre savoir-faire.	1	2	3	4	5	
9- La diversification se limite aux produits pour lesquelles vos forces commerciales peuvent être utilisées.	1	2	3	4	5	
10- La société n'hésite pas à s'écarter des affaires risquées.	1	2	3	4	5	
11- La société développe activement ses marchés à l'étranger.	1	2	3	4	5	
12- La stratégie de la société s'appuie sur une recherche systématique d'informations et de méthodes analytiques sophistiquées.	1	2	3	4	5	
13- Les informations sont recherchées même à propos de marchés ne concernant pas la société.	1	2	3	4	5	
14- La stratégie de base de la société est inséparable des valeurs du PDG actuel ou du fondateur.	1	2	3	4	5	
15- La rémunération de l'actionariat est prioritaire pour l'entreprise.	1	2	3	4	5	
16- L'accomplissement des différentes responsabilités sociales de l'entreprise est clairement indiqué dans la stratégie de l'entreprise.	1	2	3	4	5	
17- Le recrutement du personnel d'encadrement et des experts techniques est basé sur une planification à long terme du personnel, plutôt que sur des besoins immédiats.	1	2	3	4	5	
18- Les propositions émanant du personnel d'encadrement de base sont fréquemment suivies par des cadres supérieurs.	1	2	3	4	5	

Q5 - En général, quelle est l'influence et le poids de chacun des départements suivants quand il s'agit de prendre ensemble une décision qui peut déterminer la performance générale de votre entreprise ?

	peu / aucune influence	un peu d'influence	beaucoup d'influence	énormément d'influence
1-R & D				
2-Vente/Marketing				
3-Production				
4-Finance/Comptabilité				
5-Personnel				
6-Comité de direction				
7-Fourniture/Approvisionnement				

## ORGANISATION DE LA R&D \_\_\_\_\_

Q6 - Votre Entreprise a-t-elle un service s'occupant exclusivement de la stratégie de la R&D ?

1. Oui      2. Non (*allez à la question n° 7*)

• Comment ce service s'intitule-t-il ?-----

• A qui ce service est-il rattaché ?

1. Le PDG    2. La Direction Générale    3. Une division opérationnelle    4. Un laboratoire

Décrivez succinctement l'histoire de ce service ?

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Combien d'employés travaillent dans ce secteur et comment le budget a-t-il évolué ?

	1982	1992
Employés		
Budget de R&D		

Q7 - Quelle est la répartition de vos thèmes de recherche.?

1. recherche fondamentale	%
2. recherche appliqués aux projets actuels	%
3. recherche sur de futurs projets	%
4. Autres	%
	100 %

Q8 - Si les thèmes de recherche peuvent être divisés selon leurs origines, quelles en sont les proportions ?

1. Recherche développée à partir de la théorie	%
2. Recherche développée à partir du marché	%
3. Recherche combinant marché / théorie	%
	100 %

Q9 - A quel schéma suivant se réfère votre recherche?

1. Un seul laboratoire ou département de R&D indépendant des divisions opérationnelles

2. Un ou plusieurs laboratoires / départements de R&D indépendants des divisions opérationnelles

3. Un département de R&D indépendant couplé avec des laboratoires intégrés dans les divisions opérationnelles

4. Recherche totalement sous traitée à une entité extérieure

5. Autres

# STRATEGIE DE LA R&D

Q10 - Quel est le poids des facteurs suivants dans la construction de la stratégie de la R&D ?

	très important	important	indéterminé	peu important	pas du tout
1. Compétence du département R&D	1	2	3	4	5
2. L'importance de la technologie pour l'avenir de votre Société	1	2	3	4	5
3. L'existence de limites dans le savoir-faire technologique	1	2	3	4	5
4. Investissement nécessaires pour les sauts technologiques	1	2	3	4	5
5. la possibilité de percée technologique	1	2	3	4	5
6. Ressources R&D par rapport à la concurrence	1	2	3	4	5
7. Compétition sur les coûts des produits	1	2	3	4	5
8. Temps et dépenses requis pour les projets candidats	1	2	3	4	5
9. Volonté du chercheur	1	2	3	4	5
10. Orientation de la concurrence	1	2	3	4	5
11. Orientations du gouvernement, des projets internationaux	1	2	3	4	5
12. Ligne de produit	1	2	3	4	5
13. Technologie de la production	1	2	3	4	5
14. Conjoncture économique	1	2	3	4	5
15. Responsabilité sociale (problème d'environnement)	1	2	3	4	5

Q11 - Le plan de recherche est-il développé pour la Société entière ?

1- oui                      2- non (allez à la question n° 12)

• En général, quelle est la durée de planification ?

1-- 3 ans      2- 5 ans      3- 10 ans      4- + 10 ans

• Qui est principalement chargé du développement du plan de recherche ?

- 1- Chercheur
- 2- Directeur de Recherche
- 3- Directeur de la Division de la gestion de la recherche
- 4- Cadre de la Division de la gestion de la recherche
- 5- Le PDG

• Qui prend la décision finale en matière de planification de la recherche ?

- 1- Le PDG,
- 2- Le Directeur de la Division de la gestion de la recherche
- 3- Cadre de la Division
- 4- Autres Cadres

**Q12 - La stratégie de la recherche est-elle développée pour la Société entière ?**

1- oui                      2- non (*allez à la question n° 13*)

- En général, sur quelle durée porte la stratégie de recherche ?   
1- 3 ans      2- 5 ans      3- 10 ans      4- + 10 ans

- Qui est principalement chargée du développement de la stratégie de recherche ?   
1- Chercheur  
2- Directeur de Recherche  
3- Directeur de la Division de la gestion de la recherche  
4- Cadre de la Division de la gestion de la recherche  
5- Le PDG

- Qui prend la décision finale en matière de stratégie de recherche ?   
1- Le PDG  
2- Le Directeur de la Division de la gestion de la recherche  
3- Cadre de la Division  
4- Autres Cadres

**Q13 - Pensez-vous qu'il soit nécessaire de tenir des accords de partenariat entre entreprises en ce qui concerne la R&D (exceptés les accords subventionnés par le gouvernement) ?**

1- oui                      2- non

- Avez-vous déjà participé à un partenariat concernant la R & D?   
1-oui                      2-non (*allez à la question 14*)

- Les sociétés participantes étaient-elles européennes, japonaises ou américaines?   
(*s'il y a plusieurs partenariats, décrire le cas le plus typique*).

1-Européens              2-Américains              3-Japonais      4-USA/CEE  
5-CEE/Japon              6-USA/Japon/CEE      7-Autres

- Quelles étaient les motivations? (*Plusieurs réponses sont possibles*).

1- Répartir les dépenses  
2- Répartir les risques  
3- Etendre les capacités de la R & D  
4- Acquérir une complémentarité technologique  
5- Pénétrer un domaine hors des compétences établies de la firme  
6- Atteindre une taille nécessaire sur le plan international  
6- Etablir des liens internationaux  
5- Autres

- Est-ce que le projet a réussi?

1- oui. les raisons du succès sont: .....

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2- non.les raisons de l'échec sont : .....

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**Q14- Dans la détermination des différents aspects de la stratégie de la R&D, quelles influences ont les départements suivants:**

**1 - A propos du choix des équipements de R & D.**

	peu/ aucune influence	un peu d'influence	influence moyenne	beaucoup d'influence	influence déterminante
1-Vente/Marketing					
2-Production					
3-Finance/Comptabilité					
4-Personnel					
5-Comité de Direction					
6-Achat/Approvisionnement					

**2 - A propos du recrutement des nouveaux employés.**

	peu/ aucune influence	un peu d'influence	influence moyenne	beaucoup d'influence	influence déterminante
1-Vente/Marketing					
2-Production					
3-Finance/Comptabilité					
4-Personnel					
5-Comité de Direction					
6-Achat/Approvisionnement					

**3 - A propos de la détermination des domaines de recherches**

	peu/ aucune influence	un peu d'influence	influence moyenne	beaucoup d'influence	influence déterminante
1-Vente/Marketing					
2-Production					
3-Finance/Comptabilité					
4-Personnel					
5-Comité de Direction					
6-Achat/Approvisionnement					

**4 - A propos de l'établissement du budget de recherche.**

	peu/ aucune influence	un peu d'influence	influence moyenne	beaucoup d'influence	influence déterminante
1-Vente/Marketing					
2-Production					
3-Finance/Comptabilité					
4-Personnel					
5-Comité de Direction					
6-Achat/Approvisionnement					



**Q15 - Dans le but de vous adapter aux changements de votre environnement (orientation de la concurrence, taille du marché, émergence de nouvelles technologies), votre société réexamine-t-elle sa stratégie de R&D?**

Si oui, qui est impliqué ?

- 1- Le chercheur lui-même
- 2- Le chef du groupe de recherche
- 3- Le département de gestion de R&D
- 4- Le département de gestion de R&D en coopération avec le département marketing
- 5- La Direction Générale

**Q16 - Décrivez le système d'évaluation utilisé pour sélectionner les thèmes, en donnant des exemples de thèmes choisis dans le passé.**

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## **BUDGET DE LA R&D \_\_\_\_\_**

**Q17- Dans votre Société, comment est planifié le budget de R&D?**

- 1. Chaque groupe de recherche détermine son propre budget dans le cadre d'un plan de recherche pré-défini.
- 2. Chaque groupe de recherche détermine son propre budget qui est ensuite ajusté par le département de gestion de la R&D
- 3. Chaque groupe de recherche détermine son propre budget qui est ensuite ajusté par le département de gestion de la R&D, et ce dernier débloque des fonds spéciaux pour des projets importants.
- 4. le Département de gestion de la R&D attribue les budgets à chacun des groupes de recherche selon les informations des années antérieures.
- 5. Le Département de gestion de la R&D agit comme en point (4), mais intègre l'opinion du département Marketing?

**Q18 - Quel pourcentage du budget de la R&D est consacré à de nouveaux thèmes de recherche ?**

 %

# GESTION DU PERSONNEL DE R&D \_\_\_\_\_

Q19 - Qui avait en charge la responsabilité de la R & D il y a dix ans et qui l'a aujourd'hui ?

- 1- le PDG
- 2- le Vice-président
- 3- le Directeur Général
- 4- un des membres du comité de Direction
- 5- un Directeur Fonctionnel
- 6- un Directeur Opérationnel
- 7- Autres

1983                      1993

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Q20 - Parmi les phrases suivantes, quelle sont celles qui s'appliquent le mieux au traitement des chercheurs et ingénieurs de votre entreprise?

- 1. La structure hiérarchique des chercheurs et ingénieurs est identique à celle du reste de l'entreprise
- 2. Il existe une structure hiérarchique spécifique au Département de R&D
- 3. Les chercheurs et ingénieurs sont considérés comme des cadres supérieurs.
- 4. Autres.

Q21 - Dans quelle mesure les phrases ci-dessous traduisent-elles l'attitude de votre entreprise envers ses chercheurs ?

	tout à fait	plus ou moins	indéterminé	pas vraiment	pas du tout
1- Le chercheur doit réaliser son travail conformément au plan de recherche annuel.	1	2	3	4	5
2- Pour conduire une recherche innovative, la liberté des chercheurs est très importante.	1	2	3	4	5
3- Tant que les résultats suivent, on ne doit pas s'occuper de l'organisation de la recherche.	1	2	3	4	5
4- La recherche personnelle doit être encouragée.	1	2	3	4	5
5- Il est important d'avoir d'excellents résultats de recherche, même si cela prend beaucoup de temps.	1	2	3	4	5
6- C'est le travail du chercheur de rassembler des informations au sujet de son thème de recherche.	1	2	3	4	5
7- Chercheurs et ingénieurs sont des professions différentes et doivent donc être gérées différemment.	1	2	3	4	5
8- Les chercheurs doivent respecter des horaires de travail réguliers.	1	2	3	4	5

# RELATION R&D ET ENTREPRISE \_\_\_\_\_

Q22 - Quelle est la fréquence des réunions du département de R&D avec les départements suivants?

	jamais	4 fois/an	1 fois/mois	1 fois/sem.	plus.fois/sem.
1-Vente/Marketing					
2-Production					
3-Finance/Comptabilité					
4-Personnel					
5-Comité de Direction					
6-Achat/Approvisionnement					

Q 23 - Dans quelle mesure les phrases ci-dessous traduisent-elles la transition entre la recherche et les étapes de développement de produits ?

	tout à fait	plus ou moins	indéterminé	pas vraiment	pas du tout
1- Le chercheur supervise lui-même son projet à travers le développement et la production.	1	2	3	4	5
2- A chaque étape correspond une personne-pilote.	1	2	3	4	5
3- Il existe un système pour faciliter les étapes prenant en compte les avis de la R&D, du marketing, des commerciaux.	1	2	3	4	5
4- Un temps suffisant pour le contrôle du transfert et une communication entre les étapes est nécessaire.	1	2	3	4	5
5- Chaque projet est réalisé par un groupe spécifique intégrant des représentants des différents services (R&D, Bureau d'étude, Bureau des méthodes, Marketing, Production...).	1	2	3	4	5

# EVALUATION DE LA R&D

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Q24 - Quel est le temps moyen passé sur un thème de recherche ?

1. 1 à 2 ans      2. 3 ans      3. 5 ans      4. 10 ans

Q25 - Quels doivent-être les axes prioritaires pour améliorer l'efficacité de la R&D?

- 1- Améliorer l'adaptation du thème de recherche au besoin du marché.
- 2- Faciliter le transfert technologique entre la recherche, le développement, et la production.
- 3- Limiter le domaine dans lequel les ressources sont investies.
- 4- Déterminer les échéances pour les projets de recherche.

Q26 - Comment sont évaluées la qualité et la quantité des résultats de votre recherche et à quelle fréquence ?

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Q27 - En examinant l'activité de la R&D strictement en termes d'efficacité d'investissement, quel schéma s'adapte le mieux à votre entreprise ?

1. Il est impossible d'évaluer l'efficacité des investissements en R&D.
2. Notre Société cherche actuellement une méthode pour vérifier l'efficacité des investissements en R&D.
3. Notre Société a déjà développé un système pour vérifier l'efficacité des investissements en R&D.

Décrivez brièvement cette méthode :

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## **Annex 3 Correspondence between Both Questionnaires**

### Correspondence between NISTEP and BETA Questionnaires (1)

NISTEP Questions	BETA Questions	Adoption for the joint report
JQ.1	FQ.1	<input type="radio"/> III-1-1 Position of the respondents
JQ.2	FQ.2	<input type="radio"/> III-1-2 Sections where respondents are involved in R&D strategy development
JQ.3	FQ.9	<input type="radio"/> III-2-4 Types of R&D organization
JQ.4	FQ.3	<input type="radio"/> III-1-3 Some general information on the responded firms
JQ.5	FQ.6	<input type="radio"/> III-2-1 Existence of an R&D strategy division
JQ.6	FQ.11	<input type="radio"/> III-3-1-3 Setting up a research plan for whole company
JQ.7	FQ.12	<input type="radio"/> III-3-1-2 Setting up a research strategy for whole company
JQ.8	FQ.18	×
JQ.9	FQ.27	<input type="radio"/> III-5-2-4 Evaluating efficiency of investment on R&D activities
JQ.10	-	×
JQ.11	-	×
JQ.12	FQ.25	<input type="radio"/> III-5-2-3 Improving efficiency of R&D activities
JQ.13	FQ.19	<input type="radio"/> III-4-1 Changes in the position of the R&D division head since last 10 years
JQ.14	FQ.13	<input type="radio"/> III-3-3 Research consortia
JQ.15	FQ.4	×
JQ.16	FQ.5	<input type="radio"/> III-3-2-1 Influence of each division on matters affecting performance of overall company
JQ.17	FQ.22	<input type="radio"/> III-3-2-2 Frequency of contacts between R&D division and other division
JQ.18	FQ.14	<input type="radio"/> III-3-2-4 Influence of each division in setting up R&D strategy
JQ.19	FQ.10	<input type="radio"/> III-3-1-1 Considerations in making up an R&D strategy
JQ.20	FQ.26	×
JQ.21	FQ.24	<input type="radio"/> III-5-2-2 Standard period of research themes
JQ.22	FQ.7	<input type="radio"/> III-2-2 Breakdown of R&D activities based on the number of research themes

### Correspondence between NISTEP and BETA Questionnaires (2)

NISTEP Questions	BETA Questions	Adoption for the joint report
JQ.23	-	×
JQ.24	-	×
JQ.25	FQ.8	○ III-2-3 Breakdown of research themes according to origin
JQ.26	-	×
JQ.27	-	×
JQ.28	-	×
JQ.29	-	×
JQ.30	FQ.15	○ III-5-2-1 Review of R&D strategy in response to changes in the R&D environment
JQ.31	-	×
JQ.32	-	×
JQ.33	FQ.23	○ III-3-2-3 Technology transfer from research to development or production
JQ.34	FQ.20	○ III-4-2 Treatment of researchers and engineers
JQ.35	FQ.21	○ III-4-3 Attitudes towards research and researchers
JQ.36	FQ.16	×
JQ.37	FQ.17	○ III-5-1 Procedures of development of R&D budget plan
JQ.38	-	×