Chapter 2 The role of international expansion in productivity improvement

Section 1 Determinants of firm level productivity in Japan -A test using regression analysis-

1. Introduction

In the previous section, we focused on macro level and industry level productivity. In this section however, we turn to the firm level productivity and investigate its factors. First, by regressing firm level productivity and productivity growth rate on the various attributes of each firm, we reveal the relationship between these variables[1].

2. Data

The regression analysis uses the following variables calculated based on individual data from the Basic Survey of Japanese Business Structure and Activities. The relative TFP is used as a dependent variable, which is a measure representing individual firm's productivity. Export intensity (export / sales), overseas investment ratio (overseas investment balance / total asset), logarith of the total workers engaged, logarithm of firm age and its squared, foreign-owned firm dummy, Japanese subsidiary dummy, R&D intensity (R&D spending / sales), and informatization investment ratios (rise and fall in investment in ICT/ fixed asset) are used as independent variables[2]. As can be expected from dummy variables, domestic Japanese independent firms are used as benchmark in this regression model[3]. Also, because there may be time lag between independent variables and dependent variable, we assume that there exists one period (1 year) lag in the independent variables in regression analysis below. In addition, following Fukao (2012), year dummies and industry dummies (3 digit classification based on the Basic Survey of Japanese Business Structure and Activities) are included in the regression equation.

3. Empirical results

First, the results for TFP level are displayed in Table I-2-1-1. All estimated coefficients for each independent variable are significant at the 1% level. Corrected coefficient of determination and *F*-value are 0.829 and 2923.3, respectively. The coefficient of log-firm age is negative and otherwise are positive (not including constant term).

[1] The regression analysis in this section based on the analysis of determinants of firm level TFP and TFP growth in Fukao (2012).
[2] Refer to supplementary notes 4 for detailed definitions for each variable, model specification and descriptive statistics.
[3] Domestic independent companies refer to companies other than foreign companies and companies with a parent company.

Table I-2-1-1 Determinants of the TFP level - Estimation results using regression analysis -

Independent variables	Dependent variable: relative TFP level					
	Coefficient	Standard error	*t*-value	*p*-value	95% confidence interval (lower)	95% confidence interval (upper)
Export intensity (t-1)	0.504 ***	0.016	32.67	0.000	0.473	0.535
Overseas investment ratio (t-1)	0.402 ***	0.036	11.10	0.000	0.331	0.473
Logarithm of total worker engaged (t-1)	1.060 ***	0.001	722.42	0.000	1.057	1.063
Logarithm of firm age	-0.154 ***	0.013	-11.74	0.000	-0.180	-0.129
Squared logarithm of the firm age (t-1)	0.029 ***	0.002	13.73	0.000	0.025	0.033
Foreign-owned firm dummy (t-1)	0.486 ***	0.011	43.61	0.000	0.454	0.508
Japanese subsidiary dummy (t-1)	0.137 ***	0.003	43.98	0.000	0.131	0.144
R&D intensity (t-1)	1.872 ***	0.070	26.90	0.000	1.736	2.009
Rise and fall in investment in ICT (t-1)	1.558 ***	0.153	10.15	0.000	1.258	1.859
Constant term	-7.060 ***	0.031	-230.60	0.000	-7.120	-7.000
Corrected coef. of determination	0.829					
F-value	2923.3 (0.000)					

Notes: Estimation is performed by pooled OLS. The regression model includes year dummies and industry dummies (3 digit). *** denotes statistical significance at the 1% level. Japanese independent companies are benchmark for foreign-owned firm and Japanese subsidiary dummies. The values in the parenthesis beside the *F*-value is the *p*-value corresponding to the *F*-value.

Source: METI, "Basic Surrey of Japanese Business Structure and Activities".

After controlling industry attributes, firm age and size, we find that positive correlation between TFP level and (1) export intensity, (2) overseas investment ratio, (3) R&D intensity, and (4) investment in ICT.

The coefficient of foreign-owned firm dummy is positive and statistically significant level. This implies that productivity of foreign-owned firms is higher than Japanese independent firms as a benchmark here.

The results for TFP growth rate are summarized in Table I-2-1-2. In case of the TFP growth rate is used as a dependent variable, the same results are seen as when the TFP level is used as a dependent variable. Estimated coefficients for all independent variables are statistically significant at the 1% level. Corrected coefficient of determination and *F*-value are 0.162 and 117.0, respectively. The coefficient of logarithm firm age and logarithm of TFP level are negative and otherwise are positive (not including constant term).

Table I-2-1-2 Determinants of the TFP growth rate - Estimation results using regression analysis -

Independent variables	Dependent variable: relative TFP growth rate					
	Coefficient	Standard error	*t*-value	*p*-value	95% confidence interval (lower)	95% confidence interval (upper)
Export intensity (t-1)	0.131 ***	0.010	12.73	0.000	0.111	0.151
Overseas investment ratio (t-1)	0.086 ***	0.023	3.70	0.000	0.041	0.132
Logarithm of total worker engaged (t-1)	0.273 ***	0.002	140.06	0.000	0.270	0.277
Logarithm of firm age	-0.029 ***	0.008	-3.40	0.001	-0.045	-0.012
Squared logarithm of the firm age (t-1)	0.004 ***	0.001	2.90	0.004	0.001	0.007
Foreign-owned firm dummy (t-1)	0.132 ***	0.007	18.27	0.000	0.118	0.146
Japanese subsidiary dummy (t-1)	0.039 ***	0.002	19.35	0.000	0.035	0.043
R&D intensity (t-1)	0.650 ***	0.046	14.29	0.000	0.561	0.740
Rise and fall in investment in ICT (t-1)	0.494 ***	0.099	4.99	0.000	0.300	0.688
Logarithm of relative TFP level (t-1)	-0.253 ***	0.002	-155.50	0.000	-0.256	-0.250
Constant term	-1.842 ***	0.023	-80.97	0.000	-1.887	-1.798
Corrected coef. of determination	0.162					
F-value	117.0 (0.000)					

Notes: Estimation is performed by pooled OLS. The regression model includes year dummies and industry dummies (3 digit). *** denotes statistical significance at the 1% level. Japanese independent companies are benchmark for foreign-owned firm and Japanese subsidiary dummies. The values in the parenthesis beside the F-value is the p-value corresponding to the F-value.

Source: METI, "Basic Surrey of Japanese Business Structure and Activities".

For both export intensity and overseas investment ratio are positive and statistically significant. We find positive relationship between high TFP growth rate and firms that expand business overseas.

A positive correlation is also seen in high R&D intensity and investment in ICT coefficients, and it

is suggested that high productivity is achieved through these investment activities.

For dummy variables, as with the result for productivity level, we obtain the evidence that foreign-owned firms exhibit higher productivity growth rate.

4. Summary

When the regression results above are summarized as follows; positive correlation is observed between firm level productivity and innovation activities such as R&D and informatization investments and expansion of business overseas (export and foreign direct investment) as well as, and it has been made clear that foreign-owned firms have higher productivity than Japanese independent firms. Through expansion of activities by companies with these attributes, it is suggested that productivity can be increased for the whole Japanese economy. It is also suggested that innovation activities can lead to higher productivity. In the next section, based on the empirical results obtained from this section, the contribution of international expansion on productivity improvement willbe discussed in detail.

Section 2 Role of overseas market expansion in productivity improvement

As a result of direct foreign investment, the relationship between expansion of business overseas and productivity is clarified. The role of expansion of business overseas in order to improve productivity within the Japanese economy is also confirmed.[4]

1. Expansion of business overseas and productivity

Based on the regression analysis from the previous section, a positive correlation was seen between companies with high export intensity and foreign investment rates, and high productivity standards and growth rate. Therefore, by controlling various attributes that effect productivity such as company size, research and development, and differences between each industry, it is understood that there is a trend such as companies that expand business overseas have high productivity as well as high productivity growth rates.

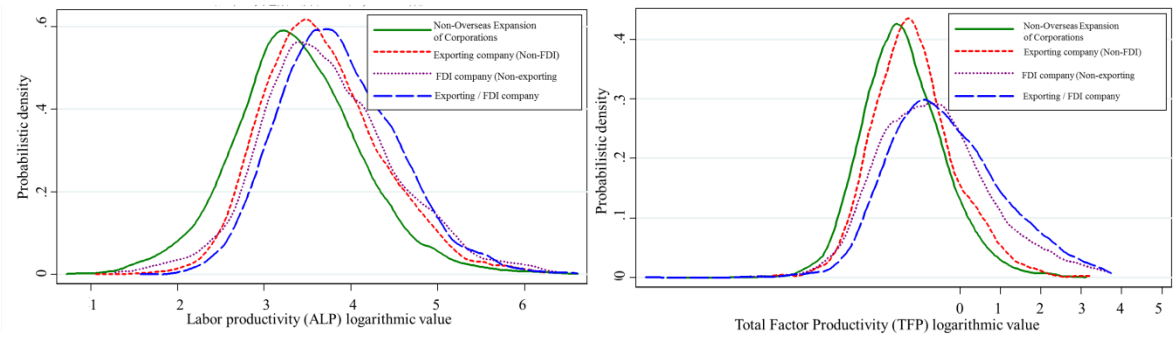
Using individual data of the “Basic Survey of Japanese Business Structure and Activities”, the relationship displayed in the graph (Figure I-2-2-1) between Japanese companies’ attributes (manufacturing industry) and productivity (apparent labor productivity (ALP) and total factor productivity TFP)) can be confirmed. Productivity differences between “companies that do not expand business overseas” (no export or foreign direct investment (FDI)), “export companies” (only exporting, no FDI), “FDI companies” (only FDI, no exporting), and “exporting / FDI companies” (both exporting and FDI) are confirmed using a density function and displayed with a range of continuity. Based on this, it is confirmed that “companies that do not expand business overseas”, “export companies”, “FDI companies”, and “export and FDI companies” are distributed to the left with companies with low productivity, company groups with a low rate of expansion of business overseas tend to be on the low

[4] “Expansion of business overseas” is not only foreign direct investment that sets up overseas production sites, but is also considered to be a concept that includes the exporting of products to overseas clients.

productivity side (left), and companies with a high rate of expansion of business overseas tend to be on the high productivity side (right).

Figure I-2-2-1 Productivity distribution by Japanese companies (Manufacturing industry) (2008)

Apparent Labor productivity (ALP) **Total Factor Productivity (TFP)**



Notes: Labor Productivity (ALP) is calculated by sale per laborer Each labor productivity is displayed in the graph for companies that do not expand overseas, export industry (non-FDI), FDI Industry (Non-Export), Export/FDI Industry

Source: Ministry of Economy, Trade, and Industry, Japan "Basic Survey of Business and Activity"

Note: TFP estimation of Levinsohn and Petrin (2003) according to Law Each TFP is distributed and displayed in the graph for companies that do not expand business overseas, export industry (non-FDI), FDI companies (Non-Exporting), Export/FDI Industry.

Source: Ministry of Economy, Trade, and Industry, Japan "Basic Survey of Business and Activity"

This result can be explained by using the new currently discussed trade theory[5] focusing on the productivity difference instead of the conventional trade theory where trade opportunities where obtained by comparative advantages and factor endowments. In the new theory model, the fixed cost for supplying products differs for each form of expansion to the overseas market, so attributes are higher in the order of foreign direct investment, export supply, and domestic supply. Therefore, in order to enter the market with each configuration, profitability for raising profit above that fixed cost is needed and, as a result, the productivity of companies that expands business overseas and engage in exporting and foreign direct investment is higher than companies that do not expand business overseas. (refer to column 1 for details)

Column 1 Theoretic model for company profitability and expansion of business overseas

Figure 1-1 displays a model that represents two symmetric countries with the same domestic and overseas production marginal costs. Assume that the fixed cost necessary for each market differs for a company that implements production initiatives.

In addition to fixed costs involved in domestic industries, marketing costs including necessary local information collection during export as well as fixed costs including sales / distribution construction are also incurred.[6] Also, during foreign direct investment, in addition to necessary fixed costs during exporting, costs involved in local corporation establishment and maintenance are also largely incurred.

[5] According to Tanaka (2010-2013), Krugman explained a new trade theory by trade profit deduction for the scale of economic performance and the diverse preferences of consumers, while Melitz introduced the concept of company heterogeneity and uniformity in turn for the conventional trade theories by Ricardo and Heckscher–Ohlin.

[6] Furthermore, because transportation costs are also incurred, marginal costs become more expensive than domestic market marginal costs, and profit increase that comes with productivity increase is smaller for exporting. Therefore, the slope of the graph in the model is gradual.

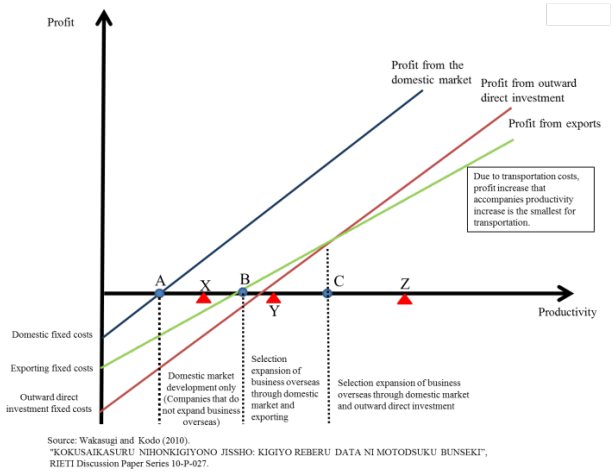
Due to this, supply from foreign direct investment is greater than supply from exports which are greater than domestic demand.

In order to supply products to the market with this setting, high productivity is necessary to raise profits above fixed costs within each configuration, and in order to maximize company profits, initiatives are implemented according to productivity. For example, a company with a productivity of X can achieve profits within the domestic market; however, because profits are not achieved in overseas markets through exporting and foreign direct investment, the company does not expand business overseas and only supplies domestic markets. Also, a company with a productivity of Y, adds domestic supply as well as supplies overseas markets to maximize company profit; however, selects exports with a higher profit than foreign direct investment and becomes an export company. On the other hand, a company with a productivity of Z selects foreign direct investments with a higher profit than exports and becomes an foreign direct investment company. Companies with a productivity between A and B supply domestic markets only, companies between B and C supply domestic markets and export, and companies larger than C prefer domestic markets and foreign direct investment.

From this, it is understood that in addition to expanding business overseas, companies that prefer expansion overseas above exporting and foreign direct investment have high productivity that achieves profit higher than the fixed costs. In other words, companies that expand business overseas tend to have high productivity.

This theory model has been supported in various experimental studies[7] and conforms to the results of the regression analysis of Section 1 which indicates a higher productivity level in exporting companies and foreign direct investing companies rather than in companies that do not expand business overseas.

Column 1 - 1 Figure Model of productivity and expansion of business overseas



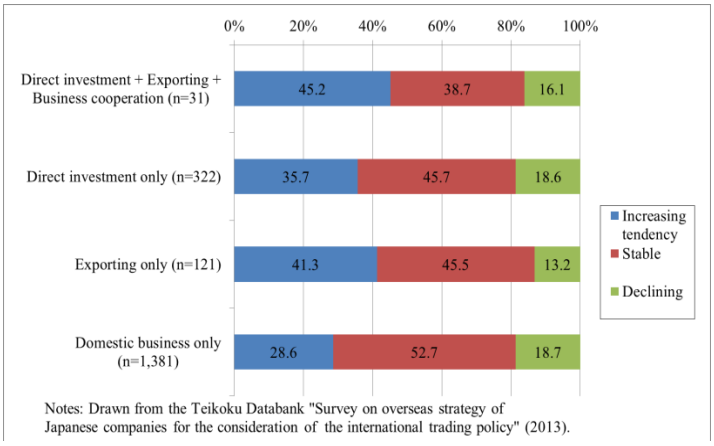
Source: Wakasugi and Kodo (2010). "KOKUSAIKASURU NIHONKIGIYONO JISSHO: KIGIYO REBERU DATA NI MOTODSUKU BUNSEKI", RIETI Discussion Paper Series 10-P-027.

Also, it is revealed from company consciousness that companies that expand business overseas feel that their own productivity trend is high. When asked to evaluate their own companies by business

[7] Expansion of business overseas and positive analysis of the related productivity have been actively performed since 1990. Recently, they have been supported by the results of various experimental studies by Bernard et al. (2007) targeting the United States, Mayer and Ottaviano (2008) targeting European countries, as well as Kimura and Kiyota (2006), and Wakasugi et.al (2008).

development configuration in the “Survey of overseas business strategies for Japanese companies in regard to trade policy considerations” (2013), the breakdown of companies with “rising trend” are “direct investment only” (35.7%), “export only” (41.3%), and “domestic business only” (28.6%), showing a trend in consciousness of greater expansion in productivity for companies that expand overseas. Also, even within companies that have expanded business overseas, a higher percentage of companies that expand using various configurations (direct investment, exporting, business cooperation) have a “rising trend” in productivity compared to companies that expand using one configuration (Figure I-2-2-2). From these results, it is not possible to look at only expansion of business overseas as a contributing factor in productivity level; however, it is understood that companies that expands business overseas have higher productivity than companies that do not.

Figure I-2-2-2 Company productivity evaluation (by business development configurations)



(Effectiveness of productivity improvement from expanding business overseas)

As above, the graph and regression analysis that used individual data shows that companies that expand business overseas have a high trend in productivity compared to companies that do not expand business overseas. On the other hand, by expanding business overseas, various experimental studies are progressing even for productivity improvement effectiveness.[8]

For exporting, there is an intake of overseas market demand in addition to domestic demand, and not only further profit increase, but by providing companies with opportunities to tap into new knowledge and technologies, efforts to improve technical / quality standards while meeting overseas market demand as well as through intake of information and connection with innovation, ex-post facto productivity is increased and the existence of the so-called “Learning-by-Exporting Effects” is also

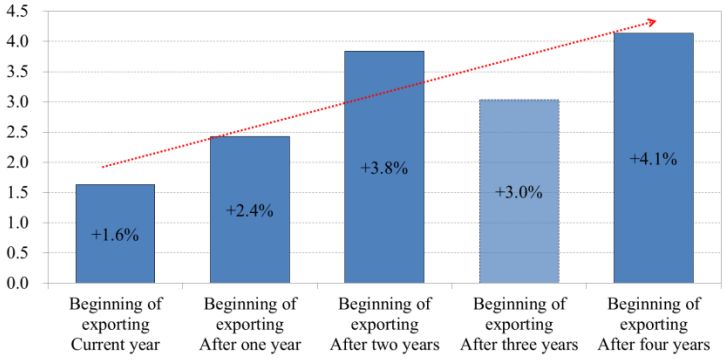
[8] Based on Kimura and Kiyota (2006), if initial TFP standards for each company are controlled, total factor productivity (TFP) extension is an average of 2.4% higher compared to companies that do not conduct exporting, and companies that conduct outward direct investment have an average 2.4% higher TFP extension than companies that do not conduct outward direct foreign investment. Also, Kwon, Kim and Fukao (2008) concludes that with high export intensity (export value / sales), companies within the manufacturing industry that invest in overseas subsidiaries positively affect the TFP increase rate compared to companies that do not. In Wakasugi et.al (2008), companies that begin exporting and overseas direct investment have high labor productivity (added value per laborer) expansion compared to companies that do not, and the difference is reported to be expanding.

indicated.[9]

Regarding this “Learning-by-Exporting Effects”, companies that began high level exporting to advanced regions such as North America and Europe have the same company attributes; however, initial sales and number of employees, etc. productivity (TFP) increase rate increased more than companies that did not begin exporting. It was also confirmed that research and development cost also increased widely. Specifically, there is a trend whereby TFP increase rate four years after beginning exporting is higher than companies that did not begin exporting during the same period (Figure I-2-2-3). Also, from these results, in order to achieve learning-by-exporting effects , it is thought that a high ability to use technology and knowledge gained overseas is desired.[10]

In the future, due to consumer advancement as a result of the real emergence of Western companies and the increase in the affluent population within emerging countries, if emerging markets advance the same as advanced regions, learning effects as a result of exporting to emerging markets can be expected.

Figure I-2-2-3　Effects on productivity increase rate as a result of beginning exporting to North America / Europe



Notes: Accumulative growth rate compared to the level of the previous year before beginning exporting. Also, not statistically significant three years after beginning exporting.
Source: Ito (2011), "YUSHUTSU NIYORU GAKUSHU KOUKA NO BUNSEKI" , RIETI discussion Paper Series 11-J-066.

Subsequently, exporting is conducted through locally established sales subsidiary companies and, within competition with companies in other countries, research and development is expanded to meet local needs, and product technology / quality is improved. Furthermore, as a result of high-value-added product development, past examples of companies that achieved productivity improvement are introduced.

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[9] According to Matsuura and Hayakawa (2010), Park, who has organized the previous research, provided five reasons for “Export learning effectiveness”: 1) technical guidance by buyers, 2) access to high level product technology through participation of international markets, 3) technological progress by increased international market needs, 4) knowing the necessities in new products and customer needs, and 5) Securing of independence from domestic demand variations and high operation rate.

[10] Ito (2011).

Example: OPTOELECTRONICS CO., LTD.

OPTOELECTRONICS CO., LTD. is a company with 184 employees that performs manufacturing and sales of automatic recognition equipment centered on barcode reading devices. The business format is based on the designing department, and although they have a small factory in Hokkaido, the company is basically fabless, outsourcing most of its production. There are many cases where they use unutilized factories at large manufacturers as production lines.

i) Active expansion of business overseas

OPTOELECTRONICS, founded in 1976, thought that barcode technology was a technology that could be used by various regions of the world and first established a barcode scanner module engine business.[11] Therefore, sights were set on the world from the start towards actively expanding business overseas. Eight years after establishment, the company established a local subsidiary in the United States, which is the home of barcode scanner technology, and began full-fledged expansion of business overseas. Barcodes spread across the world and, by 1984, they expanded to Europe and established a local subsidiary in the Netherlands. Other local subsidiaries were also established in Australia, Germany, France, United Kingdom, Italy, Sweden, Taiwan, and China. Branch offices / locations were established in Taiwan and Brazil, and overseas sales rates are more than 60%. These are created as sales bases and are developed as Dutch corporate branches. The Dutch corporate president is Japanese; however, as a rule, other overseas subsidiaries are entrusted to a local person with a policy of using local staff.

Production subcontractors were shifted overseas (China / Taiwan) in 2009; however, from last year, a policy of made in Japan is being returned to.

Sales methods including direct sales to large domestic manufacturers and distributors are performed and direct sales used by each sales base overseas is fundamental.

Figure I-2-2-4 Status of OPTOELECTRONICS overseas market expansion

Notes: Reprinted from OPTOELECTRONICS CO., LTD. documents.

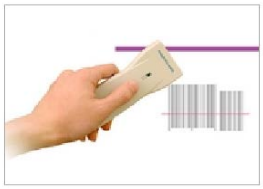
ii) Successful productivity improvements from learning from the experience of competing in overseas markets

Automatic recognition technology that uses optics theory, miniaturization, and software technology is OPTOELECTRONICS' core technology.

[11] An essential component of scanner terminals: for example, for laser modules, they deliver a laser to a barcode and receive the reflected light, periodically analyse it, and are key devices for reading data.

Judging from barcode technology transitions, future lasers becoming mainstream was predicted from the beginning of the 1980s and quickly pushed past CCD, reading which was mainstream at the time, to advance into the United States market, which was the home of barcode technology. In the United States, while competing with Symbol Technologies (now a wholly owned subsidiary of Motorola Solutions) which proudly had an overwhelming share, met customer needs while advancing research and development and, due to laser module engine technology / quality improvement, raised added value and succeeded in increasing productivity. After that, when expanding into the European market where Symbol Technologies was not able to achieve a large share, based on customer needs, they succeeded in developing new products, further increased added value products, increased productivity, and were able to compete on the same level as Symbol Technologies in the European market. Through this kind of overseas market expansion, both companies achieved low prices / high quality laser module engine development and are proud to currently have the number two share in the world and be number one domestically (above 90%). The major barcode markets are North America, then Europe, and Japan. Because barcode use does not expand without infrastructure, emerging markets are still small. Currently, two-dimensional barcodes are being developed and, in accordance with QR codes advancing to take the place of sectional barcodes, CMOS sensor technology is required. CMOS is strong within companies in the United States (Honeywell and Motorola); however, OPTOELECTRONICS boasts a strong position within a number of fields such as CMOS modules and two-dimensional data collectors, etc. Furthermore, the company produces not only module engines, but also manufacturing / development of handy scanners that incorporated the module engines.

Figure I-2-2-5　OPTOELECTRONICS products



Handy laser scanner

Laser module engine

Picture: Excerpt from the OPTOELECTRONICS website.

iii) Consider customer needs and achieve further added value increase

Using the above sales structure, the goal of 100% user satisfaction is set for customer relationships and, even for new product development and after service, the customer is number one. Therefore, with emphasis on the customer's point of view, the goal is to develop products that contribute to customer operation effectiveness improvement. Also, a flat structure is created, a system whereby customer claims / demands can be supported immediately is maintained, and increases in added value continue.

On the other hand, foreign direct investment that contributes to an optimal international division based on effective distribution of production factors raises productivity for the economy as a whole by maintaining and expanding the highly productive sectors with high added values that remain within

the country.

Regarding the relationship between foreign direct investment and domestic productivity, from analysis based on the East Asian international division of labor patterns within the electrical equipment industry, it was confirmed that horizontal foreign direct investment that transfers a portion of own country production overseas with the goal of efficient distribution of production factors (overseas transfer of sectors related to domestic business sector production output - input) is effective in increasing the TFP level and increase rate of the remaining domestic business sectors [12].

Through the expansion of business overseas and in addition to high overseas demand being linked with Japan's economic development that was previously high, as well as learning effects and the optimal construction of international division of labor systems from continuously maturing markets, stimulation of Japan's productivity increase is also expected.

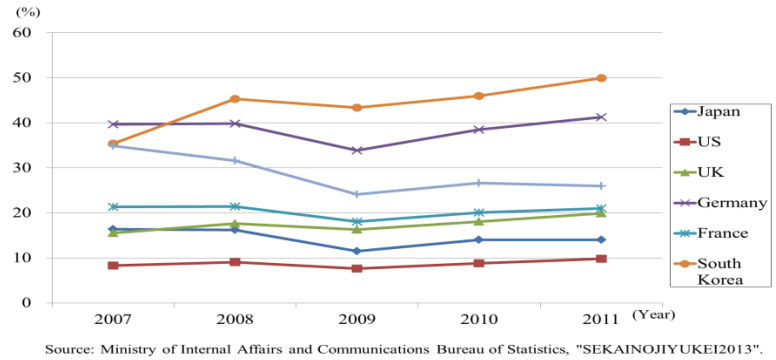
(Scale of Japan's expansion of business overseas)

Subsequently, when comparing the scale of the Japanese overseas business with each country in terms ofexport dependency (Export amount to nominal GDP ratio) and FDI stocks to nominal GDP, it can be saidthat the scale is on a low level in each measurement.

Expansion of business overseas will increasingly be important. The reason is as follows. Japanese firms can access the new markets. The productivity level on the whole will rise because the share of the companies with high productivity will increase. The business expansion overseas itself could improve the productivity of the companies that do overseas business. Considering the size of economy, Japan still has a lot of room to expand. leeway. In this way, effective use of overseas business expansion for Japan's productivity improvement is expected; specifically however, there are two dual-purpose methods to encourage expansion of business overseas for businesses that do not have the ability to do so, as well as further promote the overseas operation activities of highly productive companies that have already expanded business overseas. The following two points are explained below.

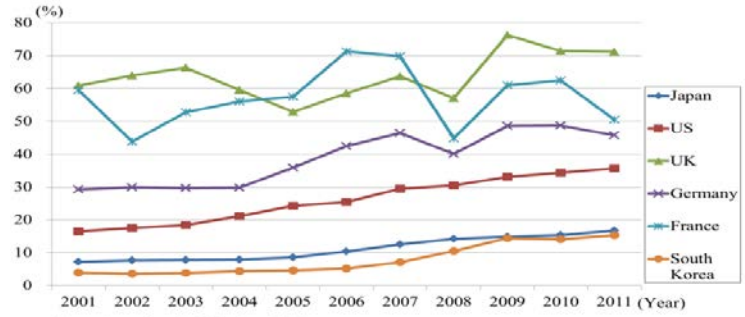
[12] Matsuura et. al. (2008). Also, Obashi et al. (2009) concluded that vertical foreign direct investment contributes to the productivity increase of company manufacturing sectors. Recently, through analysis devices, considering the differences between the target, purpose, and details of foreign direct investment, results are seen regarding a more elaborate analysis of the relationship with productivity.

Figure I-2-2-6　Export dependency of each country (export to nominal GDP ratio)



Source: Ministry of Internal Affairs and Communications Bureau of Statistics, "SEKAINOJIYUKEI2013".

Figure I-2-2-7　FDI stocks to GDP rate compared to each country



Notes: Based on BPM6 after 2005.
Source: IMF (IIP, Outlook)

2. Groups of companies with the ability to expand business overseas

In the previous section, recent academic research is competed against and information is presented regarding the impact of company expansion of business overseas. In this section, the potential of Japanese companies to expand business overseas as well as the current conditions are organized.

By confirming the state of expansion of business overseas and productivity of Japanese companies based on the “Basic survey of business and activity,” within companies in the manufacturing industry, the average productivity of companies (companies that do not expand business overseas) that have not expanded business overseas (no direct export value and no overseas subsidiaries / affiliates) is less than companies that have expanded business overseas. However, around 28% of companies that did not expand business overseas have a higher average productivity than companies that did, and companies with this high productivity can be seen as having the potential to expand business overseas (Figure I-2-2-8).

Even within these companies that did not expand business overseas, indication is possible with the corresponding existence of highly productive companies with the potential to expand business overseas regardless of industry type or company size (Figure I-2-2-10).

On the other hand, when looking at the actual state of expansion of business overseas, mid-market / small and medium-sized enterprises (hereinafter SMEs) as well as the non-manufacturing industries are behind, and it can be said that there is room for expanding business overseas in the future. When looked by business size, within SMEs, 10% of the export value that makes up sales amount is

continued, the low number of overseas bases per company remains low, and exporting as well as foreign direct investment correspondingly lags. Also, when looked at by industry type, the number of overseas bases of companies within the non-manufacturing industry remains around 30% of the manufacturing industry, and expansion of business overseas of the non-manufacturing industry correspondingly lags. Furthermore, the lag of expansion of business overseas of the non-manufacturing industry is referenced in Section 2, Chapter 3 of Part 2.

Figure I-2-2-8 Labor productivity of companies that do not expand business overseas (manufacturing industry)

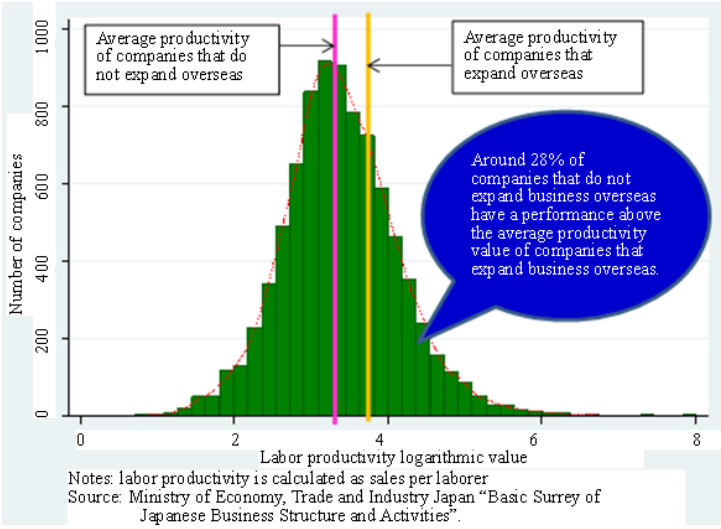


Figure I-2-2-9 Labor productivity of companies that do not expand business overseas (non-manufacturing industry)

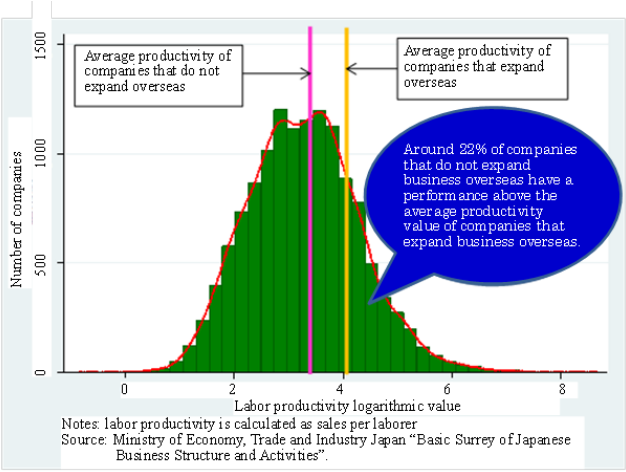
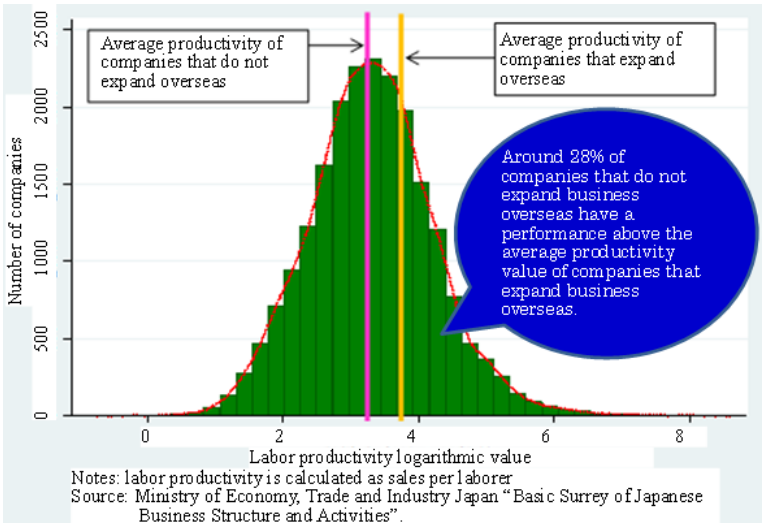
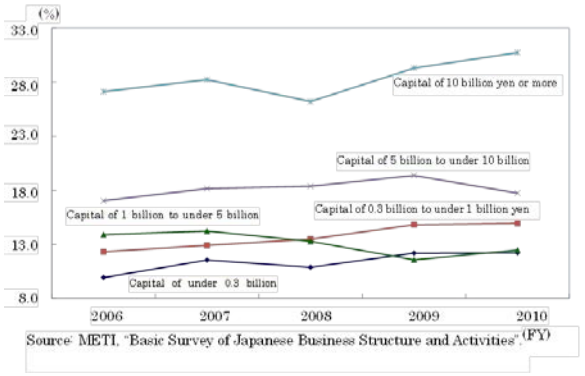


Figure I-2-2-10　Labor productivity of companies that do not expand business overseas (SMEs)

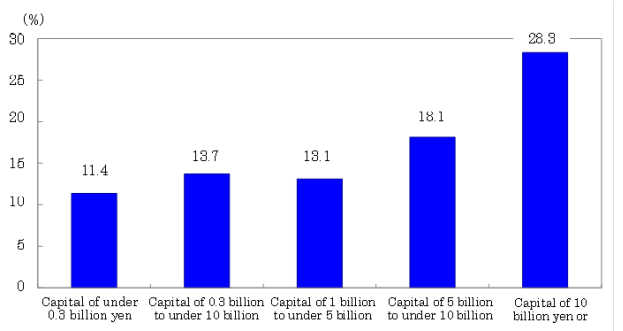


Notes: labor productivity is calculated as sales per laborer
Source: Ministry of Economy, Trade and Industry Japan "Basic Surrey of Japanese Business Structure and Activities".

Figure I-2-2-11　Export and sales ratio

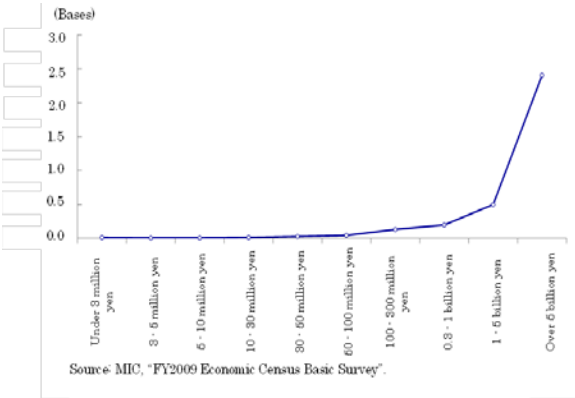


Source: METI, "Basic Survey of Japanese Business Structure and Activities". (FY)

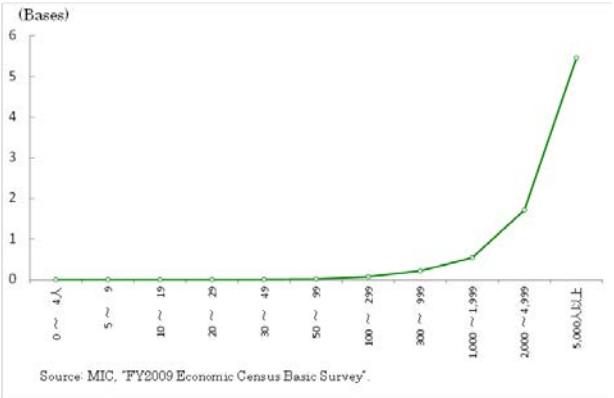


Notes: The proportion of export value within sales of companies belonging to each capital class is calculated. The graph shows the average values from 2006 to 2010.
Source: METI, "Basic Survey of Japanese Business Structure and Activities".

Figure I-2-2-12　Number of overseas bases per company
(by amount of capital (left), by number of employees (right))

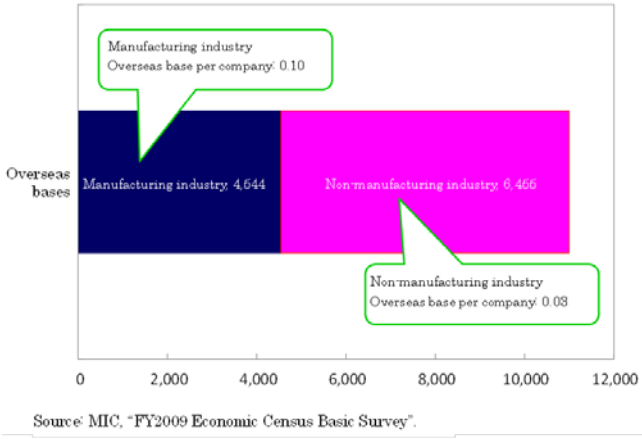


Source: MIC, "FY2009 Economic Census Basic Survey".



Source: MIC, "FY2009 Economic Census Basic Survey".

I-2-2-13 Number of overseas bases by industry type



Source: MIC, "FY2009 Economic Census Basic Survey".

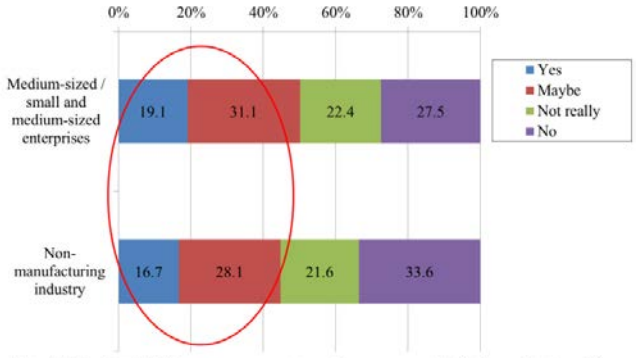
(Companies mind)

It can be confirmed that many companies have confidence in marketability of their products in overseas markets and want to expand overseas activities.

Based on the previous survey (2013), out of companies that do not expand business overseas, 50.2% of SMEs "think" or "slightly think" that their company's products / services can be marketable overseas. The percentage was also 44.8% within the non-manufacturing industry and around half for both had confidence in their company's products / services (Figure I-2-2-14).

Similarly, companies that do not expand business overseas estimate that rate of overseas sales which makes up total sales will be "unsatisfied" / "slightly unsatisfied" five years in the future, and 39.3% of SMEs have an active desire to expand business overseas, as well as 38.0 % in the non-manufacturing industry. This is approximately 40% for both (Figure I-2-2-15). Furthermore, within the 40% of companies with a desire to expand business overseas, when asked about necessary measures for eliminating dissatisfaction, a large proportion of SMEs as well as companies within the non-manufacturing industry specified "securing staff for overseas expansion", "know-how acquisition for overseas expansion" and "overseas markets information collection" (Figure: I-2-2-16).

Figure I-2-2-14 Do you think your company's existing products and services will be accepted in overseas markets? (companies that do not expand business overseas)

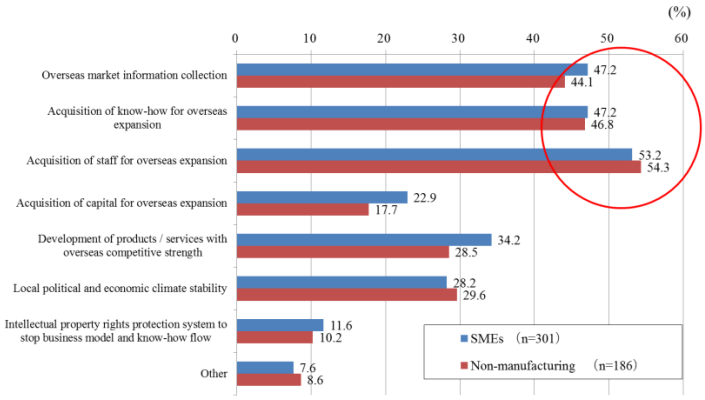


Notes: Teikoku Databank" Survey on overseas strategy of Japanese companies for the consideration of the international trading policy". (2013)

Figure I-2-2-15　Evaluation of predicted overseas sales that make up total sales rate (consolidated basis)　5 years in the future (companies that do not expand business overseas)

Notes: Teikoku Databank" Survey on overseas strategy of Japanese companies for the consideration of the international trading policy". (2013)

Figure I-2-2-16　Necessary measures for the elimination of dissatisfaction regarding the prediction of overseas sales rate 5 years in the future (companies that do not expand business overseas)



Notes: Teikoku Databank (2013), "Survey on overseas strategy of Japanese companies for the consideration of the international trading policy."

From above, it is understoodthat there are still a number of companies with high productivity that do not expand business overseas in Japan. Specifically, SMEs as well as the non- manufacturing industry, as opposed to being behind regarding the expansion of business overseas, there are many companies that are confident in their products and services and have a desire to expand business overseas. Also, many of these companies encounter problems with securing staff, know-how as well as information collection, and it has been confirmed that elimination of these problems would benefit expansion of business overseas.

If these SMEs and non-manufacturing industries that have potential were to expand business overseas, through expansion of economic initiatives implemented by productive companies, Japan’s overall productivity will increase. Also, it can be expected due to learning-by-exporting effects, that a productivity increase for relevant companies can be achieved.

(Potentially competitive fields where domestic and overseas demand is expected to increase)

There are fields that have the potential to utilize Japan's technological and service strengths and are expected to increase global demand. Of course these fields are already highly productive, and even if productivity was low, there are companies where productivity is expected to increase and aspirations of active expansion of business overseas is desired.

For example, global medical markets record a large extension every year, especially in economic development of emerging countries such as Asia, and the need for sophisticated medical care, nursing, and health related industries is rapidly expanding along with an aging global population.

On the other hand, in spite of Japan's health and medical services receiving high marks internationally, major Western companies hold an overwhelming share in the medical device market and Japan's share is slumping.

Maximizing the use of Japan's strong technology and know-how and by expanding overseas into markets where global demand is expected to increase, a connection to productivity improvement in Japan's overall economy is expected (refer to Section , Chapter 3 of Part 2).

3. Companies that have already expanded business overseas

In the previous paragraph, the significance of the development of expansion of business overseas of companies that have not yet done so, but have the potential to do so were viewed; however, companies that have already expanded business overseas are discussed here. As confirmed in the first paragraph, because companies that have already expanded business overseas are highly productive, expansion of economic activivtiesof these companies will lead to overall productivity improvement.

In order to further expand the economic initiatives of companies that have already begun business overseas, further acquisition of new markets is important. Especially in booming emerging markets, it is necessary to capturehigh demand without lagging behind overseas competitors. However, as outlined in Chapter 2 of Part 2, Japan’s overseas expansion to emerging countries has currently become subordinate to overseas competitors in each region regarding exporting. Also, even regarding foreign direct investment, importance on Asia stands out, and it cannot be said that presence in overall developing nations is high. In the future, strategic initiatives corresponding to the current state of each region are necessary for the further overseas expansion of Japanese businesses (refer to Chapter 2 of part 2).

However, when establishing overseas bases as a result of foreign direct investment, highly productive business functions with high added value that is the source of Japan’s strength, and by maintaining and strengthening the so-called “mother function” [13], maintenance / strength of domestic productivity and advantages of accumulation are achieved, and construction of an optimal

[13] The "mother function" referred to here is highly productive with high added value and, if removed, it is kept in mind that domestic productivity maintenance and improvement would be difficult. For example, there are sophisticated technologies and know-how management functions such as research and development / design, management strategy, planning, and marketing. However, even within the same research and development, there are not only applicative items for the purpose of meeting local product specifications, but also items such as research and development of leading core technologies which is the source of strength for Japanese companies.

international division of labor through appropriate allotment of roles is necessary.

Regarding this, the results of the previously mentioned survey will be looked at regarding what functions need to be maintained overseas by companies that have already expanded business overseas, as well as how overseas business functions will be thought of in the future.

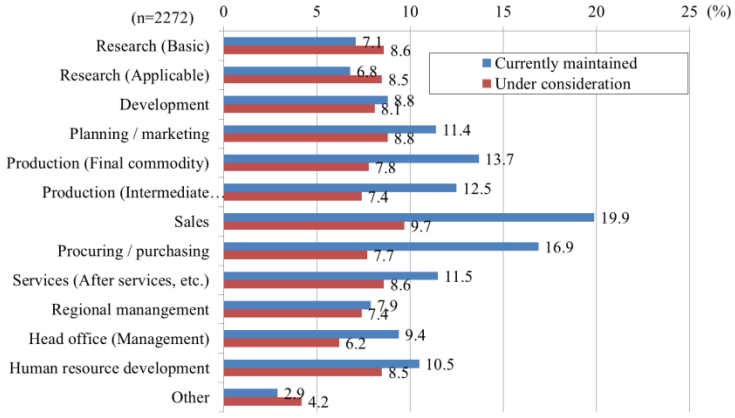
Starting with the highest proportion, functions that are currently maintained overseas are, “sales” 19%, “procuring / purchasing” 16.9%, “production (final commodity)” 13.7%, “production (intermediate commodity)” 12.5%, and there were many responses indicating that production and sales functions will be increased. On the other hand, functions that are not currently maintained overseas but are being considered are, from the highest proportion, “sales” 9.7%, “planning / marketing” 8.8%, “research (basic)” 8.6%, and in addition to production and sales, active consideration aspects for overseas maintenance of planning and research functions are seen.

Furthermore, the ratio of responses whereby corresponding functions that are currently maintained overseas will be “expanded” is, from the highest proportion, “sales” 70.3%, and “procuring / purchasing” 60.7%. However, on the other hand, it is understood that “research (basic)” 35.0%, “research (applicable)” 37.4%, “development” 45.2%, “planning / marketing” 56.6%, and “regional management” 35.2% is not low (Figure I-2-2-18). In Japan, in addition to traditional production and sales, even with functions such as research, development, planning, and integration, enhancement in overseas expansion is seen.

In the 2013 version of the White Paper on Manufacturing Industries, regarding the future outlook for expansion of business overseas by value chain for automobile and electrical equipment, overseas production technical levels continue to achieved the same level as the domestic standard, and even with functions that are the source of competitive strength such as product planning and research and development and future high added value products　analysis that shows the movement of expansion of business overseas is performed (I-2-2-19).

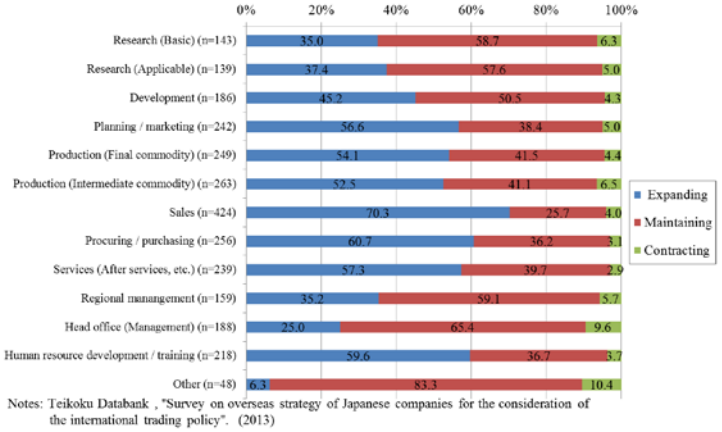
From the above results, aspects of the achievement of overseas maintenance and enhancement of functions such as research and development as well as planning and marketing by Japanese companies were confirmed. Although it is considered that in overseas research and development and planning / marketing, it is necessary to absorb local needs and customs for the purpose of expanding products and services with customized specifications, the transfer of high-level technology / know-how accumulated by companies and R&D of leading edge core technology　could lead to domestic productivity decline. Therefore, as well as for maintaining / improving the advantages of productivity and accumulation, it is important that high added value functions and functions that are the source of Japan’s strength remain and are strengthend within the country

Figure I-2-2-17　Functions that are currently maintained at overseas bases and functions that are under consideration to be established



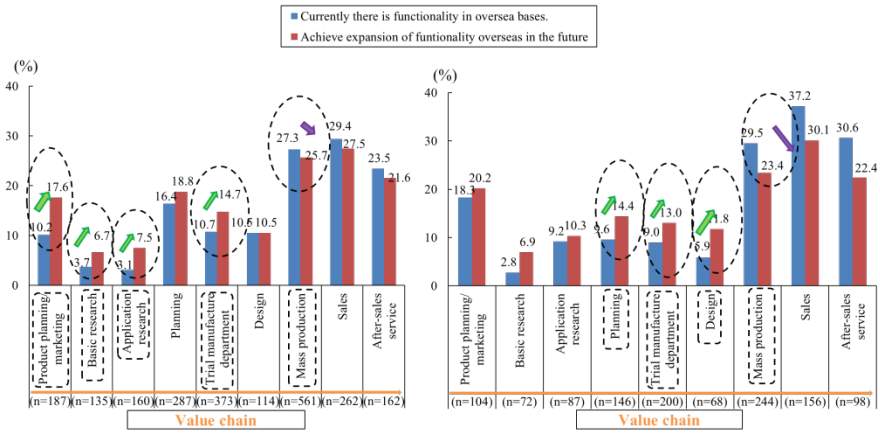
Notes: Teikoku Databank , "Survey on overseas strategy of Japanese companies for the consideration of the international trading policy". (2013)

Figure I-2-2-18　Currently maintained at overseas bases Future outlook of functions



Notes: Teikoku Databank , "Survey on overseas strategy of Japanese companies for the consideration of the international trading policy". (2013)

Figure I-2-2-19　Overseas expansion outlook by value chain



4. Summary

The effects of productivity improvement through expansion of business overseas were looked at above. Regardless of Japan's high productivity, there are companies that have not expanded business overseas through export and foreign direct investment. Specifically, SMEs as well as the non-manufacturing industry, as opposed to being behind regarding the expansion of business overseas, there are many companies that are confident in their products and services and have a desire to expand business overseas. Also, many of these companies encounter problems with securing staff, know-how as well as information collection, and it has been confirmed that elimination of these problems would benefit expansion of business overseas.

Furthermore, domestic and overseas demand is expected to rise in the future and there are fields that have potential and that use Japan's strength in technology and service.

In light of the case in which learning effects gained by through overseas market competition, it is effective for the increase of the productivity of overall economy to encourage such companies to gain foreign market.

On the other hand, acquisition of foreign markets by highly productive companies that have already expanded business overseas also benefits productivity improvement for the entire economy. However, for the purpose of improving domestic productivity and maintain the industry accumulation, it is important that high added value sectors and mother functions that are the source of Japan's strength remain within the country.

Section 3 Role of innovation in productivity improvement

1. Productivity and innovation

Innovation plays an important role as a factor in productivity improvement within each industry. According to the OECD report, "The OECD Innovation Strategy", innovation is an important driver of growth and much TFP growth is linked to innovation and improvement of efficiency.[14]

Research and development (R&D) is a representative example of innovation initiatives and, including the regression analysis in section 1 of this chapter, it was confirmed by many analyses to have a significantly positive effect. For example, Figure I-2-3-1, which is the results of analyses of the relationship between R&D intensity (R&D cost / sales) and total factor productivity (TFP) growth rate, using various different methods with firm-level data; research and development has a significantly positive effect on TFP growth rate.[15]

[14] OECD (2010) "The OECD Innovation Strategy: Getting a Head Start on Tomorrow"

[15] On the same paper, with analysis A as a base (least-square method including a year dummy, research and development intensity is regressed on TFP growth rate), other analyses are conducted using various different methods such as the least-square method with an additional industry dummy (analysis B), generalization method of moments. As dependent variables, along with value-added-based TFP, output-based TFP is also used.

Figure I-2-3-1 Research and development intensity and TFP productivity increase rate

Analysis A (OLS, including year dummy)

	All Industries (1)		Manufacturing industry (2)	
Research and development intensity	0.260	***	0.260	***
	(0.018)		(0.019)	
R-squared	0.187		0.205	
Sample size	8,769		7,456	

Analysis B (OLS, including year and industry dummy)

	All Industries (1)		Manufacturing industry (2)	
Research and development intensity	0.209	***	0.209	***
	(0.023)		(0.023)	
R-squared	0.214		0.234	
Sample size	8,769		7,456	

Notes: 1. The dependent variable is the added value TFP increase rate for the previous four years. The independent variable is the research and development intensity rate.

2. Estimate period: 1986 to 2005
3. Numbers in brackets are standard deviation.
4. :p<0.1、**:p<0.05、***:p<0.01.

Notes: Kwon, Fukao and Kim (2008), "KENKYUKAIHATSU TO SEISANSEI JOUSHO : KIGYO REBERU NO DATA NIYORU JISHO BUNSEKI" (R&D and productivity increase: An empirical analysis based on firm-level data).

Also, in a broad sense not limited to R&D, intangible asset investments are focused on as development factors. The previously mentioned OECD report "OECD innovation strategy" said that firms in several OECD countries invest as much in intangible assets, such as R&D, software, data base, and skills as in physical capital.

From the second half of the 1990s in the United States, IT devices and communication tools such as computers and internet were widely used. And new types of business were born, together with improvement of productivity. Although other countries have also advanced in the IT field, productivity catchup with the United States may not be of success. It is gradually understood that investment in not only hardware, but also investment in software such as human resources and organizational structure is also necessary.

These kinds of intangible assets, excluding partial exceptions such as software investment, are not included in production factor (capital) accumulation. Therefore, it is thought that effectiveness from intangible assets are seen as a TFP increase. Regarding the effects of intangible asset investments on TFP increase, research has advanced and, for Japan, research results were reported indicating that TFP growth rate was significantly affected in manufacturing industry after late 1990s (Figure I-2-3-2)

Figure I-2-3-2 Effects of intangible assets on total factor productivity (TFP) increase rate

Dependent Variable: TFP increase rate

	Fixed effects estimation	Fixed effects estimation with instrumental variables	Generalization method of moments
Intangible assets / production value	0.419141 (4.06)***	0.277203 (1.96)***	0.621194 (6.71)***
TFP (Previous year)			-0.132317 (4.18)***
constant	-0.027798 (3.11)***	-0.019609 (1.86)***	-0.030187 (4.13)***
Number of observations	676	676	676
Number of industries	52	52	52
Estimation period	1996-2008	1997-2008	1996-2008

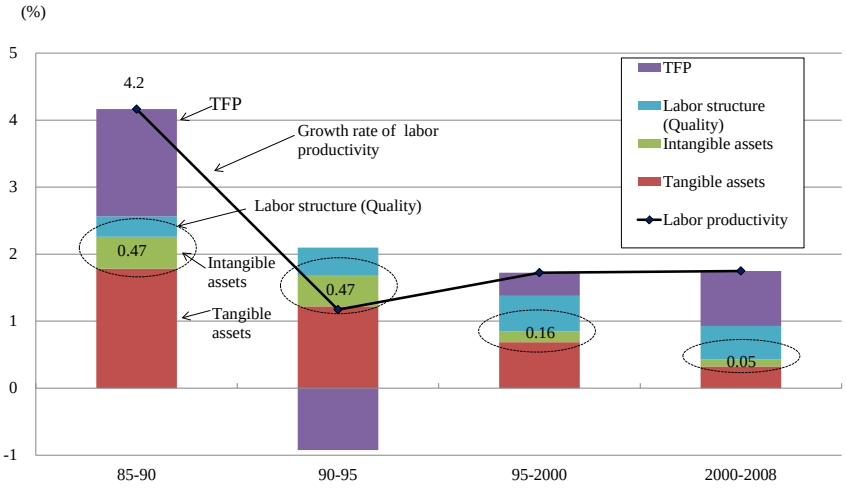
Source: Chun, Fukao. Hisa and Miyagawa (2012) "Measurement of Intangible Investments by Industry and Its Role in Productivity Improvement Utilizing Comparative Studies between Japan and Korea"

Figure I-2-3-3 calculates contributions of intangible assets to labor productivity, by the growth accounting concept, presuming these intangible assets are included in production factor (capital) accumulation. Based on this, between 1985 and 1990, intangible assets contributed 0.5% within a labor productivity growth of 4.2%. However, that contribution declined to 0.2% during the second half of the 1990s, and a further decline to 0.1% continued between 2000 and 2008.

We will look at what kind of intangible asset specifically contributies. Intangible assets include computerized information (such as custom software), as; innovative property (such as research and development, copyright and license, design expenses), and economic competencies (such as brand equity, human capital, organizational structure).[16] The contributions of research and development, custom software, design, brand, and human capital were large during the second half of the 1980s. However, contributions of intangible asset greatly declined during the second half of the 1990s. And, during the 2000s, custom software contributions expanded; however; contributions of research and development, design, and brand contributions shrank and contributions of human capital and organizational structure turned to negative. After the collapse of the bubble in the first half of the 1990s, it is suggested that intangibleinvestment, including human resources, showed low tone in Japan.

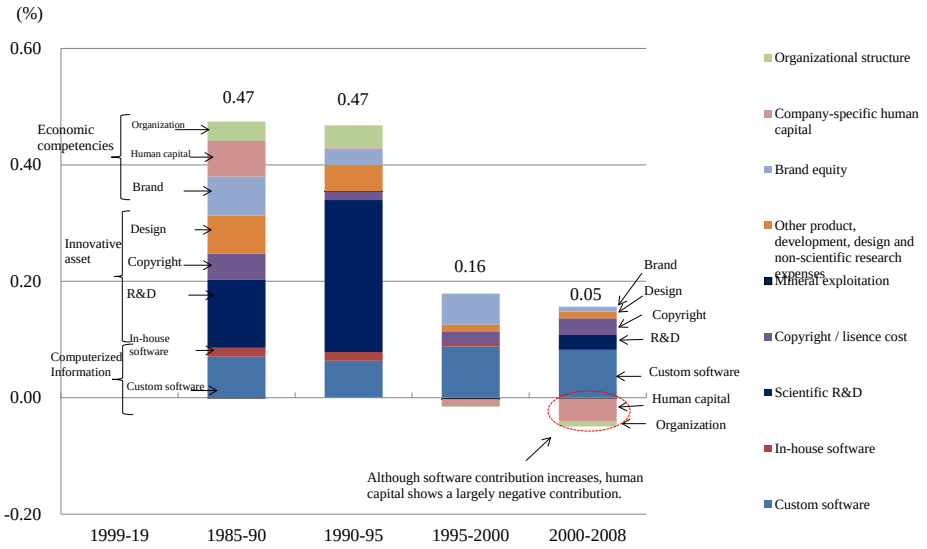
[16] Regarding intangible asset classification, within Corrado, Hulten and Sichel (2009), computerized information, innovative property and economic competencies are put forward, and this concept was also adopted by Fukao, Miyagawa, Shinoda and Tonogi (2009), Miyakawa, K. (2010) etc.

Figure I-2-3-3　Factor breakdown of Japan's labor productivity increase rate (Considering intangible assets)



Data : Back data of Fukao, Miyagawa, Shinoda and Tonogi (2009) "Intangible Investment in Japan:Measurement and Contribution to Economic Growth", and JIP database.

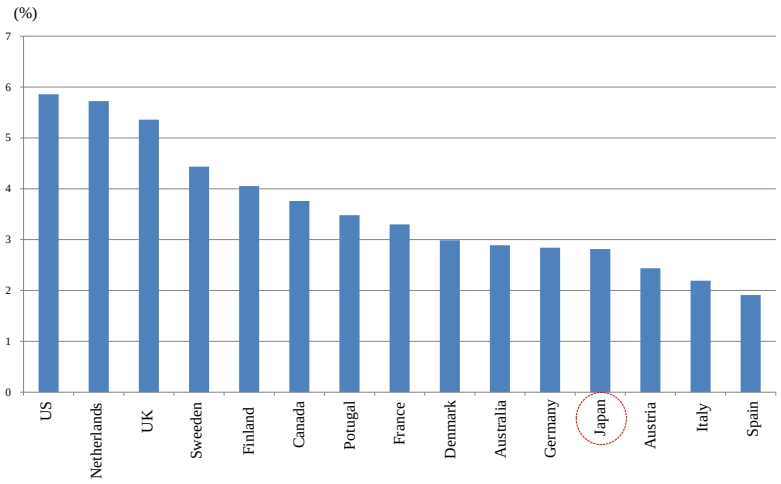
(Intangible asset breakdown)



Source: Back data of Fukao,Miyagawa,Shinoda and Tonogi (2009) "Intangible Investment in Japan:Measurement and Contribution to Economic Growth", and JIP database.

Whether the level of Japan's intangible asset investment, especially human capital and organizational structure is low or not, when compared with main other countries? The data show that the investment in brand equity, human capital and organizational structure remain low (Figure I-2-3-4).

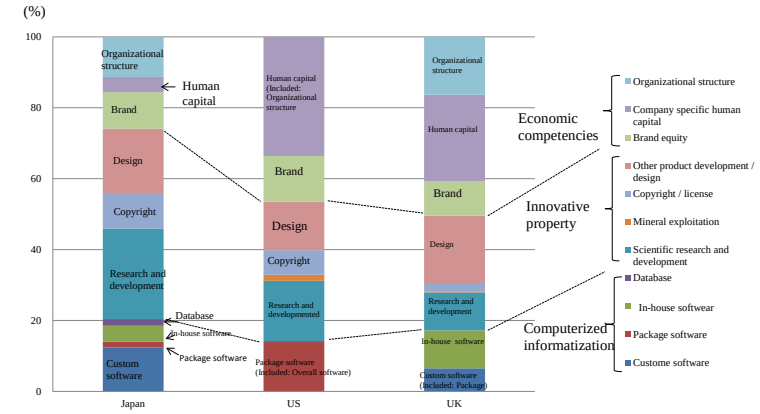
Figure I-2-3-4 Investment in brand equity, human capital and organizational structure as a share of GDP



Notes: Japan, Canada, Portugal, Sweeden, and Finland : in 2005. Other countries : 2006.´
Source:OECD "Science, Technology and Industry Scoreboard 2011".

Furthermore, comparing Japan's structure of intangible investmentto the United States and the United Kingdom, while share of research and development is large, share toward human capital and organization is small (Figure I-2-3-5).

Figure I-2-3-5 Intangible asset investment composition ratio comparison for Japan, the United States, and the United Kingdom



Notes: Japan : 2000 to 2005, US is 1998 to 2000, and UK : 2004.
2. US package software : general software that includes custom software and in-house software. Humancapital includes organizational structure.
3. UK custom software includes package software. In-house software includes a database.
Source: Fukao,Miyagawa,Shinoda and Tonogi (2009) "Intangible Investment in Japan : Measurement and Contribution to Economic Growth" .

2. The status of Japanese innovation initiatives

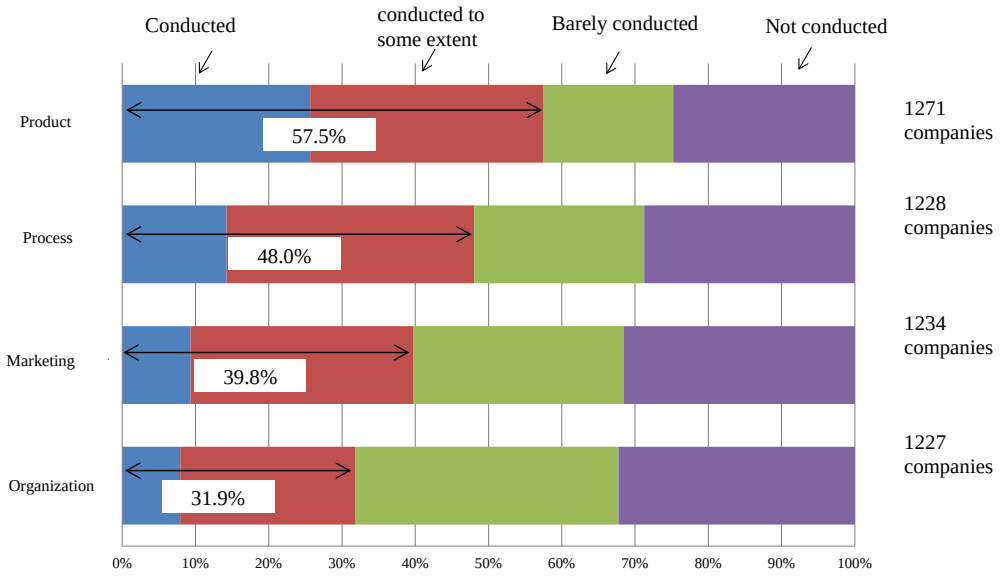
The current status of innovation initiatives by Japanese companies are discussed based on a company survey. There are various concepts regarding innovation types; here however, innovation is classified into the following four types.[17] New product / new service development (product

[17] Shinning a spot light on the term "innovation", Schumpeter, an Austrian economist, presented five types regarding the concept of innovation including new products, production methods, markets, supply sources and organization. For the concept of innovation, OCDE conducted studies. And ,in this chapter, we follow

innovation), new or improved production or delivery method (process innovation), new marketing method such as design, sales, prices setting (marketing innovation) and new organizational methods (organizational innovation).

We start with the status of innovation initiatives within Japanese companies. Based on the survey, discrepancies in efforts are seen by innovation type. The share of companies that make efforts for product and process innovation is comparatively high; however, the that for marketing and organizational innovation is correspondingly low (Figure I-2-3-6). For example, around 60% and 50% of companies indicated that they either "conducted" or " conducted to some extent" product and process innovation respectively, and this drops to 40% and 30% for marketing and organizational innovation.[18]

Figure I-2-3-6　Efforts for innovation activities by Japanese companies



Source: Teikoku Databank "TSUSHO SEISAKU NO KENTOU NO TAMENO WAGAKUNI KIGIYO NO KAIGAIJI JIGYO SENRYAKU NI KANSURU ANKETO".

Also, when the achievement rate is looked at within companies that conducted innovation activities, 70% of companies indicated that they "achieved" or " achieved to some extent" product or process innovation, and marketing and organizational innovation achievement rate was lower at 60% (Figure I-2-3-7).

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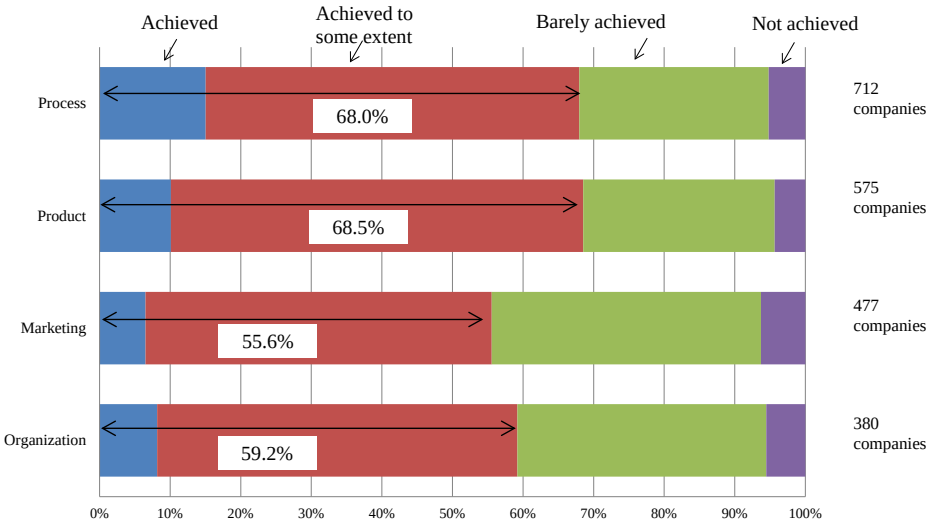
the four types established in the OECD Oslo Manual.

[18] In the survey conducted in February 2013, out 5000 companies that were surveyed, there was a valid response rate of 43.5%. The industry category structure of companies that provided valid responses were manufacturing industry 37.3% and non-manufacturing industry 62.7% (agriculture, forestry and fisheries 0.6%, construction 11.1%, wholesale 23.4%, retail 3.7%, transportation 5.6%, financial 0.9%, real estate 1.1%, service 16.3, and other 0.1%). By company size, large companies 14.1% and small / medium companies 85.9%.

Figure I-2-3-7　Achievement rate of companies that conducted innovation activities

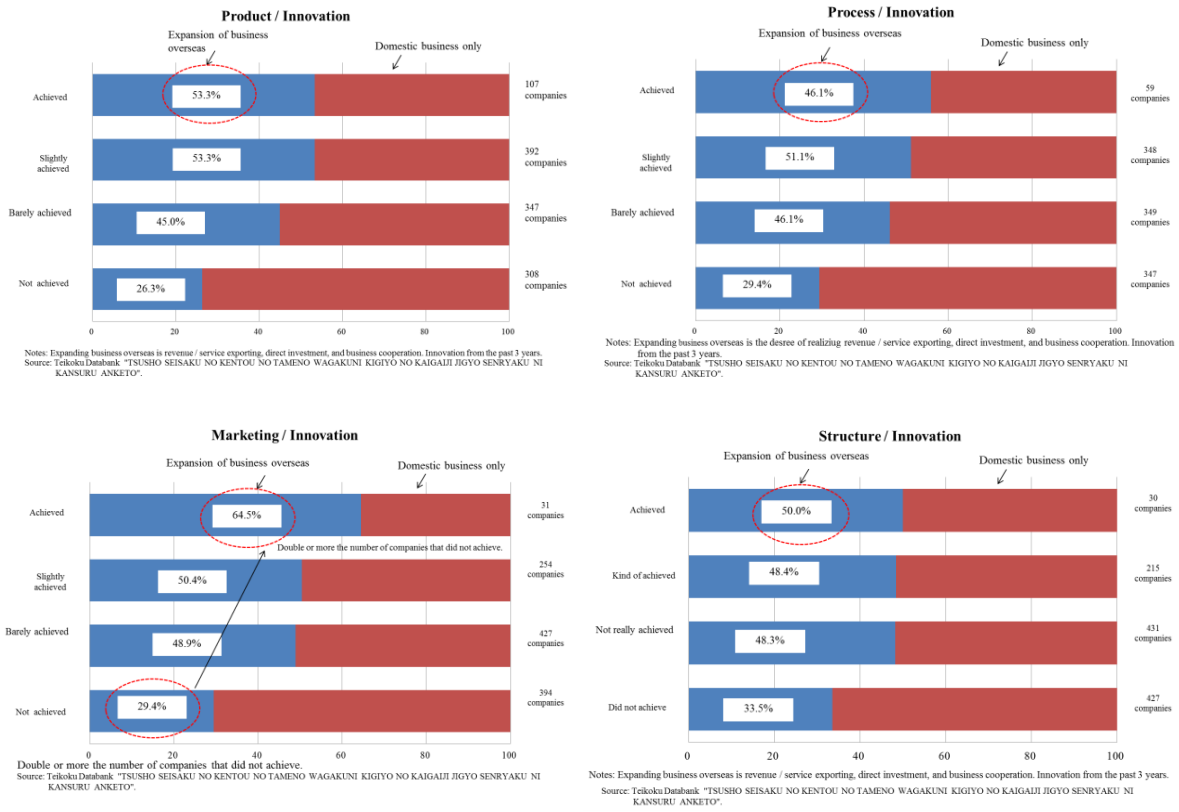


Source: Teikoku Databank "TSUSHO SEISAKU NO KENTOU NO TAMENO WAGAKUNI KIGIYO NO KAIGAIJI JIGYO SENRYAKU NI KANSURU ANKETO".

Considering the relationship between innovation and overseas deployment of business , companies that achieved innovation, compared to companies that did not, the ratio of overseas deployment is high (Figure I-2-3-8).[19] Specifically, the ratio of expansion of business overseas for companies that achieved market innovation (60%) is twice as high (30%) as companies that did not; furthermore, this is high even when compared to the rate of expansion of business overseas of companies that achieved other types of innovation (50%). It is suggested that marketing innovation plays an important role regarding expansion of business overseas.

[19] The overseas deployment includes, at the very least, implementation of revenue / service exporting, direct investment, or business cooperation is indicated.

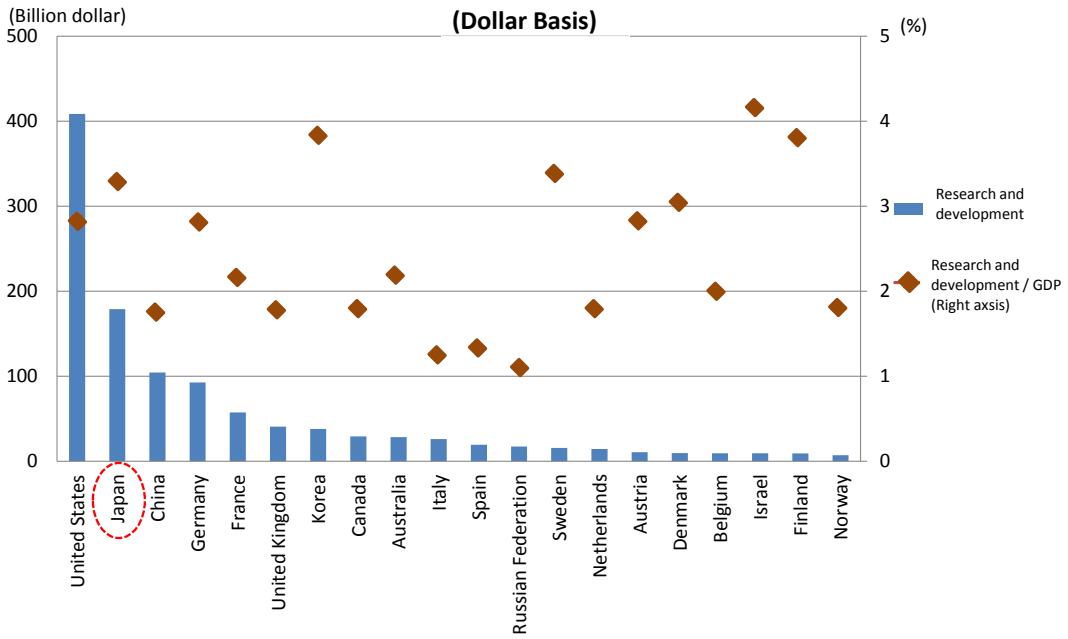
Figure I-2-3-8 Innovation achievement rate and expansion of business overseas



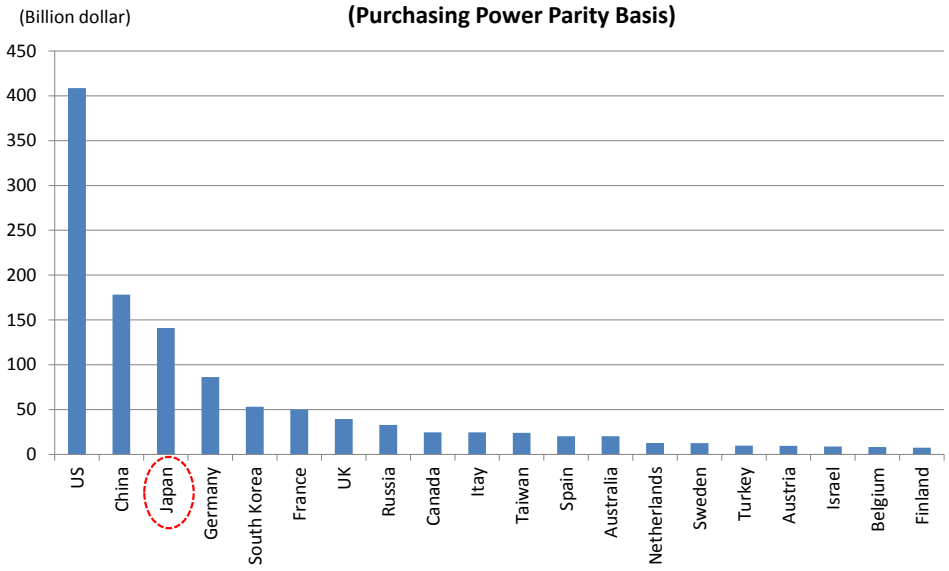
3. Japanese research and development

The current status of research and development, as a typical example of innovation activities, in Japan are examined in this part. Japan's gross expenditure on research and development is second in the world behind the United States on US dollars basis and, purchase power parity basis, is third in the world behind the United States and China. Japan is at a high level above the United States, the United Kingdom, Germany, and France when looking at research and development as a percentage of GDP. Even the number of researchers in Japan is in third place following the United States and China (Figure I-2-3-10).

Figure I-2-3-9 Gross expenditure on research and development and share of R&D as a percentage of GDP (2010)

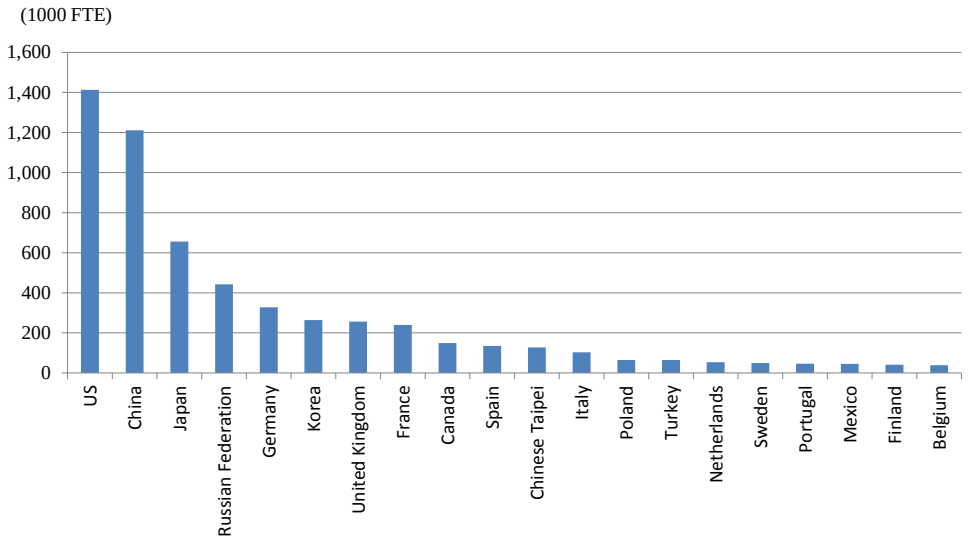


Notes: Expenditure on Research and development is calculated from expenditure of local currency with average exchange rate.
Source: OECD "Main Science and Technology Indicators"



Notes: Purchasing Power Parity Base (PPP)
Source: OECD "Main Science and Technology Indicators"

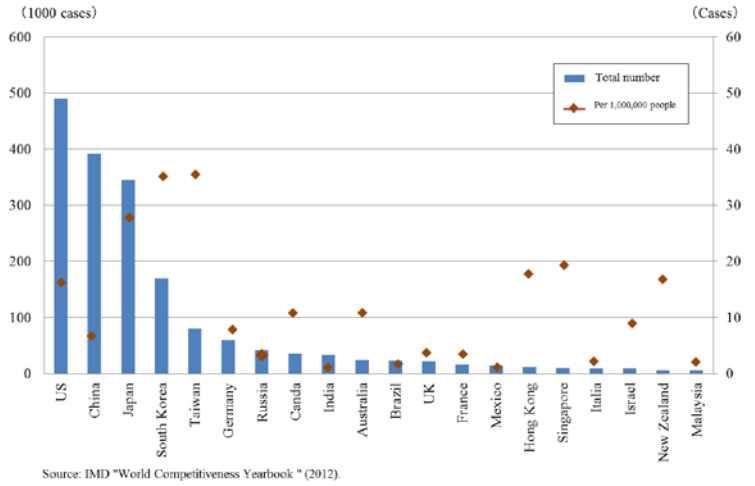
Figure I-2-3-10　Number of researchers of the main countries (2010)



Notes: 1. FTE (Full-time equiavlents) is the units for the number of part-time employees calculated as full-time staff.
2. The US Fugure is an estimation for 2007.
Source: OECD "Main Science and Technology indicators"

The patent application, as a result of research and development, are internationally high both in terms of the total number of applications and per capita applications (Figure I-2-3-11).

Figure 2-3-11　Patent applications within the major countries



Source: IMD "World Competitiveness Yearbook " (2012).

Japan is ranked high within international competitive strength rankings. For example, within the IMD (International Institute for Management Development) world competitiveness rankings, Japan's total score is not necessarily ranked high internationally (27th out of 59 countries), however ranking for science infrastructure, which is determined by R&D expenditure and number of researchers, is high (Figure I-2-3-12). High rankings are also achieved within the World Economic Forum rankings (5th out of 144 countries).

Figure I-2-3-13　International competitiveness rankings (2012)

IMD

Rank	Total	Scientific infrastructure
1	Hong Kong	US
2	US	Japan
3	Switzerland	Germany
4	Singapore	Israel
5	Sweeden	South Korea
6	Canada	Switzerland
7	Taiwan	Taiwan
8	Norway	China
9	Germany	Sweeden
10	Qatar	UK
	・・・	・・・
27	Japan	-

Notes: 1. The total ranking is determined based on economic state, political and corporate organization, and 4 infrastructure pillars.

2. Scientific infrastructure is 1 item within infrastructure sectors. Research and development cost is determided based on data such as the required number of R&D staff, number of patents, etc. and a survey.

3. Applicable to 59 countries and regions.

Source::IMD "World Competitiveness Yearbook" (2012).

World Economic Forum

Rank	Total	Innovation
1	Switzarland	Switzerland
2	Singapore	Finland
3	Finland	Israel
4	Sweeden	Sweeden
5	Netherlands	Japan
6	Germany	US
7	US	Germany
8	UK	Singapore
9	Hong Kong	Netherlands
10	Japan	UK

Notes: 1. Total ranking is organized and determined based on 3 sectors including ″basic requirements″, ″efficiency enhances″, and ″innovasion and phistication factors″.

2. ″Innovation″ is one of ″innovation and sophistication factors″. Determined based on objective data (Number of patents etc.) and survey (RD performance status, research institution ability, cooperation between businesses and universities, etc.).

3. Applicable to 144 countries and regions.

Source: World Economic Forum ″Global Competitiveness Report″ (2012-2013).

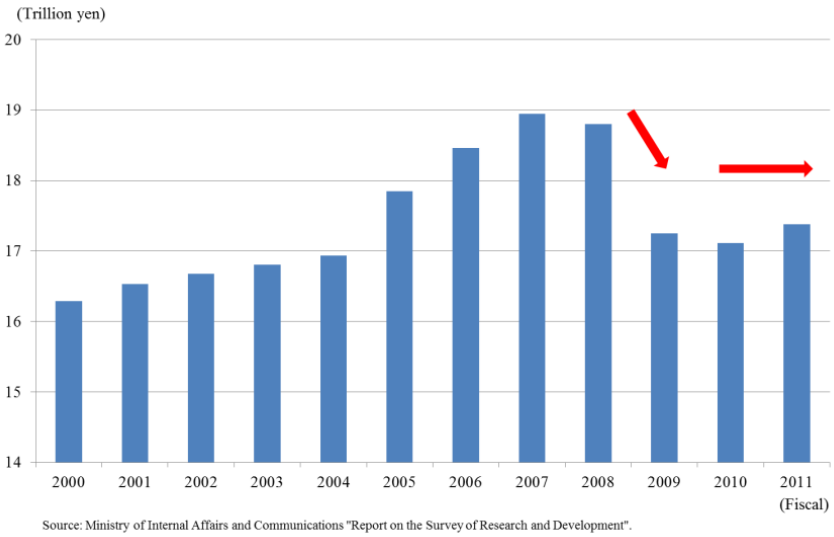
When the proportion of each industry that makes up research and development of each country is looked at, Japan's share within the manufacturing industry is large. Specifically, high research and development expenses are being used within the electrical machine, transportation machine, and chemical industries (Figure I-2-3-13). When looking overseas, along with the high share of Germany's manufacturing industry which is centered on transport machine, in the United Kingdom and France, along with machine and chemical, service, and information transmission make up a large share within the non-manufacturing industry. South Korea's electrical machine share is extremely large.

Figure I-2-3-13　Structure of expenditure on research and development in the main countries (2010)

Notes: 1. Company R&D cost.
2 . Inspection device, measuring device, medical device, clock, and camera are included in electrical equipment.
3. Chemical, oil / coal, pottery soil and stone / rubber, plastic, lumber / paper / print are not disclosed for the US.
Source: OECD Main Science and Technology Indicators.

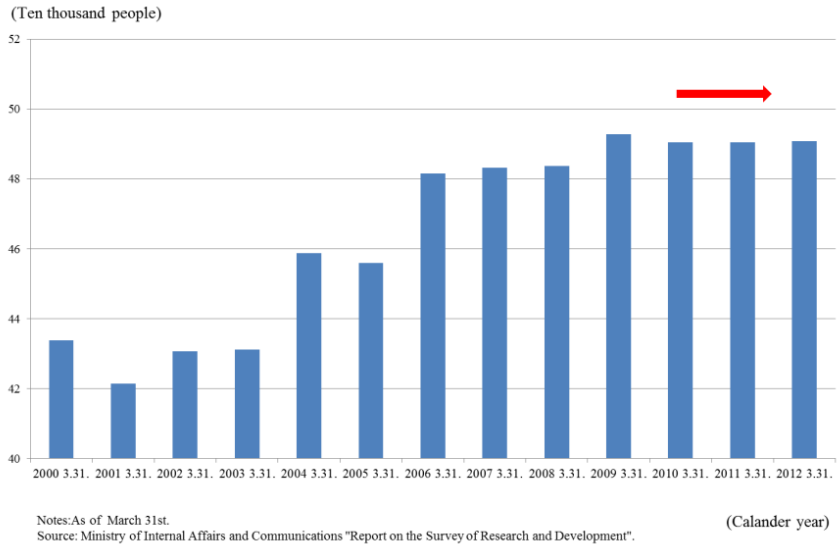
Japan's research and development is at a high level internationally; however, when looking at the trends of Japanese companies with the lowest research and development expenditure, low level trends remain after the Lehman Shock and the number of researchers remains the same (Figure I-2-3-15).

Figure I-2-3-14　Trends of expenditure on research and development by Japanese companies



Source: Ministry of Internal Affairs and Communications "Report on the Survey of Research and Development".

Figure I-2-3-15　Trends of the number of researchers in Japanese companies



Also, rapid catch-up of South Korea and China is encountered. When making up for the size of the economy with research and development GDP proportion and comparing internationally using a time line, Japan's level is high; although it has declined slightly after the Lehman Shock (Figure I-2-3-16). On the other hand, South Korea, Taiwan, and China are rapidly catching up; for example, South Korea passed Japan in 2009. As well as the number of researchers in China rapidly increasing, South Korea catching up to France and the United kingdom is also seen (Figure I-2-3-17).

Figure I-2-3-16　Trends of research and development intensity of the main countries (Research and development expenditure / GDP)

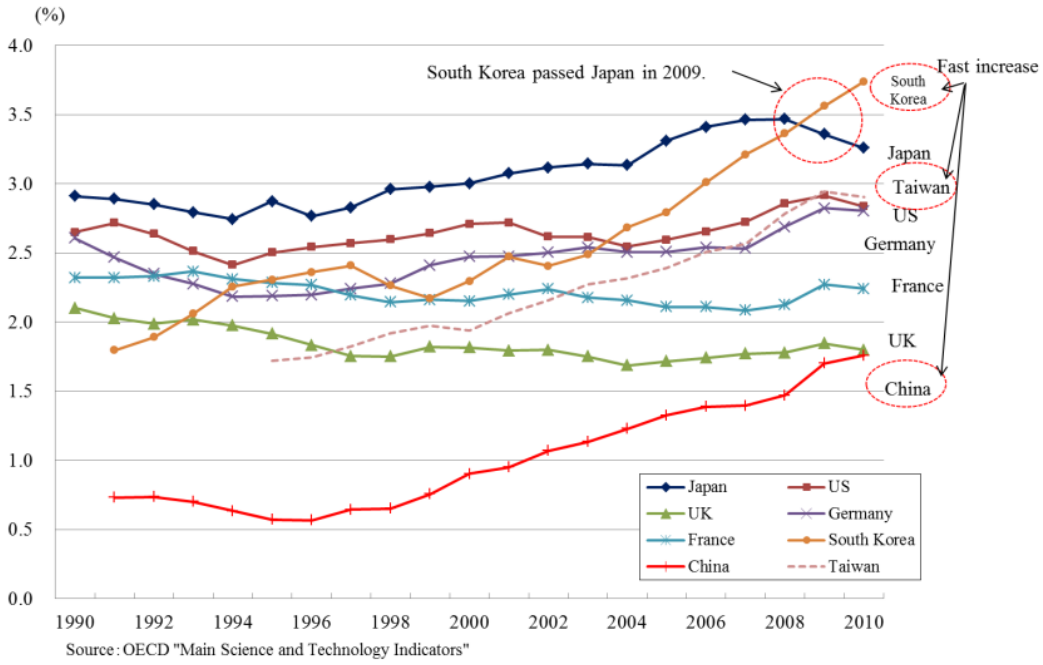
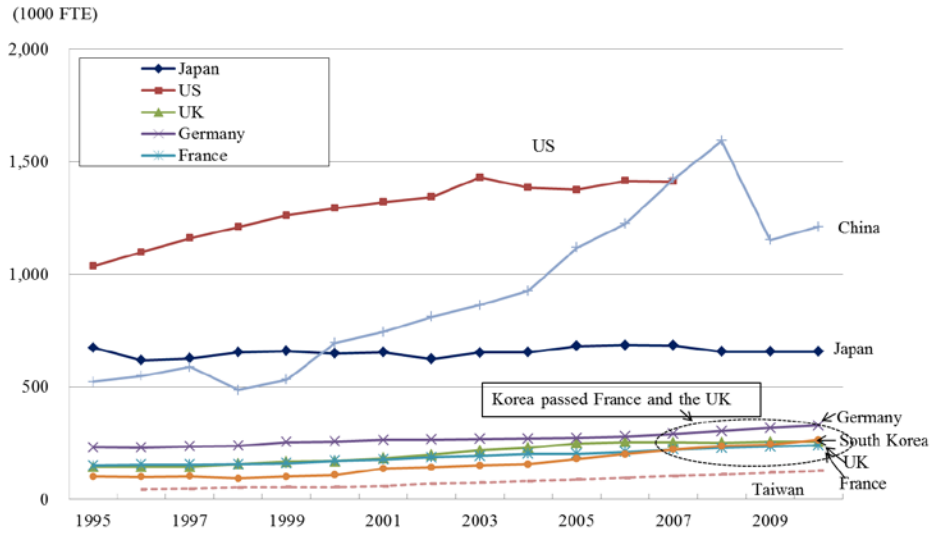


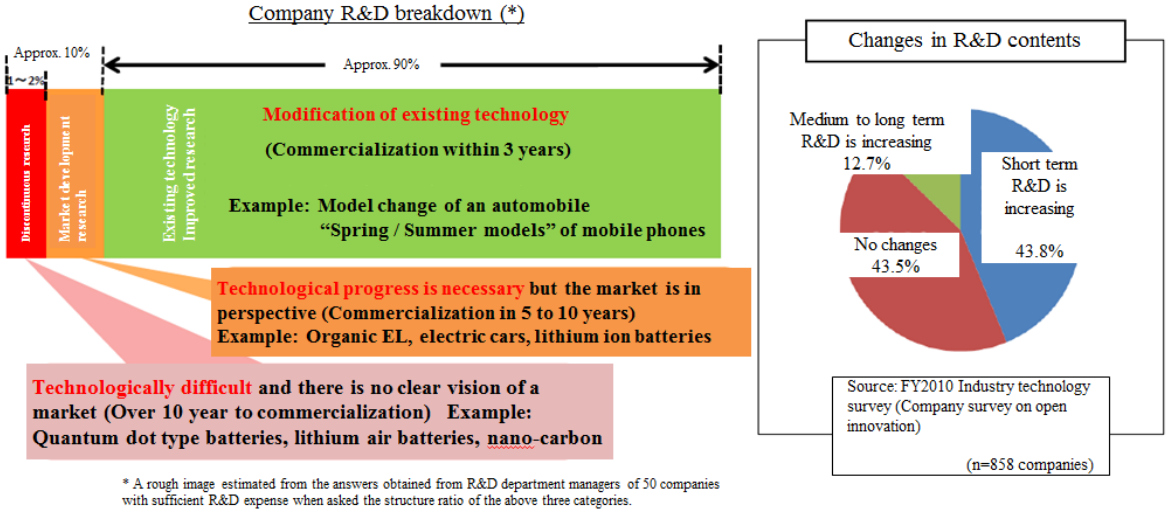
Figure I-2-3-17　Trends of number of researcher of the main countries



Notes: 1. FTE (full-time equiavlents) is the units for the number of pert-time staff calculated as full-time staff.
2. Because the is no UK data for between 1996 to 1998, it is displayed as a straight line.
Source: OECD "Main Science and Technology Indicators".

Also, Japanese companies are getting to focus near-term profits in research and development. A significant portion of Japan's research and development expenditure is used for improving existing technology (Short-term development with the goal of commercialization in 3 years or less). In addition, within over 40% of companies, short-term research and development ratios are increasing and ratios of medium-term research and development, that may become future growth evolution, are decreasing (Figure I-2-3-18).

Figure I-2-3-18　Shift to near-term profit in research and development

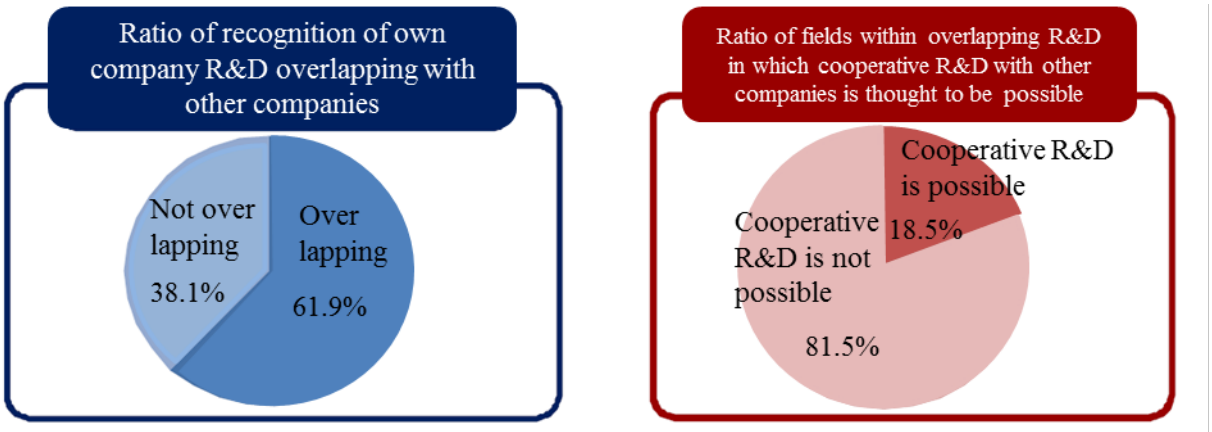


Source: Industrial Structure Council, Industrial Science and Technology Committee, R&D Subcommittee (2012), Report (Reference) (April 2012).

Also, within many companies within the the same industry type in Japan, because there is a lot of research and development overlap with rival companies, so-called "self-sufficiency" trends are strong,

and there are also indications of research and development investment inefficiency (Figure 2-3-19)

Figure I-2-3-19　Company research and development overlap



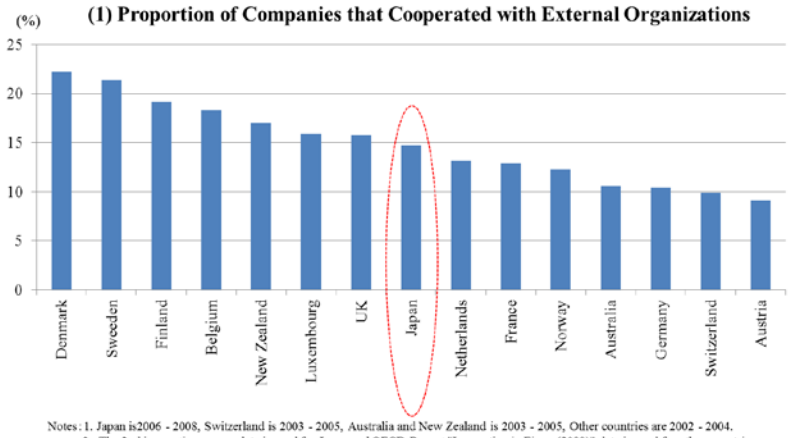
Source: FY2010 Industry technology survey (Company survey on open innovation)

(Left : n=722, right : n=706)

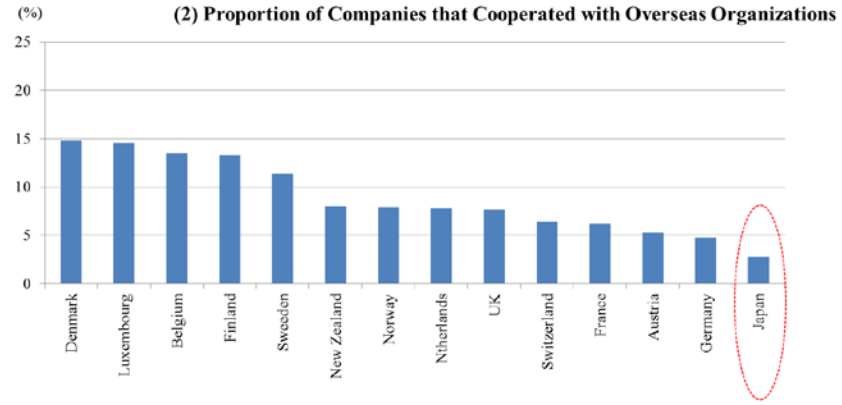
4. International cooperation and foreign staff

There is a strong "self-sufficiency" trend within Japanese companies and research and development inefficiency has been looked at; however, when said the other way around, for effective innovation including research and development, it is suggested that cooperation (Open innovation) with external institutions is important. Not only within Japan, it is thought that active in-take of overseas top-caliber staff and technology is effective in improving productivity. When the scale of cooperation with external institutions by Japanese companies is compared internationally, there is a certain degree of cooperation within innovation initiatives; however, innovation cooperation with overseas organizations is extremely low and a low level remains when looked at internationally (Figure I-2-3-20).

Figure I-2-3-20 Ratio of companies that cooperated with external organizations within innovation initiatives



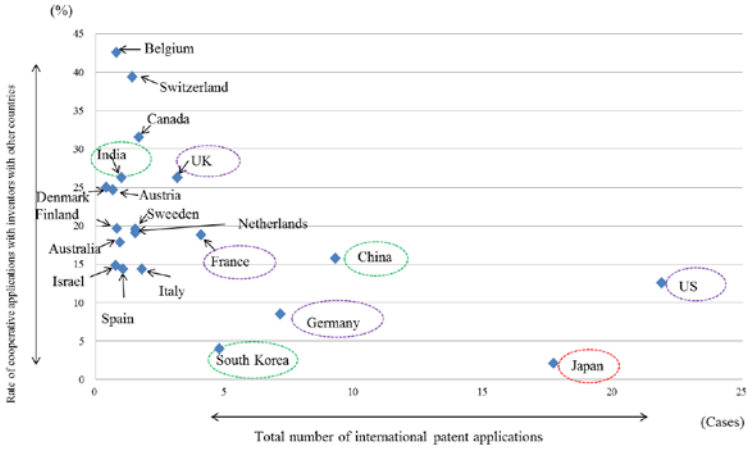
Notes: 1. Japan is2006 - 2008, Switzerland is 2003 - 2005, Australia and New Zealand is 2003 - 2005, Other countries are 2002 - 2004.
2. The 2nd innovation survey data is used for Japan and OECD Report "Innovation in Firms (2009)" data is used for other countries.
3. Within each country's survey which is the basis of the data, "innovation innitiatives" are defined as innitiatives with the purpose of achieving product and process innovation.
Source: Nishikawa, K. and H. Ohashi (2010), "Current aspects of innovations in japan: Evidence from cross-country comparison", NISTEP Discussion Paper,No.68.



Notes: 1. Japan is2006 - 2008, Switzerland is 2003 - 2005, Australia and New Zealand is 2003 - 2005, Other countries are 2002 - 2004.
2. The 2nd innovation survey data is used for Japan and OECD Report "Innovation in Firms (2009)" data is used for other countries.
3. Within each country's survey which is the basis of the data, "innovation innitiatives" are defined as innitiatives with the purpose of achieving product and process innovation.
Source: Nishikawa, K. and H. Ohashi (2010), "Current aspects of innovations in japan: Evidence from cross-country comparison", NISTEP Discussion Paper,No.68.

Japan has weak international cooperation even look at from international patent applications. There are a high number of patent applications in Japan; however, the rate of cooperative applications with inventors from other countries is extremely low (Figure I-2-3-21). The main European countries such as the United Kingdom, Germany, and France have a high rate of cooperative applications, and a country such as the United States that takes in many inventors also has a very high number of international cooperative applications when compared to Japan. When looking at emerging countries, China and India have a high rate of cooperative applications with inventors from other countries when compared to Japan. Furthermore, only South Korea maintains a low rate along with Japan.

Figure I-2-3-21　Cooperation within international patent applications (2010)

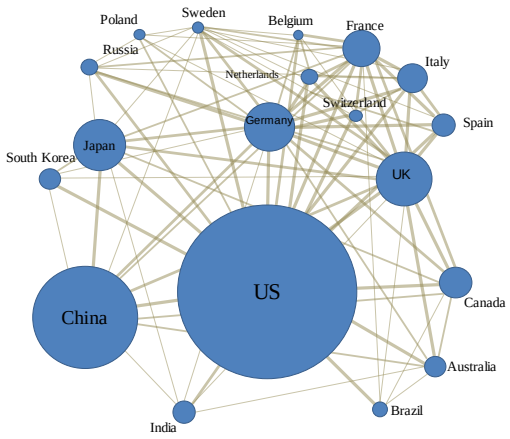


Notes: International applications based on the Patent Cooperation Treaty. The top 20 countries are displayed.
Source: OECD "Patents Statistics"

Centered on universities, relationship trends between total articles and collective writing are looked at. The United States, United Kingdom, Germany, and France have a mutually strong collective writing relationship and it is understood that international cooperation is advancing (Figure I-2-3-22). Japan's collective writing relationship is strengthening; however, the degree of international cooperation is still weak compared to the main western countries. Within emerging countries, China and Taiwan, along with rapidly increasing the number of articles, are beginning to strengthen their collective writing relationship with the United States. Beyond this, South Korea, India, Brazil, etc., albeit only slightly, are strengthening their number of articles and collective writing relationship.

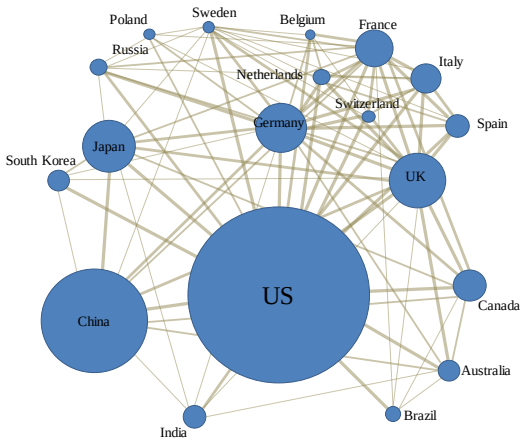
Figure I-2-3-22　Science articles and collective writing relationship

1998



Notes:OECD (2010) "Measuring Innovation: A New Perspective".

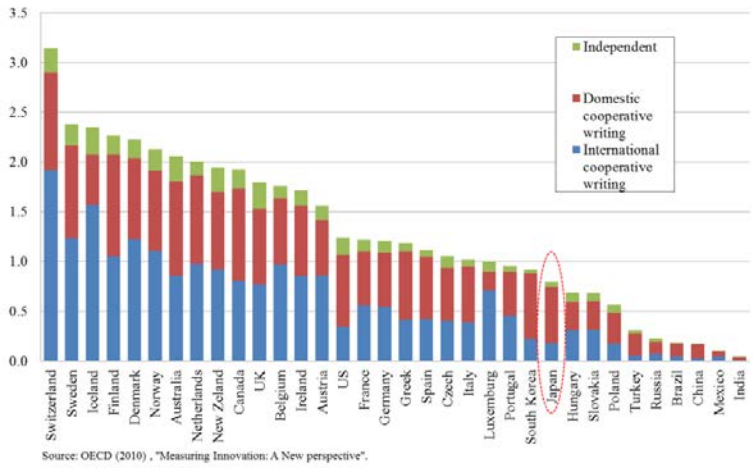
2008



Notes:OECD (2010) "Measuring Innovation: A New Perspective".

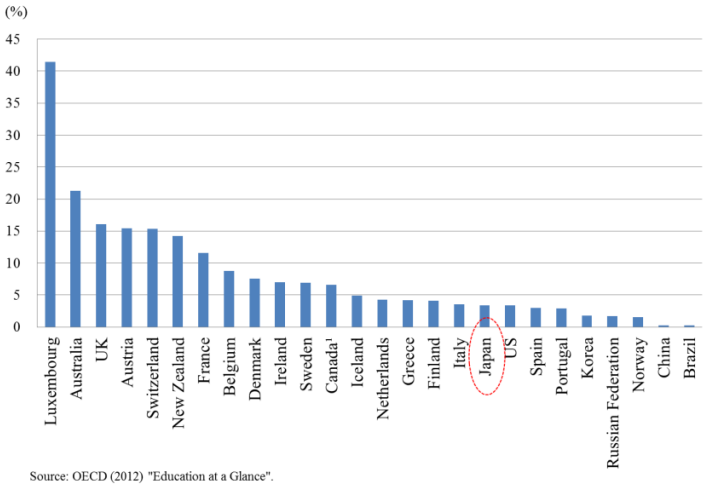
The total number of scientific articles is on the same level as the United Kingdom, Germany, and France. However, it is low when looked at per capita and, within this, the international rate of cooperative writing is low (Figure I-2-3-23). For example, nearly half of all articles in the United Kingdom, Germany, and France are cooperative writings, while Japan maintains a low ratio at 20%.

Figure I-2-3-23　Science articles (per capita) and collective writing relationship (2008)



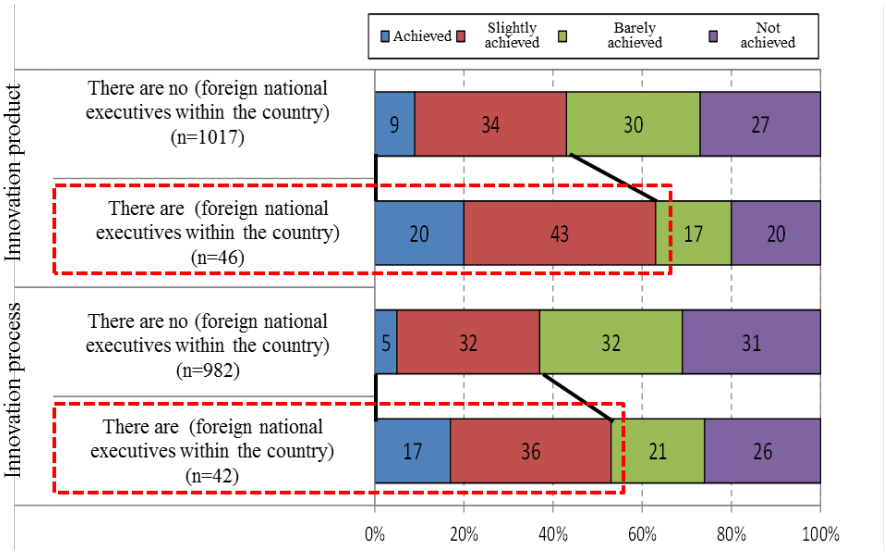
International co-writing of articles was already looked at; however, how is international exchange from the point of view of foreign exchange student acceptance? Foreign exchange ratio within higher education for each country is displayed in Figure I-2-3-24; however, it cannot necessarily be said that Japan's level is high when looked at internationally.

Figure I-2-3-24　Foreign exchange rate with higher education for the main countries



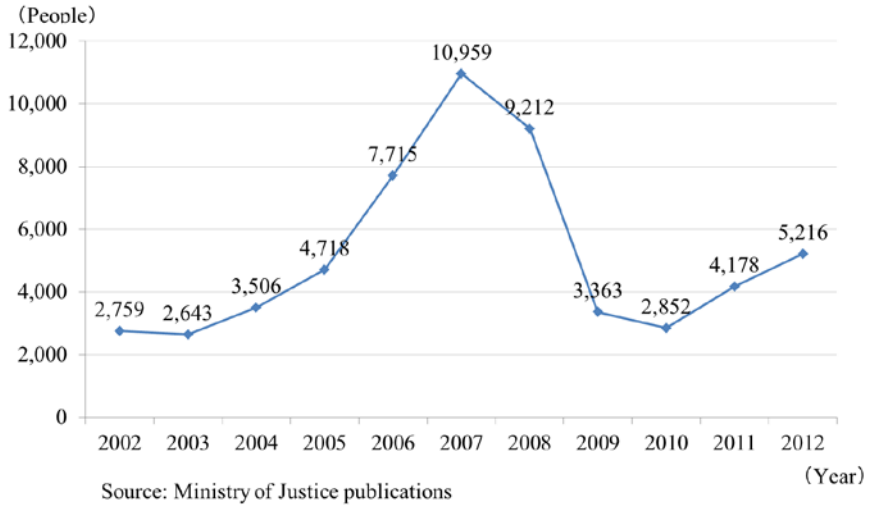
For innovation, it is thought that multiple concepts for interaction are important and, from that perspective, it is thought that the promotion of foreign nationals to company executive level positively effects innovation achievement. Based on the previously mentioned company survey, the companies that utilize foreign executives have higher ratio to achieve innovation　than companies that do not (Figure I-2-3-25).

Figure I-2-3-25　Innovation achievement rate and foreign national executive employment status



Also, not only Japanese domestic staff, but when looked at from the point of view of overseas technical staff inflow, the number of new entries to Japan with a status of residence of “Engineer” declined greatly after the Lehman Shock. The number is recovering little by little; however, a return to the pre-Lehman Shock level is not yet seen at present.

Figure I-2-3-26　The number of foreign nationals newly entering Japan with a status of residence of “Engineer”

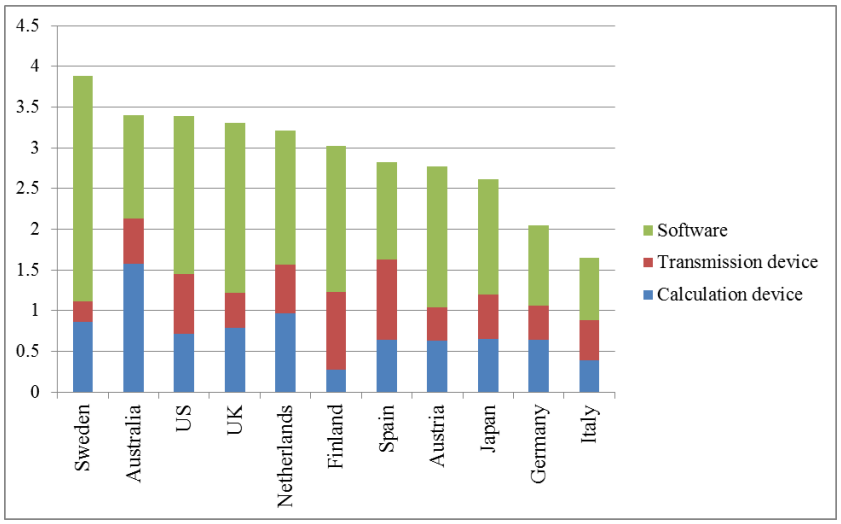


Source: Ministry of Justice publications

5. IT investment

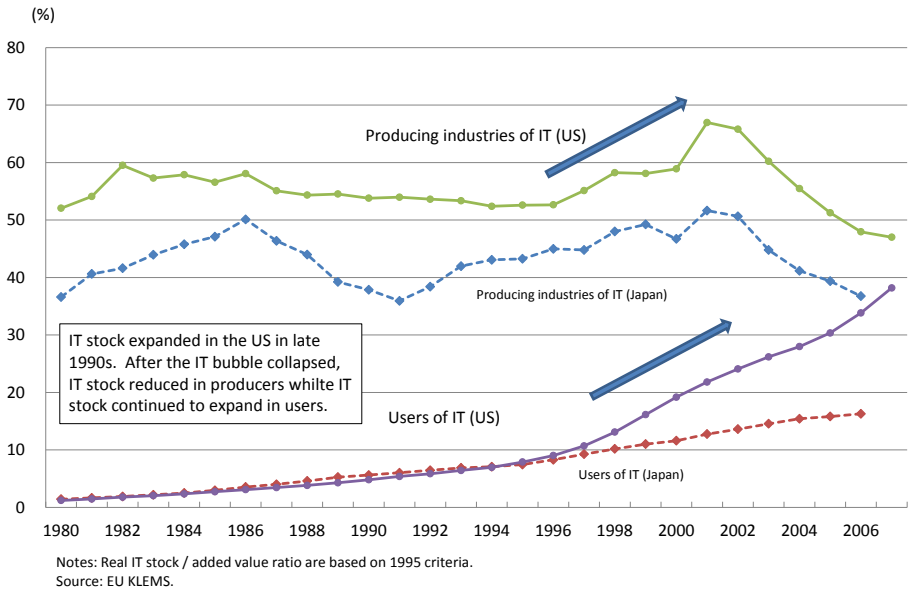
As seen in the regression analysis in Section 1 of this chapter, a relationship was displayed between active IT investment and high productivity. Japan's IT investment level will also be compared internationally. First, when looking at proportion of IT investment to GDP (based on nominal flow), Japan's level remains low (I-2-3-27).

Figure I-2-3-27　Proportion of fixed capital formation to GDP



Furthermore, in the sense of accumulation of IT investment from the past, the ratios of real IT assets (stock) to added value of industry are displayed in Figure I-2-3-39. When all industries are separated into two categories, producing industries of IT (such as manufacturers of electrical equipment and communication services) and user industries of IT , Japan's level is not so low compared to the United States in producing industries of IT. However, after 1990, US user industries accumulate IT stock rapidly and there seems a growing disparity with Japan (Figure I-2-3-28).[20]

Figure I-2-3-28　The ratio of real IT assets to added value

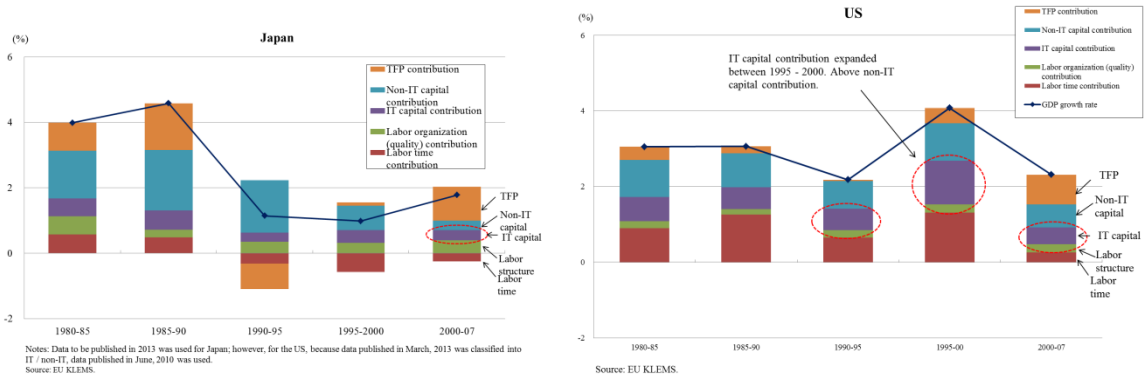


Notes: Real IT stock / added value ratio are based on 1995 criteria.
Source: EU KLEMS.

[20] The electrical equipment and post / communication industries are two industries that produce IT. Other industries are compiled user industries.

Also, when looking at contribution of IT investment to economic development, in the case of Japan, the level remains low. In the case of the United States, IT investment contribution is large and is especially contributing to economic development in the second half of the 1990s.

Figure I-2-3-29　Contribution of IT investment to GDP growth



6. Summary

As seen up to this point, it has been confirmed that research and development effects productivity improvement. Not only research and development, but in a wider sense including software, design, brand, human capital, organization, etc. intangible asset accumulation also plays an important role in productivity. In case of Japan, research and development investment is high even internationally; however, brand, staff, organization investment is at a low standard.

Looking at Japanese company innovation initiatives and the current state from the company survey, differences are seen between innovation types, and companies that implement product and process innovations are comparatively high; however, marketing and organization innovations is correspondingly weak.

Regarding research and development, Japan's level is internationally high and, as a result of that achievement, is proud to lead the world in patent levels. By industry, active research and development is performed in the chemical, electrical machine, and transport machine industries. However, after the Lehman Shock, Japan’s research and development initiatives decreased and China, Korea, were catching up. Japanese companies spend a lot of money on short-term research and development. There is also a lot of research and development overlap with rival companies and research and development ineffectiveness is also indicated.

When looking at cooperation with external institutions, top-caliber staff that play a role in innovation and active intake of technology benefits productivity improvement; however, within innovation initiatives, the ratio of Japanese companies that cooperated with overseas external institutions is low. Also, the ratio of companies that utilize foreign national executives and achieved innovation is high; however, the number of technically skilled foreign nationals newly entering Japan has not recovered to the pre-Lehman Shock level.

Furthermore, Japanese investments relating to information transmission technology (IT) is low.

Specifically, in the second half of the 1990s, within user industries of IT in the United States, IT investments greatly expanded and the disparity with Japan widened.

In summarizing this, marketing including brand strategy and organizational reformation, development of human resources, recovery of declining research and development initiatives, active acceptance of high-caliber human resources and technologies from overseas are important for productivity improvement through innovation.

Section 4 Role of direct inward investment in productivity improvement

As showed in the regression analysis in Section 1, foreign affiliates tend to have higher productivity levels and increase rates than Japanese companies (Figure 2-4-1). OECD (2007) indicates that, as the potential macroeconomic benefits of direct inward investment, "Given the appropriate host-country policies and a basic level of development, a preponderance of studies shows that FDI triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment and enhances enterprise development. Through these mechanisms, FDI promotes economic growth by raising total factor productivity (herein referred to as "TFP"). Even if FDI has little influence on aggregate employment, it can influence the composition of employment such as by increasing the demand for skilled labor, technicians or scientists.[21] In this way, inward direct investment is expected to increase the productivity of overall economy having the emergence of foreign affiliates with high productivity and increase the productivity of Japanese companies transferring technologies and know-how from foreign affiliates.

Even from other experimental studies, productivity levels of foreign affiliates in japan are comparatively high compared to Japanese companies, and overseas company acceptance increasing the productivity of domestic host companies is showed (Figure I-2-4-2 and I-2-4-3) and is an important issue from the perspective of inward direct investment increasing Japanese productivity.[22] However, even when looked at internationally, Japanese inward direct investment stock (GDP ratio) is at a low level (Figure I-2-4-4 and I-2-4-5). Also, foreign affiliate research and development cost ratio

[21] Analysis of employment trends of foreign companies in Japan, Hayakawa, Matsuura and Kiyota (2005) for example, indicates that "foreign companies (non-manufacturing) may have supported Japanese employment (foreign company emergence is an advantage from an employment perspective)".

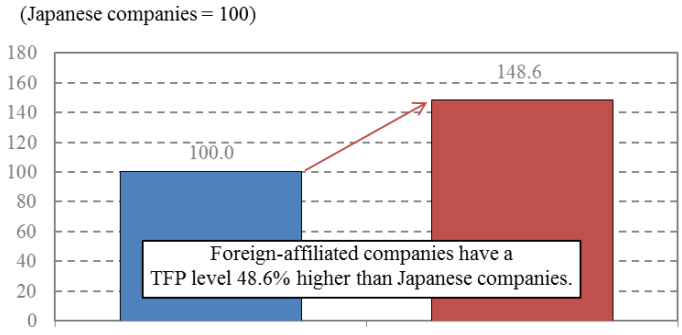
[22] Regarding the former, as showed in I-2-4-2 and I-2-4-3, Kwon and Kim (2010) indicates using Japanese manufacturing and non-manufacturing data that "foreign affiliates have high TFP levels compared to domestic companies". Also, Fukao and Amano (2004) indicate using Japanese manufacturing data that "foreign affiliates have a TFP level around 10% higher compared to domestic companies, and recurring profit margin, wage level and labor productivity are also high".

Regarding the latter, Kwon, Fukao and Ito (2006), using Japanese manufacturing company data, analyzed performance changes before and after acquisition of domestic company by foreign company. The results indicated that "within companies that were acquired with foreign capital, improvements in TFP level as well as recurring profit margin were seen. Furthermore, even when comparing the M&A of domestic companies, productivity and profit rate improvement for companies that were acquired with foreign capital are wider and faster". Also, Fukao, Ito, Kwon and Takizawa (2008), using Japanese manufacturing and non-manufacturing data, showed that within the non-manufacturing industry, TFP growth rate of domestic companies improved after acquisition with foreign capital.

that makes up domestic research and development cost is also low when looked at internationally, and this can be considered the result of a low rate of foreign affiliate acceptance in Japan (I-2-4-6).

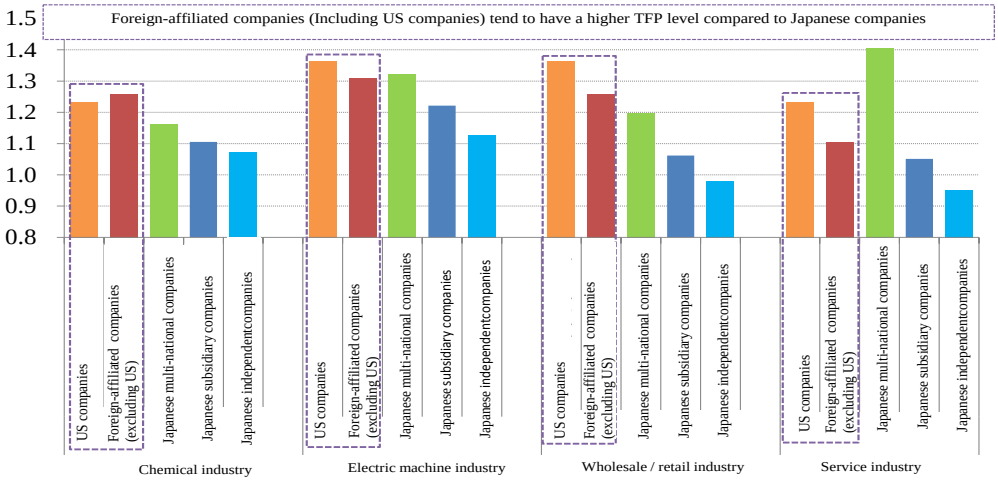
Below, the current state of inward direct investment is verified centering on trends for foreign affiliates in Japan and Japanese investment climate evaluation (refer to "Promoting domestic direct investment" in Section 2 Chapter 4 of Part 2 for details regarding measures to attract investment in Japan).

Figure I-2-4-1 TFP levels of foreign affiliates and Japanese companies



Notes: Foreign-affiliated companies are companies with over 50% foreign capital. Subsidiaries are removed from Japanese companies (Companies with a domestic parent company independently injecting 50% or more capital).
Source: METI, "Basic Survey of Japanese Business Structure and Activities".

Figure I-2-4-2 Average company TFP level value by industry (by ownership structure) (2000 to 2005)



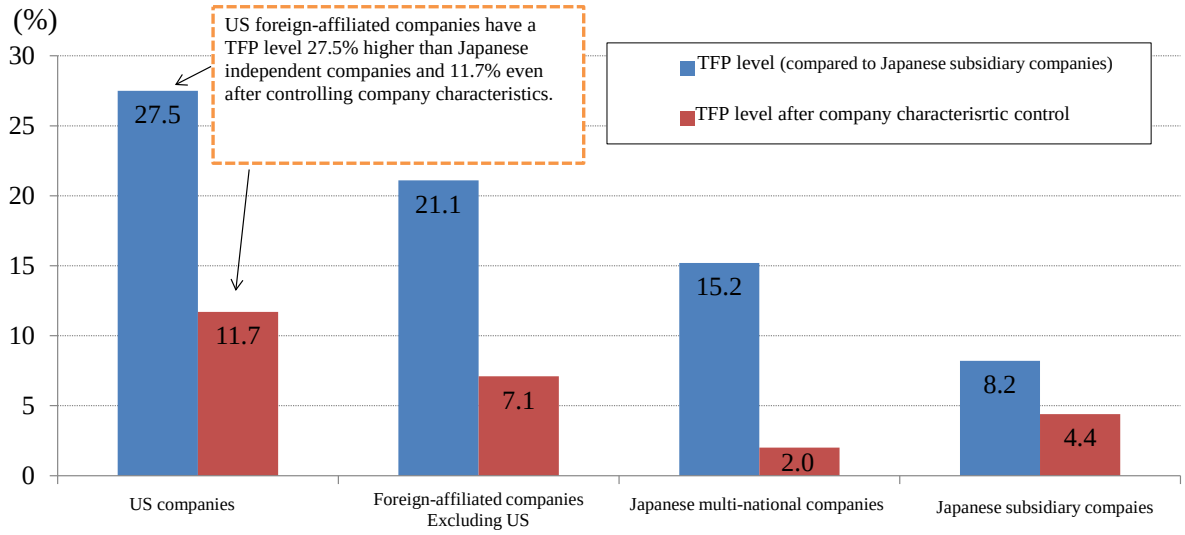
Notes: 1. Japanese company ownership structure classifications are displayed below.
2. Source data is logarithm natural. Actual numbers are displayed here.
Source: Kwon and Kim (2010), "SHOYUKOUZOU TO TFP: NIHON KIGYO DATA NI MOTOZUKU JISSHO BUNSEKI",RIETI Discussion Paper Series 10-J-050.

Figure I-2-4-2 Notes 1. Company ownership structure classification

1. US-affiliated companies: Independent US parent company injecting 50% or more capital.
2. Foreign-affiliated companies: Independent overseas parent company other than the United States injecting 50% or more capital.
3. Japanese multi-national companies: (Other than 1, 2, and, 4) Manufacturing industry companies that conduct exporting while holding a stake of over 1 billion yen in a foreign company, and non-manufacturing industry companies that conduct exporting while holding a stake of over 1 billion yen in a foreign company.
4. Japanese subsidiaries: Independent domestic parent company injecting 50% or more capital.
5. Japanese independent companies: (Other than 1 to 4)

* Using Ministry of Economy, Trade and Industry, *Basic Survey of Japanese Business Structure and Activities* (2000 - 2005) company level data (applicable to companies with 50 or more employees and capital or stake of 300 million yen of more).

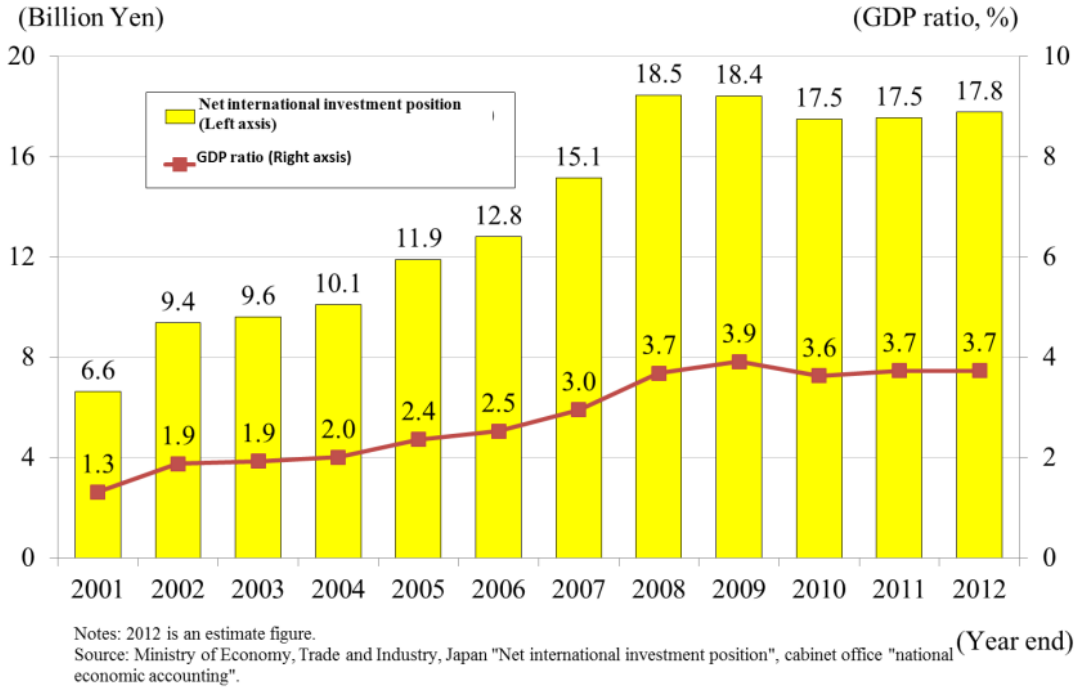
Figure I-2-4-3　Company (by ownership structure) TFP level comparison from regression analysis



Notes: 1. Company ownership structure classifications are the same as in the previous figure.
2. As explained variables, a year dummy and industry dummy was added to a company dummy by ownership structure based on a Japanese independent industry dummy and regression analysis was performed. In order to control company characteristics, variables which display company size, human capital, technology level, etc. were used.
3. Applicable to 2000-2005. Applicable industry types are chemical, Electric equipment, wholesale/retail, and service industries.

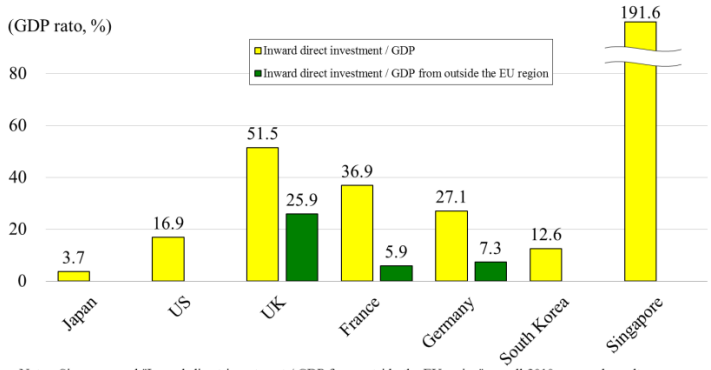
Source: Kwon and Kim (2010), "SHOYUKOUZOU TO TFP: NIHON KIGYO DATA NI MOTOZUKU JISSHO BUNSEKI",RIETI Discussion Paper Series 10-J-050.

Figure I-2-4-4　Trend of direct investment to Japan



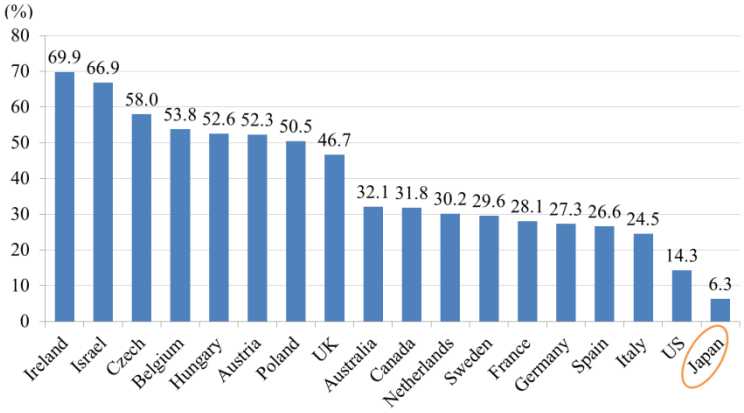
Notes: 2012 is an estimate figure.
Source: Ministry of Economy, Trade and Industry, Japan "Net international investment position", cabinet office "national economic accounting".

Figure I-2-4-5　Direct investment stocks to Japan GDP ratio of each Major country (End of 2011)



Notes: Singapore and "Inward direct investment / GDP from outside the EU region" are all 2010 year-end results.
Source: Each data below.
<FDI(Book amount)> Japan: Ministry of Economy, Trade and Industry, Japan "Net international investment position statistics", UK/Germany/South Korea/Singapore: IMF "International Financial Statistics", US: Department of Commerce, France: Bank of France "The French Balance of payments and international investment position" IMF "International Financial Statistics"。

Figure I-2-4-6　Foreign affiliate research and development cost ratio (2009)



Notes: Provisional value included.
Source: OECD "Main Science and Technology Indicaors".

1. Foreign affiliate trends in Japan

Here, using the 2011 Survey of Trends in Business Activities of Foreign Affiliates (2010 results), ratio of current profit to sales as well as ratio of research and development expenses to sales within Japan and hiring outlook/ future business expansion are confirmed.[23]

The survey includes a total of 2,965 companies and the structure is showed by home country and industry type in Figure I-2-4-7.[24] When looking at the advancement status of regional headquarter within the Asia / Oceania region, 152 bases were established in Japan, and this falls short of the 350 bases in China, 343 bases in Singapore, and 286 bases in Hong Kong that were established by the parent companies of the companies that replied (Figure I-2-4-8).[25][26]

(1) [23] This survey covers companies that will satisfy the following conditions by the end of March of year 2011, or have satisfied the following conditions during year 2010. The survey was conducted in August, 2011 with a reply rate of 62.8%. A company in which more than one third of shares or holdings is owned by a foreign investor.
(2) A company funded by a domestic company (in Japan) in which more than ones third of shares or holdings is owned by foreign investors, in which the total ratio of the foreign investors' direct and indirect investment is more than ones third of the shares or holdings of the company concerned..
(3) Companies that fall under (1) or (2) above, in which the principal foreign investor's direct investment ratio is more than 10%.

[24] Not including the finance / insurance industry and real estate industry.

[25] Including the finance / insurance industry and real estate industry.

[26] Within the 2011 Ministry of Economy, Trade and Industry Contract Survey "OUBEI ASIA NO GAIKOKUKIGYOU NO TAINICHI TOUSHI KANSHINDO CHOSA" that targeted overseas company Asian investment representatives that do not advance into Japan, "Attractive countries as regional headquarters in Asia" are China, Singapore, Hong Kong and Japan in order.

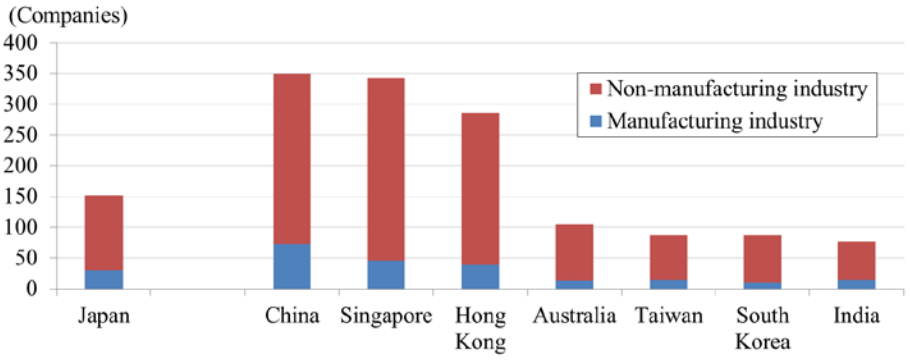
Figure I-2-4-7　Foreign affiliates by home country and industry structure ratio

（Units: Company, %, % point）

	2010 Total number of companies	Composition ratio					
		2006	2007	2008	2009	2010	Difference with prev. year
World total / All industries	2,965	100	100	100	100	100	－
US foreign capital companies	861	35.4	32.0	30.7	30.2	29.0	▲ 1.2
Asian foreign capital companies	640	16.8	20.8	21.0	20.8	21.6	0.8
China	222	6.1	7.0	7.4	7.6	7.5	▲ 0.1
European foreign capital companies	1,281	42.6	41.6	42.5	43.2	43.2	0.0
Other	183	5.2	5.7	5.7	5.8	6.2	0.4
Manufacturing industry	513	25.2	22.4	19.0	18.1	17.3	▲ 0.8
Non-manufacturing indusrty	2,452	74.8	77.6	81.0	81.9	82.7	0.8

Notes: Not including finance / insurance industries and real estate indudtry.
Source: Ministry of Economy, Trade and Industry, "Japan FY2011 Survey of Trends in Business Activities of Foreign Affiliates".

Figure I-2-4-8　Number of regional headquarters in the Asia and Oceania region (Including finance / insurance industry, real estate industry)



Notes: 1. (Excluding Japan) Asian and Oceanic regional headquarters other than the target companies of the survey established by overseas subsidiary companies are totaled by country / region.
Source:
2. The number of regional headquarters is a gross total due to multiple replies.
For 1 overseas subsidiary, in case there are replies from both the subsidiary and sub-subsidiary companies, overlapping is deleted.
Source: Ministry of Economy, Trade and Industry, " FY2011 Survey of Trends in Business Activities of Foreign Affiliates (2010 results)".

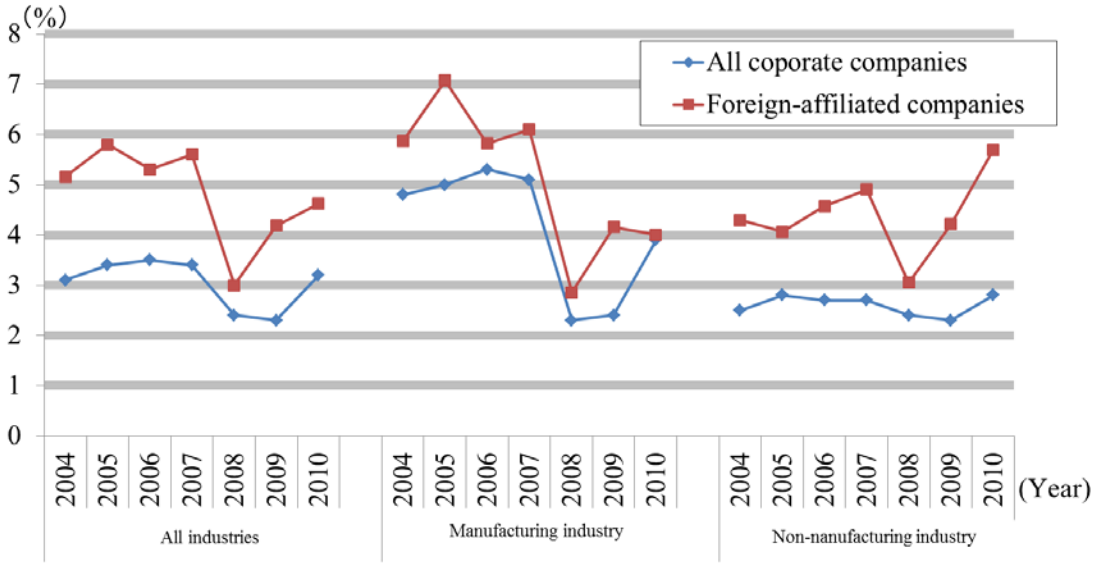
Here, foreign affiliates' ratio of current profit to sales and ratio of research and development expenses to sales levels are compared to all Japanese corporate company levels. First, when looking at ratio of current profit to sales that shows the height of the profitability, within the entire industry, foreign affiliates tend to be consistently above all corporate companies (Figure I-2-4-9).[27] Specifically, in recent years, the expansion of foreign affiliates within the non-manufacturing industry is large, and is double the 2010 level for all corporate companies. Furthermore, when ratio of current profit to sales trends are looked at by home country, western companies and especially US-affiliated companies tend to have a high level.

Next, when looking at ratio of research and development expenses to sales that shows research and development expenses regarding sales spending weight, foreign affiliates tend to have a

[27] All corporate companies use treasury "HOJIN KIGYO TOKEI CHOSA" data, and it is important to be careful of data source discrepancies.

decreasing trend within the manufacturing industry; however, non-manufacturing trends are increasing since 2006. (Figure I-2-4-11). When this movement is compared to all Japanese corporate companies[28], the non-manufacturing level is almost unchanged between 2006 and 2010 (1.1% in 2006 and 1.2% in 2010) and foreign affiliates' level 1.5 times higher (Same 1.2% and same 1.8%). Given the fact that the productivity level of the Japanese non-manufacturing industry is relatively low compared to the United States and the R&D mentioned in the previous section improves productivity, there is a possibility that foreign affiliates with increasing trend of research and development expenses will contribute to the increase of productivity of non-manufacturing industry in Japan.[29]

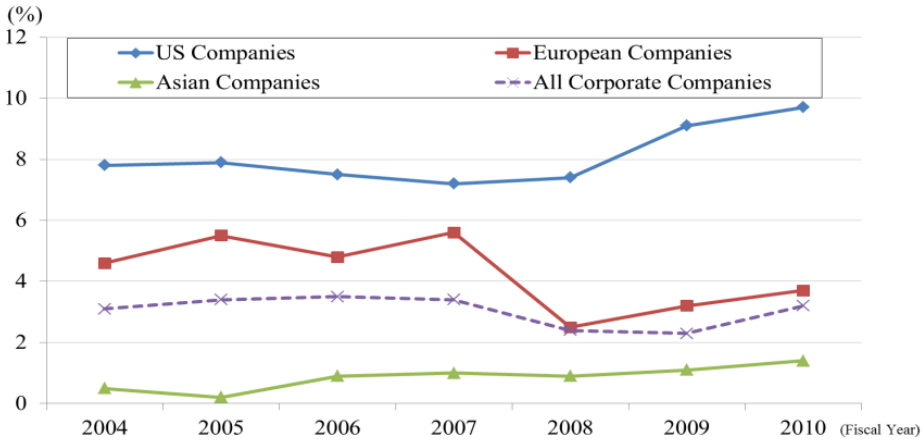
Figure I-2-4-9 Ratio of current profit to sales trends for foreign affiliates and all corporate companies



Notes: 1. Recurring profit margin = Recurring profit / Sales × 100.
2. All industries and non-manufacturing industries do not include finance / insurance (Foreign-affiliated companies include real estate).
Source: All corporate: Ministry of Finance "HOJINKIGYOTOKEICHIYOSA", Foreign capital: Ministry of Economy, Trade and Industry, Japan "Survey of Trends in business Activities of Foreign Affiliates".

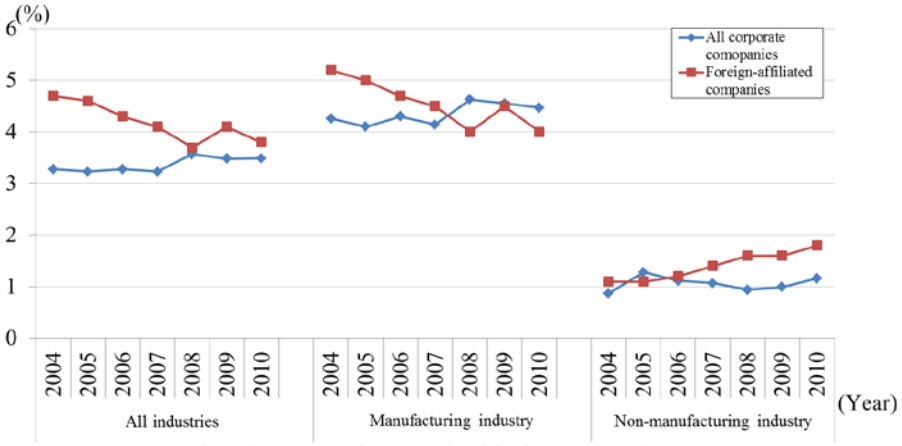
[28] All corporate companies use METI "Basic Survey of Japanese Business Structure and Activities" data, and it is important to be careful of data source discrepancies.
[29] Refer to Section 3 Chapter1 of Part 1.

Figure I-2-4-10 Ratio of current profit to sales trends for foreign affiliates and all corporate companies (by home country and all industries)



Notes: Not including the finance / insurance industry and real estate industry.
Source: Foreign companies: Ministry of Economy, Trade and Industry "2011 foreign companies trend survey (2010 results)". Original source of all corporate companies is from Treasury "HOUJIN KIGYOU TOKEI CHOSA".

Figure I-2-4-11 Sales research and development trends for foreign affiliates and all corporate companies



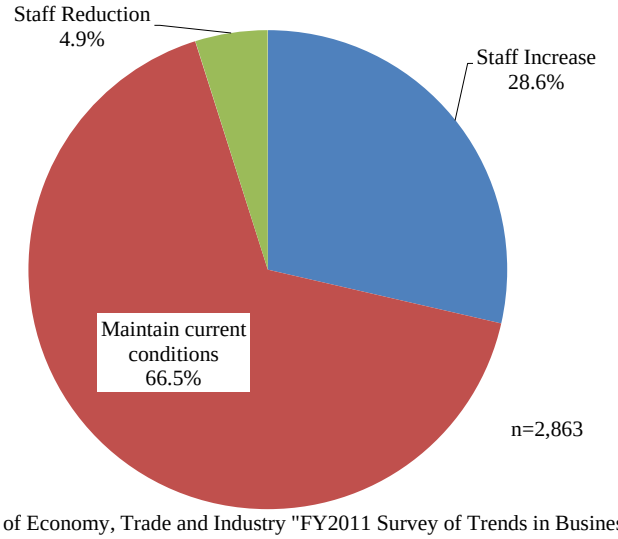
Notes: 1.Sales research and development ratio = Research and development cost / salesa × 100.
2.All corporate company data is calculated from the manufacturing industry.
3. Foreign capital company non-manufacturing industries do not include finance / insurance and real estate.

Source: All corporate company: Ministry of Economy, Trade and Industry, Japan "Basic Survey of Business and Activity", Foreign capital: Same "Basic Survey of Business and Activity".

Lastly, foreign affiliates' hiring outlook and future business expansion in Japan are confirmed.[30] One year hiring outlook includes "staff increase" 28.6%, "maintain the current state" 66.5%, which makes up a total of 95% of companies (Figure I-2-4-12). One year business expansion outlook includes "expansion" 49.1%, "maintain the current state" 48.0%, which makes up a total of 97% of companies (Figure I-2-4-13).

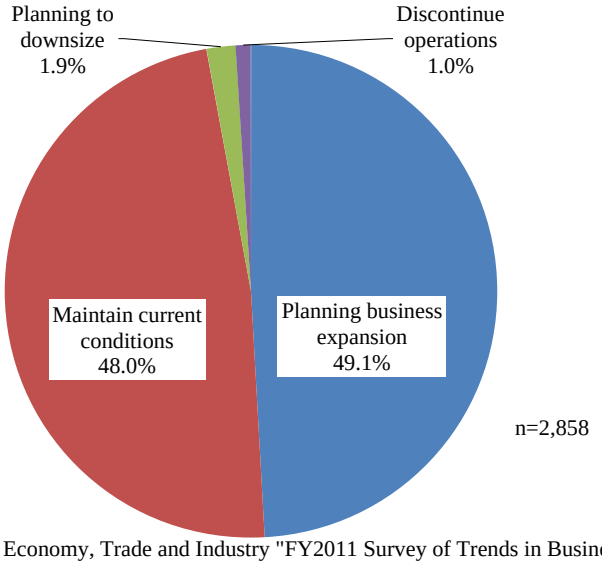
[30] A survey was conducted in August, 2011, and the effects of the Great East Japan Earthquake are considered.

Figure I-2-4-12 Foreign-affiliated company: 1 year future hiring outlook



Source: Ministry of Economy, Trade and Industry "FY2011 Survey of Trends in Business Activities of Foreign Affiliates"

Figure I-2-4-13 Foreign-affiliated company: Future business expansion in Japan



Source: Ministry of Economy, Trade and Industry "FY2011 Survey of Trends in Business Activities of Foreign Affiliates"

As displayed above, Japanese foreign affiliates tend to have higher ratio of current profit to sales compared to all corporate companies, and within the non-manufacturing industry, foreign affiliates' ratio of research and development expenses to sales tend to increase. Also, regarding hiring outlook and future business expansion in Japan, over 95% of foreign affiliates expect to maintain or exceed the current state in the future, and it is expected that this foreign affiliates trend will tie to Japan's productivity improvement.

2. Japan's investment environment

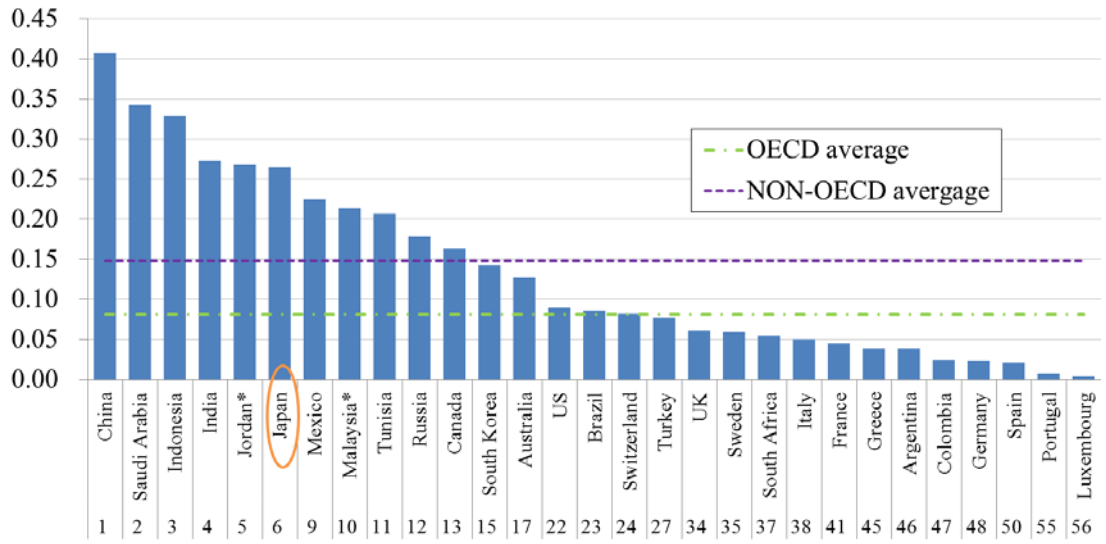
As mentioned before, Japan's inward direct investment (GDP ratio) is transitioning at a low level

when looked at internationally (Figure I-2-4-5). How is Japan's investment environment evaluated? Looking at the OECD FDI restrictiveness index obtained by indexation of the four types of restrictive fields[31] of direct investment, Japan ranks 6th out of 56 countries (the more restrictive the higher the ranking) (Figure I-2-4-14).[32] Also, in World Bank's "Doing Business 2013" [33] where business environments from ten restrictive fields are evaluated, Japan ranks 24th out of 185 countries, which is relatively high (the easier to do business, the higher the ranking). However, evaluation regarding new business entry was low, ranking 114th in the individual item of "business establishment".

According to the "FY2011 Survey of Trends in Business Activities of Foreign Affiliates" (FY2010 results), the top inhibiting factors for a foreign affiliate in expanding business in Japan are, "high business cost", "reclusive market", "complicated administrative procedures", and "strict regulations and permissions" (Figure I-2-4-16). On the other hand, the attractions of Japan's investment environment are "high income level" and "extensive infrastructure" (Figure I-2-4-17).

According to IMF data, the FDI income ratio of Japan was declining in 2008, but has recovered in 2011, which is not significantly low compared to other advanced countries (Figure I-2-4-18).

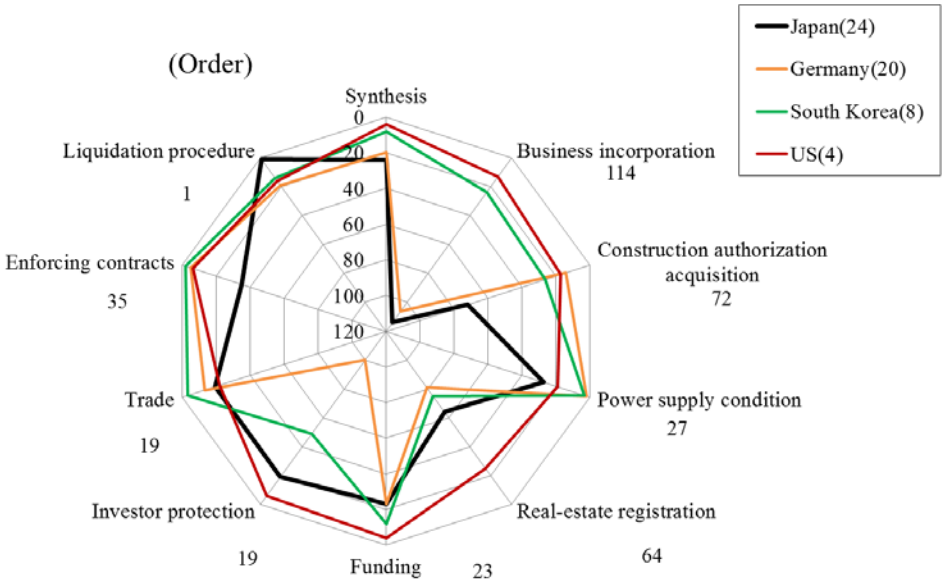
Figure I-2-4-14 OECD FDI limited exponent international comparison



Notes: 1. Closer to 1 is restrictive and closer to 0 is open.
2. overall ranking is displayed under the country name.
Source: OECD "2012 FDI regulatory restrictiveness index by country".

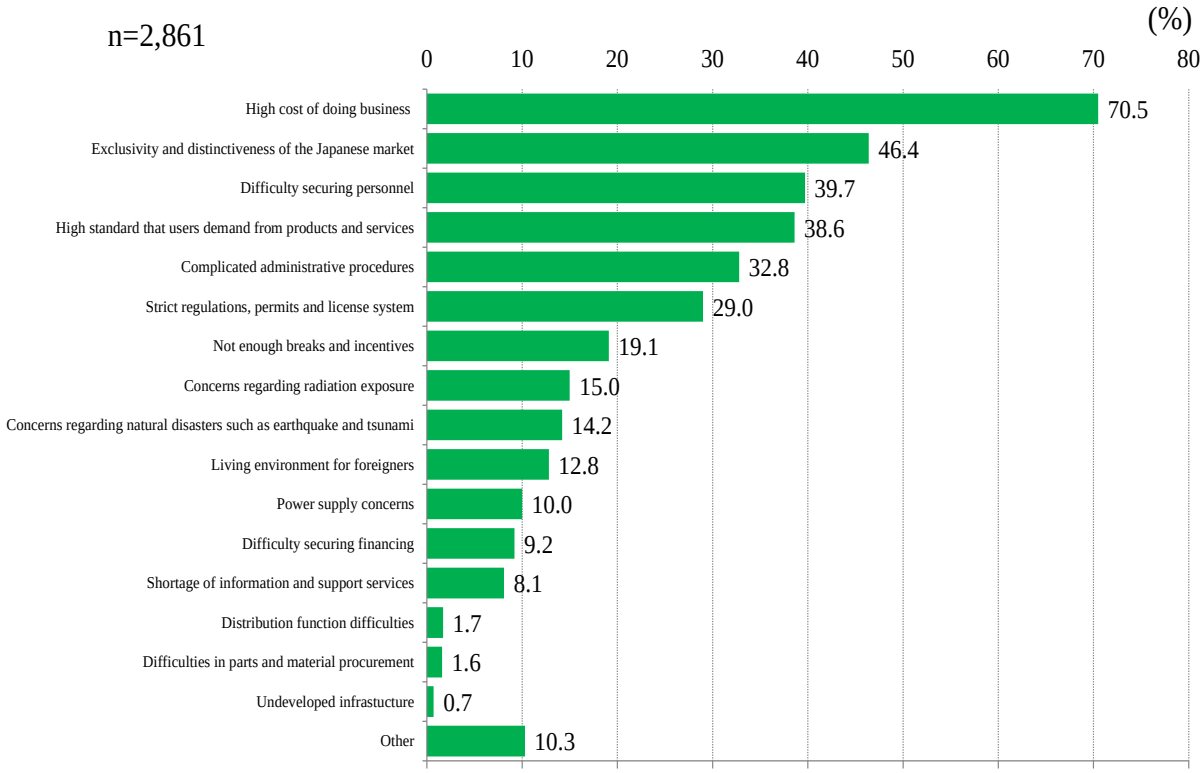
[31] Four types including limits on share holding, investment screening / approval requirement, restrictions on core executives, and other (limited acquisition on land, etc.). Internationally, a country with higher restrictiveness index tends to have a lower FDI stocks (GDP ratio) (Kalinova, Palerm and Thomsen (2010)).
[32] Number one within OECD countries (most restrictive).
[33] Published in October 2012. Data of June, 2012 is used.

Figure I-2-4-15 Business environment international comparison based on "World Bank Doing Business 2013"



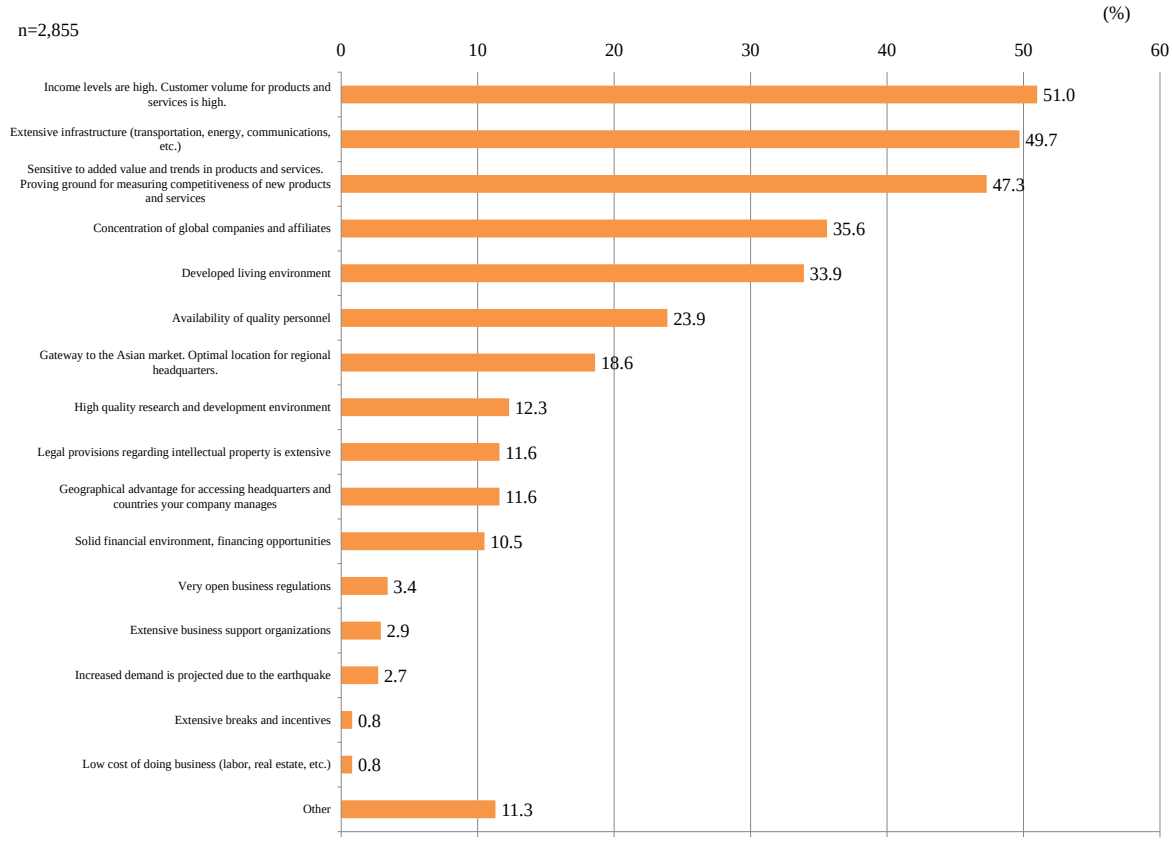
Notes: The number next to each country shows overall ranking,the figures below each item shows the Japan's ranking.
Source: World bank "Doing Business 2013".

Figure I-2-4-16 Inhibiting factors regarding foreign affiliates expanding business in Japan (Multiple answers: up to the top five)



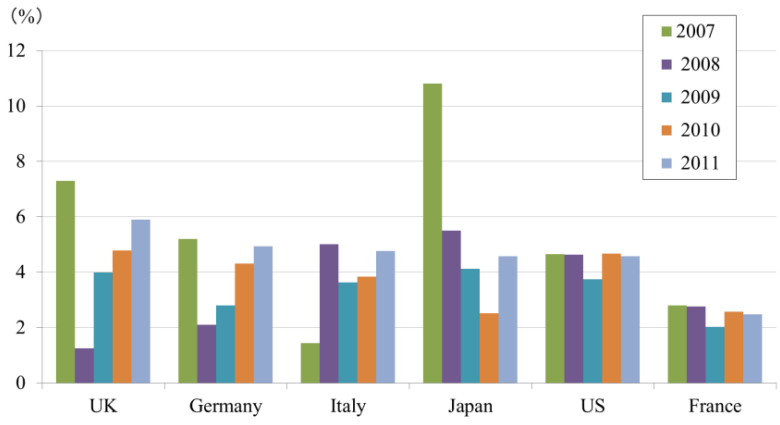
Source: Ministry of Economy, Trade and Industry "FY2011 Survey of Trends in Business Activities of Foreign Affiliates"

Figure I-2-4-17 Attractiveness regarding foreign affiliates expanding business in Japan (Multiple answers: up to the top five)



Source: Ministry of Economy, Trade and Industry "FY2011 Survey of Trends in Business Activities of Foreign Affiliates"

Figure I-2-4-18 Inward direct investment return rate of the major advanced countries



Notes: Inward diect investment profit = Direct investment profit Payment) ÷ Inward direct investment balance × 100.
Source: IMF, CEIC Database.

Each government emphasizes on promoting innovation related investments by providing preferential treatment to foreign affiliates in order to grow and improve competitiveness. For example, in South Korea, corporate tax is reduced / exempted for foreign investors in businesses involving high level technology to increase international competitiveness of domestic industries and industrial

support services. Also, in the United Kingdom, high added value fields such as research and development and field in which the United Kingdom has competitive strength (life science, energy, information-communication technology, etc.) are set as incentive businesses for foreign investment, which are entitled to R&D deduction as with other British companies. Furthermore, Singapore is passionate about attracting investment. Singapore aims to establish a knowledge-integrated type economic structure and encourages investment in advanced technology, high added value industries, service that reinforces business hub functions. From the taxable year of 2010, corporate tax rate was reduced from 18% to 17%, and a strategy of a maximum of 15 years of corporate tax exemption for technological innovation companies was set out.[34] In addition, the Singapore government promotes initiatives to join people and corporates. One of the initiatives is introduced below.

Singapore government initiatives: Singapore International Water Week

The Singapore government claims that Singapore is the development base for advanced water related technology, and aspires to attain a position as a "global hydro-hub" that exports the newly developed technology. In 2006, the "Environment, Water Industry (EWI) Committee" was established in the Ministry of the Environment and Water Resources. EWI's goal is to attract large water treatment companies that will serve as R&D, engineering and manufacturing headquarters, and to promote technology to overseas growing markets.[35] Based on these activities, Singapore has been holding an annual "Singapore international water week" since 2008. During the water week of July 2012, the largest water related international fair in Asia, the "Water Expo" and business forums were held, and many agreements and memorandums concerning R&D investment / cooperation were concluded (Figure I-2-4-19).

Figure I-2-4-19 Singapore international water week 2012 Overview

Term:	July 1st to 5th 2012
Location:	Singapore
Organizer:	Singapore International Water Week Pte Ltd.
Theme:	Water Solutions for Liveable and Sustainable Cities
Number of exhibitors:	Approximately 750 companies / groups
Number of visitors	104 countries / regions, 18,554 people
Main details:	The Water Leaders Summit, Water Convention, Water Expo, Business Forum, etc.
Result:	13.6 billion Singapore dollars (856.8 billion yen) worth of business as well as research and development contracts / memorandums were established.

Source: Singapore International Water Week Pte Ltd.

Japan will engage in a radical reform of the Special Zone System and a reinforcement of foreign affiliate attraction / support system by the government for the summarized growth strategy (Japan Revitalization Strategy) in order to promote inward direct investment such as attracting global

[34] The economic incentives of each country are from the investment system (incentives on foreign investment) on the JETRO website (website viewed on April 9, 2013).

[35] From the Singapore National Economic and Development Authority (EDB) HP Environment and Water, Factsheet. http://www.edb.gov.sg/content/edb/en/industries/industries/environment-and-water.html.

companies for high added value bases (regional headquarters, R&D base). In the future, as a result of these measures, inward direct investment will increase a level and a connection to productivity improvement in Japan is hoped for.