Summary of the White Paper on Manufacturing Industries (Monodzukuri)
2009

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Ministry of Economy, Trade and Industry
Ministry of Health, Labour and Welfare
Ministry of Education, Culture, Sports, Science and Technology
<Table of Contents>

Part 1 Current State of Manufacturing Infrastructure Technology and Related Issues

Chapter 1: Status of Manufacturing Industries in Japan under the Worldwide Recession [p. 3]
Section 1 Status of manufacturing industries in Japan under the worldwide recession
Section 2 Current state of employment/labor of manufacturing workers

Chapter 2: Challenges and Prospects Facing Japan’s Monodzukuri Industries [p. 12]
- Strategic Move for the Growth of Japan’s Monodzukuri Industries -
  Section 1 Japan’s monodzukuri industries turn expanding limitations on resources and environmental constraints into a strength and continue to grow
  Section 2 Japan’s monodzukuri industries strive to enhance the level of manufacturing (monodzukuri) capability
  Section 3 Restructuring of global supply chains and merchandise strategy under worldwide recession
  Section 4 Strategic moves for the growth of manufacturing industries/approaches to and challenges for the development of prospective areas

Chapter 3: Strengthening the Manufacturing Base by Developing Human Resources as the Core for Monodzukuri [p. 39]
Section 1 Securing and training of core human resources in manufacturing industries
Section 2 Skill development measures related to “monodzukuri”

Chapter 4: Research and Development and Promotion of Study to Support the Basis of Monodzukuri [p. 50]
Section 1 Situation of R&D and promotion of study to support the basis of monodzukuri
Section 2 Promotion of regional R&D for strengthening of industrial capabilities
Section 3 Promotion of R&D to enhance industrial capabilities
Section 4 Development of monodzukuri human resources through school educational programs

Part 2 Measures and Policies Implemented in Fiscal 2008 Relating to the Promotion of Manufacturing Infrastructure Technology [p. 64]
The Japanese economy has been showing negative growth as a result of a sharp drop in exports caused by a slump in overseas demand. With consumer sentiment depressed, a slump in personal consumption may prolong the weakness of the Japanese economy.
(Comparison with prior recessions (ii) Extent of the impact)

The impact of the economic downturn has varied from industry to industry in the prior recessions, whereas the impact has been felt similarly by a wide range of industries in the current recession because of a steep decline in overseas demand and a slump in domestic demand.

[Chart 1-5 Changes in Indices of Industrial Production by Industry; Comparison with Prior Recessions]
(Trends after the peak of each economic cycle)

Remarks: In all of the above charts, the production levels have been indexed with the level of 2005 as 100. The horizontal axis indicates the number of months past the peak of the economic cycle.

The key in the right-hand chart is also applicable to the other two charts.

Source: METI Indices of Industrial Production

Year-on-year changes in the volume of automobile exports indicate that in prior recessions, the Japanese auto industry maintained and expanded export volumes through a shift in export destination regions. However, exports to almost all regions have declined since December 2008, suggesting that the current recession has caused a widespread reduction in demand compared with prior recessions.

[Chart 1-6 Changes in Contribution to Auto Exports by Export Destination Region (Annual Figures)]

Source: Statistics compiled by the Japan Automobile Manufacturers Association,Inc.

[Chart 1-7 Changes in the Contribution to Auto Exports by Export Destination Region (Monthly Figures)]

Source: Statistics compiled by the Japan Automobile Manufacturers Association,Inc.
(Comparison with prior recessions (iii) Response by companies)

Comparison with production, shipments, and inventories of automobiles in prior recessions shows that the speed of production adjustments in the current recession is different from that seen in the recession that followed the collapse of the bubble economy (after February 1991), as Japanese automakers have been curbing a rise in inventories by quickly implementing production adjustments in response to a steep drop in demand.

[Chart 1-8 Changes in Production, Shipments, and Inventories of Automobiles; Comparison with Prior Recessions] (Trends after the peak of the economic cycle)

[After February 1991] [After October 2007]

Remarks: Inventory levels have been indexed with the level of 2005 as 100. The horizontal axis indicates the number of months past the peak of the economic cycle.
Source: METI “Current Production Statistics Survey” and METI “Indices of Industrial Production”

(Impact of fluctuations in foreign exchange rates)

The trend in the exchange rates between the yen and other currencies including the U.S. dollar, the euro, and the South Korean won since 2000 shows that the yen has rapidly appreciated against the won in particular since September 2008. The won’s rapid depreciation was triggered by the withdrawal of funds from the South Korean financial market by foreign investors and continued against the background of South Korean companies’ moves to have dollar funds on hand as a result of the deterioration of the real economy. Such volatility in the exchange rates, which we have not experienced in the prior recessions, has significantly affected the export and import environment for Japan’s manufacturing industries.

[Chart 1-9 Changes in the Yen’s Exchange Rates Against the U.S. Dollar, the Euro, and the South Korean Won (Monthly Basis)]

[Chart 1-10 Trend in the Yen’s Exchange Rates Against the U.S. Dollar, the Euro, and the South Korean Won (Weekly Basis)]

Remarks: The exchanges rate has been indexed with the monthly average rate of each currency per yen in January 2000 as 100.
Source: Economic statistics compiled by Bloomberg

Remarks: The exchanges rate has been indexed with the weekly average rate of each currency per yen in the first week of January 2007 as 100.
Source: Economic statistics compiled by Bloomberg
In terms of real GDP (on an annualized basis), the Japanese economy contracted 12.1% in the October-December quarter, a worse performance than the 6.3% contraction posted by the U.S. economy, where the worldwide recession originated. This is probably attributable to differences in the industrial structure between Japan and the United States, such as Japan’s heavy dependence on the auto and electronics industries, which have slumped particularly sharply, and the high ratio of exports to the total demand by these industries in Japan. In addition, the impact of the recession has been amplified by a sharp slump in consumer sentiment as well as by the widespread effects on upstream industries of the rapid production and inventory adjustments implemented in response to the recession.

**Differences in the industrial structure**

- **Heavy dependence on specific industries**
  - Japan depends heavily on the electric machinery, transportation machinery, and general machinery industries. (These three industries account for about 50% of Japan’s industrial production, compared with a ratio of 20% for the United States.)

- **Heavy dependence on products susceptible to economic cycles, such as luxury consumer goods and production equipment**
  - Purchases of luxury consumer goods such as automobiles, which are Japan’s major export item, decrease during an economic downturn, and production equipment such as industrial machinery and prime movers are liable to be significantly affected by cuts and postponements of capital investment.

- **High ratio of domestically procured parts, materials and production equipment**
  - As the ratio of domestically procured parts and materials is high in Japan, fluctuations in the production of final goods have a widespread effect on Japanese industry.

**Ratio of exports to total demand**

- The ratio of exports to total demand in the three major industries is higher in Japan than in the United States. The ratio of exports in Japan is on an uptrend against the background of growing demand from emerging countries and resource-rich countries as well as the yen’s depreciation.

**Rapid production and inventory adjustments**

- A slump in consumer sentiment due to job reductions and salary cuts
- The yen’s appreciation that came in tandem with the above

**High ratio of domestically procured parts, materials and production equipment**

- As the ratio of domestically procured parts and materials is high in Japan, fluctuations in the production of final goods have a widespread effect on Japanese industry.
(Deterioration of the cash position and implementation of support measures)

The diffusion index of the cash position has rapidly deteriorated since 2008, with small and medium enterprises experiencing substantial negative figures. In consideration of these severe business conditions, the Japanese government has been adopting a variety of supportive measures to improve the cash position.

1. Supportive measures to improve the cash position for small and medium enterprises (SMEs)
   - Safety net guaranteed program: The number of designated business types increased to 760.
   - Safety net loan program: The maximum loan amount and the scope of allowable purposes of fund use were expanded and the loan maturity period was extended.

2. Supportive measures to improve the cash position for middle-ranking and large enterprises
   - Anti-crisis response measures: Development Bank of Japan and Shoko Chukin Bank provide low-interest loans to middle-ranking and large enterprises. Japan Finance Corporation purchases commercial papers issued by companies.
   - Provision of financing support for companies recognized as eligible for support under the Industrial Revitalization Act.

3. Supportive measures to improve the cash position for Japanese companies operating abroad
   - Expansion of financing support by JBIC for overseas subsidiaries of Japanese companies
   - Expansion of financing support by NEXI (Nippon Export and Investment Insurance) for overseas subsidiaries of Japanese companies

In the face of the severe fundamental financial outlook, manufacturing companies started reviewing their capital investment by postponing and reducing the size of investment while focusing investment on areas which they expect to grow in the future. While it will be essential that they reduce costs and improve efficiency further in the short term to cope with the worldwide recession, it is desirable that in the medium to long term, they pursue the creation of added-value by concentrating investment on specific areas (the environment, new energy, etc.).

<table>
<thead>
<tr>
<th>Year-on-Year Changes in Capital Investment by the Manufacturing Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Chart 1-16 Year-on-Year Changes in Capital Investment by the Manufacturing Industry]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intensive Investment in Specific Areas (Solar Cells)</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Table 1-17 Intensive Investment in Specific Areas (Solar Cells)]</td>
</tr>
</tbody>
</table>

Remarks: The production volumes indicated in the above table are annual volumes. Source: Survey by METI
Section 2 Current state of employment/labor of manufacturing workers

<Condition of the labor market>

- The number of people employed in the manufacturing industry has been on a long-term downtrend. Although the number began to recover somewhat in the second quarter of 2005, it has been declining again since the latter half of 2007.
- The unemployment rate increased from 3.6% in July 2007 to 4.8% in March 2009.
- The number of new job offers has been on a downtrend, with offers in the manufacturing industry posting a particularly sharp drop.
- The effective job offer rate in the areas of manufacturing processes and labor services has declined notably since late 2008.

[Chart 1-18 Changes in the Number of Workers Employed, etc. in the Manufacturing Industry]

[Chart 1-19 Changes in the Unemployment Rate and the Number of the Unemployed]

[Chart 1-20: Changes in the Number of Job Offers in the Manufacturing Industry (October 2007 = 100)]

[Chart 1-21 Changes in the Effective Job Offer Rate]

Remarks: The above figures represent offers for permanent jobs excluding offers for new graduates but including those for part-time jobs. The figures are raw numbers.

Source: MHLW “Statistics on Job Security”
In terms of a feeling of labor excess or deficiency, the number of companies feeling an excess of labor began to exceed the number of companies feeling a deficiency of labor in the fourth quarter of 2008, and the feeling of an excess in supply has been expanding rapidly, especially in manufacturing industries.

The number of companies that adopted some form of employment adjustment increased sharply during the period between October and December 2008. The number of such companies in manufacturing industries reached half of all enterprises.

According to data collected by the Ministry of Health, Labour and Welfare, about 193,000 non-regular workers in manufacturing industries have left or will leave their jobs between October 2008 and June 2009 because of suspension of employment.

The number of people covered by the employment adjustment subsidy program has increased rapidly since around the end of 2008, standing at approximately 2.38 million people in March 2009.

### State of employment adjustments

- **All industries**
- **Manufacturing industries**


### Situation of Employment Suspension of Non-Regular Workers in Manufacturing Industries

- **Independent contractors**: 14,001
- **Contracted employees**: 48,377
- **Temporary employees**: 128,732

Total for manufacturing industries = 192,791

Remarks: 1. As voluntary hearings with enterprises are being held to the extent possible based on information obtained by Prefectural Labour Bureaus and public job security offices, all cases were not identified nor were the details of all cases assessed.
2. The above figures represent cases of suspension implemented in or planned for October 2008 to June 2009 that were assessed as of April 17, 2009.

Source: Survey by MHLW

### Situation of Receipt of Temporary Layoff Plans Related to the Employment Adjustment Subsidy Program (Preliminary)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Number of business sites</th>
<th>Number of target employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiscal 2007</td>
<td>638</td>
<td>12,940</td>
</tr>
<tr>
<td>April-November 2008</td>
<td>898</td>
<td>26,407</td>
</tr>
<tr>
<td>December 2008</td>
<td>1,783</td>
<td>138,549</td>
</tr>
<tr>
<td>January 2009</td>
<td>12,640</td>
<td>879,614</td>
</tr>
<tr>
<td>February 2009</td>
<td>30,621</td>
<td>1,865,792</td>
</tr>
<tr>
<td>March 2009</td>
<td>48,226</td>
<td>2,379,069</td>
</tr>
</tbody>
</table>

Remarks: Data for December 2008 and later include the number of temporary layoff plans received with regard to the emergency stabilization subsidy for SMEs (established on December 1, 2008)

Source: Survey by MHLW
<Measures to deal with current employment conditions>

- In the face of the severely deteriorating employment conditions, the government has implemented the following measures:
  (i) Maintaining employment
  - Relaxing the conditions and raising the rate of Employment Adjustment Subsidy, and offering an Immediate Employment Security Subsidy for SMEs.
  - Establishing an incentive program to encourage companies to reduce overtime while retaining employment (aimed at stabilizing the employment of workers under fixed-term employment contracts or dispatched workers).
  - Investigating the company practice of withdrawing employment offers to fresh graduates, taking hold of the measures taken by universities and other schools against withdrawal of employment offers, and giving full advice to business (including publishing the names of companies that have withdrawn employment offers), while implementing job placement assistance to those who were declined a job offer by enhancing the consulting function of schools and universities.
(ii) Support for the unemployed
  - Lending funds for living expenses and job-hunting activities to unemployed people who have lost their housing
  - Significantly expanding training programs for the unemployed and establishing and expanding a program to provide benefits to cover living expenses during the training period.
(iii) Job creation
  - Supporting local efforts for job creation (by setting up funds)

[Chart 1-26 Outline of the Employment Adjustment Subsidy Program]

Business operators that are forced to reduce business activity because of declines in production volume caused by economic factors, such as cyclical economic changes, are granted subsidies that cover a part of wages and other costs when the business operators temporarily lay off employees, educate and train them, or send them on loan to other companies, or when the business operators maintain employment by reducing overtime work.

<table>
<thead>
<tr>
<th>Reduction of overtime work</th>
<th>Large enterprises (employment adjustment subsidy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary layoff, Education and training, Sending workers on loan to other companies</td>
<td></td>
</tr>
<tr>
<td>The subsidy rate for the expenses related to temporary layoffs, etc. and for sending workers on loan to other companies: 2/3</td>
<td></td>
</tr>
<tr>
<td>The amount of subsidies related to education and training: ¥12,000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMEs (the Immediate Employment Security Subsidy for SMEs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The subsidy rate for the expenses related to temporary layoffs, etc. and for sending workers on loan to other companies: 4/5</td>
</tr>
<tr>
<td>The amount of subsidies related to education and training: ¥6,000</td>
</tr>
</tbody>
</table>

Cases in which there are no dismissals, etc.*

For business operators that receive the subsidy for employment adjustments because of temporary layoffs, etc., the subsidy rate is increased if they avoid dismissals, etc.*

<table>
<thead>
<tr>
<th>Amount of funds provided (annual amount)</th>
<th>Incentive funds for reduction of overtime work and maintenance of employment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMEs</strong></td>
<td>¥300,000</td>
</tr>
<tr>
<td><strong>Large companies</strong></td>
<td>¥200,000</td>
</tr>
</tbody>
</table>

Increase in the subsidy rate

Subsidy rate:
- Large companies: 2/3 → 3/4
- SMEs: 4/5 → 9/10

As of April 1, 2009

* "Dismissal, etc." includes the dismissal of employed workers, the termination of employment for fixed-term workers, and premature cancellation of contracts for dispatched workers for reasons on the side of business operators.
[Column: 1,400 Job-Creating Companies]

On February 27, 2009, METI, in cooperation with the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Health, Labour and Welfare published “1,400 Job-Creating Companies,” which is a list of SMEs and middle-ranking companies that are eager to employ workers as they recognize the recession as an opportunity to secure human resources. The list includes many companies which have advanced molding and metal processing technology and which actively pursue human resource development.

Information concerning “1,400 Job-Creating Companies” has been made accessible via the Internet from Hello Work facilities and job cafes. In addition, the list was compiled as a two-volume book with a total of 1,600 pages and distributed to technical upper secondary schools and colleges of technology.

On April 7, job-creation initiatives implemented by about 5,800 companies in 21 prefectures were published on METI’s website. There is also a plan to organize bus tours for job seekers and students from across the country to visit local communities and local companies and become aware of the attraction of local areas. These activities are expected to help resolve a mismatch between the needs of job seekers and the needs of employing companies.

Website (in Japanese):
**Chapter 2: Challenges and Prospects Facing Japan's Monodzukuri Industries**

**Section 1** Japan's monodzukuri industries turn expanding limitations on resources and environmental constraints into a strength and continue to grow

Natural resource prices are expected to remain unstable in the future regardless of economic downturns. It is necessary to promote the development of technology and activities to secure resources and enhance resource productivity by accelerating energy and resource conservation activities.

**High volatility of natural resource prices**

Prices of crude oil futures continued to rise from 2004 onward but plunged after hitting a high of US$147 per barrel in July 2008 and stood at the level seen around 2005 as of April 2009. In addition, the input price index dropped sharply in the latter half of 2008 because of a drop in prices of coking coal. However, it is necessary to keep a careful watch on natural resource prices, as a tightening of the supply-demand balance for exhaustible natural resources will become inevitable in the medium to long term due to the economic growth of BRICs and other countries.

**Recognition of the volatility of natural resource prices and response**

Japan has strived to shift to industries to be oriented toward energy and resource conservation based on its experiences in the oil crises. However, because of the high volatility of natural resource prices that began at the beginning of 2007, the ratio of Japanese companies that recognize the volatility of natural resource prices as a risk has reached 44.6%. Japanese companies judge it necessary to introduce measures to reduce costs and strengthen their technology development capability in order to better deal with price volatility.

**Chart 2-1 Changes in Crude Oil Prices (WTI)**

Source: New York Mercantile Exchange

**Chart 2-2 Factors Constituting the Input Price Index of the Manufacturing Industry (compared with the same period of the previous year)**

Source: BOJ "Input-Output Price Index of the Manufacturing Industry by Sector"

**Chart 2-3 Recognition of the High Volatility of Natural Resource Prices**

Source: Survey by METI (December 2008) (n=1,868)

**Chart 2-4 Measures Taken by Companies to Turn the Volatility of Natural Resource Prices to Their Advantage**

Source: Survey by METI (December 2008) (n=343)
(Activities to secure natural resources)

Japan is making active efforts to self-develop mines and obtain rights in natural resource development projects through M&As. In the past, Japan raised the ratio of self-development by obtaining rights to exploit and run copper mines as a strategic initiative regardless of market conditions. It is also desirable that with regard to other resources, the public and private sectors work together to make active investments against the background of a strong yen, in order to raise the ratio of self-development, which directly contributes to stable project management and enhancement of price competitiveness.

[Chart 2-5 Acquisition of Stakes in Copper Mines by Japanese Companies and Shifts in the Rate of Self-Development]

Source: Compiled by METI based on data prepared by the London Metal Exchange, the Japan Mining Industry Association and Japan Oil, Gas, and Metals National Corporation

(Production expansion in resource-producing countries [i])

In recent years, many plant construction plans have been realized in resource-producing countries in the Middle East and in other regions that have been rapidly developing against a background of the foreign currency inflow that comes when natural resources prices are surging. These plans are intended not only to obtain a market share in the countries where plants have been built and in their neighboring countries, but also to gain an advantage in the procurement of natural resources by establishing a foothold in the resource-producing countries.

[Chart 2-6 Plants Owned by Japanese Companies in Saudi Arabia]

The number of companies operating in Saudi Arabia: 60

The following are examples:
- Advanced Communications and Electronics Systems Co. (Sumitomo Corporation: 22%)
- Chiyoda Petrotech Ltd. (Chiyoda Corporation: 49%)
- JGC Arabia Ltd. (JGC: 40%)

The number of companies owning plants in Saudi Arabia: 14

The following are examples:
- DENSO Abdal Lafid Jamel Co., Ltd. (Denso: 50%)
- Saudi Factory for Electrical Appliances Co., Ltd. (Mitsubishi Heavy: 20%; Others)
- Unicharm Gulf Hygiene Industries Ltd. (Unicharm: 51%)
- Kubota Saudi Arabia Company, LLC (Kubota: 51%)*
- Isuzu Motors Ltd.*

The number of chemical companies owning plants in Saudi Arabia: 5

The following are examples:
- Eastern Petrochemical Co. (SPDC: 50%)
- Rabigh Refining and Petrochemical Co. (Sumitomo Chemical: 37.5%)
- Saudi Methanol Co. (Japan Saudi Arabia Methanol Company: 50%)

Remarks: Included in the above are companies planning to start operating or to build a plant in Saudi Arabia (The mark * indicates a project in the planning stages.)

Source: Compiled by METI based on data prepared by the Japan External Trade Organization

[Column: Acquisition of Rights to Exploit and Run Mines by the Japan-Korea Consortium]

On October 17, 2008, the Japanese and Korean (Posco) consortium agreed to jointly acquire a 40% of stake in Mamisa, a 100% subsidiary of the major Brazilian steelmaker CSN. Namisa plans to expand its production of iron ore from 18 million tons in 2009 to 38 million tons in 2013.

METI actively supports this project from the viewpoint of ensuring the stable supply of iron ore. It has been providing low-cost funds through Japan Bank for International Cooperation, Nippon Export and Investment Insurance and a reserve system for possible foreign investment losses.

[Column: Sumitomo Chemical’s Strategy for Plant Construction (Rabigh Project)]

Under the Rabigh Project, a joint venture set up by Saudi Aramco and Sumitomo Chemical Co., Ltd. will adopt advanced oil refining technology and build a new manufacturing plant for petrochemical products such as polyethylene. Through the Rabigh Project, Sumitomo Chemical will be able to secure a production base in the Middle East, which is a favorable region for the procurement of raw materials, to significantly enhance the profitability of its petrochemical business, and to strengthen its business foundation.

13
Japanese steelmakers are building new production facilities and expanding existing ones in Brazil, which is the world’s largest producer of iron ore, in light of the growth of demand in Brazil and its easy access to the European and North American markets. METI has been providing active support to Japanese steelmakers’ activities in Brazil by organizing a ministerial visit to the country in June 2008 and by using a loan system of Japan Bank for International Cooperation.

Japanese steelmakers' projects in Brazil:

(i) Nippon Steel
Planning to expand the Usiminas steel plant (at a cost of approximately ¥1 million).

(ii) Sumitomo Metals
Building a new plant for the production of seamless pipes through a joint venture with a French steelmaker (at a cost of approximately ¥200 billion; scheduled to start operation in 2010).

(iii) JFE Steel
Started a feasibility study on the construction of a new steel plant in cooperation with Vale, a Brazilian mining company, and Dongkuk Steel Mill of South Korea.

Current situation surrounding rare metals:
Rare metals are vital for next-generation products and technologies related to the enhancement of resource productivity, which will represent the strength of Japan’s manufacturing industries. Global consumption of rare metals is growing because of factors such as the economic growth of emerging countries. As many rare metals are very scarce and unevenly distributed, the supply-demand chain could change significantly depending on the resource policy of rare metal-producing countries, among other factors.

Uneven distribution of rare metals:

[Chart 2-8 Uneven distribution of rare metals (as represented by the rate of production in the largest producing country to the total production)]

[Chart 2-9 Producing countries of unevenly-distributed rare earths]

Remarks: Uneven distribution = the ratio of production in the largest producing country to the total production
Rare earths such as neodymium and dysprosium, for example, are widely used as materials in high-performance magnets for motors of electric vehicles and the outdoor units of air conditioners. The use of rare earths greatly contributes to the enhanced energy-saving performance of next-generation products and the downsizing of such products. Therefore, in line with the growing demand for such products and their increasing diversity, demand for rare earths is expected to expand significantly.

Given the importance of rare metals in Japanese manufacturing, securing a stable supply of them is a critical task. To secure a stable supply, it is necessary for Japan to continue its active efforts to diversify the supply sources through strategic resource diplomacy and joint exploration with resource-producing countries, and to develop recycling technology and alternative materials.

**Activities to secure a stable supply of rare metals**

<table>
<thead>
<tr>
<th>Major applications of neodymium and dysprosium</th>
<th>Major applications of high-performance motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-performance motors and magnets</td>
<td>Next-generation vehicles (e.g. electric vehicles)</td>
</tr>
<tr>
<td>Personal computers (HDD)</td>
<td>Home electric appliances (e.g. air conditioners and washing machines)</td>
</tr>
<tr>
<td>Industrial machinery (e.g. robots)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled by METI

**Chart 2-10 Neodymium and Dysprosium, for which Demand is Expected to Grow in Line with the Diffusion of Next-Generation Products**

[Column: Moves to Ensure a Stable Supply of Rare Earths (in Vietnam)]

Toyota Tsusho Corporation and Sojitz Corporation plan to establish a joint venture together with LAVRECO, a Vietnamese state-run company, in order to develop the Dong Pao deposits. Deposits containing high concentrations of cerium and lanthanum, which are used for precision polishing of liquid crystal displays and other glass products, have already been found in the Dong Pao region. In addition, there are hopes that deposits of heavy rare earths used for neodymium magnets will also be found there, as this region is located near ion-adsorption deposits in southern China. Annual production of rare earths in the Dong Pao deposits is estimated at 6,000 tons (equivalent to 30% of Japan’s annual consumption of rare earths, which amounts to approximately 20,000 tons), and production is scheduled to start in 2011 for an operation period of 20 years.

Meanwhile, Showa Denko K.K. established a subsidiary (90% owned by Showa Denko) in the Ha Nam province, south of Hanoi, in October 2008, to produce alloy materials for rare earth magnets and started the construction of a plant in November of the same year. At the plant, the company plans an annual production of 800 tons of dysprosium, which is necessary for the production of neodymium magnets used in hybrid vehicles.

**Chart 2-11 Locations of Ongoing Joint Survey Projects**

<table>
<thead>
<tr>
<th>Vietnam Lao Cai province - Yen Bai province (Rare earths)</th>
<th>Korea Sehwa area (Tungsten)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia Kajang area (Indium)</td>
<td>Kazakhstan Usbuhl-Mulaly area (Tungsten)</td>
</tr>
<tr>
<td>Potential survey under way South Africa (Rare earths)</td>
<td>Canada Yukon area (Copper, nickel, platinum group metals)</td>
</tr>
<tr>
<td>Potential survey under way Lubuk, Botswana (Rare metals)</td>
<td>Peru Pichayo area (Molybdenum and indium)</td>
</tr>
<tr>
<td>Australia Border area (Rare earths)</td>
<td>Brazil Agrupet area (Copper, nickel, platinum group metals)</td>
</tr>
</tbody>
</table>

Explanatory notes:
- Basic survey for joint resource development (ODA survey)
- Project to establish infrastructure for the promotion of development of rare metal resources
- Establishment of infrastructure to promote the development of rare metals for rationalization of energy use

Source: Compiled by METI based on data prepared by Japan Oil, Gas and Metals National Corporation

**Chart 2-12 Promotion of the Development of Materials as Alternatives to Rare Metals**

- **Project to Develop Materials as Alternatives to Rare Metals**
  - Developing technologies for commercialization that should be realized quickly in order to improve the energy intensity.
  - Development started in fiscal 2007
    - (i) Indium (transparent electrode)
    - (ii) Dysprosium (rare earth magnet)
    - (iii) Tungsten (carbide tools)
  - Development started in fiscal 2009
    - (iv) Platinum (exhaust gas purifying catalyst, etc.)
    - (v) Terbium, europium, etc. (fluorescent materials)
    - (vi) Cerium (precision polishing materials, etc.)

Source: Compiled by METI
As countries are strengthening their efforts to prevent global warming and ensure appropriate management of toxic substances, the manufacturing industry of each country is required to comply with regulations. The number of standards that are required to be met as a procurement condition and the number of sales destinations that require compliance with environmental regulations as a procurement condition are increasing every year, and the required standards are becoming more and more stringent. These requirements have non-negligible effects on purchasing and sales activities, as well as on the valuation of in-house manufactured goods.

### Chart 2-13 Procurement Conditions Required by Sales Destinations Related to Environmental Regulations

<table>
<thead>
<tr>
<th>Condition Description</th>
<th>Large companies (%)</th>
<th>SMEs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination/reduction of chemical substances with high risks</td>
<td>73.1</td>
<td>20.2</td>
</tr>
<tr>
<td>Design that gives consideration to recycling</td>
<td>50.3</td>
<td>22.2</td>
</tr>
<tr>
<td>Design that gives consideration to reducing the amount of resources use</td>
<td>25.0</td>
<td>17.9</td>
</tr>
<tr>
<td>Design that gives consideration to energy-saving performance</td>
<td>21.3</td>
<td>19.6</td>
</tr>
<tr>
<td>Reduction of CO2 emissions through overall life cycles such as production, logistics, etc.</td>
<td>19.4</td>
<td>11.0</td>
</tr>
<tr>
<td>Acquisition of in-company environment management systems and specifications</td>
<td>16.9</td>
<td>6.6</td>
</tr>
<tr>
<td>Acquisition of domestic environmental labels (e.g. “eco mark”)</td>
<td>13.9</td>
<td>8.6</td>
</tr>
<tr>
<td>Acquisition of foreign environmental labels (e.g. Blue Angel)</td>
<td>11.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Others</td>
<td>2.2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: Survey by METI (December 2008) (n=547)

### Chart 2-14 Companies’ Recognition of Standards Required by Sales Destinations as Procurement Conditions

- Feeling a burden, as sales destinations require compliance with standards related to environmental regulations as a procurement condition: 36.8%
- Not feeling a burden, although sales destinations require compliance with standards related to environmental regulations as a procurement condition: 15.5%
- Feeling a burden, as sales destinations require compliance with standards more rigorous than law: 19.6%
- Feeling a burden, as multiple sales destinations require compliance with different standards: 35.1%
- Sales destinations do not require compliance with standards related to environmental regulations as a procurement condition: 28.1%
- Feeling a burden, as sales destinations do not require compliance with standards related to environmental regulations as a procurement condition: 1.6%

Source: Survey by METI (December 2008) (n=790)

### Response to environmental constraints: [i] The fight against global warming

A survey showed 64% of the companies that perceive an impact from regulations related to the fight against global warming as replying that promoting energy conservation and reduction in greenhouse gas emissions through technology development is a task that must be performed. There are hopes that environmental technologies, including energy-saving technologies developed by Japan, will be actively used to reduce global emissions of greenhouse gases, including emissions in developing countries.

### Chart 2-15 Tasks to be Performed to Comply with Regulations Related to the Fight Against Global Warming

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion of energy conservation and greenhouse gas reduction</td>
<td>64.1</td>
</tr>
<tr>
<td>Acquisition of domestic certification by an external organization</td>
<td>30.3</td>
</tr>
<tr>
<td>Improvement of the appeal to end users</td>
<td>22.2</td>
</tr>
<tr>
<td>Acquisition of foreign certification by an external organization</td>
<td>10.4</td>
</tr>
<tr>
<td>Technology transfer to domestic and foreign business partners</td>
<td>8.3</td>
</tr>
<tr>
<td>Management of the carbon footprint</td>
<td>7.3</td>
</tr>
<tr>
<td>Development of carbon-offset-related products, etc.</td>
<td>5.8</td>
</tr>
<tr>
<td>Securing of emission rights such as CER</td>
<td>4.8</td>
</tr>
<tr>
<td>Others</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Source: Survey by METI (December 2008) (n=374)

Since September 2005, Toshiba Corporation has been engaging in a CDM (Clean Development Mechanism) project to reduce greenhouse gas emissions in Vietnam. Specifically, Toshiba introduced an anaerobic fermentation tank at a waste water treatment facility of a starch processing plant, thereby curbing the emissions of methane generated from waste water. The company aims to enable risk control regarding new foreign projects by introducing its own proprietary methane-fermentation technology that meets the needs of developing countries and to expand its environmental business abroad through CDM projects.
(Response to environmental constraints: [ii] Efficiency enhancement through reorganization of logistics systems)

In the future, Japan’s manufacturing industries intend to increase the outsourcing of work to logistics business operators which are advanced in implementing environmental protection measures, and there are high hopes that the burden on the environment will be reduced through the consolidation of production and sales facilities, consolidation of procurement and distribution routes, and joint distribution of products with other companies. In addition, amid a growing awareness that streamlining logistics systems directly contributes to cost reduction, efforts to reduce CO2 emissions through innovations in distribution are being strengthened.

[Chart 2-16 Criteria for the Selection of Logistics Business Operators to which Logistics Operations are to Be Outsourced (Around five years later)]

[Column: Logistics Innovation by Toray Industries Inc.]
For the manufacturing industry, the introduction of measures to reduce costs and CO2 emissions in the logistics sector is becoming an important strategy for enhancing competitiveness. Compared with the manufacturing sector, which has enhanced production efficiency through daily (kaizen) improvement efforts, the logistics sector has a great deal of room to enhance efficiency.

Through a logistics innovation carried out from the viewpoint of the environment, safety, and efficiency, Toray Industries Inc. succeeded in reducing the CO2 emissions factor by around 8% over the past two years while cutting costs in the logistics sector.

For example, in the transportation of materials, which are shipped in large lots, the company enjoyed benefits, in terms of cost and environmental friendliness, by shifting from land transportation to vessel and railway transportation, for which regular service is common. In addition, the company expanded the size of their vehicles and increased their loading capacities through consultations with logistics business operators with due consideration of the lot size and shape of transported products.

Such internal and external collaboration will be the key to enhancing the efficiency of logistics systems for the manufacturing industry.

(Response to environmental constraints: [iii] Promotion of the “3Rs”)

The main objective of the 3Rs (reduce, reuse, and recycle) Initiative has shifted from ensuring the appropriate treatment of wastes and achieving the legally required recycling rate to ensuring stable procurement of materials and enhancing competitiveness through cost reduction. For example, as a way to minimize wastes for materials and enable a stable supply of materials, efforts are being strengthened to reuse products without lowering their quality, in addition to recycling, which leads to a reduction of product quality.

[Column: Copier Recycling Business of Ricoh Co., Ltd.]
Ricoh Co., Ltd has been engaging in the 3Rs Initiative regarding used products based on its group-wide Environmental Action Plan. Through sales of recycled copiers, use of recycled parts, and use of recycled plastics, the company is reducing the burden on the environment, and in fiscal 2007, the 3Rs division turned profitable on a non-consolidated basis. Based on the Comet Circle concept, Ricoh is also striving to improve the quality of recycled products and making active efforts to expand “closed recycling,” in which parts of used copiers are reused as parts of new copiers.

[Chart 2-17 Comet Circle]

[ Comet Circle]: The upper route performs functions as the artery and the lower route functions as the vein. Resources provided by the raw materials supplier in the upper right moves from the right to the left through the upper route and turns into a product during the process, while used products move from the left to the right through the lower route. The more inner a circle is, the more difficult it is to complete but the more effective it is in reducing the burden on the environment.
Internationally, there is a growing move to require the strengthening of regulations concerning the production and use of chemical substances and companies’ voluntary efforts concerning the management of chemical substances. In Japan, too, the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. was reviewed. From now on, it will be necessary to quickly improve the framework for information management by unifying formats concerning the management of chemical substances and by coordinating different information management systems.

(Chart 2-18 Tasks to Be Performed to Comply with Regulations Related to Chemical Substances)

<table>
<thead>
<tr>
<th>Task</th>
<th>Large companies (%)</th>
<th>SMEs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of the amount of regulated chemical substances used through technology development</td>
<td>43.2</td>
<td>58.7</td>
</tr>
<tr>
<td>Development of alternative substances</td>
<td>46.0</td>
<td>41.0</td>
</tr>
<tr>
<td>Establishment of a platform for information sharing (information system)</td>
<td>33.7</td>
<td></td>
</tr>
<tr>
<td>Unification of indication formats through the supply chain</td>
<td>31.2</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>3.0</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Source: Survey by METI (December 2008) (n=847)

(Activities to improve resource productivity)

Amid growing environmental constraints, about 60% of the companies surveyed are striving to improve their resource productivity, which will lead to effective use of resources and reduction of greenhouse gas emissions through energy conservation, resource conservation, and development of alternative materials. Priority tends to be placed, for example, on enhancing production efficiency through the reduction of the use of materials and the promotion of energy conservation in the manufacturing process.

(Chart 2-19 Status of Activities to Enhance In-House Resource Productivity)

Not planning to make efforts 17.5%
Considering making efforts 19.6%
Making active efforts 14.1%
Making efforts 48.8%

Source: Survey by METI (December 2008) (n=1,874)

“Resource productivity” refers to the quantity of value added per unit of input of resources (natural resources, raw materials, and energy).

Specifically, technology with high resource productivity refers to technology that realizes energy conservation or recycling of resources as well as new energy technology. Products with high resource productivity include next-generation automobiles, energy-saving home electric appliances, solar cells, and highly efficient industrial machinery.

Highly efficient coal-powered thermal plant

Solar cells

Next-generation automobile
(Competitive environment and the need for products with high resource productivity)

As an activity to improve resource productivity, many Japanese companies are placing a top priority on expanding the domestic market, whereas only 12.6% are trying to gain a market share in foreign markets. Given that major competitors are mostly domestic companies at the moment, products related to the enhancement of resource productivity may become an area of strength for Japan.

![Chart 2-20 Activities of High Priority for Enhancing Resource Productivity]

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of the domestic market</td>
<td>37.8%</td>
</tr>
<tr>
<td>Securing new procurement routes for raw materials/fuels</td>
<td>33.9%</td>
</tr>
<tr>
<td>Intensive investment in technology development</td>
<td>25.8%</td>
</tr>
<tr>
<td>Securing human resources with high value added</td>
<td>23.8%</td>
</tr>
<tr>
<td>Securing sales channels</td>
<td>18.8%</td>
</tr>
<tr>
<td>Enhancement of cooperation in the supply chain</td>
<td>14.0%</td>
</tr>
<tr>
<td>Acquisition of shares in foreign markets</td>
<td>12.6%</td>
</tr>
<tr>
<td>Others</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Source: Survey by METI (December 2008) (n=1,614)

As the need for products with high resource productivity are growing both in Japan and abroad, competition involving foreign companies as well as domestic ones is expected to intensify. Indeed, an increasing ratio of Japanese companies are feeling a sense of crisis, with about 60% perceiving that their lead over foreign competitors is narrowing or that they are losing competitiveness.

![Chart 2-21 Major Competitors Concerning Products Related to the Enhancement of Resource Productivity]

- Domestic competitors: 65.7%
- Asian companies: 17.7%
- European companies: 2.6%
- North American companies: 1.8%
- Companies in other regions: 0.7%
- Almost no competitors: 11.5%

Source: Survey by METI (December 2008) (n=1,735)

[Chart 2-22 The Need for Products with High Resource Productivity] (Compared with five years ago)

- Domestic need: 61.6% growing, 36.6% unchanged, 1.8% declining
- Need in advanced foreign countries: 46.5% growing, 52.3% unchanged, 1.2% declining
- Need in developing countries: 28.1% growing, 70.1% unchanged, 1.8% declining

Source: Survey by METI (December 2008) (n=1,430)

[Column: Strengthened Energy Efficiency Standards for Air Conditioners in China]

In March 2009, the Chinese government significantly raised the energy efficiency standards for air conditioners, forcing domestic manufacturers to shift to the production of inverter-based models. The strengthening of environmental standards in China and other countries are expected to benefit Japan’s manufacturing industries, which have the world’s highest level of energy conservation technology.

![Strengthened Energy Efficiency Standards for Air Conditioners in China]

- The level of popular models in Japan is 9.0 or higher.
- High-end models in China
- Popular models in China
- Average level of inverter-based models when the old standard was applicable.
- Minimum level allowed for sales under the new standard.
- Prescribed level for energy efficiency certification under the new standard.

Source: Compiled by METI
Currently, Japanese companies mainly sell products with high resource productivity in the United States, Europe, and Asia. Many companies are placing a priority on emerging markets like China, India, and Russia as future target markets. In order to continue to show strength in products with high resource productivity, it is essential for Japan's manufacturing industries to enhance their international competitiveness through active business strategies and development of technology. In addition, while overseas demand is sluggish for the moment amid the global recession, it will be necessary in the medium to long term to aim to capture overseas demand in a strategic manner.

Source: Survey by METI (December 2008)
Section 2  Japan’s monodzukuri industries strive to enhance the level of manufacturing (monodzukuri) capability

It is critical for monodzukuri industries to review their field capability and R&D capacity and brush up their management resources, in order to overcome the rapid changes that have occurred and that will continue to grow.

(Review of manufacturing capabilities)

The productivity of Japan’s manufacturing industries is said to be high, and 90% of the companies surveyed said that the technical skills of factory workers are improving. On the other hand, however, there are signs of some problems, as shown by the presence of companies expressing concerns over the scarcity of communication between workers and a shortage of core personnel capable of passing on their techniques and skills to others.

[Chart 2-24 Techniques and Skills of Factory Workers]

<table>
<thead>
<tr>
<th>Level of Communication between Factory Workers</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing very close</td>
<td>3.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing close</td>
<td>34.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing somewhat close</td>
<td>43.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing scarce</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing very scarce</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No reply</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Survey by METI (January 2009)  Remarks: n=1,840

(Importance of direct communication among factory workers)

Although the use of IT has advanced the productivity, many companies think that it is important for workers to share information through direct communication with each other. Regarding trouble and problems that occur at the factory site in particular, more than 80% of the companies surveyed felt the need for direct communication among workers.

[Chart 2-26 Information Requiring Direct Communication]

| Information concerning troubles and problems that occur at the factory site | 81.6 |
| Information concerning the business process standards and business operations at the factory site | 54.4 |
| Information related to customers and consumers such as customer satisfaction, needs, and complaints | 50.4 |
| Information concerning the objectives and plans of the production division | 47.2 |
| Information concerning employees' techniques, skills, etc. | 41.5 |
| Others | 0.5 |
| No reply | 1.9 |

Source: Survey by METI (January 2009)  Remarks: Multiple replies were allowed. n=1,840

[Column: Promoting the Use of IT in the Production Processes and Fostering Close Communication among Workers at the Same Time] (Daicel Chemical Industries Ltd.)

Amid concerns that the use of IT may isolate technology from the outside world or lead to a lack of sufficient communication among workers, Daicel Chemical Industries Ltd. is trying to enhance the skills of its workers by training them intensively at a training plant not equipped with advanced IT, while promoting the use of IT at the factory site. In addition, the company holds daily meetings in which the relevant parties analyze trouble reported by factory workers as a way to foster closer communication between workers.

[Plant for training]
More than 20% of the companies surveyed are making efforts not only to ensure that skills are passed on among its own workers but that these skills are also passed on to their suppliers, thereby enhancing the manufacturing capabilities of their business partners as a whole. This trend is particularly notable in the transportation equipment industry and the precision machine industry, which require close coordination between machinery makers and parts suppliers. In most cases, workers of machinery makers visit suppliers in person to provide direct instruction.

[Chart 2-27 Rate of Companies Providing Skills Transfer Support to Suppliers]

<table>
<thead>
<tr>
<th>Industry</th>
<th>Support Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation equipment manufacturing</td>
<td>23.2%</td>
</tr>
<tr>
<td>Precision instruments manufacturing</td>
<td>32.8%</td>
</tr>
<tr>
<td>Metal products manufacturing industry</td>
<td>27.5%</td>
</tr>
<tr>
<td>General machinery manufacturing</td>
<td>13.0%</td>
</tr>
<tr>
<td>Electrical machinery manufacturing</td>
<td>9.1%</td>
</tr>
<tr>
<td>All of the above industries</td>
<td>0%</td>
</tr>
</tbody>
</table>

Remarks: n=1,840

[Chart 2-28 Details on the Skills Transfer Support Provided to Suppliers]

<table>
<thead>
<tr>
<th>Method</th>
<th>Support Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>The respondent's own workers provide direct instruction in techniques and know-how</td>
<td>77.5%</td>
</tr>
<tr>
<td>Support is provided through informal communication among workers</td>
<td>27.5%</td>
</tr>
<tr>
<td>Workers of suppliers participate in the respondent's education and training program</td>
<td>13.0%</td>
</tr>
<tr>
<td>Information concerning techniques and know-how is shared through a database</td>
<td>9.1%</td>
</tr>
<tr>
<td>Others</td>
<td>4.4%</td>
</tr>
<tr>
<td>No reply</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

Source: Survey by METI (January 2009)
Remarks: Multiple replies were allowed. n=386
The above figures are based on the replies provided by companies providing support.

(Diversification of joint R&D activities)

Joint R&D with other companies is becoming increasingly important as a way to incorporate external technologies and ideas. About 40% of the companies surveyed were engaging in joint R&D, with 25.3% engaging in joint R&D with companies other than existing business partners.

[Chart 2-29 Existence of Joint R&D with Companies with which there Were No Previous Business Relations]

<table>
<thead>
<tr>
<th>Implementation of joint R&amp;D</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of joint R&amp;D with companies other than existing business partners</td>
<td>25.3%</td>
</tr>
<tr>
<td>Implementation of joint R&amp;D with existing business partners</td>
<td>14.7%</td>
</tr>
<tr>
<td>Implementation of joint R&amp;D only</td>
<td>58.0%</td>
</tr>
<tr>
<td>No reply</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Source: Survey by METI (January 2009)

[Chart 2-30 Specific Joint R&D Partners (Excluding existing business partners)]

<table>
<thead>
<tr>
<th>Partnership Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic companies in a different sector than the respondent's own sector</td>
<td>55.5%</td>
</tr>
<tr>
<td>Research organizations including universities</td>
<td>43.2%</td>
</tr>
<tr>
<td>Domestic companies in the same sector in which the respondent has existing business</td>
<td>23.4%</td>
</tr>
<tr>
<td>Domestic companies in the same sector as the respondent</td>
<td>20.9%</td>
</tr>
<tr>
<td>Government or public organizations</td>
<td>16.1%</td>
</tr>
<tr>
<td>Foreign companies in a different sector than the respondent's own sector</td>
<td>6.9%</td>
</tr>
<tr>
<td>Foreign companies in the same sector as the respondent</td>
<td>5.8%</td>
</tr>
<tr>
<td>Foreign companies in the same sector in which the respondent has existing business partners</td>
<td>2.6%</td>
</tr>
<tr>
<td>Others</td>
<td>0.9%</td>
</tr>
<tr>
<td>No reply</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Source: Survey by METI (January 2009)
Remarks: Multiple replies were allowed. n=465
The above figures cover joint R&D partners with which the respondent had no previous business relations.
Companies engaging in cooperation with other companies in different business sectors from their own have a greater appreciation of the results of joint R&D than those engaging in other types of cooperation, and in light of this, cooperation across different business sectors may be expected to promote innovation.

**[Chart 2-31 Results of Joint R&D]**

Source: Survey by METI (January 2009)
Remarks: The number of companies engaging in cross-sectoral cooperation: 266
The number of companies cooperating with companies other than existing business partners: 465
The number of companies cooperating with existing business partners only: 270

**[Column: Industrial Innovation Organization]**
- The government submitted a bill to amend the Act on Special Measures for Industrial Revitalization, etc. for the Purpose of Promoting Innovation in Industrial Activities in Japan to the 171st session of the Diet, and the bill was enacted on April 22. The bill provides for the establishment of the Industrial Innovation Organization, which will provide funds for business activities that create new added-value through open innovation.

**[Chart 2-32 Unsatisfactory Points Concerning Joint R&D]**

Remarks: Multiple replies were allowed
The number of companies implementing cross-sectoral cooperation: 266
The number of companies cooperating with existing business partners: 270

**[Column: Partial Amendment of the Unfair Competition Prevention Act]**
- Improvement of the environment for open innovation
- Joint R&D requires partners to disclose their trade secrets to each other and use the secrets together. For this, the establishment of an institutional framework that ensures appropriate protection of trade secrets is vital.
- In order to better protect trade secrets held by companies, METI submitted a bill to partially amend the Unfair Competition Prevention Act to the 171st session of the Diet, revising the requirements of the offense of the infringement of trade secrets.

Source: Survey by METI (January 2009)
Remarks: Multiple replies were allowed
The number of companies implementing cross-sectoral cooperation: 266
The number of companies cooperating with existing business partners: 270

23
Japan’s manufacturing industries are said to have accumulated technical and coordination skills by identifying the desirable direction of technology development through stable, long-term business relations between companies. Therefore, the diversification of the structure of business relationships could undermine companies’ accumulation of technical skills. However, companies that are pursuing cooperation with other companies in different business sectors from their own have not experienced a weakening of their relations with existing business partners, which suggests that they are maintaining their relations with both new and existing business partners.

**Chart 2-33 Business Partners with which Stronger Ties are Desirable**

|                      | 0% | 20% | 40% | 60% | 80% | 100% | %
|----------------------|----|-----|-----|-----|-----|------|------
| All companies        | 42.0 | 54.6 |     |     |     | 3.4  |     
| Companies not implem. joint R&D | 44.9 | 52.7 |     |     |     | 2.4  |     
| Companies implem. cross-sectoral cooperation | 34.2 | 65.0 |     |     |     | 0.8  |     

- To put a priority on existing business partners and strengthen ties with them
- To strengthen ties with new business partners
- No reply

Source: Survey by METI (January 2009)
Remarks: The total number of companies: 1,840
The number of companies not implementing joint R&D
The number of companies implementing cross-sectoral cooperation

**Chart 2-34 Changes in Ties with Existing Business Partners**

|                      | 0% | 20% | 40% | 60% | 80% | 100% | %
|----------------------|----|-----|-----|-----|-----|------|------
| All companies        | 79.5 | 17.0 |     |     |     | 3.5  |     
| Companies not implem. joint R&D | 79.2 | 18.5 |     |     |     | 3.3  |     
| Companies implem. cross-sectoral cooperation | 82.0 | 16.5 |     |     |     | 1.5  |     

- Business ties are growing closer
- Business ties are growing weaker
- No reply

**Chart 2-35 Changes in Product Design Concept**

- Design that meets appropriate safety specifications and standards
- Design that prevents product breakdown
- Design that prevents accidents when used by consumers in an inappropriate manner
- Design that prevents consumers from using the product in an inappropriate manner
- Design incorporating the concept of “fail safe”
- Design that prevents accidents when used by unexpected users (e.g. young children)
- Design that can function when existing parts are replaced with other parts
- Others
- No reply

Source: Survey by METI (January 2009)
Remarks: Multiple replies were allowed. n: 1,720
The above results are based on the replies given by the companies that said the safety of their products is improving.

**Chart 2-36 Details on Cooperation with Business Partners**

- Investigating the causes of the problem and sharing information with the partner
- Sharing information concerning complaints from customers and consumers
- Deliberating on safety in the product planning stage
- Sharing information with the partner so as to prevent design-related problems
- Setting rigorous design and safety standards and sharing them with the partner
- Providing joint education and training regarding product safety
- Others
- No reply

Source: Survey by METI (January 2009)
Remarks: Multiple replies were allowed. N=1,211
The above results are based on the replies given by companies that said they are cooperating with business partners so as to enhance product safety.
Amid the globalization of corporate activities and the diversification of the procurement environment, the risk of defective parts and materials being used in the production process is expected to increase. However, recognition of this risk and the measures taken to deal with it vary according to company size. SMEs may find it difficult to take measures to deal with this risk because of constraints in terms of know-how and corporate strength.

[Chart 2-37 Risk of a Product Accident Occurring because of a Defect in a Procured Component]

[Column: An SME that Obtained Difficult-to-Acquire International Organic Certification] — Heart Co., Ltd.—

In pursuit of purely organic products, Heart Co., Ltd., a company with a workforce of 20 people, that designs, manufactures, and sells bedding using organic cotton, has established a traceability system that verifies manufacturing records based on the lot number attached to each product. In all processes, the company conducts fluorescence inspection and document-based verification, and monitors the operations of partner companies in order to preclude contamination with and inclusion of chemicals in their materials. In 2005, the company acquired international certification by Ecocert, an organic certification organization, and its sales channels have rapidly expanded as a result of the acquisition of this certification.

(Measures against the inclusion of counterfeit elements in procured parts and raw materials)

More than 50% of the companies surveyed are concerned about the risk of counterfeit elements being included in procured parts and raw materials, and about 10% have become victims of such counterfeiting. Regarding measures against the inclusion of counterfeit elements in procured parts and raw materials, SMEs apparently bear a heavy burden relative to their level of know-how and corporate strength.

[Chart 2-38 Activities to Prevent the Inclusion of Defective Procured Components]

[Chart 2-39 Risk of Counterfeit Parts or Materials Being Included]

[Chart 2-40 Reason for Incurring Damages]

Remarks: The number of SMEs: 1,653

Remarks: Multiple replies were allowed. n=1,286

Remarks: The number of large companies: 182

Remarks: The number of SMEs: 1,286

Remarks: The number of SMEs: 136

Remarks: The number of large companies: 17

Remarks: The number of SMEs: 869

Source: Survey by METI (January 2009)
In order to differentiate products from low-cost products made in other countries, companies are enhancing customer satisfaction by combining product sales and services and manufacturing products featuring “kansei value” with an emphasis on the manufacturer’s care for users and users’ preferences. “Collaboration between agriculture-commerce-industry,” a move to blend manufacturing with the agriculture, forestry, and fisheries sectors, is also expected to expand the potential of Japan’s manufacturing industries.

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**New trends in the manufacturing industry**

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**[Column: Provision of Added Value that Transcends Manufacturing]**

— Air conditioner maker A —

Air conditioner maker A provides a service that enables energy-saving operation of air conditioners based on the use of information sent from a weather satellite as well as a pre-accident maintenance service. The company enhances customer satisfaction by enabling energy conservation and reducing equipment maintenance costs. It does business in China, Europe, and North America, as well as in Japan.

**[Column: Kansei-Japan Design Exhibitions Held in Paris and Tokyo]**

Designating the three years from fiscal 2008 as the Kansei Value Creation Years, METI held exhibitions in Paris (December 2008) and Tokyo (January 2009) in order to communicate, throughout Japan and to other countries, the concept of an economic value which we call kansei (aesthetic) value, which is contained in Japanese products. Kansei value is a value that materializes when a product appeals to the aesthetic sense of the people and arouses their emotions and empathy. The Kansei-Japan Design Exhibition that was held in the Musée des Arts Décoratifs (French national museum of decorative arts) had a significant impact as it attracted more than 10,000 visitors and was widely reported by the French media.

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**[Promotion of Agriculture-Commerce-Industry Collaboration]**

The New Economic Growth Strategy 2008, which was approved by the cabinet in September 2008, calls for the implementation of a variety of support measures to promote cooperation between agriculture, commerce, and industry. METI, in cooperation with the Ministry of Agriculture, Forestry and Fisheries, will continue to provide support to activities in the agriculture, forestry, and fisheries industries to take advantage of new technologies and business methods.

For example, a production system called a “plant factory,” which enables automated, stable production of vegetables, is attracting attention as a new food production system with the potential to realize a stable supply of foods and industrialization of agriculture at the same time.

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**Source: Data by Company A**
Section 3 Restructuring of global supply chains and merchandise strategy under worldwide recession

It is of special importance to review and restructure the global supply chain and identify consumers on the basis of medium and long-term growth market analysis, especially when the world economy is slowing down.

(How Asian production bases should be positioned)

Despite the global recession, many companies think that Asia remains an important production base. On the other hand, the positions of individual countries and regions as production bases are beginning to differ. Companies are eager to expand production in Indonesia, where local demand is expected to be firm, in Thailand, where the automobile and other industries are heavily concentrated, and in Vietnam, where low-cost labor is available, and they also plan to maintain or expand current production levels in India and the coastal regions of China. On the other hand, a high rate of companies intend to reduce production or close production facilities in the Philippines, Taiwan, Singapore, and central-western China.

[Chart 2-42 Outlook for Production Bases Five Years Ahead]

It is of special importance to review and restructure the global supply chain and identify consumers on the basis of medium and long-term growth market analysis, especially when the world economy is slowing down.

(Change in the purpose of local production)

Low-cost labor continues to be a reason for establishing a local production base. However, regarding China (the Yangtze delta economic zone), the purpose of local production has changed from utilization of low-cost labor to market development for the purpose of local sales, indicating the increasing priority on local markets. Although an increasing priority is being placed on local sales in Thailand, which is expected to expand as a production base, as well as in China, Thailand’s position as a base for exports to third-party nations is growing.

[Chart 2-43 Changes in the Purpose of Advancing into Major Asian Production Bases]
Analysis of statistics concerning overseas production bases shows that reductions and closures of such bases for the purpose of consolidating overseas bases have rapidly increased since fiscal 2000. This suggests that the reorganization of production bases that had been established by the 1990s, a review of business resources, and strategic reorganization to take advantage of economic partnership agreements (EPAs) are increasing.

(Reasons for the reduction and closure of overseas bases)

The development of EPAs in East Asia and Southeast Asia is expected to further promote the consolidation of Japanese companies’ overseas operating bases.

(Reorganization of international production systems)

Trade between countries that have signed EPAs already accounts for about 50% of overall trade within East Asia, and EPAs have contributed to efficient reorganization of production bases and sales networks (supply chains).

Examples of consolidation of production bases due to signing of an EPA

- As a result of early tariff reduction under the India-Thailand EPA, production bases for TV sets and air conditioners in India have been integrated into those in Thailand.
- As a result of inter-regional tariff reduction for finished products due to the signing of AFTA, production bases for flat-panel TV sets have been concentrated in Singapore and Malaysia, while those for washing machines and refrigerators have been concentrated in Thailand.

Source: Compiled by METI
Regarding the policy for selecting business partners in Asia, an overwhelming number of companies replied that they do not care whether a partner company is a Japanese company or not while taking into consideration factors such as delivery time and quality. However, automakers apparently put priority on doing business with Japanese companies.

Source: Survey by METI (January 2009)
Remarks: “Business partners” as referred to herein means companies to which the respondent entrusts a part of the operations concerning processing and materials.

There is a clear trend of placing a priority on the middle class in emerging markets in the future, rather than on the wealthy. Despite the impact of the global financial crisis, the importance of emerging countries’ middle classes as a market is certain to be growing. Many companies replied that they will place priority on the middle class, rather than on the wealthy, as a target for sales of consumer goods such as automobiles, home electric appliances and audio/video equipment in emerging countries. This trend is growing particularly strong with regard to sales of home electric appliances and audio/video equipment in India.

Source: Survey by METI (January 2009)
In emerging countries, to this point, Japanese companies have introduced similar products and services to those sold in Japan for sales to the wealthy. However, as they are now placing a priority on the middle class as a consumer base, they are shifting to a strategy of introducing products, technologies, and services tailored to local needs.

On the other hand, the rate of companies reducing prices and costs has decreased, while the rate of companies introducing high-quality products and technologies with high value added and high quality increased, indicating the possibility that Japanese companies are not necessarily pursuing a strategy focusing on the middle-income group (called the “volume zone”) of emerging countries.

**Remarks:** The above figures were calculated by multiplying the population by the percentage of households with an annual disposable income of 500 dollars or more.

Source: Compiled based on the JETRO “Trade White Paper on International Trade and Foreign Direct Investment” and the IMF “World Economic Outlook database”
(Japanese companies’ activities concerning emerging markets)

There are movements to streamline the product functions required in local markets in light of the needs of the middle class in emerging countries, mainly with regard to home electric appliances. The challenge is how to accurately identify the local needs, reduce excess functions without undermining customer satisfaction, and realize low-cost production. Also necessary is a reform of the mindset of head offices in Japan, as represented by the easing of overly strict quality standards, for example.

[Chart 2-48: Specific Examples of Activities by Individual Companies]

Electric manufacturer A has started to manufacture products for emerging countries. Its products feature adaptation to unique local standards and specifications, proposals tailored to local lifestyles, designs made with the local people in mind, and a reasonable value for the price. The company has introduced microwave ovens, air conditioners, washing machines, glass-tube TV sets, cordless telephones, and hair dryers that are suited to the characteristics of individual markets, targeting the middle-income group classes of emerging countries.

Company B, which manufactures high-end, low-noise air conditioners for household and commercial use and which enjoys a prestigious brand image, is selling models in the mid-price range with a lower noise-reduction function, targeting the middle classes of Thailand and other Southeast Asian countries, who appreciate the basic function of air conditioning more than the noise reduction function. The company is catching up with a U.S. manufacturer that has a dominant share in the market for mid-price range models.

Company C, a manufacturer of secondary materials that has a 40% share in the global market for materials used in luxury-brand products because of its outstanding product quality and technology, launched a second brand targeted at emerging countries. Products under this new brand are developed so as to suit the characteristics and needs of individual target markets and to meet their quality and strength standards. The company is selling the products on a trial basis in China, Vietnam, and Thailand for domestic consumption at lower prices than the prices of existing products.

In China, Company D, an analytical/measurement instrument manufacturer, is developing products tailored to local needs and trying to realize “100% local development and production,” including procurement of parts and materials. Although the company has a broad lineup of ultraviolet-visible spectrophotometers ranging from high-end models to general-use models, and holds a market share of 40% in the foods sector in China, it faces intensifying competition with local manufacturers that emphasize low prices. With regard to high-end models, the company is introducing Japanese-made products with a prestigious brand image, while aiming to double sales in the market for mid-range models by fully localizing design, development and production and increasing local procurement to reduce costs by 40% compared with Japanese-made products and enhancing price competitiveness.

(Localization of planning and design functions)

Most companies do not plan to localize their planning and design functions. On the other hand, many of the companies that plan such localization are developing products that meet the needs of the local markets where sales are planned. In order to target the middle class of emerging countries, it is necessary to actively incorporate local needs into product development in this way.

[Chart 2-49 Localization of Planning and Design Functions]

Source: Survey by METI (January 2009)
Remarks: The above figures are based on the replies given by companies with production bases in Asia
Japanese companies recognize that there is a strong need to localize the management of overseas production bases with regard to sales, personnel/labor affairs, procurement/purchasing, and manufacturing (plant managers). On the other hand, a relatively high ratio of Japanese companies replied that they will continue to have Japanese staff serve as managers regarding business management and design/R&D. Although the companies that recognized the need for localization are lagging in localization with regard to sales and design/R&D, 80% have implemented localization with regard to other operations.

Source: Survey by METI (January 2009)

(Career background and authority of presidents of local subsidiaries)

The need to appoint a local person as the president of a local subsidiary is deemed to be relatively weak given the necessity for frequent communications with the head office in Japan. The group of locals most often appointed as presidents of local subsidiaries are people who have experience studying or working in Japan, indicating Japanese companies’ tendency to prefer locals with experience in Japan for that post. The authority that is delegated to the president of a local subsidiary in the most cases is that for the formulation of a personnel plan at the local subsidiary and the formulation of a production plan.

Source: Survey by METI (January 2009)
(Appointing of locals as plant managers)

Many companies replied that it is desirable to appoint locals as plant managers, who are responsible for exerting leadership at the factory-floor level. Nearly 70% of the plant managers appointed from among local staff were those who were employed locally as new graduates or in mid-career, while only slightly above 20% were people who had experience studying or working in Japan. This indicates that it is essential to secure excellent human resources locally. The tasks to be performed for localization that were cited by the most companies were to ensure understanding of the concept of “zero defects” and quality control and Japan’s culture of manufacturing. This suggests that a higher priority is given to communicating Japan’s concept of manufacturing to the locals, than on passing on skills and techniques.

(Effects of appointing locals as plant managers)

Among the effects of appointing locals as plant managers that were cited by many companies were those related to improvement in morale at the factory-floor level, such as facilitating smooth labor-employment relations, fostering mid-level employees qualified to serve in posts supervising other employees, and improving worker motivation.

[Column]: Localization of manufacturing at Kanzaki MFG Co., Ltd.

Kanzaki MFG Co., Ltd., which manufacturers mold parts for plastic products, established a joint venture in Thailand in 1988. Of the staff of about 450 at the joint venture, President Kanzaki is the only Japanese member. Locally employed Thais serve as the managers of individual divisions. While the Japanese manufacturing industry’s approach is pursued thoroughly with regard to product quality and delivery time, the Thai way is respected with regard to management at the factory-floor level.

Source: Survey by METI (January 2009)
The number of foreign nationals with specialized skills who work in Japan is still small. However, about 15% of SMEs employ or plan to employ foreign nationals with specialized skills and 20-30% of large companies employ or plan to employ such foreign nationals. As for the policy for future treatment of foreign employees, large companies tend toward planning to appoint them as senior officials at foreign business sites in their home countries, while SMEs tend toward planning to treat them as part of the domestic workforce in Japan.

[Chart 2-57 Presence or Absence of Foreign Nationals with Specialized Skills at Japanese Business Sites]

[Chart 2-58 Future Treatment of Foreign Nationals Playing a Leadership Role at the Factory-Floor Level]

[Column]: Career Development Program for Foreign Students in Japan

Among the programs intended to develop human resources capable of strengthening the competitiveness of Japan’s manufacturing industry and promoting its internationalization is the “Career Development Program for Foreign Students in Japan,” which provides excellent foreign students in Japan who are willing to work in Japan or for Japanese companies with comprehensive support, including language training in business Japanese, education about Japanese business practices, professional education provided through industry-academia cooperation (in areas such as manufacturing and IT) and employment support. (This program has been implemented by METI and MEXT since fiscal 2007.)

Under this program, more than 100 universities and more than 800 companies have formed 30 consortiums across Japan and implemented human resource development programs for more than 1,300 excellent foreign students staying in Japan, so as to enable them to find jobs at Japanese companies (fiscal 2008). In expanding its business globally, NIDEC Servo Corporation (based in Kiryu, Gunma Prefecture), which has production bases in China, Indonesia, and Vietnam, felt a need to foster personnel capable of acting as the leaders of local operations who understand not only Japanese production methods, management style, and technologies but also the culture of Japan’s manufacturing. Therefore, the company has joined a program implemented by Gunma University (Kiryu, Gunma Prefecture) to foster excellent engineers capable of working globally, and has made active contributions to the program, including dispatching lecturers to provide lessons. The results have led the company to employ highly-motivated Vietnamese students with excellent skills.

This program will continue to attract more and more attention, as it fosters advanced human resources that are strongly committed to manufacturing, have in-depth understanding of Japanese corporate culture, and are capable of supporting the development of Japan’s manufacturing.

Source: A lesson provided through industry-academia cooperation (Nagoya Institute of Technology)