Summary of the White Paper on Manufacturing Industries (Monodzukuri) 2011

October 2011

Ministry of Economy, Trade and Industry
Ministry of Health, Labour and Welfare
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Part 1: Current Status and Challenges of Manufacturing Infrastructure Technology

Chapter 1: Status of manufacturing industries in Japan in correlation with changes in domestic and overseas economies

Section 1: Trends in Japan’s manufacturing industries

(Situation surrounding Japan’s manufacturing industries: Japan’s economic conditions (1))

The Great East Japan Earthquake occurred when the Japanese economy was showing signs of recovery from the worldwide recession and the subsequent sluggish economic growth. Japan’s real GDP suffers negative growth, affected by lower production activities and decreased final consumption expenditures. In particular, the transport machinery industry has suffered a record-setting production drop, but mining and industrial output is seeing a trend of recovery these days.

[Chart 1-1: Contribution of GDP components to the real GDP growth rate]

Source: Cabinet Office, “National Accounts”

[Chart 1-2: Trend of industrial production indexes (manufacturing industries)]

Source: METI, "Industrial Production Index"
Corporate views on business environment are deteriorating due to the negative impacts of the Great East Japan Earthquake. In addition, the sales volume of products covered by the Eco Point or Eco Car Subsidy Program has increased the positive impacts of these policy programs, but it has fluctuated so much due to the termination/alternation of these policy programs or from the effects of the Great East Japan Earthquake.

**Chart 1-3: Business conditions DI**


**Chart 1-4: Trends in consumer electronics sales/shipment volume and automobile sales volume**

Japanese firms have a stronger tendency to earn profits in Asia or other emerging markets by expanding their business operations overseas. In addition, Japanese firms’ overseas subsidiaries have more suppliers/customers in their neighboring countries or other nations, suggesting that global supply chains are getting more complicated.

**Chart 1-5:** Trend of regional current profit of Japanese firm’s overseas subsidiaries (manufacturing industry)

**Chart 1-6:** Trends in suppliers/customers of Japanese firms’ local overseas subsidiaries (manufacturing industries)

Source: METI, “Survey of Overseas Business Activities”

Source: METI data (January 2011)
(Changes of profit structure: Current status of globalization (2))

The income balance, which represents a gap between interests, dividends, or wages receivable from foreign nations and those payable to foreign nations, has been exceeding the trade balance since 2005. Foreign direct investment (FDI) of manufacturing industries is taking a downward trend on the world total basis, showing a significant drop in North America and Europe, but it takes an upturn in Asia.

[Chart 1-7: Trends in income balance and trade balance]

[Chart 1-8: Trends in foreign direct investment by region (manufacturing industries)]

Remarks: Data for “Europe” from 2005 to 2009 represent the sum of “Western Europe” and “Eastern Europe, Russia, etc.” in the same period.

Source: Ministry of Finance, “Balance of Payments”
Current profits of overseas subsidiaries have been decreasing since 2008, but the back-flow of profits to the domestic market suffered only a relatively small drop in 2008 and started to take an upturn in 2009. Since the overseas subsidiary dividend income non-accrual program was introduced in April 2009, more and more companies are intending to bring their dividend income back to Japan.

**Chart 1-9: Flow-back of profits to the domestic market**

**Remarks:** The data are plotted, with the data in 2001 representing 100.

**Sources:** Chart developed by METI based on “Balance of Payments” by Ministry of Finance and “Survey of Overseas Business Activities” by METI.

**Chart 1-10: How to spend overseas subsidiary's profits before/after the overseas subsidiary dividend income non-accrual program is introduced**

**Remarks:** “The overseas subsidiary dividend income non-accrual program”

If a domestic corporation has 25% or larger shareholding ratio in a foreign firm for six months or longer, the domestic corporation is able to exclude 95% of the dividend income from such foreign firm from its profits.

**Source:** Japan Economic Foundation, “Survey Research on Enhancing Competitive Edge of Japan’s Industries to Address Changes in Competition Environment”
Overseas/domestic capital investment ratio in manufacturing industries is rising to 51.4%. A lot of firms put emphasis on capital investment at overseas production bases for “capacity enhancement” purposes, while they also focus on capital investment at domestic bases for “rationalization/laborsaving” purposes or “new products or advanced products” purposes.

[Chart 1-11: Overseas/domestic capital investment ratio]

[Chart 1-12: Priority investment categories in FY2011 (in comparison with FY2010)]

Remarks: Overseas/domestic capital investment ratio = (consolidated overseas capital investment / consolidated domestic capital investment) * 100; if overseas investment exceeds domestic investment, this ratio will rise further than 100%.


Source: METI, “The Second Emergency Survey on the Actual Status of Industries after the Great East Japan”
As for effective forex rates for recent years, the yen has been rapidly appreciating in comparison with the US dollar, Euro, or Korean won. The yen is getting much stronger than is assumed by exporting firms.

**Chart 1-13: Value of major currencies in effective forex rates**

- **Japanese yen**
- **US dollar**
- **Euro**
- **Korean won**
- **Chinese yuan**

Remarks: The data are plotted, with the forex rate in January 2007 representing 100.
Source: Bank for International Settlements (BIS)

**Chart 1-14: Assumed trend of forex rates by exporting firms**

With the yen getting stronger in relation to the US dollar, more than 70% of the respondent companies say that they are facing “serious profit drop” or “profit drop to a certain extent.” If the forex rate stays around ¥76/$1 for a half year or longer, more and more corporations will suffer “serious profit drop.” To address a sharp rise in the yen value, overseas production transfers will probably speed up further.

**[Chart 1-15: Impacts of the forex rate on earnings (large manufacturers; against the US dollar)]**

<table>
<thead>
<tr>
<th>Impacts of the current yen value (n = 59)</th>
<th>Possible impacts if the yen value stays high for a half year or longer (n = 59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Severe profit decline (operating profit will decline by 20% or more on a year-on-year basis)</td>
<td>32 Severe profit decline (operating profit will decline by 20% or more on a year-on-year basis)</td>
</tr>
<tr>
<td>61 Almost no impact</td>
<td>47 Almost no impact</td>
</tr>
<tr>
<td>12 Profit decline to a certain extent (less than 20%)</td>
<td>8 Profit decline to a certain extent (less than 20%)</td>
</tr>
<tr>
<td>12 Profit increase to a certain extent (less than 20%)</td>
<td>12 Profit increase to a certain extent (less than 20%)</td>
</tr>
</tbody>
</table>

Remarks: Survey period: August 22 to August 26, 2011  
Source: METI, “Survey concerning the impact of the current strong yen on industries (large manufacturers)”

**[Chart 1-16: Impacts of stronger yen on overseas transfers]**

- 59 Cutting down costs through management efforts and product design changes
- 56 Changing materials procurement methods/percentage (Overseas procurement is increasing)
- 52 Changing parts procurement methods/percentage (Overseas procurement is increasing)
- 52 Risk hedging through foreign exchange contracts
- 46 Overseas transfers of production plants or R&D facilities

Remarks: These are possible actions if stronger yen as of August 2011 (approximately ¥76/$1) continues for longer than a half year.  
Source: METI, “Survey concerning the impact of the current strong yen on industries (large manufacturers)”
“Overseas firms’ M&A toward Japanese manufacturers” are obviously increasing more than “Japanese manufacturers’ M&A toward overseas firms.” On the other hand, a stronger yen these days will have positive impacts on “Japanese manufacturers’ M&A toward overseas firms.”

Source: The data come from RECOF Data materials.
Section 2 Current status of employment/labour of manufacturing workers

(Status of the employment/ labour market (1))

The number of people employed in manufacturing industries has been on a long-term downtrend, and although the number began to recover in 2005, it has been declining again since the second half of 2007. Unemployment rate (seasonally adjusted) has been showing a downward trend after hitting a record high of 5.5% in July 2009. Active jobs-to-applicants ratio (seasonally adjusted) is demonstrating a gradual upward trend having reached 0.66 in August 2011 after hitting a record low at 0.43 in August 2009. However, the employment situation still remains quite severe. The number of new job offers in manufacturing industries and the active jobs-to-applicants ratio in the areas of production processes and labour services has recently been growing moderately.

[Chart 1-19: The number of employed workers, etc. in manufacturing industries]
[Chart 1-20: Trend of total unemployment rate and active jobs-to-applicants ratio]
[Chart 1-21: Changes in the number of job offers in manufacturing industries (October 2007 = 100)]
[Chart 1-22: Changes in the Active Jobs-to-Applicants Ratios in Production Process and Labour Services]

Remarks: I to IV represent the 1st quarter to the 4th quarter. The above figures are original series.
More and more corporations, mainly manufacturers, reported a rapidly growing feeling of excessive employment in the first half of 2009, but the feeling gradually subsided after that point. However, it is becoming stronger again in the second quarter of 2011.

The proportion of establishments that had implemented some form of employment adjustment was nearly 50% in the second quarter in 2009. In particular, the proportion decreased after recording 70% in the manufacturing industries. However, the trend is reversing in 2011.

The number of people covered by the employment adjustment subsidy program took a downward trend after the second half of 2009. It has been decreasing after a sharp rise in March and April 2011.

In addition, a sharp rise in the yen value will likely accelerate overseas production transfers in materials/parts industries, which play core roles in supply chains, leading to the loss of domestic job opportunities in manufacturing industries. For this reason, the government needs to quickly take employment-security actions.
To address such employment situations appropriately, the government is steadily working on "Step 2" of New Growth Strategy in line with the "2011 Employment Strategy: Basic Policy" drafted by the government, and is also pushing ahead with full-fledged "Employment and Human Resources Strategies" as "Step 3." To be more specific, the government is pushing ahead with comprehensive employment/labour policies with the FY2011 budget, etc. by expanding employment/labour-related supportive measures under the three policy pillars of "connecting," "creating," and "protecting" job opportunities.

Note: The box with solid lines represents a project financed with the FY2011 budget, while the box with dotted lines shows a policy action already financed with FY2010 "Contingency Reserve for Economic Crisis Response and Regional Revitalization" or FY2010 supplementary budget.

- **Connecting** job opportunities
  - Creating the Job Seekers Support Program
    - New
    - Launching a new permanent program that provides jobless people with free vocational training sessions and livelihood support benefits during the training sessions if they are not covered by the employment insurance.
  - Extension of the Emergency Human Resource Development Program
    - [Supplementary budget: ¥100 billion]
    - Extending the "Emergency Human Resource Development Program" until the "Job Seekers Support Program" is formally launched.
  - Employment support services for new graduates or non new graduates
    - [continued] [¥11 billion]
    - Assigning university graduates and job supporters at Hello Work.
    - Enhancing collaborations with universities to push ahead with cooperation in holding job-interviewing sessions to provide job opportunities.
    - Pushing ahead with the utilization of "Hello Work" Facilities Dedicated to Support for the Employment of New Graduates or "Headquarters for Supporting Employment of New Graduates (consisting of Hello Work, local governments, labour circle, educational circle as members, etc.)."
  - Project to help new graduates obtain jobs
    - [Reserve fund: ¥12 billion; supplementary budget: ¥49.5 billion]
    - Creating "a cash incentive scheme to increase the employment of graduates within three years from their graduation (under the same terms as those for new graduates)" and "a cash incentive scheme for trial employment of graduates within three years from their graduation (financed with reserve fund) and extending these programs by the end of FY2011 by spending supplementary budget; and creating "a cash incentive scheme for non-new graduates employment" (financed with supplementary budget).

- **Creating** job opportunities
  - Expanding the project to create jobs in priority fields
    - [Supplementary budget: ¥100 billion for each]
    - Extending policy actions for new employment opportunities creation and human resource development in growth fields, such as long-term care services by the end of FY2011.
  - Employment adjustment subsidy
    - [continued] [¥392.7 billion]
    - Granting the employment adjustment subsidies as well as the emergency employment stabilization subsidies for SMEs to support companies’ efforts to maintain jobs.
  - Creating of support program for human resource development in growth areas
    - [Supplementary budget: ¥50 billion]
    - Providing funds (¥200,000 at maximum) to cover actual costs of vocational training if the employer hires new workers, or relocate manpower from other areas, in health, environment, and other related manufacturing processes and the employer lets employees undergo vocational training in locations other than their workplaces.

- **Protecting** job opportunities
  - Employment insurance system expansion
    - * Estimated to yield economic impacts worth ¥38.3 billion
  - Relaxation of eligibility requirements for employment adjustment subsidies
    - [Supplementary budget: Amendment to the current framework]
    - Relaxing eligibility requirements for companies suffering from delayed production due to a sharp rise in the yen value
  - Supporting SMEs to raise the minimum wage
    - [new] [¥5 billion]
    - Setting up one-stop counseling desks nationwide (167 locations) to provide business management and labor-related counseling services for SMEs working on raising their wages.
    - Providing subsidies if nationwide trade organizations in 13 industries, where raising the minimum wage will pose significant impacts, are working on their projects to raise the wage level (¥20 million at maximum, 15 organizations)
    - Providing subsidies to the local SME with the minimum wage of ¥700 or lower if it systematically raises the wage level to ¥800 or more and introduces new equipment that will contribute to improving labor efficiency (the subsidy ratio: 1/2).
  - Promoting workers’ mental health measures
    - [continued] [¥3.6 billion]
To promote employment support and job creation for the disaster victims of the Great East Japan Earthquake on March 11, 2011, the government has set up the “Conference on promotion of employment support and job creation for the disaster victims”, and formulates the overall countermeasures across the ministries and strongly pushes ahead with the measures.

On April 5, 2011, the government decided its basic guidelines “to support the disaster victims’ employment and living by Japan becoming one,” and named the overall project as “Japan as One Work Project”. In line with this basic guidelines, the government is taking various policy actions by sorting them out as Phase 1, (defined as tentative emergency overall countermeasures), and as well as Phase 2 (comprehensive countermeasures through supplementary budgets and new legislation).

| Chart 1-26: Employment/labour measures in response to the Great East Japan Earthquake |
|----------------------------------|-----------------------------------|-----------------|
| **Phase 1: “Japan as One Work Project”** | **Phase 2: “Japan as One Work Project”** |
| **Supporting your employment and living through “Japan as One”** | **Supporting your employment and living through “Japan as One”** |
| (The conclusion on the countermeasures Phase 1 decided at the “Conference on promotion of employment support and job creation for disaster victims”) | (The conclusion on the countermeasures Phase 1 decided at the “Conference on promotion of employment support and job creation for disaster victims”) |
| **1. Basic guidelines** | **1. Basic guidelines** |
| The disaster victims' employment and living will be supported by “Japan becoming one”, through measures listed below: | **April 5, 2011** |
| 1) Creating employment opportunities, for the disaster victims and utilizing the companies and resources affected by the disaster through reconstruction projects. | **April 27, 2011** |
| 2) By carefully taking into consideration of the disaster victims and local areas accepting the disaster victims, supporting the employment in areas outside the affected sites for those who desire. | **13** |

| 2. Tentative, emergency overall countermeasures |
|----------------------------------|-----------------|
| Steadily creating jobs through reconstruction projects , etc. | Promoting the reconstruction of the disaster areas. |
| Constructing a system to match the disaster victims and jobs. | Creating “Japan as One” Job Council. |
| Maintaining/Securing employment of the disaster victims. | Expanding the employment support for newly graduates. |

| 3. Informing the disaster victims for sure through effective public relations activities |
|----------------------------------|-----------------|
| Promoting of reconstruction projects | 1) Strengthening the functions of matching disaster victims and jobs in the affected areas. |
| - Restoration of infrastructures, clearing of rubble, construction of provisional housing, and repairing and rebuilding of housing | Creating “Japan as One” Hello Work. |
| - Promoting to secure orders to local contractor companies in the tentative reconstruction projects. | Providing on-site counseling services to evacuation areas. |
| - Requesting that private employers to submit the job offer for restoration projects to Hello Work. | Assisting those engaged in agriculture/forestry/fishery workers and self-employed workers. |
| - Providing incentives through the provision of employment subsidies targeting the unemployed by the disaster. | Expanding and conducting vocational training feasibility. |
| - Expanding the employment adjustment subsidies. | Expanding and conducting the administrative functions of council/policies. |

| Overall countermeasures according to the supplementary budgets and new legislations |
|----------------------------------|-----------------|
| Steadily creation of employment through reconstruction projects (¥23.54 billion estimated to create job opportunities for 200,000 workers) | Expansion of subsidies for companies that hire disaster victims. |
| Assistance for disaster victims’ new employment (¥15.8 billion estimated to underpin employment for 60,000 workers) | Maintaining and expanding employment stability. |

| The impact of job creation and support for employment through the Countermeasures Phase 2 |
|----------------------------------|-----------------|
| Economically, a total of 4,296.6 billion yen is generated. Jobs are created for about 200,000 people. Over 1.5 million people’s employment is supported. | Maintaining and expanding employment stability. |

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Chapter 2: Challenges and Prospects Facing Japan’s Monodzukuri Industries

Section 1: Manufacturing industries in Japan are facing structural changes in the global economy

(International structural changes)

Emerging economies are enjoying significant growth, but Japan fails to take advantage of such growth. On the other hand, as competition to acquire resources is getting stiffer owing to growth of emerging economies, resource constraints are further intensified.

[Chart 2-1: Growth of Asian emerging economies, and increase in value of exports by major countries]

[Chart 2-2: Trend of crude oil prices and consumption volume]

Source: Global Trade Atlas, World WDI

Source: BP "BP Statistical Review of World Energy June 2010"
Foreign nations are actively making efforts to advance their manufacturing industries. They aim to simultaneously achieve the two goals of addressing limited resource availability and enhancing the competitive edge of their manufacturing industries in the medium and long run by acquiring next-generation technologies mainly in environment and energy saving fields.

[Chart 2-3: Examples of foreign governments’ supportive measures for manufacturing industries]

<table>
<thead>
<tr>
<th>Country</th>
<th>Main policies that contribute to enhancing the competitiveness of manufacturing industries</th>
<th>Core policy areas</th>
</tr>
</thead>
</table>
| USA       | National Export Initiative (March 2010)  
Doubling exports in five years through expanding domestic investment and thereby creating job opportunities for 2 million workers | Green New Deal  
Support policy for innovation programs in environment and energy fields |
| Germany   | Cabinet decision on Electromobility National Strategy (May 2011)  
Creating the automobile tax exemption program for electric cars for ten years in order to disseminate electric cars. Taking enhancement policies by spending 1 billion Euros by FY 2013 in addition to 500 million Euros for financing electromobility-related R&D projects which were decided in 2009. | Electric car national platform  
Fostering domestic firms as “lead market players” through supporting R&D on electric cars |
| South Korea | Framework Act on Low Carbon, Green Growth (April 2009)  
Spending more than 50 trillion won on low carbon, green growth areas, including manufacturing industries, for 4 years until 2012, aiming to create job opportunities for 950,000 workers | Fostering the 10 major core materials industries  
Green New Deal (Four main national policies)  
Creating job opportunities by securing growth potentials through low carbon, new energy policies |
| China     | The 12th Five Year Plan (2011)  
Enhancing the competitive edge of innovative industries by designating (1) IT, (2) energy saving and environment protection, (3) new energy, (4) bio, (5) high-performance manufacturing equipment, (6) new materials, and (7) new energy cars as strategic industries | Energy-saving, New energy  
Automobile Industry Development Plan:  
Fostering large corporations that manufacture EVs, etc. |
(Aiming at “profitable Monodzukuri”)

Advanced manufacturing industries are developing in South Korea because the nation is gaining a comparative advantage in intermediate commodities. Overseas firm’s M&A toward domestic manufacturers are also increasing. Japan’s competitive edge is taking a downward trend. Japanese manufacturers should actualize “profitable Monodzukuri” practices that create value-added products from technological advantages.

[Chart 2-4: Comparative advantage index]

[Chart 2-5: Chinese/Korean firm’s M&A toward Japanese manufacturers]

[Chart 2-6: IMD international competitiveness ranking]

Remarks: Comparative advantage index (in the case of intermediate goods) =
(intermediate goods export/total export)/(intermediate goods export in the world/total export in the world)

Source: RIETI-TID 2010

Source: IMD "WORLD COMPETITIVENESS YEARBOOK"
The Great East Japan Earthquake on March 11, 2011, has brought about significant damage in the Tohoku and Kanto areas. Production disruption at affected firms has had extensive negative impacts on production activities in a wide variety of companies through supply chains surrounding the manufacturing industries. Since a lot of firms do not fully understand the supply chains they belong to, negative impacts have spread out further.

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### Chart 2-7: Total damage caused by the Great East Japan Earthquake

<table>
<thead>
<tr>
<th>Categories</th>
<th>Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings, etc. (housing/housing sites, stores/offices, factories, machines, etc.)</td>
<td>Approximately ¥10,400 billion</td>
</tr>
<tr>
<td>Lifeline facilities (water supply, gas, electricity, communications, broadcasting facilities)</td>
<td>Approximately ¥1,300 billion</td>
</tr>
<tr>
<td>Social infrastructure (rivers, roads, ports, sewage systems, airports, etc.)</td>
<td>Approximately ¥2,200 billion</td>
</tr>
<tr>
<td>Agriculture/forestry/fishery-related (farmland/agricultural facilities, forest land, fishery-related facilities, etc.)</td>
<td>Approximately ¥1,900 billion</td>
</tr>
<tr>
<td>Others (Education facilities, healthcare/medical/welfare related facilities, waste treatment facilities, or other public facilities)</td>
<td>Approximately ¥1,100 billion</td>
</tr>
<tr>
<td>Grand total</td>
<td>Approximately ¥16,900 billion</td>
</tr>
</tbody>
</table>

Source: Cabinet Office disaster prevention group’s data

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### Chart 2-8: Impacts of earthquake damage on production activities

- **Primary damage**
  - Parts/materials manufacturers <Suspension>
  - Processing manufacturers <Suspension>
  - Final products manufacturers <Suspension>

- **Secondary damage**
  - Parts/materials manufacturers <Production cutback>

- **Tertiary damage**
  - Damage, etc.
  - Decreased demand
  - Supply disruption

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### Chart 2-9: Reasons for difficulties to procure raw materials, components and parts

- Materials industry (n = 26)
- Processing industry (n = 22)
- Suppliers have damaged by the earthquake
- Supplier’s suppliers/damaged by the earthquake
- Damage to Distribution network
- Affected by rolling blackouts
- Others

- Only understand their suppliers 46.7%
- Understand their supplier’s parts/materials suppliers 29.7%
- Other (1.2%)
- Only understand their suppliers 22.4%
- Other 1.2%

Source: METI data (January 2011)
Some affected firms enjoy high market share in the world and supply highly important parts/materials that play core roles in the supply chains. Even in districts without direct earthquake damage, production or economic activities have stagnated, bringing about extensive repercussions to corporations at home and abroad.

[Chart 2-11: Examples of damage by the Great East Japan Earthquake have spread out across the supply chain]

Source: Extracts from the documents distributed at the third meeting of the Basic Policy Subcommittee, Industrial Structure Council (May, 2011), METI.
(Impacts of electricity restraint and higher electric power cost)

The nuclear power station accident resulting from the Great East Japan Earthquake has resulted in a constrained electricity supply. If operating rates at nuclear power stations decline and alternative power sources are used, a rise in electric power cost will push up production cost across industries, possibly posing negative impacts on the international competitiveness in many industries.

<table>
<thead>
<tr>
<th>Company</th>
<th>Impacts on business activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical firm A</td>
<td>As massive amounts of significant electric power is consumed for manufacturing products, restrictions on electricity consumption will directly lead to decreased production. A 15% electricity consumption restriction will probably send down corporate earnings by more than 20%.</td>
</tr>
<tr>
<td>Automaker C</td>
<td>The company is planning nonworking day shifts or acceleration of production speed in order to mitigate limited electricity availability, but it needs to make adjustments with the labor union or increase the wage cost, such as extra pay.</td>
</tr>
<tr>
<td>Chemical firm D</td>
<td>The company has been facing stiffer competition with other manufacturers in Asia. If the company starts private power generation to address limited electric power availability, the cost will double, posing significant negative impacts on corporate earnings.</td>
</tr>
<tr>
<td>Nonferrous metal firm G</td>
<td>Even instantaneous voltage reduction will lead to blackout in plants. It will take at least 4 hours to recover from the blackout. Work-in-progress goods will become scrap. Plant workers need to readjust measuring equipment every time a blackout occurs, significantly raising costs.</td>
</tr>
</tbody>
</table>

Source: METI data

[Chart 2-12: Impacts of electricity restraint on corporate activities]

<table>
<thead>
<tr>
<th align="left">(US cent/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left"><strong>Japan</strong></td>
</tr>
<tr>
<td align="left">15.8</td>
</tr>
</tbody>
</table>

Source: METI, “FY 2010 Power Source Site Selection Promotion Adjustment Project (Survey on Power Utility’s Cost Structure in Europe and the US)”

[Chart 2-13: International comparison of industrial-use electricity tariff]

[Chart 2-14: Increased production cost as a percentage to operating surplus]
The nuclear power station accident has yielded anxieties about Japanese brands, such as “high quality” and “safety.” It has also had negative impacts on business activities of a lot of firms, such as delayed procurement of materials and increased cost on radioactivity inspections.

**Remarks:** Interbrand Japan surveys how consumers in the US, the UK, and China have changed their recognition toward Japanese brands in five industrial categories: “automobiles,” “consumer electronics,” “cosmetics/toiletries,” “foods/beverages,” and “apparels.” The company calculates the percentage of respondents choosing the answer option “I think in that way very much” or “I think in that way” in terms of five brand images: (1) trustworthiness, (2) safety, (3) high quality, (4) stylishness, and (5) familiarity. The chart above shows the average points of the five industries and the five brand images.

Source: Interbrand Japan, “Quantitative Survey on Impacts of Earthquake and Nuclear Power Station Accident on Japanese Brands Overseas”

Source: Chart developed by METI based on Teikoku Databank’s survey (August 2011).
Japanese manufacturers have recovered from earthquake damage at a quicker pace than expected, through serious corporate effort and collaboration among companies.

[Chart 2-17: Production level at disaster-affected production bases (June 2011 survey)]

Source: METI, “Emergency Survey on Actual Status of Industries after the Great East Japan Earthquake (2)"

[Column: Quick recovery through inter-company collaboration] Renesas Electronics Corporation’s core plant, Naka Plant, suffered earthquake damage, posing serious negative impacts on supply chains of automobiles, electric appliances, and machinery. However, aiming to resume production as soon as possible, business partner automakers and electric appliance manufacturers sent up to 2,500 workers a day to cooperate with Renesas workers. As a result of their recovery work by maximizing the effects of their teamwork efforts, Renesas has quickly recovered from earthquake damage, much quicker than initially scheduled.
As recovery of affected production bases has restored supply chains, production level at unaffected plants has also recovered quickly. Manufacturers have overcome electricity restraint this summer by making serious electricity-saving efforts.

Source: METI, “Emergency Survey on Actual Status of Industries after the Great East Japan Earthquake (2)”

[Chart 2-18: Production level at unaffected production bases (June survey)]

[Column: Electricity-saving efforts through nonworking day shifts]
The government requested companies to reduce their electric power consumption, anticipating tight electricity supply in the summertime. In response to this, electricity consumers took actions in line with their own characteristics or industry’s characteristics. Automakers decided to alter their nonworking days to Thursday and Friday on weekdays from July to September, shifting away from Saturday and Sunday on which electricity consumption is relatively low. Automakers have achieved electricity-saving outcomes by making serious efforts to gain an understanding of their staff members and local communities in terms of a lot of problems related with childcare and daily commuting.
(Industrial hollowing-out is becoming highly likely (1))

After the Great East Japan Earthquake, the domestic business environment further deteriorated, as some industrial analysts refer to it as “six problems.” Restrictions on electricity consumption or higher electricity tariff will have significant impacts on overseas transfer of supply chains. In addition, approximately 40% of respondent firms that procured materials/parts from overseas substitutive suppliers are planning to continue overseas procurement in the future. It is worrying that the Great East Japan Earthquake may trigger further hollowing-out of domestic industries.

[Chart 2-19: Possibility of supply chain overseas transfer owing to the Great East Japan Earthquake]

[Chart 2-20: Possible impacts of electric power consumption restrictions or higher electricity tariff on overseas transfer of supply chains]

Source: METI, “Emergency Questionnaire on Supply Chain Restoration and Industrial Hollowing-out after the Great East Japan Earthquake” (May 2011)

[Chart 2-21: Post-recovery suppliers of affected firms]

Source: METI, “Emergency Survey on Actual Status of Industries after the Great East Japan Earthquake (2)” (August 2011)
In line with domestic manufacturers’ stronger intentions to transfer production overseas, foreign governments are making efforts to attract production plants to their home nations. This might accelerate overseas transfers of companies.

[Chart 2-22: Examples of foreign central/local governments are making active efforts to attract Japanese firms to their home nations]

- **City A, South Korea**: The city sent a Japanese firm investment invitation mission in May, offering exemption of corporate tax for 3 years and income tax for 7 years.
- **City B, South Korea**: The city makes arrangements directly with companies, with the Korea Trade-Investment Promotion Agency (KOTRA) serving as an intermediary. It is pushing ahead with inviting enterprises, including corporate mergers and establishment of joint ventures.
- **City C, China**: (Through an official visit to express sympathy for Japanese firms after the Great East Japan Earthquake) the company officials said, “they came to know that Japanese firms would accelerate industrial transformation. This is a chance to invite Japanese firms to China. We would like to make an appeal that our transportation, hydro power generation infrastructures, human resources, and technical capabilities are better than other cities.”
- **Chemical manufacturer D, South Korea**: The company set up a joint venture of secondary batteries in tie-up with a Japanese firm. It expects that they will be able to successfully invite corporate investment to South Korea, with Japanese manufacturers starting production decentralization owing to the Great East Japan Earthquake.
- **Real estate firm E, Vietnam**: Company E, which manages industrial parks in Vietnam, started to support overseas business expansion of SMEs affected by the Great East Japan Earthquake. To enhance the domestic supply chain by inviting parts manufacturers, the company aims to establish a cluster consisting of technologically capable SME manufacturers.

Source: METI compiled the above information from news reports.

[Chart 2-23: Foreign governments’ invitations for overseas business expansion]

- **Large enterprises**: 18% are invited, 82% are not invited. (n=57)
- **SMEs**: 13% are invited, 87% are not invited. (n=85)

Source: METI, “Survey concerning the impact of the currently strong yen on industry (Large manufacturers)” (August 2011) and “Survey concerning the impact of the currently strong yen on industry (SMEs)” (August 2011)
The government should provide a better business environment, including taxation system or economic partnership so that corporations will smoothly conduct their business activities at home and abroad in the difficult business environment surrounding Japan’s manufacturing industries.

(Aiming to make a significant step forward by recognizing the earthquake damage as an opportunity)

Examples of TPP outcomes that Japan should seek

1. Eliminating tariffs
   - Passenger cars (bound for the US): 2.5%
   - Trucks (bound for the US): 25%
   - Electric/electronic equipment (bound for Australia): 5%
   - Construction machineries (bound for Australia): 5%

2. Creating fair rules
   - No discrimination in government procurement for domestic and foreign suppliers
   - Enhancing intellectual property protection schemes
   - Prohibiting government intervention into license agreements
   - Simplifying the customs clearance procedures

Source: Teikoku Databank, “Corporate Awareness Survey on Industrial Hollowing-out” (August 2011)

Source: METI data
Aiming at further progress of the Japanese economy, the government will strive to achieve the New Growth Strategy and push ahead with technical assistance related with resource-saving and energy-saving technologies for rare earths, etc. In addition, it will make use of the recent stronger yen to address limited resource availability through acquiring resource interests and to support M&A of overseas firms.

[Chart 2-26: Outline of the New Growth Strategy]

**New Growth Strategy**

**- Strong Economy, Robust Public Finances, and a Strong Social Security System -**

<table>
<thead>
<tr>
<th>Targets</th>
<th>2020</th>
<th>Current situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieve nominal and real growth in excess of 3% and 2%.</td>
<td>- Sluggish growth (real growth rate at 1% in the past decade; potential growth rate at 1%)</td>
<td></td>
</tr>
<tr>
<td>Return consumer prices to a positive increase in FY 2011</td>
<td>- Trapped in deflation (consumer price increase rate at 0% in the past 20 years)</td>
<td></td>
</tr>
<tr>
<td>Lower the unemployment rate to 3%-4% as soon as possible</td>
<td>- Unemployment rate at 5%</td>
<td></td>
</tr>
</tbody>
</table>

**Measures for ensuring achievement of the strategy**

- "Demand and job creation" criteria: Place top priority on policy measures with significant demand and job creation effects.
- "Selection and Focus" criteria: Prioritize on truly essential fields and avoid duplication of similar projects.
- Participation of the people: Open up the public sector and place priority on active participation by the people.
- "Optimum option" criteria: Choose optimum policy measures that produce maximum effects with limited financial resources.

**7 strategic areas and 21 national strategic projects**

- Green Innovation
- Life Innovation
- Asia
- Tourism-oriented nation and local revitalization
- Science-and-technology- and IT-oriented nation
- Employment and human resources
- Financial sector

Finance is added to strategic areas because it will play important roles in achieving growth.

**Creation of new demand and jobs**

<table>
<thead>
<tr>
<th>Area</th>
<th>Demand creation</th>
<th>Job creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment (Green Innovation)</td>
<td>¥50 trillion</td>
<td>1.4 million jobs</td>
</tr>
<tr>
<td>Health (Life Innovation)</td>
<td>¥50 trillion</td>
<td>2.84 million jobs</td>
</tr>
<tr>
<td>Asia</td>
<td>¥12 trillion</td>
<td>190,000 jobs</td>
</tr>
<tr>
<td>Tourism</td>
<td>¥11 trillion</td>
<td>560,000 jobs</td>
</tr>
</tbody>
</table>

**Project timetable management**

- Timetable management (commitment to successful implementation)
- Check on the implementation status and effects through the PDCA cycle

**Consistency with the Fiscal Management Strategy**

- Implementation of the New Growth Strategy consistent with the Fiscal Management Strategy
- Reallocation of the budget with review of the expenditure priorities

**Improve predictability in the eyes of the market => Induce investment**

Source: Excerpt from “Points of New Growth Strategy” on the Prime Minister’s Office website

[Column: Emergency Package in Response to the Yen’s Appreciation]

On August 24, 2011, the Ministry of Finance announced the “Emergency Package in Response to the Yen’s Appreciation” to deal with the rapid appreciation of the Japanese yen. By creating the emergency facility for dealing with stronger yen ($100 billion), the package aims at (1) stabilizing forex rates by encouraging conversion of private sector’s yen fund to foreign currencies and (2) acquiring overseas assets through M&A by making use of the stronger yen, aiming to expand national wealth in the long run. METI is also planning to spend some budget funds to encourage Japanese firms to acquire foreign firms or overseas resource interests. The government currently needs to prevent the hollowing-out of domestic industries and simultaneously back up Japanese firms so that they will draw on growth of overseas firms.
Japanese manufacturers are actively expanding their business operations overseas to draw on overseas demand these days, mainly in rapidly growing emerging markets. More and more manufacturers set up production bases that also serve as sales bases in emerging economies, aiming to capture demand in emerging markets.

Source: METI, "Basic Survey on Overseas Business Activities"
In the past, corporations expanded their business operations for “low cost production” purposes in most cases. However, they are now planning their overseas business expansion mainly to “cultivate the global market” on the back of a rise in emerging markets. Manufacturers are pushing ahead with overseas production of managerially important core products as well as transferring core technologies to overseas production bases to enhance cost competitiveness, but they should take appropriate countermeasures on technical outflow to maintain a competitive edge in the long run.
Approximately 40% of the respondent manufacturers said that they “slightly scaled down” or “significantly scaled down” their domestic production base when setting up or expanding overseas plants, while approximately 25% of firms said that they shifted their domestic production to high value added products, suggesting that they are scaling down domestic production bases but increasing domestic production of high value added products.

Source: METI data (January 2011)
Manufacturers have stronger awareness that their domestic base should work on R&D on advanced products. In addition, manufacturers that actively make capacity investment at home are showing relatively better performance. In the future, they should enhance their domestic bases through active investment and employment because domestic bases serve as a source of competitiveness.

Kureha Corporation sticks to R&D and production at home from long-term perspectives and is working on developing and producing new materials. This is because the company recognizes it is important to identify characteristics of materials and improve their qualities by paying due attention to consensus-building with downstream firms. For this reason, although the market is spreading globally, Kureha is keeping competitiveness by maintaining its mother lines at domestic plants because know-how is concentrated in the mother lines.

An example of new materials created from Kureha’s efforts is binders for lithium ion batteries (materials that bind positive electrode materials and aluminum foils as well as negative electrode materials and copper foils). Since the company developed the materials approximately 40 years ago, it has been working on R&D and production tasks from medium- and long-term perspectives. As a result, Kureha’s new materials have turned into successful materials for binders. Now, the company controls 70% of the world market share of binders.
[Column: Production process innovations]
As production cost is rising in Japan, it is very important to improve production processes so that domestic plants will maintain global competitiveness.

By visualizing, standardizing, and indexing operators' production knowhow, which is heavily dependent on personal skills in the materials industry where production innovation is rather difficult, Daicel Chemical Industries, Ltd., a manufacturer of synthetic resins for automobiles and consumer electronics as well as cellulose acetate for LCD-use films, has achieved a three-phase operational improvement consisting of “viewing, stopping, and changing” operational practices and has established a stable production management system independent of skilled mechanics.

1) Viewing
Overhauling a series of tasks ranging from new order acceptance to product deliveries, and checking out appropriate knowhow and role-sharing

2) Stopping
Creating data on a case-by-case basis by getting interviews about skilled mechanics’ behavior based on their experiences and feelings, and carefully screening essential tasks

3) Changing
Introducing an IT system that reflects the outcomes of the upstream processes and setting up a new program that will display on the single operational screen the guidance showing abnormal circumstances and a list of their possible reasons

As Daicel has accelerated its efforts before the baby boomer staff retire, operators' workload has decreased sharply, sending down the number of necessary operators to 290 from 740 at the time of introducing the new program. This production approach is called the “Daicel approach” and spreads out to other firms through study group sessions and on-site plant visits.

[Column: Monodzukuri is supported by high-quality employment]
Mirai Industries, Co., Ltd. in Gifu Prefecture shows its respect for employees by adopting an employment and labor scheme with a lifetime employment program with a retirement age of 70 years, 140 days off a year, and no overtime work. It puts emphasis on proposals and self-initiatives of company staff and has a lot of hot-selling products proposed by its staff members.

Nakashimada Engineering Works, Ltd. in Fukuoka Prefecture controls 50% of the world market share and 80% of the domestic market share of header-former (press equipment that manufactures screws and bolts) capable of producing products with a diameter of 2.5 mm or less. The company manufactures 70% of their parts in-house, keeping high product quality. It significantly enhances accuracy and durability by carefully facing up sliding surfaces manually in the assembling process. While enhancing processing accuracy by actively introducing cutting-edge equipment, the company handles finishing tasks with intensified manual work. High-quality “sliding surfaces facing-up” techniques supported with long-term employment is serving for differentiation from competitors and contributes to improving the company’s international competitiveness.

[Column: Low-carbon, Job Opportunity Creating Industries Invitation Promotion Project Costs Subsidy]
By utilizing the Low-carbon, Job Opportunity Creating Industries Invitation Promotion Project Costs Subsidy, Tanaka Chemical Corporation has constructed positive electrode materials product plant for car-mounted lithium ion batteries at the HQ plant site in Fukui City. As the market for positive electrode materials for car-mounted lithium ion batteries is still in the pioneer stage, analysts say companies capable of mass production at an early stage will easily acquire competitiveness. However, since massive amounts of capital investment is necessary, Tanaka Chemical Corporation was not able to capture an appropriate timing for capital investment on a single-company basis. As it represents a cutting-edge technology for which market demand is estimated to get stronger in the future, the company has received ardent invitations from foreign nations. By making use of the said subsidy, Tanaka Chemical Corporation was able to take a bold stance without give away an opportunity for domestic capital investment.
When selecting plant locations at home, infrastructure-related elements, such as “accessibility to customers,” “sufficient site dimensions,” and “logistic conditions,” play important roles, in addition to “availability of plant workers” and “subsidies and administrative support.”

The questionnaire survey this time has revealed that infrastructure- or hardware-related aspects, such as “sufficient site dimension,” “accessibility to customers” or “logistic conditions” play important roles in selecting plant sites at home.

In addition to creating networks among geographically closer organizations, METI has been comprehensively and effectively deploying a wide variety of supportive programs and pushing ahead with the “Industrial Cluster Plan” to create world-class new businesses and encourage the formation of industrial clusters/networks. Chubu Area Aircraft Industrial Cluster, an industrial cluster, has been supporting academic-industrial collaborative R&D and human resources development projects.

As the development and commercialization of domestically manufactured aircraft are progressing, it is important to create a next-generation aircraft innovation cluster incorporating upstream and downstream sections by taking advantage of favorable locations where aircraft body manufacturers and material makers are located.

From the viewpoint of creating the cluster “core” and enhancing centripetal force, Chubu Bureau of Economy, Trade and Industry should push ahead with creating further advanced clusters by enhancing state-of-the-art hardware that plays important roles in the creation of clusters, such as (1) testing equipment necessary for form certification of large wind tunnels and large joint testing machines because Japanese manufacturers are currently using overseas facilities and (2) an R&D base (National Composite Center) capable of comprehensively providing design technologies, processing technologies and repair services on CFRP (composite materials) usable for automobiles and aircraft.
Manufacturers put more emphasis on “forex risks” or “tariff reduction, such as EPA or FTA” in making capital investment overseas, but they tend to attach a higher value to the “cluster or accessibility of universities or research institutes,” “flexible operation of labor force,” “environment constraints, such as CO₂ emission control,” “subsidy or other preferential treatments,” and “availability of engineers” in making capital investment at home, than overseas capital spending.

Source: METI data (January 2011)
Remarks: The survey covers firms having overseas production bases.
It is important to clearly identify demand for next-generation industries arising from changes in market needs, such as recent resource/environment issues or lower birthrate coupled with aging population. Diffusion strategies are different among next-generation industries. For example, low-priced products and cost reduction will be particularly necessary for hybrid automobiles. In addition, a lot of respondents say Japan’s technological advantages and commercial advantages will both improve in next-generation industries. However, as a lower percentage of respondents estimate commercial advantages will rise stronger than technological advantages, it is necessary to enhance Japan’s commercial advantages.

Source: METI data (January 2011)

Remarks: The graph shows average points by allocating 3 points to the questionnaire survey's answer option “advantages will improve,” 2 points to the answer option “advantages will remain almost unchanged,” and 1 point to “advantages will decrease” within the next five years.

Source: METI data (January 2011)
Preparations for next-generation industries are also necessary in supporting industries that underpin automobile and intelligent home appliance industries. Buildup of supporting industries to a certain extent at home is considered necessary. In addition, supporting industries should play advanced roles, such as “high-mix low-volume production,” “prototype development,” or “innovative production technologies.”
A considerable number of Japanese manufacturers recognize that they have problems in technical, education, or other human resource-related issues. This suggests that human resources development, including technical transfer, IT-based standardization, OJT, and Off the Job Training, becomes a serious problem for them.

Remarks: In the questionnaire survey, respondents picked the top three options each from “Strengths/characteristics that should be further utilized in the future” and “Strengths/characteristics that should be enhanced immediately.” The graph shows the average points by allocating 3 points to the top priority option, 2 points to the second priority option, and 1 point to the third priority option.

Source: METI data (January 2011)
South Korea’s total export value and its import from Japan have a very strong correlation. After the Lehman Shock, materials/parts are showing better recovery performance than final products. In the global supply chains, Japanese materials/parts manufacturers are capitalizing on their strengths and winning the world market share.

Lintec Corporation controls more than 30% of the domestic market share in adhesive paper/films for seal labels and registers more than 40% of the world share in semiconductor dicing tapes. The company applies its core technology adhesion technologies and provides a wide variety of products. One of the company’s strengths is providing custom-made products incorporating customer needs. Sometimes, R&D staff members directly visit customers with sales staff to identify potential customer needs, aiming to utilize them for developing new products. In addition to product development, the R&D section is also researching Monodzukuri elemental technologies of “blending,” “painting,” “drying,” “rolling up,” or “cutting” in order to support a production scheme capable of stably manufacturing high-quality products. As a result, overseas customers give the company’s products high marks for their high quality.

As the company earns profits in a wide variety of business fields, it was capable of recovering at a relatively early stage, supported by stable earnings less subject to business fluctuations even after the Lehman Shock. In addition, the company is pushing ahead with enhancing business capabilities, such as reorganizing core plants and making large-scale capital investment in its core business such as seal-label-adhesive paper/films even in economic recession.
Japan has some business fields that play core roles in the supply chain, such as advanced parts/materials. If Japanese manufacturers want to firmly keep control of next-generation industries in the era of international role sharing, it is important to maintain/strengthen production capabilities that play core roles in the supply chain.

[Column: Technologies contributing to improving the performance of lithium ion batteries]
High capacity negative-electrode materials are necessary for improving the performance of lithium ion batteries. Hitachi Chemical has been working on R&D based on carbon technologies developed since its inception, and succeeded in developing artificial graphite capable of creating high capacity negative-electrode materials. The company controls the world’s top market share (45%) in negative-electrode materials, helped by its unique technologies.

[Column: Manufacturing custom-made core parts/materials]
To attain automobile emission control values, high-performance catalyst-use zirconium compounds play key roles. Daiichi Kigenso Kagaku Kogyo Co., Ltd. controls approximately 50% of the world market share of zirconium compounds used for a promoter of automobile emission catalysts. As its customers and raw material mineral deposits are scattered all over the world, the company puts emphasis on domestic production to prevent overseas outflow of technologies that yield the company’s competitiveness. As approximately 50 staff members belong to the R&D section out of the total 300 workers, the company is good at custom-made high-mix low-volume production through advanced processing works tailored to customer needs.

[Column: Rare earths equipment installation subsidy]
Japan Metals & Chemicals Co., Ltd. utilizes the rare earths equipment installation subsidy program to introduce new equipment that extracts/recovers rare earths from nickel hydrogen cells collected at home and abroad in order to stably supply rare earths. By doing so, the company intends to enhance operational capabilities for stably supplying high-capacity high-performance battery-use negative-electrode materials. The subsidy program has induced domestic capacity investment at the amount of ¥100 billion or more, preventing the overseas outflow of production bases or core technologies in growth industries, such as battery parts/materials or neodymium magnets for which market demand is expected to rise sharply. In addition, the subsidy program has diversified supply sources and has cut down annual rare earths consumption by approximately 10,000 tons in relation with the current domestic demand at approximately 30,000 tons.
Approximately 50% of respondent firms say some parts/materials that they are procuring are not substitutable. The Great East Japan Earthquake has revealed that the supply chain in the manufacturing industry has a “diamond structure” in which parts/materials supply at tier 2 or deeper in the supply chain is concentrated in a certain supplier.

**Pyramid structure**
- Each corporate group has a wide base consisting of multiple parts/materials manufacturers.
- Suppliers at each tier level are substitutable.

**Diamond structure**
- Production of some parts/materials concentrated in certain suppliers.
- If such a supplier suffers earthquake damage, negative impacts will occur on the entire supply chain.

Source: METI data (February 2011)
Rare earth production is unevenly distributed. Japan currently depends on China for most of its rare earth imports. As approximately 50% of China’s rare earth export is bound for Japan, Japan is one of the major rare earth consumer nations in the world. Imported rare earths are processed with advanced technologies to create parts/materials for which Japan has a large market share and re-exported to China in many cases.
If a company boasts a larger market share in the world, it knows the supply chain that it belongs to relatively well. On the other hand, such companies tend to use rare earths, rare materials, or other parts/materials susceptible to supply disruption. They should make efforts to reduce such risks.

A high market share company means a corporation with a world market share of 30% or more. The same meaning shall apply hereinafter on this page.

Source: METI data (January 2011)
Before the Great East Japan Earthquake occurred, approximately 95% of respondent firms said they are “taking countermeasures against supply disruption risks, but these countermeasures are insufficient” or they are “not pushing ahead with such countermeasures.” Not many companies lay down emergency actions as their BCP, but some of them worked very well during the earthquake this time. They are effective as contingency planning. Companies are getting more interested in mitigating risks, but some firms are planning on examining/conducting “expansion of overseas production ratio.” This suggests corporate risk mitigation actions could back up industrial hollowing-out further.

[Chart 2-57: Countermeasures on supply chain disruption risks]

Source: METI data (February 2011)

[Chart 2-58: Changes in corporate strategies to mitigate product supply disruption risks after the great earthquake]

Source: METI data based on the Teikoku Databank survey (August 2011)

[Column: Minimizing damage with BCP]
Group firms of Ricoh Co., Ltd. suffered from earthquake damage. In particular, the toner plant of Tohoku Ricoh was severely damaged because the plant tanks were damaged. However, as the company had developed BCP in preparation for significant disasters or accidents, it recovered faster than anticipated.

To be more specific, Ricoh set up the task force chaired by the president to actively share information and check out the situation by forming intersectional consensus. In addition, competitors faced difficulties in securing communications tools, but Ricoh had already created redundant networks and was able to smoothly share information among group firms.
(Column: Rare earth recycling efforts)

Hitachi, Ltd. developed a new technology that recycles rare earths, which is necessary for the production of Hitachi’s core products—motors. As a result, it developed new equipment separating/collecting rare earth magnets from used products and succeeded in extracting rare earths from rare earth magnets using an experiment with dry method. Compared with the traditional approaches, the new method is expected to send up work efficiency and reduce environmental burdens. Santoku has already commercialized the “Inter-user recycling system,” which collects scrap emerging from business partners’ magnet manufacturing processes and recycles them with the most effective approach. In addition, the company is pushing ahead with R&D on new technologies capable of efficiently separating/extracting rare earths from used products using wet methods, reducing them to metals by using only industrial-use equipment developed in-house, and recycling them as magnet alloys. By exchanging opinions with automakers and consumer electronics manufacturers, the company is working on research projects for the expansion of recycling practices.

(Strong and weak points in the supply chain (7))

On the basis of lessons learned from the Great East Japan Earthquake, Japan needs to establish robust supply chains capable of reducing costs and maintaining competitiveness if the nation intends further growth.

1. Enhancing contingency planning capabilities, such as risk diversification in core sections of supply chains
   - Dispersion and creation of the second track
   - Industrial reorganization and business integration
   - Substitutive supply from multiple suppliers at the time of disaster
   - Sorting out and standardizing well-balanced specifications/parts, and making materials specifications more flexible
   - BCP (business continuity plan), etc.

2. Strengthening business/financial capabilities

[Column: Projects to mitigate supply disruption risks of parts/materials]

Honda Motor is working on the following projects, aiming to enhance competitiveness and reduce supply disruption risks of parts/materials.

1) Pushing ahead with diversifying materials suppliers
   Listing parts/materials that Honda is purchasing from a single supplier, and always updating and managing the list. As for parts/materials on the list, Honda will make adjustments with suppliers to diversify materials suppliers as soon as possible.

2) Managing suppliers
   The company requests primary suppliers to periodically check their parts/materials procurement practices. If the supplier is purchasing materials/parts from a single supplier, Honda requests the supplier to take the following actions in the priority order as follows: (1) pushing ahead with diversifying suppliers, (2) diversifying production bases, and (3) increasing product inventories.

3) Establishing a restoration support scheme at the time of disaster
   Honda develops an internal program to send on-site a team of specialists responsible for common infrastructures among plants, such as electric power systems.
   In addition to this, in tie-up with primary suppliers, Honda has started to work on creating robust risk mitigation schemes, including secondary and tertiary supply chains.

4) Strengthening business/financial capabilities

[Column: Rare earth recycling efforts]

Hitachi, Ltd. developed a new technology that recycles rare earths, which is necessary for the production of Hitachi’s core products—motors. As a result, it developed new equipment separating/collecting rare earth magnets from used products and succeeded in extracting rare earths from rare earth magnets using an experiment with dry method. Compared with the traditional approaches, the new method is expected to send up work efficiency and reduce environmental burdens. Santoku has already commercialized the “Inter-user recycling system,” which collects scrap emerging from business partners’ magnet manufacturing processes and recycles them with the most effective approach. In addition, the company is pushing ahead with R&D on new technologies capable of efficiently separating/extracting rare earths from used products using wet methods, reducing them to metals by using only industrial-use equipment developed in-house, and recycling them as magnet alloys. By exchanging opinions with automakers and consumer electronics manufacturers, the company is working on research projects for the expansion of recycling practices.
Section 4: Japanese manufacturing industries aim to create value added in the global market

Front-end processes, such as “planning/marketing” or “R&D,” as well as rear-end processes, including “after-sales services,” tend to have higher value added. On the other hand, value added in “manufacturing/production” takes a gradual downward trend.

In addition, suppliers actively working on “enhancing proposal-making capabilities” tend to increase new order volume.

[Chart 2-59: Changes in work processes with high value-added]

[Chart 2-60: Actions taken to strengthen sales efforts after the Lehman shock]

Remarks: “Order volume increasing (or decreasing)” means that order volume has increased (or decreased) by 10% or more since the Lehman shock.
As almost half of the respondent firms recognize China has almost the same economic size as advanced nations, Asian markets are becoming very important among emerging economies. More than half of the respondent firms already attain profits emergence in such promising markets. More and more firms are estimated to yield profits in these markets.

**[Chart 2-61: Size of emerging economy markets in comparison with advanced nations]**

<table>
<thead>
<tr>
<th>Region</th>
<th>Already has almost the same size as advanced nations</th>
<th>Will have almost the same size within a few years</th>
<th>Will not have the same size for the time being</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>China (n=510)</td>
<td>44.7</td>
<td>34.1</td>
<td>12.5</td>
<td>8.6</td>
</tr>
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<td>South Korea and Taiwan (n=343)</td>
<td>35.6</td>
<td>37.6</td>
<td>8.2</td>
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<tr>
<td>ASEAN (n=407)</td>
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<td>Russia (n=227)</td>
<td>2.2</td>
<td>42.7</td>
<td>35.7</td>
<td></td>
</tr>
<tr>
<td>Middle East (n=223)</td>
<td>7.2</td>
<td>44.4</td>
<td>36.8</td>
<td></td>
</tr>
</tbody>
</table>

Source: METI data (January 2011)

**[Chart 2-62: Japanese manufacturer’s profit/loss in emerging economies (by market)]**

- **China (n=358)**
  - Present: 53.0%
  - Future: 35.4%
  - Deficit: 11.6%
- **South Korea and Taiwan (n=217)**
  - Present: 62.6%
  - Future: 32.7%
  - Deficit: 4.7%
- **ASEAN (n=257)**
  - Present: 62.7%
  - Future: 29.6%
  - Deficit: 7.7%
- **India (n=123)**
  - Present: 43.1%
  - Future: 44.6%
  - Deficit: 13.4%
- **Other Asian markets (n=80)**
  - Present: 50.0%
  - Future: 40.3%
  - Deficit: 10.0%
- **Brazil (n=58)**
  - Present: 63.2%
  - Future: 34.5%
  - Deficit: 2.3%
- **Russia (n=48)**
  - Present: 43.1%
  - Future: 46.6%
  - Deficit: 10.3%
- **Middle East (n=57)**
  - Present: 71.1%
  - Future: 21.1%
  - Deficit: 7.1%

Source: METI data (January 2011)
In rapidly growing emerging economies, Japanese manufacturers are competing with Chinese, Korean, and Taiwanese firms as well as with other Japanese firms. A lot of firms target the wealthy class. They also tend to put more emphasis on the middle-income class because it is taking an expansion trend and will turn into the wealthy class in the future. Companies that put the top priority on product strategies suitable to customer needs are showing better performance than those emphasizing price/promotional strategies.

Source: METI data (January 2011)

[Chart 2-63: Nationalities of competitor firms in emerging markets]

[Chart 2-64: The most important customer base in emerging markets]

[Chart 2-65: The most important strategies in emerging economies]

Source: METI data (January 2011)
Japanese manufacturers have competitiveness in Monodzukuri in emerging markets, including design, procurement, and production. However, they suffer competitive disadvantages in planning/marketing and sales, so-called both ends in the smile curve, which yield relatively high value-added. Japanese manufacturers should enhance these weak points, shifting to “profitable Monodzukuri” in the future.

[Chart 2-66: Weak points in emerging markets]

Source: METI data (January 2011)

[Column: Brand-building strategy through national monopoly] Eizo Nanao Corporation, a subcontract manufacturer that used to produce displays for major electronics manufacturers, launched its own brand “Eizo” in 1985 by making use of the company’s high-level technical capabilities. By setting up the one-nation one-distributor system (exclusive sales agreement), the company honestly listens to customers’ voices from trustworthy partners and feeds them back to enhance customer satisfaction, leading to successful brand-building. Currently, the company’s high popularity in Europe is spreading out to the Chinese wealthy class, sending up sales in the China market.

[Column: Enhancing sales capabilities in collaboration with overseas joint ventures] Komatsu NTC, Ltd., a major manufacturer of automobile-use machine tools in Toyama Prefecture, set up a local production firm in China in 1996 in tie-up with a Chinese local firm. Komatsu manufactures advanced equipment at home, while producing machinery that strikes a balance between product quality and price level for local manufacturers in the local Chinese market. As motorization is currently progressing in China, demand for machine tools is also rising sharply. By utilizing the connections and sales network of the joint venture local partner, Komatsu is marketing Chinese-made machines as well as domestically produced advanced equipment to Chinese firms.
Before the Great East Japan Earthquake, Japanese manufacturers enjoyed certain price premiums because Japanese brands have yielded positive impacts mainly in hardware aspects, such as “high quality and high performance.” However, as the earthquake has also posed anxieties over Japanese brands, it is necessary to restore credibility as soon as possible. On the other hand, software-like aspects, such as “product design and styles” and “Japan’s unique culture,” have not generated profitability yet. It is important to capture the world demand for Monodzukuri rooted in culture, such as highly promising Japanese traditional goods.

Cool Japan project
"Cool Japan" is a project that cultivates overseas market demand for Japanese local products with high popularity/potential strength. Sato Sen’i Co., Ltd. intensifies R&D on new products only manufactured in-house. It has expanded spinning, knit-production, and original brand businesses, participated in the world’s largest knit materials exhibition, and successfully entered into a contract with the top brands in Europe and the US.

Traditional craftwork industry
The traditional craftwork industry is a valuable sector that promotes daily commodities rooted in local communities and delivers traditional techniques and cultures to the contemporary era. However, due to recent stagnant demand, successor shortage, and some other factors, production amount has decreased to a quarter of the peak level in the 1980s. Through supporting production-site demand cultivation projects and successor fosterage projects, the government pushes ahead with improving the environment so that traditional technologies/techniques will be handed over to future generations.
When looking at the price premium of Japanese brands for each industry sector, a lot of textile companies show strong brand power. In addition, the general machineries sector and electric/electronic-related sector also have strong brand power. Price premiums are relatively lower in the parts/materials sector than in the final product sector. It is necessary to enhance appealing power in the parts/materials sector.

[Chart 2-70: Japanese brand’s premium by industrial sector]

Source: METI data (January 2011)

[Column: Preference for “made in Japan”]
Okuma, a major machine tool manufacturer in Aichi Prefecture, devotes itself to manufacturing products for high-end markets by making use of prominent technologies in Japan. As personnel cost is soaring in China, the needs for labor saving, automation, and increase in speed are getting stronger. As Japanese products that satisfy these needs (safety, high quality, and durability) have stronger customer needs, the company pushes ahead in cultivating the China high-end market, backed by power coming from made-in-Japan products.

[Chart 2-71: Japanese brand’s premium by process]

Source: METI data (January 2011)

[Column: Overseas consumers want “made-in-Japan” products]
In recent years, Yamada Denki Co., Ltd. is seeing a sharp rise in wealthy class Chinese customers that buy “made-in-Japan” consumer electronics in bulk as souvenirs. In overseas markets, people use “made-in-Japan” consumer electronics without peeling off the “made-in-Japan” label. In this sense, the “made-in-Japan” brand serves as high status from the viewpoint of high quality and trustworthiness in overseas markets. As foreign products are gaining brand power, such as South Korean products with improved designs, Japan needs to maintain its brand power in the future.
As short-term R&D projects are increasing, innovations that will lead to development of epoch-making new products will possibly dry up. As a lot of companies are working on important themes exclusively within their own company group, more than 60% of respondent firms recognize that their R&D works are overlapping with their competitors’ R&D works. It is also necessary to set up an appropriate inter-company collaborative framework. Companies with hot-selling products tend to have closer interaction in their R&D sector, operating sector, and intellectual property sector than those without hot-selling products.

Source: METI, “Quantitative Evaluation Survey on Open Innovations related to Japanese Firms’ R&D Investment Efficiency”

Source: METI data (January 2011)
Companies have a considerable gap in their recognition of how important international standardization is. However, companies that understand the importance of international standardization recognize that they should start standardization efforts early. To survive in the global market, it is important to make efforts to take full advantage of standardization outcomes, including the appropriate timing/approach.

[Chart 2-77: Importance of international standardization]

Source: METI data (January 2011)

(Column: Shifting to “Successful technologies, successful operations” business model)

In recent years, we are seeing a lot of cases where a Japanese firm successfully wins a large market share in the initial stage, backed by technological advantages, but loses market share in the market expansion stage.

International standardization is an important tool to attain the goals of business strategy. To make international standardization projects pay off fully, it is necessary to analyze various factors, such as technological capabilities and market presence, and clearly identify important points, including setting up appropriate performance criteria or compatibility. In addition, it is also necessary to create an appropriate framework capable of keeping long-term competitive advantage by incorporating patent or black box strategies.

[Chart 2-78: Appropriate timing to start international standardization program]

Source: METI data (January 2011)

[Chart 2-79: Japan’s share in the global market]

Source: METI data based on various source documents
Japanese manufacturers tend to lose their competitiveness due to competition with domestic competitors. To survive in stiffer global competition, it would be effective to strategically set appropriate targets and keep a certain corporate scale through inter-company collaborations.

[Chart 2-80: Relationship between competition among Japanese firms and business performance]

Japanese manufacturers tend to lose their competitiveness due to competition with domestic competitors. To survive in stiffer global competition, it would be effective to strategically set appropriate targets and keep a certain corporate scale through inter-company collaborations.

[Column: Reorganization for surviving in global competition]

To overcome global competition, major domestic firms are pushing ahead with collaborations and corporate reorganizations.
In September 2010, Fiji Technica, the second largest automobile metal mold manufacturer in Japan, and Miyazu Seisakusho, the third largest manufacturer in the same sector, integrated their business operations in December 2010 with assistance from the Enterprise Turnaround Initiative Corporation of Japan. Through business integration of these two firms with internationally respected high-quality technologies, they centralize their business resources, aiming at differentiating them from manufacturers in emerging economies as advanced metal mold manufacturers, breaking away from domestic over-competition, and enhancing cost competitiveness through a global network of production bases.

In the chemical sector, Idemitsu Kosan and Mitsui Chemicals set up a limited liability partnership (LLP) “Chiba Chemical Manufacturing” in April 2010. In February 2011, Asahi Kasei and Mitsui Chemical Holdings announced the establishment of “Nishi Nippon Ethylene LLP.” Through these business integrations, they aim at an optimal production scheme and efficient business operations.
In the final product sector, positive impacts from corporate reorganization include increased availability of human resources, intellectual properties, and brands. In the materials sector, a lot of companies point out that they enjoy higher capacity utilization or increased production efficiency. In the parts sector, many manufacturers are benefitting from expansion of customer base. On the other hand, when examining the feasibility of corporate reorganization, a gap in “corporate cultures” or “business strategies” becomes a significant obstacle. In addition, if corporate size increases, problems of “antimonopoly law” or “systems reorganization” will also emerge.

[Chart 2-82: Positive impacts from reorganization of companies operating overseas]

<table>
<thead>
<tr>
<th>Impact</th>
<th>Materials (n=47)</th>
<th>Parts (n=81)</th>
<th>Final products (n=84)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material procurement</td>
<td>11.8</td>
<td>19.8</td>
<td>19.0</td>
</tr>
<tr>
<td>Expansion of customer base</td>
<td>17.6</td>
<td>21.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Bargaining power against customers/business partners</td>
<td>11.8</td>
<td>21.0</td>
<td>22.6</td>
</tr>
<tr>
<td>Better availability of overseas sales channels</td>
<td>11.8</td>
<td>22.2</td>
<td>22.6</td>
</tr>
<tr>
<td>Improvement in capacity utilization rate or efficiency</td>
<td>16.0</td>
<td>16.0</td>
<td>29.4</td>
</tr>
<tr>
<td>Better availability of high-quality human resources or intellectual properties</td>
<td>11.8</td>
<td>19.8</td>
<td>27.4</td>
</tr>
<tr>
<td>Improvement in publicity or brand capabilities</td>
<td>4.9</td>
<td>17.6</td>
<td>23.8</td>
</tr>
</tbody>
</table>

Source: METI data (January 2011)

[Chart 2-83: Obstacles for corporate reorganization by company size]

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Materials (n=2,711)</th>
<th>More than ¥300 million to ¥10 billion or less (n=82)</th>
<th>More than ¥10 billion (n=69)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gap in corporate culture</td>
<td>53%</td>
<td>70.5%</td>
<td>81.2%</td>
</tr>
<tr>
<td>Gap in business strategy</td>
<td>60.7%</td>
<td>69.6%</td>
<td></td>
</tr>
<tr>
<td>Applicable rules/operations of antimonopoly law</td>
<td>26.3%</td>
<td>42.0%</td>
<td></td>
</tr>
<tr>
<td>Opinion gap about merger ratio or shareholding ratio</td>
<td>23.6%</td>
<td>25.1%</td>
<td></td>
</tr>
<tr>
<td>Opposition from shareholders or parent firm</td>
<td>30.4%</td>
<td>44.9%</td>
<td></td>
</tr>
<tr>
<td>Opposition of business partner firms</td>
<td>30.4%</td>
<td>44.9%</td>
<td></td>
</tr>
<tr>
<td>Decreased positions or posts</td>
<td>7.2%</td>
<td>11.8%</td>
<td></td>
</tr>
<tr>
<td>Staff employment problems</td>
<td>3.9%</td>
<td>3.9%</td>
<td></td>
</tr>
<tr>
<td>Necessary costs of business integration, such as system reorganization</td>
<td>23.4%</td>
<td>25.1%</td>
<td></td>
</tr>
</tbody>
</table>

Source: METI data (January 2011)

[Column: Creating appropriate scheme that will encourage corporate reorganization]

Intending to maintain/enhance the competitiveness of Japanese manufacturers under global competition, lawmakers have amended “Act on Special Measures for Industrial Revitalization and Innovation of Industrial Activities,” which came into force in July 2011. The amended legislation sets forth necessary actions to accelerate and make smooth industrial reorganization. To be more specific, the minister in charge is required to have “dialogs” with the Japan Fair Trade Commission in terms of reorganization plans. The “dialogs” are expected to provide information on overseas competitors’ investment trends or R&D projects on substitutive products, and enhance collaborations between industrial policies and competition policies. In addition, for the “Rules on Review of Business Combination,” the Japan Fair Trade Commission has reexamined its review process and review criteria on business combination regulations, taking into consideration the basic stance of the New Growth Strategy (June 2010) calling for “reviewing and reexamining, as necessary, business combination regulations, paying due attention to the global market.”
Aiming to enhance domestic business capabilities that will yield competitiveness, some manufacturers are bringing back to Japan their human resources, physical resources, money, and information resources, or other outcomes obtained from their overseas business operations. It is important to create a virtuous circle in which companies will utilize business resources obtained from their overseas operations to enhance the competitiveness of their domestic operations, which will in turn lead to increasing profitability in overseas operations.

**Column: Virtuous circle at home and abroad**

1) Cycle of manufacturing (Monodzukuri) capabilities

When launching overseas production in emerging economies, Denso Corporation forms a low-cost development team to develop new technologies that will bring down production cost. By doing so, the company has a production scheme with adequate cost-planning capabilities. To enhance the competitiveness of domestic production base through the outcome of these efforts, Denso brings back low-cost production knowhow from the emerging economy’s production base to its domestic plants and partner firms’ domestic plants, aiming to achieve “high-performance, high-function, but low-cost” production.

2) Cycle of Monodzukuri financial resources

Aisan Industry, Co., Ltd. has mass production bases in emerging economies where demand for automobiles is rising sharply, but it also recognizes that domestic plants are a source of core technologies, and has established a profitable international role-sharing scheme to this end. In principle, the company enjoys a virtuous circle in which it brings back earnings of overseas operations to domestic operations as dividends, spends such dividend fund on state-of-the-art R&D projects, and further utilizes R&D outcomes for overseas operations.

3) Cycle of Monodzukuri brands

Makino Milling Machine Co., Ltd., a major machine tool manufacturer, keeps producing advanced products that make potential customers think they would like to use Makino products some day in the future. To this end, in Singapore the company produces and sells entry-level product models that appeal to such potential customers. It is working on spreading the Makino brand among customers that have purchased entry-level product models, aiming to sell made-in-Japan, high-spec machine tools in the future.

Remarks: “Companies with profit growth (or drop)” means that operating profit has increased (or decreased) by 5% or more for the past 5 years.

Source: METI data (January 2011)
Japanese firm’s overseas subsidiaries tend to decrease the percentage of their retained earnings in overseas local markets, suggesting that manufacturers are bringing back more profits to Japan. Dividend income from these firms is taking an upward trend. On the other hand, some manufacturers do not bring back their profits to Japan because they are reinvesting their profits in overseas markets, including emerging markets that enjoy rapid growth.

**Remarks:** Calculation of the percentage of locally retained earnings of Japanese firm’s overseas subsidiaries

- “Total amount of locally retained earnings of these” divided by “Total profit of these in the current term”

Source: METI, “Basic Survey on Overseas Business Activities”
Many companies argue that they will transfer their core technologies overseas with propriety given to business chances, even though it is less likely that technical leakage preventive programs will be put in place. However, since technical leakage occurs at almost a half of the companies that have transferred their core technologies overseas, companies should enhance their awareness about creation of black boxes. Companies with favorable business performance tend to have stronger awareness of creating black boxes at their overseas plants to which they have transferred their core technologies.

Source: METI data (January 2011) (n=198)
Technological leakage occurs through locally hired employees or products on sale in most cases. A black box is created by the following approaches: “Restricting local staff’s access to information”; “Managing core parts/materials information as trade secret”; and “Exporting production equipment from Japan by sealing off knowhow in the equipment.” It is necessary to take further actions in the future.

In addition to traditional technological leakage preventive actions for overseas production, such as “Don’t bring out drawings” or “Never bring out core technologies,” Tokyo Electron Ltd. indirectly prevents leakage of state-of-the-art technologies/knowhow by continuing state-of-the-art R&D projects at home so that technologies for overseas production will be made one generation older.

When hiring new university graduates for the China plant, Morita Chemical Industries, Co., Ltd. only employs job seekers that have no connection with other firms. In addition, the company hires company staff from areas outside plant locations that have only remote relationship with external communities. Furthermore, Morita Chemical intentionally avoids automation of some production processes to make technical transfer more difficult. By taking these actions, the company achieves both goals of utilizing local human resources and preventing technical leakages.
Companies tend to show better business performance if their employees take more active stances on working overseas. Employees will become more active in working overseas if the company grants stronger rights to overseas workers. Since hiring alien executive officers will yield positive impacts, such as favorable effects on precinct peers or utilization of human networks, companies with foreign executive officers tend to show better business performance.

[Chart 2-93: Willingness to work overseas vs. company's business performance]

[Chart 2-94: Business rights overseas vs. willingness to work overseas]

[Chart 2-95: Effects of hiring foreign executive officers]

[Chart 2-96: Employment of foreign candidates for executive officers (by business performance category)]

Remarks: "Companies with profit growth (or drop)" means that operating profit has increased (or decreased) by 5% or more for the past 5 years.

Source: METI data (January 2011)
Chapter 3: Fostering Human Resources that will Play Important Roles in Monodzukuri Industries in Japan

Section 1: Current status and problems of fostering human resources that will serve Monodzukuri industries in the future

1. Current status of securing younger human resources that will play important roles in the future

(Hiring full-time younger engineers)

Ninety percent of large corporations have employed new graduates as full-time engineers for the past 3 years, while mid-50% of SMEs did so in the same period, suggesting a gap depending on corporate size. On the other hand, there is almost no corporate size gap in hiring mid-career workers younger than 35 years old (mid-career recruiting of younger staff), because 60% of both large corporations and SMEs have employed such workers. SMEs are less satisfied with both the quantity and quality of newly employed they have hired for the past 3 years than large corporations.

As for basic stance on hiring young full-time engineers for the past 3 years, 80% of large corporations put focus on “recruiting new graduates,” while SMEs are more dependent on mid-career recruiting. Mid-40% of SMEs focus on hiring new graduates, and more than 50% of SMEs put main focus on mid-career employment.

Almost 60% of large corporations have young nonpermanent workers serving for Monodzukuri, while only a little more than 30% of SMEs employ such nonpermanent workers.

Almost 70% of large corporations as well as a little more than 50% of SMEs have internal programs to appoint young nonpermanent workers as full-time permanent workers. When appointing young nonpermanent workers as full-time staff, both large corporations and SMEs attach a high value to “willingness for his/her tasks,” “skill/knowledge level,” and “on-the-job performance so far.”

* “Nonpermanent worker” means “part-time staff” or full-time contract employee called “fixed-term plant worker,” “seasonal plant worker,” or “contract worker.” It does not include employees without direct employment relations, such as “temporary workers” or “contract-based workers.”
2. Current status of fosterage and developing abilities of young human resources that play important roles in the future

(Evaluation of skill level of young full-time engineers)

More than a half of large corporations and SMEs are satisfied with skill level of young full-time engineers, saying young full-time engineers have “better skills than expected” in terms of “comprehension,” “job performance abilities,” “sense of responsibility,” “expertise/skills in tasks in charge,” “ability to make judgments,” “challenging spirit,” and “communication skills.” But SMEs are generally less satisfied with their staff’s abilities, including the aforementioned skill categories, and give lower evaluations than large corporations. Both large corporations and SMEs would like their young full-time engineers to acquire “job performance abilities,” “challenging spirit,” “expertise/skills in tasks in charge,” “sense of responsibility,” and “communication skills” in many cases. These skill categories correspond to young full-time engineers’ abilities that companies are highly satisfied with, suggesting that they attach a high value to these skill factors.

[Chart 3-7: Evaluation on average level of young full-time engineers (on the basis of corporate size)]

[Chart 3-8: Desirable/important skills that young full-time engineers should have (on the basis of corporate size) (two answer choices selected)]

Both large corporations and SMEs attach a high value to “on-site directly-connected” projects, such as “making use of work standard documents” or “systematic OJT,” but SMEs are showing less appetite for these projects than large corporations. On the other hand, almost 60% of large corporations are providing “Off the Job Training,” such as training sessions outside production sites, while only a little more than 30% of SMEs are working on these projects. In addition, a little more than 50% of large corporations are supporting workers’ self-development activities, while approximately 30% of SMEs are providing such support, suggesting that SMEs are weaker in off-site projects than large corporations.

However, a lot of firms, including those currently not providing Off the Job Training, evaluate importance of Off the Job Training and intend to provide Off the Job Training so that their staff will “acquire expertise/skills necessary for their tasks.”
Most companies are intending to foster/develop abilities of young full-time engineers “under the initiative of production site” and “under the company’s responsibilities.” However, SMEs without training sessions for work-site managers/supervisors in charge of fosterage occupy the largest group. This suggests that companies intend to foster/develop abilities of young full-time engineers “under the initiative of production site”, but SMEs only have limited capacities to do so.

[Chart 3-12: Who is responsible for fostering/developing abilities of young full-time engineers (on the basis of corporate size)?]

- **SMEs**
  - 18.5%: The company is responsible.
  - 54.3%: It is mostly the worker’s own responsibility.
  - 33.6%: No response

- **Large corporations**
  - 18.1%: The company is responsible.
  - 62.2%: It is mostly the worker’s own responsibility.
  - 17.6%: No response

(Who is responsible?)

- SMEs
  - 36.1%: Making managers/supervisors develop human resources development plans for their junior staff.
  - 52.0%: Providing training sessions on education/management of their junior staff.
  - 8.9%: Evaluating how well managers/supervisors are doing in educating their junior staff.

- Large corporations
  - 19.7%: Making managers/supervisors develop human resources development plans for their junior staff.
  - 60.6%: Providing training sessions on education/management of their junior staff.
  - 17.6%: Evaluating how well managers/supervisors are doing in educating their junior staff.

(Section that plays leading roles)


[Chart 3-13: What do you do for work-site managers/supervisors in charge of fosterage for young full-time engineers (on the basis of corporate size) (multiple answers allowed)?]
(Is fostering and developing abilities of young full-time engineers proceeding successfully?)

More than 60% of companies evaluate affirmatively, saying it is “proceeding successfully” or “proceeding successfully to a certain extent.” However, affirmative evaluation SMEs register a lower percentage than large corporations evaluating affirmatively.

Many companies point out that their human resource development and capacity development programs are unsuccessful because “they don’t have enough middle-ranking workers responsible for human resource development” or “they only have insufficient know-how on effective educational training programs.” Mid-30% of SMEs point out “weak motivation among young full-time staff,” but only 10% of large corporations recognize it as a reason for failure, suggesting a clear gap between SMEs and large corporations.

[Chart 3-14: Are you successful in fostering and developing the abilities of young full-time engineers (on the basis of corporate size)?]

<table>
<thead>
<tr>
<th></th>
<th>SMEs</th>
<th>Large corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>4.1%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Successful to a certain extent</td>
<td>61.2%</td>
<td>73.6%</td>
</tr>
<tr>
<td>Not successful so much</td>
<td>30.8%</td>
<td>18.7%</td>
</tr>
<tr>
<td>Not successful at all</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>No response</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>


[Chart 3-15: Reasons you are unsuccessful in fostering and developing the abilities of young full-time engineers (on the basis of corporate size) (multiple answers allowed)]

- We don’t have enough middle-ranking workers responsible for fostering younger engineers.
- We have insufficient know-how on effective educational training programs.
- Younger and full-time staff are not willing to learn new skills/knowledge.
- We don’t have many young full-time engineers newly assigned to production sites.
- Our work volume is too high in relation to the number of our staff members at the workplace.
- Our staff members are expected to show successful outcomes in the short run.
- We don’t have adequate budget/facilities for training activities for our staff members.
- It is difficult to assign young full-time engineers to tasks that will lead to fostering/developing their abilities.
- Experienced staff are unable to give instructions because they fail to catch up with new innovation.

(Education/training and career formation support for nonpermanent engineers)

A lot of SMEs and large corporations are “encouraging improvement proposals or QC circles” or working on “systematic OJT” or “new hires internal training sessions” for young nonpermanent engineers. On the other hand, only a few companies are providing off-site programs, such as “outside training sessions,” “support for self-development activities,” or “consultation of career.”

[Chart 3-16: Education/training/ career formation support for young nonpermanent engineers]

3. Problems and possible solutions in fostering young human resources that will play important roles in the future

Companies recognize that fostering/developing abilities of young full-time engineers are generally proceeding successfully, but it is necessary to provide support for SMEs so that SMEs will secure young full-time engineers and enhance their fosterage/skill development programs for the on-site workforce.

(Pushing ahead with SME programs for hiring new graduates human resources)

New graduates are facing difficulty in finding job opportunities. However, SMEs are unable to hire new graduates that they wish to foster as their core human resources in the future. As for final academic background of new graduates that SMEs hire, new university graduates occupy a very low percentage because SMEs are rather low-profile.

It is important that university students and high school students, including technical high school students, as well as SMEs in the local communities get to know one another. It would be very meaningful to provide daily information services among local high schools, universities, job-seeking students, and SMEs as well as counseling services from Job supporters Hello Work, hold job-placement interview sessions for local SMEs, and making efforts at appropriate matching services through utilizing internships.

(Enhancing human resource fosterage and skill development programs at SMEs)

By exchanging information with manufacturers at regular intervals, public vocational training facilities will provide “workers’ training programs, such as custom-made practices in manufacturing industries,” which give local SME workers opportunities to acquire advanced skills/knowledge, and provide “support, including instructor dispatching services for developing effective training programs and counseling/supporting vocational training instruction services.” As “shortage of middle-ranking workers responsible for human resource development” or “insufficient knowhow on effective educational training programs” becomes a bottleneck for human resources fosterage or skill development, it is very meaningful to provide support such as dispatching instructor, or developing/implementing educational/training curriculum for SMEs intending to launch new businesses. It is important to further get across related information among SMEs and encourage them to utilize our support services suitable to the needs of individual SMEs.
Workers’ training programs, where custom-made versions are also available, represent appropriate Off the Job Training opportunities. Most manufacturers using “career development promotion subsidy,” which grants subsidies for financing Off the Job Training or self-development support programs, evaluate that the subsidy program has led to training sessions or competence assessment for their employees. By further getting across the information on this subsidy program as well as workers’ training programs and encouraging to utilize them, it is important to push ahead with Off the Job Training and self-development activities at SMEs.

[Chart 3-17: How much are manufacturers utilizing the career development promotion subsidy (in the manufacturing industry; on the basis of corporate size)?]


[Chart 3-18: Has the career development promotion subsidy led to training sessions or competence assessment?]

SMEs are heavily dependent on recruitment of young mid-career workers with some work experience and appoint nonpermanent workers as full-time staff based on their skills/knowledge and job performance. In this sense, it is significantly important to conduct and utilize job performance evaluation, which objectively identifies the skill level of each staff member. As effective tools for job performance evaluation, it is important to encourage corporations to deeply recognize/understand and actively utilize the following programs: qualification programs, such as “National trade skill tests”; and “Vocational capability evaluation standard,” which organize necessary occupational skills/knowledge for each industry.

In addition, it is also important to “make visible” vocational abilities (skills) level of each staff member as well as their work experience and past records of human resource fosterage and capacity development efforts. Providing career consulting services by utilizing the “Job-Card,” a tool for making visible these factors, will yield further positive impacts. If young workers record their Off the Job Training or self-development activities on their Job-Card and work on their tasks by checking out their Job-Card with their manager/supervisor, young staff will get more motivated or willing to improve their abilities.

If an increasing number of companies set up and utilize their internal capability evaluation standard for personnel evaluation purposes by taking the opportunity of introducing the “Job-Card” system employment training program, vocational abilities will be enhanced on an industry-wide scale. For this reason, it is significantly meaningful to encourage corporations to deeply get across/understand the Job-Card system.

[Chart 3-19: What kind of qualifications do you use for vocational capability evaluation purposes (in the manufacturing industry; on the basis of corporate size) (multiple answers allowed)?]

[Chart 3-20: How to use vocational capability evaluation (multiple answers allowed)]
Section 2: Monodzukuri-related human resources development policies

(Public vocational training)

As there are few private-sector vocational training organizations in the manufacturing sector, including the automobile, electrical equipment, and machinery industries, public vocational training is expected to play a particularly important role.

"Workers' training programs" are designed to train highly skilled workers capable of serving as the core human resources of Monodzukuri industries in the future by providing sophisticated machineries used at manufacturing sites and setting up appropriate courses on high-level knowledge/skills in a wide variety of fields, such as addressing technological innovations or improving/upgrading production processes.

In particular, training people who have quit jobs is an important public vocational training program to provide security and safety in the daily life of Japanese citizens as the safety net of employment. And this training program is also quickly and flexibly utilized a sharp rise in unemployed workers due to rapid recessions these days.

[Chart 3-21: Outline of public vocational training programs]

The central and prefectural governments are providing public vocational training programs for unemployed workers, employed workers, and university graduates.

* Responsibilities of the central and prefectural governments: "give vocational training to workers who want to change their jobs, and who need special assistance to their vocational abilities development and improvement." (Article 4.2 of the Human Resources Development Promotion Act)

Unemployed workers' training program

1. Participants: Job seekers at Hello Work (free of charge but participants must pay actual cost, including textbook cost.)
2. Training period: Generally from 3 months to 1 year
3. Examples of main training courses
   - On-site training courses
     - Metallic processing section
     - Electric equipment section, etc.
   - Commission-based training courses
     - OA office work section, accounting task section, etc.

Employed workers' training program

1. Participants: Workers currently employed (paid training program)
2. Training period: Generally from 2 to 5 days
3. Examples of main training courses
   - Practical work technologies on private-use electric apparatus
   - Practical designing technologies for barrier-free housing, etc..

University graduates training program

1. Participants: High school graduates, etc. (paid training program)
2. Training period: 1 year or 2 years
3. Examples of main training courses
   - Production technology section, electronic information technology section, control technology section, etc.
   - Production machines technology section, construction work technology section, etc.

[Diagram showing the outline of public vocational training programs]
Quite a lot of "freeters" (i.e., job-hopping part-timers) have no option but to stay working as nonpermanent workers, as they fall into a vicious cycle in which they cannot be employed as full-time workers because of a lack of opportunities to improve their capabilities so as to qualify for a full-time job.

The Job-Card system was launched to guide these workers to stable job opportunities. In April 2011, Job Card Promotion Council, consisting of labor-management groups and experts, developed the “New National Promotion Basic Plan.” The program aims to help job seekers obtain a full-time job by (i) raising their awareness about work through comprehensive career counseling and identifying the issues they face in career formation, (ii) providing such people with an opportunity for practical vocational training comprising job training at companies and lectures (Vocational Ability Development Program) and (iii) summarizing training service providers’ evaluation of their job performance and their job experience in a Job-Card.

The New Growth Strategy (cabinet decision on June 18, 2010) seeks to further promote the Job-Card system by setting the goal of increasing the number of Job-Card holders to 3 million by 2020.

[Chart 3-22: Outline of Job-Card System]
By making honorable recognition of prominent craftsmen (great craftsmen in the present world), “Great Craftsmen in the present world” aims to fostering a skill-oriented mindset throughout society in general, improve the status of skilled workers and their skill levels, and boost young people’s motivation to become skilled workers and serve such professions with pride and hope in accordance with their personal characteristics.

Since the program was launched in FY1967, it has commended 5,138 award winners up until the 45th Award for outstanding Skilled Workers in FY2010 (the program granted awards to approximately 100 workers by FY1995 and then 150 workers a year since FY1996).

[Column: Skills of “Great Craftsmen in the present world” in FY2010]

Mr. Masayuki Tsunakawa, 56 years old
He is distinguished at refining the process to remove distortion in aluminum boards, making contributions to improving the quality of aluminum board materials. [He works as a metal materials finisher at Mooka Plant of Kobe Steel, Ltd.]
He is able to find extremely small distortions, which are viewable with 400 times zoom with 3D distortion measuring equipment, and is outstanding at refining skills, such as rectifying aluminum boards. He is also making significant contributions to improving product quality of aluminum boards, such as printing plates, and makes efforts to foster young engineers by teaching his deep knowledge and skills.
The National Skills Competition is held annually to give young engineers nonbinding target by holding skill level competition for youth engineers aged 23 or younger at home, to offer the opportunity to get familiar with skills, and to aim at making an appeal to the general public about the importance and necessity of skills as well as raising the public awareness of skilled work.

The 48th National Skills Competition was held in Yokohama City, Kanagawa Prefecture in October 2010. 1,028 contestants participated in the program, competing in 39 job categories, such as “lathes,” “milling machines,” “precision machinery assembling operations,” or other manufacturing skills.

The 48th National Skills Competition was held from October 22 to 25, 2010 at 9 venues mainly in Pacifico Yokohama, Kanagawa Prefecture, with 1,028 contestants participating in events for 39 job categories. During the competition, a lot of visitors including junior and senior high school students saw the event and became familiar with occupational skills. In this way, the event organizers were able to make further appeals about how occupational skills are important and wonderful.

In FY2011, the event organizers are planning to hold the National Skills Competition in December, mainly in Chiba Prefecture.

[Column: Outstanding Skills—National Skills Competition]
“National Skills Competition for People with Disabilities” (Abilympics) is significantly contributing to creating a “universal society” where anyone, including those with and without disabilities, will participate in society and support each other. The 32nd National Abilympics was held in Yokohama City, Kanagawa Prefecture in October 2010.

In FY2010, the 32nd National Skills Competition for People with Disabilities (Abilympics) was held in Yokohama City, Kanagawa Prefecture for 3 days from October 15-17. Two hundred and sixty-seven contestants from all over Japan participated in the competition in 22 job skill categories, competing in the skills they have been enhancing in their daily work. In addition, they demonstrated their skills in the innovative or highly promising three job categories of IT, office assistant, and bed-preparation.

At the same time as the 32nd Abilympics, “Work Fair for Persons with Disabilities 2010”—a multipurpose event consisting of exhibitions, demonstrations, and trial experience sessions related to employment of disabled persons—was held. More than 34,600 visitors, including those to satellite venues, attended the event, became a big event.
National Skills Grand Prix is held every second year as a skills competition for 1st Grade Skilled Workers or other participants with outstanding skills. The 26th National Skills Grand Prix was held in March 2011 mainly in Chiba City, Chiba Prefecture, with 480 contestants participating in the event, competing in 26 job categories, including “lathes,” “machine assembly,” “paper/fabric craftwork,” and “precious metal accessories.”

The National Skills Grand Prix is a skill competition for 1st Grade Skilled Workers or other participants with outstanding skills. It aims at further improving skills of certified skilled workers and demonstrating their outstanding skills to the general public in Japan in order to upgrade their status and skills. The National Skills Grand Prix started in 1982 and has been held every second year since the 22nd Grand Prix in 2003.

The most recent competition, the 26th National Skills Grand Prix, was held in March 2011 mainly in Chiba City, Chiba Prefecture, with 480 contestants competing in 26 job categories.
(Young Fellow Manufacturing Tournament)

To raise awareness of monodzukuri skills among younger generations and foster them as full-fledged skilled workers, it is necessary to give them appropriate targets for skill acquirement and provide opportunities for skills competitions. For this reason, “Young Fellow Manufacturing Tournament” are held every year for the youth who is less than 20 years old of the acquisition process at vocational training facilities, accredited vocational training schools, or technical high schools in order to provide them with appropriate targets, encourage their employment by upgrading their skills, and increase the number of young skilled workers.

[Column: Young Fellow Manufacturing Tournament]

To raise awareness of monodzukuri skills among younger generations and foster them as full-fledged skilled workers, it is necessary to give them appropriate targets for skills acquirement and provide opportunities for skills competitions. For this reason, “Young Fellow Manufacturing Tournament” have been held annually since 2005 for the youth who is less than 20 years old of the acquisition process at vocational training facilities, accredited vocational training schools, or technical high schools. The most recent event, the 6th Young Fellow Manufacturing Tournament was held in August 2011 at four locations: Techno College Maibara, Techno College Kusatsu, Kobe International Exhibition Hall, and Hyogo Prefectural Monodzukuri College, with participants competing with each other for their skills in 14 job categories.
(Recovery/reconstruction support for the Great East Japan Earthquake)

In areas that are still suffering an impact from the Great East Japan Earthquake, the government is swiftly taking the following human resources development for recovery/reconstruction from earthquake damage.

○ Expanding vocational training
  - Expanding/implementing vocational training courses at public human resources development training facilities, etc.
  - Exempting the affected area’s trainees from admission fee, tuition, etc. for vocational training for school graduates
  - Exempting the affected areas’ trainees from tuition for workers’ training programs payable by the affected areas’ employers

○ Life support in the training period
  Relaxing the requirements for training/life support benefits so that persons not entitled to employment insurance benefits will be able to attend vocational training programs without anxiety (granting training/life support benefits to these persons if they are unlikely to earn income due to earthquake damage; or flexibly operating the land/building requirements, paying due attention to individual circumstances of affected persons)

○ Supporting reconstruction of public human resources development training facilities and accredited vocational training schools affected by earthquake damage
Universities’ engineering-related faculties, colleges of technology, specialized high schools, and specialized training colleges’ vocational training programs are playing important roles in fostering monodzukuri human resources in Japan.

It is also absolutely necessary to enhance monodzukuri education, such as science/math education programs at elementary, junior high, and senior high schools, push ahead with systematic career education throughout various school stages, encourage understanding of S&T (science and technology) at community centers or museums, and develop/enhance basic technologies related to monodzukuri. It is also important to foster human resources working on monodzukuri processes in fashion, content, design, and food businesses, and intellectual property protection tasks.

On the other hand, to restore monodzukuri infrastructures in areas affected by the Great East Japan Earthquake, recovery/reconstruction of schools affected by the Great East Japan Earthquake is urgently necessary. In this context, the government has posted necessary expenses in the FY2011 Primary Supplementary Budget. To foster human resources that will play leading roles in the recovery of Japan in line with needs of local communities and local industries, the government will support advanced education programs at universities and industry–academia–government collaborative projects.

Section 1: Roles of universities (engineering), colleges of technology, specialized high schools, and specialized training colleges in fostering monodzukuri human resources

1. Characteristics and programs of human resources development at universities (engineering)

Universities (engineering) provide a wide variety of education programs in their initiatives and have been sending out high-level engineers who support Japan’s monodzukuri industries. Currently, they are providing practical engineering education through collaboration with the industry, and also working on fostering high quality engineers who will create new technologies or bring about innovations. In addition, MEXT is pushing ahead with practical engineer education by compiling a report on practical engineer training programs in FY2010.
[Column: Examples of improving curricula or teaching methods at universities (engineering)]

○ Department of Urban Management, Graduate School of Engineering, Kyoto University: Capstone Project
The department has a project in which students will comprehensively utilize the basic knowledge they have learned in their undergraduate and master’s courses to plan/develop new projects on a wide variety of problems in urban communities. To be more specific, students assume actual problems, including urban planning and river basin planning, collect/analyze information, implement projects based on such information, evaluate project effects, prepare a report outlining the outcomes, and make presentations.

○ Shibaura Institute of Technology: Custom-made Engineering Education Program
Corporate workers are attending lectures as full-time students. With instructors’ advice on lectures, students are able to take custom-made curriculum made up of classes desired by the company/organization that they belong to.
In addition, the university has a practical training program in which students will attend OJT at companies for approximately 5 months in their senior year and gain basic understanding on the research theme in their master’s course study or possible future career based on such OJT outcomes, and it will help them think about creation/deployment of technologies in the future.

○ Kanazawa Institute of Technology: Developing and putting in practice a new project-style education system
Kanazawa Institute of Technology is working on specific projects in collaboration with partner firms. These projects include “designing/producing wheels with the theme of wheels used for solar car projects,” “improving welding skills used for solar cars or formula cars project,” and “learning optimal methods to use lead batteries.”

[Column: Examples of improving teaching abilities of instructors at universities (engineering)]

○ Muroran Institute of Technology
To create excellent university settings, the Muroran Institute of Technology aims to reform instructors’ awareness, encourage self-development, foster high quality instructors, and systematically improve education quality. To this end, the university evaluates its education targets and achievements on a self-assessment basis, assesses classes, evaluates education contributions, and assesses university instructors based on comprehensive evaluation on education, research, social/international contribution, as well as university operations. By doing so, the university treats its instructors in an appropriate manner, taking into consideration these evaluation results.

○ Shibaura Institute of Technology
Aiming to share successful educational improvement projects inside/outside the university among all university staff and incorporate them in improving their education projects, the university holds university-wide faculty development (FD: systematic project in which instructors improve/enhance their class or teaching methods) lecture sessions at regular intervals. The university also gives an “Outstanding Education Instructor” award to university instructors who show excellent performance in the classes or education improvement activities in their charge and significantly motivate their students. By doing so, the university encourages/motivates university instructors to show originality and ingenuity in their classes and shares award winners’ class operation practices among university staff.
2. Characteristics and projects of fostering human resources at colleges of technology

Colleges of technology are fostering creative/practical engineers that underpin companies’ on-site works. Education provided by colleges of technology is characterized by experience-oriented specialized education with a focus on experiments and practical training sessions. They are pushing ahead with improving curriculums and educational methods, such as developing industry–university cooperative education programs, providing long-term internships, and enhancing extracurricular activities for strengthening students’ originality and ingenuity. In addition, they are also inviting instructors from companies and improving instructor’s teaching abilities through teaching staff’s training programs at companies.

[Column: Examples of improving curricula and educational methods at colleges of technology]

○ Anan College of Technology: Monodzukuri Elite Engineer Fosterage Co-op Project
The college has the nation’s first fully-fledged joint education program (co-op education) that provides students with opportunities to have work experience at a company’s production site and solve technical problems at companies by using the long vacation from their third grade year to the fifth grade.
The third and fourth grade students will have 2- to 3-week-long OJT experiences four times (7–10 weeks work experience in total) to learn communication skills and professional technologies, while the fifth grade students will foster problem solving abilities by actually solving technical problems as their thesis (graduation research) project.
The ultimate goal of this project is incorporating into the curriculum what students should learn from company perspectives. Since FY2010, the college is making use of corporate engineers to improve the curriculum, such as experiments or practical works.

○ Toyama College of Technology: Real experience-based program on steam engine technologies
Toyama National College of Technology provides experiment sessions to actually experience inventions or discoveries in technical history. For example, the college provides classes incorporating lectures, experiments, researches, or problem solving sessions in which students will research on the background why the invention is put to practical use, check out history of inventors, summarize related theories, and create equipment for presentation purposes.

○ Hakodate College of Technology: Program based on external evaluation
The college conducts questionnaire surveys for companies or graduates about its curriculum and objectively recognizes problems identified from the survey results. To incorporate survey results in improvement in their curriculum or teaching methods and to review the process of organizational framework, principals of local junior high schools, high schools, university deans, and local companies’ representatives are giving feedback to the college as external evaluators after evaluating the college’s programs.
Robot competition
To foster originality and ingenuity of students, public and private colleges of technology are working together to hold the robot competitions. Since the 1st Robot Competition in 1988, this event is held as a nationwide annual educational event in which students compete with each other in ideas and technology, experience the fun of making robots based on their own ideas and with their own hands, and share the same experience on the importance of coming up with new ideas and the delight of monodzukuri for 20 or more years. In the 23rd Competition in 2010, bipedal robots made by students were competing with each other, carrying a vehicle with students on board. About 4,000 people visited Ryogoku Kokugikan to watch the competition, cheering the robot performance incorporating unique ideas and technologies developed by the 25 teams of students who had survived the regional qualifying rounds.

Kochi College of Technology
The college continuously provides feedback to students by disclosing on the Web the instructor’s comments and questionnaire survey results of students’ class evaluation questionnaire as well as feedback to its instructors through Web disclosure on mutual class observations among instructors and their class observation reports. In addition, the college is working on improving instructors’ teaching abilities by holding FD lecture sessions including teaching portfolio, identifying actual conditions through academic achievement surveys for the first and second grade students, holding FD training programs for newly assigned instructors, and participating in SPOD (Shikoku Professional and Organizational Development Network in Higher Education) training programs.
3. Characteristics and projects fostering human resources at specialized high schools

Specialized high schools foster promising workers serving for monodzukuri and play important roles providing comprehensive humanistic education that fosters desirable industrious/work values as well as productive sensitivity and creativity. They are working on unique projects for fostering future specialists in collaboration with universities or research institutes. They are also pushing ahead with practical projects, such as developing corporate practical work training programs through collaboration with local industry, practical skill instructions by corporate engineers, or monodzukuri human resources fosterage programs incorporating joint research projects with corporations.

Technical high schools are providing a wide variety of unique programs in collaboration with the local industry. These programs include attempting to acquire advanced qualifications under skilled engineers, setting up unique programs/courses such as senior engineers (industrial Meister) programs or disaster prevention engineer courses, and establishing special study courses to work on highly professional issues.

Agricultural high schools are pushing ahead with fostering specialists capable of making use of local specialty products aiming to develop new products that will expand the consumption of rice. They are also working on joint development projects on local specialty products or brand products in collaboration with local female entrepreneurs.

Fisheries high schools are working on fostering fisheries specialists capable of researching the possible effective utilization of unused resources as valuable fisheries resources or developing local specialty products. They are also providing education programs that incorporate fisheries education, environmental education, and business entrepreneur education.

[Chart 4-3: On-site practical training work at a company]  [Chart 4-4: First-prize winners of the “Robot Software Embedding” section of the 5th Youth Monodzukuri Skills Competition]
4. Characteristics and projects fostering human resources at specialized training colleges

As an organization that fosters professional human resources that underpin local industries, specialized training colleges are working on improving practical and professional knowledge/skills through collaboration with local industry, aiming to foster knowledge/skills necessary for future career or actual life and to improve literacy levels. They are also expected to actively address adult education needs, such as improving occupational skills of employed workers and re-educating job leavers.

[Column: Examples of projects at specialized training colleges]

- Asano Institute of Technology (Project on creating framework to foster/evaluate engineers capable of reducing greenhouse gases):
  - A project selected for FY2010: “Professional Human Resources Fundamental Education Promotion Program”
  - Education institutes, such as specialized training colleges, and the industry are working together on the following projects to foster engineers capable of contributing to countermeasures on global warming.
  1. Conducting questionnaire surveys on SMEs in major industrial zones (Tomakomai in Hokkaido, Yokohama in Keihin Industrial Zone, Osaka in Kansai, and Fukuoka in Kyushu) about “appropriate environment education at engineering special schools” and “actions taken to reduce greenhouse gases.”
  2. Conducting on-the-spot investigations by visiting major plants/facilities emitting greenhouse gases (cement plants, papermaking plants, garbage incineration plants, and experimental houses)
  3. Providing demonstration lectures for students majoring in construction or civil engineering by preparing an “Environment Education Syllabus” to learn applicable laws and the Tokyo Mechanism on reduction of greenhouse gas emission (Kyoto Protocol framework, etc.) as well as the current countermeasures on global warming
     * Asano Institute of Technology (in Yokohama) and Chuo College of Technology Osaka (in Osaka) provide 36 demonstration lectures (1 lecture=1 hour).

After the demonstration lectures, these schools conducted qualification tests for evaluating attendees’ achievements and then issued “Certificates” depending on their grades. The government will continue checking out outcomes of this program. These schools are expected to foster engineers capable of contributing countermeasures on global warming. In addition, engineers with this “Certificate” will play active parts in a wide variety of companies/enterprises as core professional human resources capable of “cutting down greenhouse gas emission.”
Section 2: Educational/cultural capabilities for fostering monodzukuri human resources

1. Monodzukuri education, such as math/science education underpinning science and technology

The new Courses of Study for elementary and junior high schools (announced in March 2008) and new Course of Study for high schools (announced in March 2009) stay focused on monodzukuri education, improve class qualities of “Technology and Home Economics (technology)” classes at the junior high school level in order to further enhance monodzukuri-related capabilities, and continue providing monodzukuri-related programs in “Art and Handicraft” classes at the elementary school level, “Art” classes at the junior high school level, and Crafts Production in “Art” classes at the high school level.

In addition, the new Course of Study for Science call for enhancing content of learning, observation/experiment activities, and hands-on activities. Elementary and junior high schools increased their number of classes for science in April 2009, ahead of the initial schedule of the new Course of Study.

Furthermore, the government is comprehensively pushing ahead with enhancing science/math education that will underpin science and technology, such as supporting learning activities in collaboration between universities, research institutes and schools, and systematically enhancing science education facilities, etc.

2. Enhancing career education and vocational education

The overall unemployment rate and the irregular employment rate for young people stand at a high level. Young people are also facing problems of youth unemployment and leaving their jobs early. In this context, school education should enhance career education and vocational education in order to provide support to young people’s social and occupational self-reliance as well as the formation of their lifelong careers.

The Central Council for Education’s report on “Future vision on Career Education and Vocational Education at school” suggests specific approaches for the three basic directions:

• Pushing ahead with systematic career education, ranging from preschool education stage to higher education stage;
• Putting emphasis on practical vocational education and reevaluating the importance of vocational education; and
• Supporting career formation from lifelong learning perspectives.
3. Activities to enhance understanding in the society
(Activities to enhance understanding of science and technology)

The National Museum of Emerging Science and Innovation (Miraikan) plans interactions between researchers and ordinary citizens by producing exhibitions or planning explanations/lectures/events that deliver state-of-the-art science and technology in an easily understandable manner. The Japan Science and Technology Agency (JST) supports projects that promote science communication activities by science museums, universities, local governments, or scientific volunteers in local communities. In this activity category, JST provides hands-on classes and experimental workshops.

[Column: “Innovation and the Future” section]
The National Museum of Emerging Science and Innovation (Miraikan) opened in July 2001 and features the “Innovation and the Future” section as one its four permanent exhibition areas. In this section, the museum exhibits and demonstrates ASIMO, one of the most famous humanoid robots in Japan and developed for household activities. Visitors are able to actually touch or operate a wide variety of robots, including PARO, a therapeutic robot designed to interact with humans and improve user’s motivation, relaxation, as well as reduce stress. By closely interacting with robots, visitors are able to understand with their eyes and hands “how robots move,” “what robots can do,” and “what robots can do for humans.” In addition, this exhibition section underwent a significant refurbishment in 2009, under the supervision of Dr. Hiroyuki Sakaki, who serves as the vice president at Toyota Technological Institute. After the renewal, the section added “the Spring of Wishes,” “the River of Creativity,” and “the Sea of Fertility” in a similar manner to the “water cycle” in order to exhibit a series of flows “how electric bulbs, quantum computers, or other innovative technologies have been created from the past to the present day,” with a focus on the two themes: “People’s wishes (i.e., imagination)” and “driving forces to actualize such wishes (i.e., creativity).”
Social education facilities, such as community centers and museums that provide the closest opportunities of learning and interaction for local residents, are expected to further enhance their Monodzukuri related projects, and community centers are providing handwork classes for parents and children as well as lecture sessions where elderly citizens and children will work together on monodzukuri tasks. In addition, museums collect, maintain, and exhibit materials, such as originals, models, charts, and images. The National Museum of Nature and Science, Tokyo, is holding exhibitions and providing learning support through exhibitions on R&D on aerospace technologies. It is also working on survey studies on natural history and science/technology history.

4. Carrying on monodzukuri traditions to future generations

Monodzukuri traditions are handed over to future generations by designating craftwork arts or other distinguished techniques as “important intangible cultural properties” or by selecting as “selected conservation techniques” traditional techniques/skills that need to be preserved and are absolutely necessary for preserving cultural properties.

[Column: Examples of exhibiting/demonstrating selected preservation techniques]

Kinomoto Town Japanese Musical Instruments Original Yarn Production Conservation Society, the organization that preserves the selected preservation technique “Japanese Musical Instrument Original Yarn Production,” is fostering successors of techniques for manufacturing original yarns used for Japanese shamisen or other string instruments. In the exhibition/demonstration project of selected preservation techniques, the Society exhibited panels explaining these techniques and demonstrated the manual process to collect cocoon filaments in silk reeling machine.
Section 3: Pushing ahead with R&D to enhance industrial capabilities

1. R&D of infrastructure technologies regarding monodzukuri

In order to achieve innovation based on monodzukuri, researchers are developing advanced measurement and analysis technologies/equipment (high-pressure, constant-pressure adsorption measuring equipment) and highly accurate simulation technologies (user interfaces serving as a common base) in FY2010. The government is pushing ahead with R&D on fundamental monodzukuri technologies, such as development and promotion of public utilization of cutting-edge large R&D facilities (completing development of the X-ray free electron laser facility “SACLA” and partial startup of the next-generation K computer supercomputer “K computer”).

[Column: Outcome of Japan’s Monodzukuri technologies: X-ray free electron laser facility “SACLA”]

“SACLA” is a supreme laser facility capable of oscillating X-rays “10 billion times further multiplied by 1 billion times” as bright as the Sun. If we use this new beam, we will be able to capture ultrafast-moving atoms/molecules like frame-speed static images of 1 trillionth of second or shorter. While the X-ray free electron laser (XFEL) facility “LCLS” already in operation is 3.7 km long, Japan’s “SACLA” with better performance only runs 700 meters overall. This compact and energy saving “SACLA” is supported by cutting-edge monodzukuri technologies of Japanese engineers/researchers.

“SACLA” rays are generated by accelerating electrons to almost the same speed as light, and then swinging them finely with equipment called an “undulator” equipped with strong magnets. C-band accelerator tubes are capable of accelerating electrons in the world’s most efficient manner due to Japan’s original technologies. In addition, Japan is the first nation in the world to develop the technology that seals off undulator magnets in vacuum to further enhance magnetic energy. Furthermore, the floor surfaces on which the aforementioned devices are set out are polished totally flat without any concavity and convexity of 100 μm. The world’s smallest and highest-performance XFEL in Japan is created by mobilizing these technologies.

These outcomes yielded from Japan’s monodzukuri practices are about to bring about the world’s first research outcomes in Japan. Researchers are expected to identify functions of plants’ photosynthesis by intracellular movements at the atomic level or to develop innovative fuel cells, storage batteries, and solar cells by analyzing electron status in detail.

[Chart 4-4: Bird’s-eye view of the XFEL facility “SACLA”]
In FY2009, the number of joint R&D projects between universities and private corporations stood at 14,779, while that of R&D projects commissioned from private corporations to universities was 6,185. The number of university-launched venture businesses amounts to 2,027 on an accumulated total basis.

To encourage the commercial viability of university research outcomes through industry–university cooperation, the Japan Science and Technology Agency (JST) runs the “Adaptable and Seamless Technology Transfer Program through Target-Driven R&D (A-STEP).” This program promotes comprehensively and seamlessly intellectual property-based R&D projects by certain firms and certain universities (researchers). In addition, JST also implements the “Technical Transfer Support Center Program,” which technically supports universities’ intellectual property-related activities.

In addition, there is a special tax measure that allows the deduction, from corporate and income tax statements, of a certain proportion of research expenses for joint experimental research by private companies and universities.
MEXT is implementing “Industry–Academia–Government Collaboration Self-Reliance Promotion Program” to enhance its projects for strategically creating/managing/utilizing university-level research outcomes and to provide support to the university’s industry-academia-government projects through industry-academia-government cooperation coordinators.

These programs aim to set up appropriate environment in which universities, etc. are able to independently work on industry–academia–government collaboration projects. In this process, the government provides support to industry–academia–government partnership promotion projects in which universities, etc. intending to set up/enhance the environment necessary for their independent industry–academia–government partnership projects by employing industry–academia–government partnership coordinators.
Since FY2002, MEXT has been working on the “Knowledge Cluster Initiative” and the “City Area Program.” In these programs, universities or other public research institutes are playing core roles in R&D activities under regional initiatives in the light of corporate needs, and take advantage of the results of R&D to advance regional industries, develop new products, and improve services.

The government set up the “Council on Studying Public Testing/Research Organizations’ Possible Roles for Pushing Ahead with Regional Innovations” in July 2010 in order to examine what kind of roles public testing/research organizations should play from the viewpoint of pushing ahead with regional innovation on the nationwide scale.
Part 2: Policy Actions in FY2010 for Promoting Manufacturing Infrastructure Technologies

1. R&D on Manufacturing Infrastructure Technologies

Pushing ahead with R&D on manufacturing infrastructure technologies, etc.

“New Growth Strategy,” as approved by the cabinet in June 2010, has listed “green innovation,” “life innovation,” “the Asian economy,” and “tourism and the regions” as growing areas, and described strategies on “science and technology and information and communications technology,” “employment and human resources,” and the “financial sector” which are areas essential to supporting growth. To actualize new economic growth in line with these policies, the government takes necessary policy actions on Monodzukuri, which serves as the basis of the Japanese economy.

1) Tax system for promoting research and development (Estimated tax revenue decline: ¥235.8 billion (in FY2010))
- Tax credit system relating to the total amount of experiment and research costs*1
  A tax exemption equivalent to 8–10%*2 of the total amount of experiment and research costs (the upper limit set at 20% of the amount of corporate taxes to be paid for the relevant fiscal year) will continue to be applicable, according to the research and experiment cost ratio (the ratio of experiment and research costs to the total sales).
  *1: As temporary policy actions under the FY2009 economic crisis policy package, the government takes the following actions: 1) The upper limit on tax exemption in FY2009 and FY2010 would be raised from 20% of the amount of the corporate taxes to be paid for the relevant fiscal year to 30%; and 2) the portion of the experiment and research costs in excess of the upper limit in FY2009 and FY2010 would be eligible for tax exemption in FY2011 and FY2012, respectively.
  *2: The tax exemption ratio relating to special experiment and research costs is a figure obtained by subtracting the tax exemption rate relating to experiment and research costs from the rate of 12%.

- Tax system for strengthening SMEs’ technology infrastructures*3
  Regarding R&D activities conducted by SMEs, a tax exemption equivalent to 12% of the experiment and research costs (the upper limit set at 20% of the amount of corporate taxes to be paid for the relevant fiscal year) will continue to be applicable.
  *3: As temporary policy actions under the FY2009 economic crisis policy package, the government takes the following actions: 1) The upper limit on tax exemption in FY2009 and FY2010 would be raised from 20% of the amount of the corporate taxes to be paid for the relevant fiscal year to 30%; and 2) the portion of the experiment and research costs in excess of the upper limit in FY2009 and FY2010 would be eligible for tax exemption in FY2011 and FY2012, respectively.

- Tax deduction system relating to an increase in experiment and research costs
  In addition to the aforementioned policy actions, taxpayers may select one of the following two options: The tax deduction system related to an increase in experiment and research costs; or the tax deduction system related to the portion of the amount of experiment and research costs in excess of 10% of the average sales (the upper limit set at 10% of the amount of corporate taxes to be paid for the relevant fiscal year, separately from the aforementioned upper limits).
2) Formulation of Technology Strategy Map
After developing “Technology Strategy Map” in 2005, which takes into consideration future needs of society and the people and advances and other developments related to technologies, the government has been revising it annually. In June 2010, the government disclosed “Technology Strategy Map 2010,” which covers 31 fields, up from 30 in the previous year’s version. The map is used as a communication tool by staff serving in R&D management duties and R&D tasks.

3) Steadily pushing ahead with R&D projects (¥172.9 billion)
By sorting out R&D projects in the seven categories: 1) IT programs; 2) nanotech/materials programs; 3) Robot/new machinery programs; 4) Energy programs; 5) Environment and safety programs; 6) Health and comfort programs; and 7) Aerospace programs, the government is pushing ahead with R&D programs as well as necessary policy actions to commercialize outcomes of these R&D programs in an integrated manner, aiming to encourage creation of innovations.

4) Strategic Basic Technology Upgrading Support Program (¥25,002 million)
Aiming to strengthen the competitiveness of Japanese manufacturing industries and create new businesses, the government has provided support to SMEs’ projects from R&D to prototype stages that will contribute to upgrading the Monodzukuri basic technologies (20 technology categories, such as casting, forging, cutting, and plating).

5) Establishing Tsukuba Innovation Arena (TIA)
To accelerate R&D on nanotechnology, the National Institute of Advanced Industrial Science and Technology (AIST), National Institute for Materials Science (NIMS), University of Tsukuba, and Japan Economic Federation work together to push ahead with “Tsukuba Innovation Arena (TIA)” to implement “Project on new materials power semiconductors that actualize low-carbon society,” “Project on ultralow voltage devices that actualize low-carbon society,” “Project on ultra-lightweight, high-strength integrated materials that actualize low-carbon society,” and some other projects.

6) Supporting interface for commercializing cutting-edge technologies
To put newly-developed technologies into practical use and create new markets, industries, and employment, the government has launched “Innovation Cluster Support Program” to provide support to: 1) Set up appropriate facilities so that corporations will manufacture production samples and demonstrate outcomes of R&D projects; and 2) set up joint research facilities to commercialize newly developed technologies in industry–academia–government cooperation.
7) Intensifying management of trade secrets and prevention of technology leakages
As the Unfair Competition Prevention Act, amended in April 2009, became effective on July 1, 2010, the government has revised “Trade Secret Management Guidelines,” which suggest secret management methods and reference tools. In addition, the government gets across and disseminates trade secret management practices by distributing brochures or mail magazines to corporations that had not managed their trade secrets so far. Furthermore, it holds trade secret management briefing sessions or free counseling sessions by experts on the nationwide scale. In addition, it also set up one-stop counseling desks that provide telephone consultation services on trade secrets.

Collaboration between manufacturing businesses and universities, etc.

1) Innovation system enhancement program (Universities Industry–Academia–Government Collaboration Self-Reliance Promotion Programs) (¥2,649 million)
To actually make use of universities’ research outcomes in the society, the government enhances international industry–academia–government cooperation activities and unique industry–academia–government cooperation projects and assigns industry-academia-government partnership coordinators, aiming to create appropriate environment so that universities, etc. will be able to work on industry–academia–government cooperation projects independently.

2) Industry–academia human resources development partnership program (¥1,067 million)
To create a positive growth cycle in industry–university collaboration for human resource development, MEXT and METI have been pushing ahead with “Industry–university human resources development partnership” program since FY2007 to provide opportunities for dialog and actions relating to human resource development for the academic and the industry. In FY2010, the government takes specific actions, such as developing/demonstrating industry–university joint human resources development model programs based on results of study projects and diffusing projects on systematically fostering/evaluating social life basic abilities for university students.

3) Career Gateway to Asia (¥1.9 billion)
In order to form a network with other Asian countries, promote the globalization of universities and companies, and strengthen industrial competitiveness, METI and MEXT have been jointly implementing the “Career Gateway to Asia” program since FY2007. This program aims to foster advanced overseas human resources by providing a series of projects, including industry–university collaborative specialized education, Japanese language education, corporate culture education, internships, and employment support for high-quality and motivated international students from Asia or some other areas intending to find a job in Japan. In FY2010, around 1,000 international students participated in this program.
2. Securing monozukuri workers

Providing stable employment, including preventing unemployment

1) Supporting human resources development in growing areas (¥50 billion, for 2 years of FY2010 and FY2011)
The government provides support to human resources development in growing areas by granting a maximum of ¥200,000 per eligible worker to cover the employer’s training costs if the employer hires employees for an indefinite term or relocates company staff from other sections and then provides Off the Job Training in growing areas, such as health, environment areas, and other related manufacturing processes.

2) Maintaining/stabilizing employment through employment adjustment subsidy (¥725,741 million)
In order to prevent unemployment and stabilize the employment situation in other ways in cases where companies are forced to reduce business activities for economic reasons such as economic cyclical changes, employment adjustment subsidy was provided to companies that strive to maintain employment by suspending business operations temporarily or sending employees on loan to other companies, and providing educational training programs.

3) Eliminating employment mismatch through Miryoku Hakken Tours (i.e., appealing points discovery tours) (¥100 million)
The government provides “Miryoku Hakken Tours” to encourage awareness changes and employment conditions for students by providing students all over Japan with an opportunity to understand attractive points in individual industries with employment mismatches, such as the monozukuri sector, agriculture, and nursing care service sectors.

4) Encouraging support for reemployment of elderly people (¥38,881 million)
The government provides subsidies for employers who help employees who are scheduled to be unemployed find reemployment to employers that hire job seekers of age 60 or older through “Hello Work” as their regular employees.
It is rather difficult for the elderly or middle-aged job seekers to quickly find a permanent job because they don’t have work experience for the job they want. In this context, the government grants Trial Employment Incentive Pays to employers that hire elderly or middle-aged workers on trial runs, intending to employ them as permanent workers later.
If three or more people aging 45-year old or older jointly set up a new company by making use of their work experience and create continuous employment or job opportunities on their own, the government grants joint employment opportunities to make efficient use of subsidies for senior citizens, etc.
1) Emergency human resources development support program (approximately ¥290.6 billion for the two years of FY2009 and FY2010; in addition, the program budget has increased by ¥100 billion due to FY2010 supplementary budget)

There are concerns that nonpermanent workers who lost their jobs due to employment adjustments may face a prolonged period of unemployment. In light of this, the “Emergency Fund for Human Resource Development and Employment Support” was created in July 2009 as a safety net for people who are not eligible to receive employment insurance benefits. In addition, the government is working on emergency human resources development support project to provide free vocational training sessions and to grant the training/livelihood support benefits of ¥100,000 a month (or ¥120,000 if the recipient has a dependent family member) during the training period, if the recipient satisfies certain requirements.

It should be noted that the emergency human resources development support project finished at the end of September 2011, while a job seeker support program started in October 2011.

2) Job training for displaced workers and people looking to change jobs

Job training is being implemented by consigning training to various kinds of private sector education and training institutions, such as specialized training colleges, universities, NPOs, companies seeking workers, etc., in addition to being implemented at public human resources development facilities for the development of vocational capabilities, in order to promote the smooth reemployment of workers, including manufacturing workers who were forced to leave their jobs.

Under the FY2010 budget, the government plans and actually accepts approximately 220,000 vocational trainees, almost remaining unchanged from the preceding fiscal year.

As public human resources development facilities, etc. the government has 160 Human Resources Development Center, 14 Polytechnic Junior College, 10 Polytechnic College, 1 Polytechnic University, 61 Polytechnic Center, and 19 Human Resources Development Center for the Disabled as of April 2011.
3. Fostering Monodzukuri infrastructure industries

Pushing ahead with industrial clusters, etc.

1) Regional innovation cluster program (¥12,065 million)
Through industry–academia–government joint research projects where local universities with high-level R&D potentials will play core roles, the government strives to form a new cluster that will sustainably create innovation by setting up industry–academia–government network. It provides additional support to districts that have ever worked on cluster formation project so far.

2) Cultivating overseas markets with Cool Japan strategy
METI set up “Creative Industries Promotion Office” in June 2010 to consistently support branding strategies, sales channel cultivation, marketing, and promotion efforts based on 10-year-based long-term visions. It has also launched “Cool Japan Strategy Promotion Program” to guide craftsmen, creators, and SMEs to the world market.
In November 2010, the ministry held Cool Japan Tokyo Conference so that Japanese people will recognize anew “Cool Japan” for which the international community feels empathy, possibly leading to new actions. In December 2010, to create an appeal for Japanese apparel products in Shanghai, METI worked on sales promotion project through popular Chinese fashion magazines or IT and held product PR and fashion show by using top models that play active roles in China and Japan.
From the viewpoint of effectively conducting “Cool Japan Strategy Promotion Program” and turning Cool Japan into profitable businesses, METI held “Cool Japan Public–Private Expert Council” in November 2010 to examine specific overseas business expansion strategies among experts. Ministers, vice ministers, or parliamentary secretaries from the Cabinet Secretariat (Intellectual Property Strategy Promotion Headquarters), Ministry of Internal Affairs and Communications, Ministry of Foreign Affairs, Japan Tourism Agency, Agency for Cultural Affairs, and Ministry of Agriculture, Forestry and Fisheries are attending the said council meetings.

3) Pushing ahead with BOP businesses (¥2,810 million at maximum)
The government has pushed ahead with corporate projects on “BOP Business,” which would contribute to sustainably solving social problems (providing water, daily commodities/services, and reducing poverty) for low-income class (4 billion people with annual revenues less than $3,000, accounting for approximately 70% of the world population) in emerging economies. To be more specific, the government sets up and operates “BOP Business Support Center” to push ahead with information exchange sessions or project works in collaboration among support organizations, private enterprises, and NGOs.
4) Exporting infrastructures and systems
To draw on active demand for infrastructures, the public and private sectors have worked together to push ahead with “infrastructures/systems exports” in accordance with Industrial Structure Vision and New Growth Strategy. To be more specific, as the government set up “Package-type Infrastructures Overseas Sales Related Minister Conference” and worked on top-level diplomacy or other public–private joint efforts, Japan has won new orders for large-lot projects in electric power and aerospace sectors.

5) Policy actions on rare earths (¥101,410 million)
The government has taken policy actions to stabilize supply of rare earths and provide stable production at user firms. To be more specific, financed with FY2010 budget, researchers have developed new technology capable of substituting rare earths with other resources or significantly reducing consumption of rare earths. In addition, the government provides support to R&D on rare metal recycling. In April 2011, it also developed the final report of “Study Group on Collection and Appropriate Treatment of Rare Metals from Used Small Home Electronics,” jointly held by METI and the Ministry for the Environment since FY2008. In addition, the government has developed “Policy Package on Rare Earth,” which calls for 1) developing substitutive materials consumption volume reduction technologies, 2) recycling, 3) granting subsidies for new domestic processing/production technology plants, and 4) mine development and interests assurance, and post the fund of approximately 100 billion in the supplementary budget.

6) Local New Growing Industries Creation Promotion Program (¥1,390 million)
To tap into high-growing industrial sectors expected to serve as the driving force of local economies and encourage creation of new businesses, and to continuously create/foster new growth industry clusters that actively utilize local communities’ various strengths, characteristics, and potentials by forming networks consisting of a wide variety of stakeholders, such as the industry/the academy and government organizations, the government has commissioned external service providers to assign coordinators for wide area partnership purposes and to provide business matching services that will connect seeds and needs.

7) Pushing ahead with setting up domestic plants in low-carbon employment-creating industries (¥110 billion)
The government set aside reserve fund of ¥110 billion as supportive measures for domestic capital investment in lithium-ion batteries, LEDs, eco cars, and other low-carbon industries that Japan has the competitiveness in and are expected to further grow in the future. After inviting public participation, the government adopted 153 projects at the end of December 2010. With these projects, capital investment is estimated to stand at approximately ¥530 billion. If all of these projects finish successfully, supporting industries will enjoy additional market demand worth approximately ¥1.9 trillion a year. As a result, job opportunities for approximately 95,000 workers will be created, including in supporting industries.
8) Encouraging introduction of electric cars, plug-in hybrid automobiles, etc. (¥14,508 million)
To put a curb on CO2 emission or reduce heavy dependency on oil in the transportation sector, the government has granted subsidies, which amount to a half of the price gap with conventional automobiles at maximum, to buyers of electric cars, plug-in hybrid automobiles, clean diesel automobiles, etc. In addition, it also grants subsidies for installers of charging facilities.

9) Eco-point system for home electronics (¥692,968 million)
In May 2009, the government launched the "Program to Promote the Spread of Green Home Appliances by Utilizing Eco-Points," which provide buyers of green home electronics (energy-saving terrestrial digital broadcasting-compatible TVs, air conditioners, and refrigerators) with eco points exchangeable with a wide variety of products, aiming to push ahead with anti-global warming projects, revitalize the economy, and encourage diffusion of terrestrial digital broadcasting-compatible TVs.

In accordance with “Three-Step Economic Measures for the Realization of the New Growth Strategy,” as decided by the cabinet in September 2010, the eco point program for highly energy-saving 5-Star products was extended until March 31, 2011 (the program is applicable to products with single energy-saving label 4-Star or higher). In addition, “Comprehensive Emergency Economic Measures in Response to the Yen’s Appreciation and Deflation,” as approved by the cabinet in October 2010, call for reexamination of eco points granted from December 2010. Furthermore, the eco point program is only applicable to replacement purchase or recycle of home electronics appliances. By doing so, the government aims to soft landing by mitigating a reactionary drop after termination of the eco point program.

10) Eco-point system for housing (¥144.2 billion)
The “Eco-Point System for Housing” provides eco points exchangeable with a wide variety of products if environmental-friendly eco housing is newly constructed or renovated. METI, MLIT (Ministry of Land, Infrastructure, Transport and Tourism), and Ministry for the Environment jointly established this project in December 2009 and started accepting application documents in March 2010. The FY2010 economic package has extended this program for one more year and has provided eco points to household equipment installed with eco renovation (e.g., solar heating system, water-saving toilets, and super-insulated bathtubs). By taking these actions, the government aims to increase housing-related investment in wide variety of supporting industries, induce economic-stimulating effects, and increase energy-saving houses.
1) Encouraging corporate management innovations

The government has taken the following actions in order to support innovations in management by SMEs intended to significantly improve management through new business activities conducted in quick response to changes in the economic environment, such as the development and production of new products, the development and provision of new services, and the introduction of new methods of producing and selling products and providing services.

- Loans provided by governmental financial institutions
  Low-interest loans were provided to individual SMEs, associations, and voluntary groups implementing projects to carry out innovations in management after obtaining approval of their business innovation plans based on the Act for the Promotion of New Business Activities by Small and Medium-Size Enterprises.

- Special cases related to the Small and Medium-Size Enterprise Credit Insurance Act
  As special cases of the ordinary insurance, unsecured insurance, and small-lot special insurance as specified under the Small and Medium-Size Enterprise Credit Insurance Act, support was provided to facilitate the supply of funds for projects implemented after approval of business innovation plans based on the Act for the Promotion of New Business Activities by Small and Medium-Size Enterprises.

2) Supporting SMEs’ overseas business expansion

To enhance support for SMEs’ overseas business expansion projects, METI launched “Conference on Supporting SMEs in Overseas Business” (chaired by Minister of Economy, Trade and Industry) in October 2010. METI works with MAFF and related organizations to create the framework to provide fine-tuned support mainly from regional bureau of economy, trade, and industry.

- SME Overseas Business Expansion Support Program (¥4,009 million)
  JETRO and SME Support, Japan (the Organization for Small and Medium Enterprises and Regional Innovation, JAPAN), which play core roles in the “Conference on Supporting SMEs in Overseas Business,” have jointly provided SMEs with expert advices, support for exhibition at overseas trade fairs, and support for exhibition at domestic trade fairs that attract a lot of overseas buyers.

- Japanese Brand Fosterage Support Program (¥654 million)
  The government has provided subsidy to partially cover the cost of SME projects in which several SMEs work with one another to develop their strategies based on strong/weak points of their materials, develop new products in line with such strategy, or exhibit at overseas trade fairs.
4. Promoting Learning Activities related to Manufacturing Infrastructure Technologies

Enhancing Monodzukuri education in school education

1) “Become a specialist’ project (¥13,093 million at maximum for school/households/local community collaborative promotion projects)
A project was implemented in collaboration with universities, research organizations, and others through the provision of support for such distinctive initiatives as education that incorporates advanced technologies and skills.

2) Project to foster personnel that support local industries (¥13,093 million at maximum for school/households/local community collaborative promotion projects)
The relevant ministries (METI, MLIT, and the Ministry of Agriculture, Forestry and Fisheries), together with specialized high schools and the local industry, implemented initiatives to foster professional workers who protect the culture of manufacturing as well as culinary and everyday life and support local industries.

3) Project to develop human resources with practical skills through industry–academia collaboration (¥1,207 million)
Educational programs that help to develop human resources with practical skills through industry–academia collaboration at universities and colleges of technology were developed and implemented.
Annex: Policy Actions planned for FY2011 for Promoting Manufacturing Infrastructure Technologies

Policy actions on promoting Monodzukuri infrastructures technologies in relation with the Great East Japan Earthquake

**Countermeasures on cash flow**

1) Emergency Guarantee on Recovery from the Great East Japan Earthquake (the first supplementary budget: ¥320.9 billion)
2) Special loan on the Great East Japan Earthquake (the first supplementary budget: ¥178.6 billion)
3) Countermeasures against double loan debts (the second supplementary budget: ¥54 billion (for SMEs))
4) Emergency Financial Support Package for Middle- and Large-sized Corporations (the first supplementary budget: ¥10.5 billion)

**Supporting recovery on plants, school facilities, etc.**

1) Temporary plants/stores construction project (the first supplementary budget: ¥1 billion; and the second supplementary budget: ¥21.5 billion)
2) SME Associations or other Shared Facilities Disaster Recovery Subsidy (the first supplementary budget: ¥15.5 billion; and the second supplementary budget: ¥10.0 billion)
3) Support Experts Dispatching Program for Recovery/Reconstruction at SME Support, Japan (the first supplementary budget: ¥1 billion)
4) Recovery of school facilities, etc. (the first supplementary budget: ¥245 billion)

**Countermeasures on harmful rumors**

1) Subsidy for dose inspections of export products (the first supplementary budget: ¥670 million)
2) Actions on harmful rumors (expanding support for SMEs’ overseas business expansion) (expanding SMEs’ overseas business expansion) (the second supplementary budget: ¥2 billion)