### The World Competitiveness Ranking

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Country /Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hong Kong</td>
</tr>
<tr>
<td>2</td>
<td>USA</td>
</tr>
<tr>
<td>3</td>
<td>Singapore</td>
</tr>
<tr>
<td>4</td>
<td>Sweden</td>
</tr>
<tr>
<td>5</td>
<td>Switzerland</td>
</tr>
<tr>
<td>....</td>
<td>...</td>
</tr>
<tr>
<td>26</td>
<td>Japan</td>
</tr>
</tbody>
</table>

# Japan’s Competitiveness in Science

<table>
<thead>
<tr>
<th>Index</th>
<th>IMD Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Number of R&amp;D Professionals</td>
<td>1</td>
</tr>
<tr>
<td>The Number of Patents Granted</td>
<td>1</td>
</tr>
<tr>
<td>Scientific Infrastructure</td>
<td>2</td>
</tr>
<tr>
<td>R&amp;D Expenditure ($</td>
<td>2</td>
</tr>
<tr>
<td>The Number of Scientific Publications</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: World Competitiveness Yearbook (2011)
## Japan’s Competitiveness in Human Resources in Science & Engineering

<table>
<thead>
<tr>
<th>Index</th>
<th>IMD Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of R&amp;D Professionals in Business</td>
<td>2</td>
</tr>
<tr>
<td>% of University Degrees in Science &amp; Engineering</td>
<td>4</td>
</tr>
<tr>
<td>Availability of Qualified Engineers</td>
<td>11</td>
</tr>
<tr>
<td>Attractiveness to Researchers &amp; Scientists</td>
<td>17</td>
</tr>
<tr>
<td>Availability of IT Skills</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: World Competitiveness Yearbook (2011)
Human Resources in Science & Engineering

- Scientists
  - Professors & Researchers at Universities
  - Scientists in National Research Institutes, Corporate R&D Centers, Hospital Research Laboratories, etc.

- Engineers
  - **ICT industry** (Internet, Software, Media, Films/DVD, Communications)
  - Construction, Manufacturing, Machinery, Chemical, Metal
  - Agriculture, Fishery, Food, and others
ICT Industry Profile I

- **ICT Industry Defined as:**
  - **IT sectors** (Software, Internet Services, System Services) + **Media/Communications** (TV/Radio/Films, Newspapers, Publishing), Advertisement, and others

- **Industry Sales** (METI Economic Census, 2011)
  - **US$694 billion**
  - The 4th largest after wholesale trade, retailing, and construction

- **Net Profit** (Ministry of Finance, 2011)
  - **US$19.8 billion**
ICT Industry Profile II: Corporate Size

- 0-9 employees: 71%
- 10-49 employees: 20%
- 50-99 employees: 4%
- 100-299 employees: 3%
- 300-999 employees: 1%
- 1,000+ employees: 1%

Source: Economic Census (METI, 2011)
ICT Industry Profile III: Labor Force

- **1.9 million workers** in ICT Industries
  - 3% of the total labor force (including non-IT professionals and temp staff)
- **1.1 million IT Professionals** in ICT Industries
  - 1.4% of the total labor force
- **830,000 IT Professionals** in Core IT Industries
  - 1% of the total labor force
## ICT Industry in Japan: Overall Structure I

<table>
<thead>
<tr>
<th>Category</th>
<th># of Corporations</th>
<th># of Offices</th>
<th>Full-Time Regular Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>47,969</td>
<td>68,336</td>
<td>1,429,665</td>
</tr>
<tr>
<td><strong>Information Services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Software/System Development/Database)</td>
<td>26,514</td>
<td>36,606</td>
<td>964,230</td>
</tr>
<tr>
<td><strong>Communications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Telephone/Mobile/Internet Service Provider, Internet Data Center)</td>
<td>1,759</td>
<td>4,805</td>
<td>140,081</td>
</tr>
<tr>
<td><strong>Internet Services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Portal Site Operation, Network Security, Application Service Provider)</td>
<td>4,677</td>
<td>5,168</td>
<td>48,542</td>
</tr>
<tr>
<td><strong>Audiovisual Contents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Films/DVD/Video/Media)</td>
<td>14,214</td>
<td>19,485</td>
<td>221,509</td>
</tr>
<tr>
<td><strong>Broadcasting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(TV, Internet Channels)</td>
<td>805</td>
<td>2,272</td>
<td>55,303</td>
</tr>
</tbody>
</table>

Source: Economic Census (METI, 2011)
Migrant Engineers in Japan

- **Total Number of Migrants:** 2.1 million (2011)
  - 1.7% of Japanese Population
- **Total Number of Migrant Engineers:** 42,634 (2011)
  - “Engineer Visa” Holders
    - Engineers (System, Civil, Chemical, etc.)
    - IT Professionals (Programmers)
  - Approximately 1.7% of “Engineer Visa” Holders in Japan
Migrant Engineers in Japan: 1986-2010
The Age Structure

- **20-29 years**: 65.0%
- **30-39 years**: 26.7%
- **40-49 years**: 5.9%
- **50-59 years**: 1.9%
- **Others**: 0.4%

Source: Ministry of Justice (2005-2010)
The Size of Employers

Source: Ministry of Justice (2011)
The Income Level

Source: Ministry of Justice (2011)
Migrant Engineers in Japan: Profile

- Asian Males
- Former International Students
- 74% in Non-Manufacturing Industries
  - ICT (62%), Finance/Insurance (5.4%), Human Resources (4.9%)
- 26% in Manufacturing Industry (Automobile, Electronics, and Machinery)
- 68% work in the Kanto region (Tokyo) followed by Chubu 12% (Nagoya, Toyota), Kinki (Osaka, Kobe) 9%
Policy Environment for S&E Migration

- Japan as an “Open Country” for Highly-Skilled Migration
  - Promoted since 1988
  - No Labor Market Test, Numerical Quota, or Point System that could reject the entry of migrants

- Population Aging
  - Labor Force decline by 45% in 2055
  - Dependency Ratio to reach 1.3 in 2055

- Global Competition for Talent
Policy Development I

- **2003: “E-Japan Strategy II”**
  - “Accept 30,000 highly-skilled migrants (IT workers) by 2005”
    → Not Achieved

- **2008: The MEXT Plan to Attract More International Students**
  - 188,000 in 2011 → 300,000 by 2020

  - Increase Highly-Skilled Migrants & International Studies

- **But migrants comprise only 1.7% of engineers and 0.1% of scientists in Japan**
Why So Few S&E Migrants?

1. Demand-Side Factors

- **Limited Demand for Highly-Skilled Migrants**
  - 46% of Japanese corporations have never hired highly-skilled foreigners (HRI, 2011)
  - Only 10% have hired former international students (JILPT, 2008)

- **Why?**
  - Concerns for Communication Ability in Japanese
  - Concerns for High Turn-Over Rates
  - Limited Assignment Options due to the Immigration Status
Why So Few S&E Migrants?

2. Supply-Side Factors

- Limited Supply of Migrant Engineers with Japanese Proficiency
  - Japan as a non-English working environment

- Japan as an Unattractive Country for Employment
The Attractiveness for the Highly-Skilled

<table>
<thead>
<tr>
<th>Country</th>
<th>IMD Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>8.77</td>
</tr>
<tr>
<td>Singapore</td>
<td>8.22</td>
</tr>
<tr>
<td>USA</td>
<td>7.8</td>
</tr>
<tr>
<td>Australia</td>
<td>7.63</td>
</tr>
<tr>
<td>Canada</td>
<td>7.46</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>7.42</td>
</tr>
<tr>
<td>China</td>
<td>6.05</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5.67</td>
</tr>
<tr>
<td>Thailand</td>
<td>5.49</td>
</tr>
<tr>
<td>India</td>
<td>5.34</td>
</tr>
<tr>
<td>Taiwan</td>
<td>4.74</td>
</tr>
<tr>
<td>Philippines</td>
<td>4.44</td>
</tr>
<tr>
<td>Korea</td>
<td>4.39</td>
</tr>
<tr>
<td>Japan</td>
<td>4.07</td>
</tr>
</tbody>
</table>

IMD, World Competitive Yearbook 2009
1. Career Development

- **Unattractive Remuneration Package**
  - Based on Lifetime Employment System – Lower Salaries for Young Professionals
  - Engineer’s Average Starting Salary is $42,000 in Japan vs. $60,000 in the US

- **Lack of Transparency & Rigidity in Promotions**

- **Inflexible Labor Market**
  - Difficult to change jobs/positions

- **Japan-Specific Business Practices**
  - Assignment in Japan as a “Career Killer” *(Tsukazaki, 2009)*
  - “Japanese Trap”
2. Integration at Workplace

- **Difficulty in Communications**
  - Not only the language Acquisition
  - Limited social contacts even among Japanese

- **Lack of Role Models**

- **Feelings of Isolation & Marginalization**
  - Even when not being discriminated, man of them feel isolated and marginalized at their workplaces.

- **Lack of Work-Life Balance**
  - Stuart Chambers (a former CEO of Japan Sheet Glass) resigned because of the “need to prioritize time with family.”
3. Social Integration

- **Integration of Children**
  - Lack of Diversity/Multicultural Education in Japanese Schools
  - Tuition for International Schools = 3 million yen/year
    - No subsidies from Japanese corporations
  - “Japanese Trap” vs. “Global Professionals”
  - Declining Quality of Japanese Education

- **Integration of Spouses**
  - Social Isolation in the Communities
  - Limited Employment Opportunities

- **Common-Law Partners**
  - No legal entry as a family member
4. Institutional Barriers

- Social Security System
  - 25 years of membership required to receive benefits
    - Less incentives for settlement if migrants are not eligible or if they cannot commit themselves to stay for life.
  - Withdrawal → Lump sum Payment of $2,600 (National Pension Plan) or 2-month salaries (Employees Pension Insurance)

- Limited International Agreements on Social Security
## Social Security Agreements

<table>
<thead>
<tr>
<th>Country</th>
<th>The Number of SS Agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>386</td>
</tr>
<tr>
<td>Germany</td>
<td>226</td>
</tr>
<tr>
<td>Canada</td>
<td>180</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>157</td>
</tr>
<tr>
<td>United States</td>
<td>97</td>
</tr>
<tr>
<td>Japan*</td>
<td>10</td>
</tr>
</tbody>
</table>

Recent Policy Development

- **2012: The Point System for the Highly-Skilled**
  - Additional Incentives for Highly-Skilled Migrants
  - **70 points** needed
    - The annual income of ¥10 million ($120,000) or more (40 points), Ph.D. (30 points), MA/MSc (20 points), 10+ years of work experience (20 points)
  - **Permanent Residency after 5 years** (now 10 years)
  - **Work Permit for a Spouse**
  - **Residential Permits for Parents and Domestic Workers**
    - Various Restrictions Applied (Annual income of $120,000 for a parental permit and $180,000 yen for a DW permit)
## Point System: Basic Qualifications

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic Qualifications</strong></td>
<td>Ph.D.</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>MSc.</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>BSc.</td>
<td>10</td>
</tr>
<tr>
<td><strong>Work Experiences</strong></td>
<td>10+ years</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>7-9 years</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>5-6 years</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3-4 years</td>
<td>5</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>29 years old or below</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>30-34 years</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>35-39 years</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Ministry of Justice (2011)
# The Income Points for IT Professionals

<table>
<thead>
<tr>
<th>Income Range</th>
<th>&lt;Age 29</th>
<th>Age 30-34</th>
<th>Age 35-39</th>
<th>Age 40+</th>
</tr>
</thead>
<tbody>
<tr>
<td>10+ million yen ($120,000)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>8,000,000 yen- ($1,100,000)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>6,000,000 yen ($860,000)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>5,000,000 yen ($614,000)</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4,000,000 yen ($491,000)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Ministry of Justice (2011)
Future Challenges for S& E Migration:

1. The Impact of 3.11

- “Exodus” after the Great East Japan Earthquake on March 11, 2011
  - 531,370 migrants (1/4 of all migrants) left in March
  - Overall Decline of Migrant Engineers (▲8.5%) & International Students (▲6.4%)
  - Acceleration of Corporate Relocations to China, Hong Kong, Singapore (Structural Issues)
Future Challenges for S&E Migration

2. Long-term Sustainability

- **China as a No.1 Source of S&E Migrants in Japan**
  - 54% of Engineers
  - 39% of Scientists

- **China Emerging as a “Brain Magnet”**
  - The 2\textsuperscript{nd} in the Publication of Scientific Articles
  - Higher Citation Ranking on Scientific Articles than Japan
  - No.1 Research Collaborator of American Scientists

- **State Strategies for Global Talent Acquisition**
  - Attracting 1,000 World’s Top Scientists with 1 million Yuan (US $160,000) -- \textbf{PLUS} Annual Income of $370,000-$500,000
Future Challenges for S&E Migration

3. Long-term Sustainability -continued

- **Dependency on China?**
  - Only “the Moderately Highly-Skilled” Available for Japan?
    - 1 Million “Excess College Graduates” in China
    - High Unemployment among College Graduates = 18% (30%?)
  - The “Only-Child” Generation has a Higher Inclination to Return Home

- **Dependency on Asia?**
  - Declining Birthrates and Working-Age Populations in Korea, Singapore, HK, Taiwan
  - Narrowing Economic Gap between Japan and other Asian Countries
Declining Working-Age Population in Asia

Conclusion

• Globalization of Japanese Corporations
  • Office Language, Remuneration Scheme, Better Work-Life Balance, and Diversity Education for Japanese employees

• Globalization of Japanese Universities
  → More International Students
  • More courses in English, Institutional Adjustment (e.g. Change in Academic Year)
  • More Incentives for Science/Technology Majors - Only 17% are in Science & Technology

• National Integration Plan for Migrants and Their Families
  • Proper Implementation of “Multicultural Coexistence Policies”

• Japan Must Become a More Open and Attractive Country