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“Growth Strategy after the World Financial Crisis”
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Evolving Spatial Economy of Asia-Pacific and the Growth Strategy

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1. Introduction: The Three Priority Viewpoints of RIETI

In the face of rapid globalization, technological changes, and decreasing and aging population,

i. how to incorporate the growth of the world economy?

ii. how to develop new growth areas?

iii. how to create new economic and social systems for sustainable growth?

\[ i \cdot ii \cdot iii \rightarrow \text{enhancing the productivity and vitality of the Japanese economy and society in the long-run} \]

\[ \rightarrow \text{Supporting the “Third Arrow” of “Abenomics” in the long-run} \]
2. The evolution of the global economy in the recent past: from the viewpoint of spatial economics

Rapid Progress in ICT and Transport Technology together with the promotion of free trade through WTO · FTAs · EPAs

Globalization of production · trade · investment and finance

dense networks

Local Agglomeration of production · consumption · R&D

A Complex, Networked World

Efficient and growth-enhancing under normal conditions but

Vulnerable to major local disasters / shocks
World GDP and Trade

GDP annual growth rate
1970-2000: 3.2%
2000-2008: 3.0%
2008-2009: -2.0%
2009-2012: 3.9%

Trade annual growth rate
1970-2000: 5.6%
2000-2008: 6.5%
2008-2009: -5.1%
2009-2012: 8.8%

Source: UN National Accounts Statistics Database and WTO Time Series on International Trade
Impact of Decreasing “Transport Costs”

ICT revolution
TT development
WTO / FTAs / EPAs

→

major reduction
in
“transport costs”

→

more even distribution
of
economic activity on earth

common sense

the prediction of spatial economic theory

only when transport costs
become sufficiently low

→

major agglomeration

utilizing
scale economies
(home-market effects)

→

“concentrated dispersion”

further reduction
in
“transport costs”
Regions shine in the night.

Source: the Earth at night 2012, NASA Earth Observatory/NOAA NGDC (http://earthobservatory.nasa.gov/Features/NightLights/)
GDP shares in the world total: East Asia, EU, NAFTA

East Asia = ASEAN-10 plus China, South Korea, Japan, Taiwan and Hong Kong

Source: IMF World Economic Outlook database October 2013
By courtesy of Professor Nobuaki Hamaguchi
GDP shares within East Asia

Source: IMF World Economic Outlook database October 2013
By courtesy of Professor Nobuaki Hamaguchi
Income divergence / convergence in East Asia

GDP per capita at 2005 price US$, Japan=1

(Source) Penn World Table Version 8.0   By courtesy of Professor Nobuaki Hamaguchi
Share of intra-regional trade in each region

Source: RIETI-TID
By courtesy of Professor Nobuaki Hamaguchi
3. Is Asia still the World Factory?


Source: 2008 White Paper on International Economy and Trade
Figure 1. The Value of US Exports to China and East Asia and China’s and East Asia’s Exports to the US.

Source: US Census Bureau.

Note: East Asia includes China, Japan, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and Thailand. (Figure made by Dr. Willem Thorbecke at RIETI)
Figure 2. US Trade Deficit with China, East Asia, and non-East Asian Countries.

Source: US Census Bureau.

Note: East Asia includes China, Japan, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and Thailand.

(Figure made by Dr. Willem Thorbecke at RIETI)
East Asia today: the World Factory based on supply chain networks centered around dozens of major cities and industrial agglomerations.
Agglomeration through snowball effects
Example: auto/electric machinery industry

Key factors for agglomeration: scale economies and low transport-cost
World parts and components trade shares by region

Source: RIETI-TID
ROW: Rest of the World
By courtesy of Prof. Nobuaki Hamaguchi
4. Auto Industry: global supply chain and its vulnerability

Automobile production by area (All types)

- China
- Europe
- NAFTA
- Japan + Korea
- ASEAN
- South Asia

Source: OICA
Automobile production in ASEAN

Source: OICA
Automobile industry (together with supporting industries) production of a car ← assembling 20,000~30,000 parts

scale economies in production

low transport costs

each key part produced at only one (or a few) locations in Japan (or East Asia)

multilayered complex supply chain networks from procurement of parts to delivery of finished products

minimizing inventory stocks through just-in-time procurement policy

Quite efficient under normal conditions but

Quite vulnerable to major disasters
Agglomeration of auto and supporting industries in Japan

Domestic production per year
10 million cars

exports : about half
Overseas production: 16 million cars (using key parts from Japan)
Supply chain of automobile parts in ASEAN countries

THAILAND
- Press parts
- Frame panels
- Electronic parts
- Interior parts
- Engine parts

PHILIPPINES
- Engine fuel system
- Emission dress parts
- Engine electronic parts
- Suspension parts
- MT mission

MALAYSIA
- Instrumental panel assembly
- Bumper
- Drive shaft

INDONESIA
- Cylinder head assembly
- Cylinder block
- Engine valve
- Steering handle
- AT mission

Source: IDE-JETRO and WTO 2011, Trade Patterns and Global Value Chains in East Asia: From Trade in Goods to Trade in Tasks
Index of Automobile production in Tohoku and in Japan (synchronized impacts)

Source: R. Wakasugi, RIETI Symposium on Great East Japan Earthquakes, 2011.11.07
The Global Impact of the Japanese Quake and Thailand’s Flood

2011, Japan, Guangdong (China), Thailand, and the US
Automobile production (y-o-y % change)

Source: JAMA, Statistic Bureau of Guangdong Province, TAIA, Federal Reserve Board
By courtesy of Professor Nobuaki Hamaguchi
2011, ASEAN automobile production (y-o-y % change)

Source: TAIA, AAM, GAIKINDO, AAP

By courtesy of Professor Nobuaki Hamaguchi
Impact of natural disasters and international conflicts on automobile sales in China

Source: The Nikkei, 10 October 2012 and 5 June 2013 (two diagrams combined by the author)
No place in the world would be risk-free!
Possible large-scale disruption of supply chains from any major disaster:

**Natural disasters**
- Quake
- Tsunami
- Flood
- Typhoon / Hurricane

**Social disasters**
- Air / Water pollution
- Epidemics
- Financial / Monetary shocks
- Terrorism
- Political conflicts
- Military conflicts / War
- Global warming

**Secondary disasters**
- Transport disruptions, Nuclear Power plant accident, Demand/Supply disruptions...

International cooperation for mainstreaming the global resilience of supply chains
5. The Asian Century?: Prospects and Tasks

The Scenario of the Asian Century (ADB, ASIA 2050)

<table>
<thead>
<tr>
<th>Year</th>
<th>Global Population</th>
<th>Asian Population</th>
<th>Global GDP</th>
<th>Asian GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>7.1 billion</td>
<td>3.9 billion (55%)</td>
<td>$70 trillion</td>
<td>$21 trillion (30%)</td>
</tr>
<tr>
<td>2050</td>
<td>9.2 billion</td>
<td>4.8 billion (52%)</td>
<td>$335 trillion</td>
<td>$174 trillion (52%)</td>
</tr>
</tbody>
</table>

- **Granular Region Breakdowns**

  - Asia: 30%
  - North America: 29%
  - Europe: 26%
  - LAC: 8%
  - ME
  - SSA: 2%
  - the Rest: 1%

- **Projected Growth Rates**
  - 4.2% / year
  - 5.8% / year
In order to realize the expected Asian Century

Asia as the World Factory today
based on the extensive supply chains utilizing huge wage-disparity

![Diagram showing a World Center of Advanced Production networks + High Quality Markets + Innovation networks]

International Cooperation

I. Rebuilding more resilient and inclusive Supply-Chain-Networks, and

II. Strengthening the Brain-Power-Network for the future Asia
6. Developing the brain-power-network in Asia

Development of the Brain Power Society since the late 20th century

Revolutionary development in ICT and Transport Technology

globalization of the world economy

Development of Brain Power Society

The major reorganization of global economic • political • social systems
The image is an infographic titled "Eruption of Innovation" from the NIKKEI ASIAN REVIEW dated March 20, 2014. The infographic illustrates the growth in innovation and research credentials in Asia, quantified by various indicators. These indicators include:

- Number of papers most cited (top 1%)
- Number of papers
- Number of patent applications
- Government R&D expenditure
- Private Sector R&D expenditure

The infographic uses bubbles to represent these data points, with the size of the bubbles indicating the magnitude of each indicator. The largest bubbles represent China, followed by the United States, Germany, the United Kingdom, and South Korea. The infographic also highlights the innovation trajectory, showing the growth in innovation and research spending over time.
R&D expenditure by country (OECD PPP)

trillion yen

US
China
Japan
Germany
S. Korea
France
UK

Number of patent applications by nationality

Data source: National Institute of Science and Technology Policy
Diagram made by Dr. Isamu Yamauchi at RIETI
Number of papers cited frequently (top 10%)

Data source: National Institute of Science and Technology Policy
Diagram made by Dr. Isamu Yamauchi at RIETI
Importance of International Cooperation through diversity and culture in the Brain Power Society

The fundamental resources in the Brain Power Society

- **Individual Brain Power**

- **Diversity in people·brains in the society**
  - Synergy through heterogeneous people·brains

- **Diversity in cultures among different regions**
  - Synergy through heterogeneous cultures
Close cooperation of heterogeneous \( K \)-workers (e.g. “nominication” in Japan)

**Antinomy**

- **In the short-run**
  - Close communications
  - Synergy

- **In the long-run**
  - Common knowledge
  - \( \rightarrow \) Diversity
  - \( \rightarrow \) Synergy

For resolving this fundamental problem

**Promote active interactions among diverse regions and countries**
Diversity and creativity: National Institute for Materials Science (NIMS)

Table 1. The number of foreign researchers in public research institutes in Tsukuba (2011, March)

<table>
<thead>
<tr>
<th>研究機関</th>
<th>外国人研究者数</th>
</tr>
</thead>
<tbody>
<tr>
<td>物産・材料研究機構(NIMS)</td>
<td>636</td>
</tr>
<tr>
<td>産業技術総合研究所</td>
<td>463</td>
</tr>
<tr>
<td>青いエネルギー加速器研究機構</td>
<td>305</td>
</tr>
<tr>
<td>国立環境研究所</td>
<td>130</td>
</tr>
<tr>
<td>農業・食品産業技術総合研究所</td>
<td>64</td>
</tr>
<tr>
<td>農業水産研究センター</td>
<td>51</td>
</tr>
<tr>
<td>農業生物資源研究所</td>
<td>28</td>
</tr>
<tr>
<td>農業環境技術研究所</td>
<td>18</td>
</tr>
<tr>
<td>土木研究所</td>
<td>12</td>
</tr>
<tr>
<td>気象庁気象研究所</td>
<td>10</td>
</tr>
<tr>
<td>森林総合研究所</td>
<td>6</td>
</tr>
<tr>
<td>総務省総務研究所</td>
<td>3</td>
</tr>
<tr>
<td>国土交通省国土環境政策総合研究所</td>
<td>3</td>
</tr>
<tr>
<td>国土交通省国土地理院</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2. World ranking in terms of citations in materials science

<table>
<thead>
<tr>
<th>Institute</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Planck Society</td>
<td>25739</td>
</tr>
<tr>
<td>Tohoku Univ</td>
<td>23891</td>
</tr>
<tr>
<td>MIT</td>
<td>18568</td>
</tr>
<tr>
<td>UC Santa Barbara</td>
<td>17338</td>
</tr>
<tr>
<td>Penn. State Univ.</td>
<td>15003</td>
</tr>
<tr>
<td>Chin. Acad. Sci.</td>
<td>15101</td>
</tr>
<tr>
<td>Univ. Cambridge</td>
<td>14977</td>
</tr>
<tr>
<td>Kyoto Univ.</td>
<td>13301</td>
</tr>
<tr>
<td>Osaka Univ.</td>
<td>12575</td>
</tr>
<tr>
<td>Russ. Acad. Sci.</td>
<td>12556</td>
</tr>
<tr>
<td>NIMS</td>
<td>11266</td>
</tr>
<tr>
<td>Natl. Univ. Singapore</td>
<td>11209</td>
</tr>
<tr>
<td>Tsing Hua Univ.</td>
<td>10436</td>
</tr>
<tr>
<td>Tohoku Univ.</td>
<td>10291</td>
</tr>
<tr>
<td>Georgia Tech.</td>
<td>9463</td>
</tr>
<tr>
<td>Ind. Inst. Tech.</td>
<td>9469</td>
</tr>
<tr>
<td>Univ. Manchester</td>
<td>9197</td>
</tr>
</tbody>
</table>

- Among high-ranking papers at NIMS in terms of citations, the number of papers written by author(s) including foreign researcher(s)
  - among top-10 papers: 8
  - among top-31 papers: 24

SOURCE: Ariga and Urao, “Productivity enhancement of a research institute through the contribution of foreign researchers,” Science & Technology Trends No.127, 2012, 1•2, Ministry of Education and Science
The Map of international research cooperation in Solar Cells
the number of papers and international coauthorship (published between 1945 and 2009)

Source: I. Sakata, H. Sasaki, H. Nakamura and Y. Kajikawa "Maps of international research collaboration in clean energy"

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>US</td>
</tr>
<tr>
<td>2nd</td>
<td>Japan</td>
</tr>
<tr>
<td>3rd</td>
<td>Germany</td>
</tr>
<tr>
<td>4th</td>
<td>China</td>
</tr>
<tr>
<td>5th</td>
<td>India</td>
</tr>
<tr>
<td>6th</td>
<td>France</td>
</tr>
<tr>
<td>7th</td>
<td>England</td>
</tr>
<tr>
<td>8th</td>
<td>South Korea</td>
</tr>
<tr>
<td>9th</td>
<td>Spain</td>
</tr>
<tr>
<td>10th</td>
<td>Italy</td>
</tr>
</tbody>
</table>

(but, weak research cooperation in Asia)
7. The Growth Strategy for Implementing the “Third Arrow”

Making the economy grow while the population decreases
≈ Enhancing the TFP of economy

But, how? : **Innovation everywhere involving everyone!**

Advancing the bold new strategy reflecting new values such as:

I. “Silver” is beautiful
II. “Small and creative” is beautiful
III. “Open and connected” is beautiful
Flying Geese of Aging Society in Asia-Pacific
the population share (%) of aged people over 65: year 2010 → year 2060

Let Japan be a leader of the innovative silver society

Source: UN World Population Prospects, The 2012 Revision
Who are the aged? Why fix the dividing line at 65?

The average life expectancy in Japan

Ultimate Goal: Create a new society where everyone can happily work/enjoy in good health until the end.
The Silver is beautiful:

**Senior Citizen**
Creating the best matching

**Younger generations**

---

**Big customers for new products / industries**
- housing · goods · services · entertainments tailored for the aged
- medical / nursing services
- medical / nursing equipments
- friendly and helpful robots
- lifetime education
- all kind of resorts / retirement villages

**Big resources**
- human resources for workers / managers, skills / knowledge, innovation / creation / ventures
- financial resources

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Creating the most innovative silver society through international cooperation
Increasing share of consumption expenditure by senior households

Source: Nikkei Shimbun, May 12, 2014

American labor force participation rate: aged 62-74

Source: The Economist, April 26, 2014
Irodori Project in Action (with All Smiles): Kamikatsu, Tokushima
Products of Irodori Project: Tsumamono for Japanese Dishes
**Irodori (Color) Project** in Kamikatsu Village, Tokushima

- Initiated in 1986 by Mr. Yokoishi (then 24 years old) of JA and four senior ladies
- Now 150 members (all farmers)  
  average age: 67 (mostly females), the oldest: 94
- Average revenue per member: 1.7 million yen

**Kamikatsu village today**
- Irodori project + four similar projects (the third-sector)
- Population: 2092 (U-turn + I-turn: 6.3%)
- Aged people over 65: 47% (the highest in Tokushima)
- Only two persons are bedridden
- Per capita medical expenditure (National Health Insurance): 260 thousand yen (vs. 460 thousand yen at the village with the second highest ratio of elderly)
“Small and Creative” is beautiful.

Ranking of Japanese per capita GDP in OECD

The top 10 countries in the OECD in terms of per capita GDP (2008)

1. All small countries located in the northern part of Europe
2. The total population of the 10 countries: 63 million (about ½ of Japan)
   The average population: 6.3 million (vs. 5.5 million in Hokkaido)
   → To achieve economic growth in a Brain Power Society,
   population size is not essential.
3. Most countries are already in the advanced “silver society”. (the share of people over 65 in 2010: Sweden 18%, Denmark 17%, Switzerland 17%, Finland 17%,…)
4. Each is an independent country, having its own language and culture, with a unique set of economic · social · educational policies.
5. Each spends a high proportion of GDP on education (Denmark 7.8%, Sweden 6.7%, Norway 6.7%, Finland 5.9%, vs. Japan 3.4%, in 2007)
6. Each is highly globalized with high GDP ratios of exports, out-FDI and in-FDI, and with a high proportion of immigrants
7. Most multi-national firms are concentrated on knowledge-intensive activities (e.g. HQ-management, R&D, design) with high profit-ratios, while all workers in each country get relatively high wages, (cf: Grossman and Ross-Hansberg, 2008, AER 98)
8. The ten countries together form a Brain Power Society, rich in diversity
Let Japan be a union of semi-independent shining regions

We Love Hokkaido
We Love Japan
We Love the World

We Love Kansai
We Love Japan
We Love the World
“Open and connected” is beautiful
Promoting the Regional Integration of Asia-Pacific
Connect or Perish: International coauthorship

Source: Nikkei Shimbun, May 12, 2014