Designing SCP from Sufficiency Perspective

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Background of the study

- Growing attention of **Sufficiency Approach** – its thinking is explicitly or implicitly reflected in international policy processes: e.g. SDGs, Paris Agreement, G7 Toyama Framework.

- Focus of SCP policy is shifting from end-of-pipe, product based, and technical-fix solution to **systemic changes in lifestyles and provision systems** with socio-physical infrastructure.

- **Collaboration between qualitative and quantitative analysis** is essential for analyzing systematic change towards SCP.

- This research is in the 2nd year of total 5 years research.

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**Sufficiency Approach in this study**

An approach contributing to **techno-social systems** development controlling overall energy and resource consumption through **decarbonisation and resource saving** (including a shift in needs itself) keeping within resource and environmental constraints such as planetary boundaries, while maintaining or increasing well-being of the society as a whole.
1. Repacking SCP policies into a framework

Limitation of Conventional Policy Typology

- Assuming conventional externality such as **pollutions and life cycle impact of product**
- Not covering the **broader sustainability policy areas** (ex. Lifestyles, Sustainable infrastructure)
- Not integrating **ambitions towards long-term/mid-term targets** (ex. decarbonisation)
- Not dynamic enough to analyze **policy mix** for sustainability transition

Source: Hansen et al 2014
1. Repacking SCP policies into a framework

Two Key SCP Approaches

1. Lifecycle approach

- Efficiency & Eco-design
- Smart Infrastructure
- Circular Economy
- Sustainable Lifestyle

Upstream

- Production and trade
- Manufactured Goods
- Food
- Leisure & Service
- Waste management recycling

Downstream

- Infrastructure
- Housing
- Mobility

Source: authors
# 1. Repacking SCP policies into a framework

## Sustainability policy discourse (1970s-2010s)

<table>
<thead>
<tr>
<th>Major concepts</th>
<th>Efficiency</th>
<th>Sufficiency (Responding to rebound effect)</th>
<th>Circular &amp; Share</th>
<th>One planet living</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970s</td>
<td>1990s</td>
<td>2010s (After SDGs &amp; Paris Agreement)</td>
<td></td>
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</tbody>
</table>

### Key issues
- **Industrial pollution**
  - Climate change, waste, environmental issues associated with consumption
  - Well-being, lifestyle
  - Socio-technical system of service provisions

### Environment-economy relationship
- Separate, contradictory, confrontational
- Compatible, industrialization can be harmonized with environmental conservation
- Inclusion of social consideration
- Sustainability is a key for next socio-technical innovation

### Approaches
- Installation of end of pipe technologies
- Increasing material and energy efficiency
- Innovation, new business model, ICT
- Consensus building, change in systems of service provision

### Major actors/stakeholders
- Government v.s. Industry
- Collaboration of government & market agents
- Business model, social entrepreneurship
- Multi-stakeholder, lifestyle

### Attitude of policy
- React and cure
- Anticipate and prevent
- Create and communicate
- Long-term goal setting, investment, creating business model for sufficiency business

## 1. Repacking SCP policies into a framework

### A new SCP policy framework

<table>
<thead>
<tr>
<th>Product Lifecycle Policy</th>
<th>Production</th>
<th>Waste/R Recycling</th>
<th>Policy for change in provision system</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pollution prevention/basic needs Approach</td>
<td>Sound treatment</td>
<td>Information provision/green procurement</td>
<td>Basic Infrastructure</td>
</tr>
<tr>
<td></td>
<td>Efficieny</td>
<td>Recycle</td>
<td>Car sharing, ride sharing, share house</td>
<td>Public Transport</td>
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<tr>
<td></td>
<td></td>
<td>Reduce, reuse</td>
<td>Reflective consumption</td>
<td>Smart/compact city</td>
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<td>Social media/IoT/Big-data</td>
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<td></td>
<td></td>
<td>Multi-platform in collaboration with AI</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Source: authors</td>
</tr>
</tbody>
</table>

- **Conventional**
  - Product Lifecycle Policy
  - Production
  - Waste/R Recycling
  - Policy for change in provision system
  - Infrastructure

- **Shift in Policy Trends**
  - Pollution prevention/basic needs Approach
  - Efficiency Approach
  - Sufficiency Approach

- **Transition-oriented**
  - Circular Economy
  - One planet living

- **Order-made product based on consumer’s demand**
- **Zero emissions, zero waste**
- **Reflective consumption**
- **Multi-platform in collaboration with AI**
### Three patterns of community-level SCP initiatives

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Leading actor</th>
<th>Stakeholder collaboration</th>
<th>Synergies among initiatives</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern 1</td>
<td>Government-led/Active community</td>
<td>Collaborative</td>
<td>Existing</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>Local collaborative model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pattern 2</td>
<td>Citizen-led</td>
<td>Collaborative</td>
<td>Existing-limited</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Social business model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pattern 3</td>
<td>Government-led</td>
<td>Limited</td>
<td>Limited</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>Pilot model</td>
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</tr>
</tbody>
</table>

#### 2. Community Level SCP Initiatives

Three patterns of community-level SCP initiatives

- **Pattern 1**: Local collaborative model
  - Leading actor: Government-led/Active community
  - Stakeholder collaboration: Collaborative
  - Synergies among initiatives: Existing

- **Pattern 2**: Social business model
  - Leading actor: Citizen-led
  - Stakeholder collaboration: Collaborative
  - Synergies among initiatives: Existing-limited

- **Pattern 3**: Pilot model
  - Leading actor: Government-led
  - Stakeholder collaboration: Limited
  - Synergies among initiatives: Limited
## Community Level SCP Initiatives

### Cases studied

<table>
<thead>
<tr>
<th>Patterns</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pattern 1-A</strong>&lt;br&gt;<strong>Matured Collaboration</strong></td>
<td>- Higasi-Omi “Nano-hana (Rape Blossms) Project”&lt;br&gt;- Oki-town “Local resource circulation of kitchen waste and excrements from household”</td>
</tr>
<tr>
<td><strong>Pattern 1-B</strong>&lt;br&gt;<strong>Collaboration under development</strong></td>
<td>- Surabaya “Household organic waste composting”&lt;br&gt;- Khon Kaen “Organic farming and green market”&lt;br&gt;- Khon Kaen “Waste cooking oil collection and recycling”</td>
</tr>
<tr>
<td><strong>Pattern 2-B</strong>&lt;br&gt;<strong>Social business model</strong></td>
<td>- Surabaya “Mangrove restoration and business development”&lt;br&gt;- Ogawa-town “Organic farming”</td>
</tr>
<tr>
<td><strong>Pattern 2-B</strong>&lt;br&gt;<strong>Niche social business development in very early stage</strong></td>
<td>- Da Nang “100% Renewable Energy House”&lt;br&gt;- Da Nang “Food waste to Pig feeding”&lt;br&gt;- Higashi-Omi “Niche industry of youth”&lt;br&gt;- Surabaya “Town walk proposed by youth”</td>
</tr>
<tr>
<td><strong>Pattern 3</strong>&lt;br&gt;<strong>Pilot model</strong></td>
<td>- Lao PDR “Development and promotion of energy saving stove”&lt;br&gt;- Chaing Rai “Organic farming promotion, idle land use”&lt;br&gt;- Chaing Rai “Mechanical sorting of waste”</td>
</tr>
</tbody>
</table>
2. Community Level SCP Initiatives

Observations from successful initiatives

1. Direct connection to **local life issues**

2. Local initiatives should be analyzed through **local utilization and loop-making of “materials”, “human”, “financial”, and “information” resources** rather than life-cycle and supply chain of products.

3. **Platform is a key** for the loop-making, strengthening collaboration of stakeholder through information sharing and consensus building.

4. **Collaboration and participation** existing from planning stage. **Reframing** to adjust initiatives to fit to local and emerging needs.

5. Once Social **business model** is established, it can expanded in a decentralized manner.

6. Need to embed initiatives related to lifestyle as a **social practice** as a part of daily life.

7. **Collaboration with outside stakeholders** or international collaboration can empower the initiative through synergetic effect.
2. Community Level SCP Initiatives

Initial Key Messages

• Transition to SCP at local level may be possible by identifying and nurturing **bottom-up initiatives**.
• It should be linked to **solutions of local life concerns** (such as decreasing population in Japan).
• However, there are **huge gap between global agenda/national agenda** (long-term and mid-term goals) and local concerns. Thus, it is necessary to consider “different way” of upgrading/upscaling.
• **Networking (not upscaling but keeping diversity)** of these different local initiatives may be possible through more localized network of logistics, information, financial resources, and material resources utilizing advanced information technologies.
• It is not efficiency solution by upscaling rather **sufficiency solution to network locally-available resources with external networking**.
Approach

• Focusing on final demands: housing, mobility, household, energy.

• Scenario for SCP approach: for each final demands, consider “efficiency approach (increasing product-level efficiency such as energy/material efficiency including waste issues)”, “share-approach (increasing uses of unused product/service/infrastructure)”, and “substitution/transition(change from air transport to walk for example)”

• Focusing on demand shift type (+ infrastructure shift for product and service provision) approach

• Assess ecological footprint, GHG emission, material footprint
Definition of Ecological Footprint (EF)

- Global Footprint Network (GFN) estimated nationwide ecological footprint (EF), or national footprint account (NFA), of 232 countries. EF is defined as a summation of 5 types of footprints (e.g. carbon footprint, crop land footprint, etc.).

- GFN defines production-base EF (EFP) and consumption-base EF (EFC) as follows:
  - EF_P: Ecological footprint from production of goods and services produced in the referent country.
  - EF_C: Ecological footprint from production of goods and services consumed in the referent country.

\[
EF_C = EF_P + EF_{Import} - EF_{Export}
\]

- We define final demand-base EF (EF_{FD}) as follows:
  - EF_{FD}: Ecological footprint throughout life cycle of goods and services consumed in the referent country.
Policy impact assessment based on sufficiency approach

- We developed a methodology to evaluate policy impacts on $E_{FD}$, by combining computable general equilibrium model (CGE) and Input–output model (IO), in collaboration with Global Footprint Network.
  - Policy impact on $E_{P}$ is estimated based on CGE simulation.
    - BAU scenario: How will $E_{P}$ evolve without policy?
    - Policy scenario: How will $E_{P}$ evolve with policy?
  - $E_{FD}$ is estimated using Input–output model based on the estimated $E_{P}$ by CGE.

- Policy assessment is NOT based on the comparison with BAU.
  - Usually decision criterion is whether policy scenario is better than BAU scenario.
  - Our decision criterion is whether policy can achieve sufficiency conditions in terms of quality of life given that EF reduction target is achieved.
  - Setting sufficiency conditions is a challenging task. A preliminary attempt is to set non-declining conditions for GDP or welfare level based on the base year level.
Impact of upstream carbon tax on ecological footprint (change from the base year)

- Carbon tax rate is gradually introduced from 2017 (USD115/t-CO$_2$) and increased by 25% a year until 2020 (full rate at USD460/t-CO$_2$ after 2020). Tax revenue in 2030 reaches around USD170 billion.
- Japanese EF$_{FD}$ in 2030 is 29% less than the base year.
- Japanese real GDP increases 18.8% from the base year (from 2030 BAU, 7% reduction)
3. Developing economic modeling to analyze SCP policy

Impacts of downstream ecological footprint (EF) tax on EF (change from the base year)

- Tax rate is set at USD7.7/gha, such that the tax revenue in 2030 is similar to the carbon tax case (i.e. USD170 billion)
- Japanese EF$_P$ (production EF) reduces 4.3%, while Japanese EF$_{FD}$ reduces 11.5% in 2030. The magnitude of reduction is smaller than upstream carbon tax, but the relativity between EF$_P$ and EF$_{FD}$ reverses.
- Japanese real GDP increases 31.4% from the base year (from 2030 BAU, 2.7% increase)
4. Developing indicators to address sufficiency approach

Research question

Limiting consumption based on planetary boundary

Will resource consumption constrain decrease happiness?

What kind of consumption style can increase happiness?


Income / consumption

Ex) Sweden (income)

Ex) US, Japan (income)


消費の研究はNoll and Weick (2015)程度（ドイツ（生活満足度）：US, Japan型）
4. Developing indicators to address sufficiency approach

Indices concerning well-being

Life evaluation
- Cantril ladder
- Life satisfaction
- Eudaimonia

Emotional well-being
- Emotional experiences

Subjective happiness
- Intermediate

Questionnaire Survey in Japan (10 thousands samples): Amount of Goods Consumption (price-based)

Questionnaire Survey in Japan (10 thousands samples): Amount of Service Consumption (price-based)

Generalized Additive Model (N=9,635)

5. Summary

- It is necessary to develop a new framework for SCP policy design in the era of Planetary Boundaries (or SDGs and Paris Agreement). That should be based on the idea of sufficiency approach in contrast to efficiency approach.

- The case study suggests that SCP initiatives at local level should not be approached from upscaling/replication approach rather through networking of diverse local initiatives through connecting logistics, information, financial resources, and material resources. Advanced information technologies are available now to support such approach.

- We are currently developing economic modeling for macro-policy analysis to reflect resource constraints.

- Also, to enable new evaluation of development under resource constraints, we are now analyzing the relationship between consumption and well-being.
Acknowledgement

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“Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region”

PECoP-Asia
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References


