Innovation policy in Finland

Trapped by the Past or Symptoms of Policy Learning?

Markku Sotarauta
• Rise and ? of Finnish innovation policy
  o Innovation policy meets social cohesion
  o Innovation policy meets the global world
  o Innovation policy meets the region
  o Innovation policy meets itself
  o Innovation policy meets dwarfs and basketball
"Innovation policy is actions by public organizations that influences innovation processes”
(Edquist 2008)

Is it?
Cluster policy and innovation system enters Finland

- Deep recession of the early 90’s
- High-road targeted - continuing with the old path simply was not an option
- Cluster and innovation system as key focusing devices
The growth of R&D expenditure (total, € milj.) and employment (person years) in Finland 1995-2009 (Source: Statistics Finland)

<table>
<thead>
<tr>
<th></th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2009</th>
<th>95-09 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Finland</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>2172</td>
<td>4423</td>
<td>5474</td>
<td>6786</td>
<td>212</td>
</tr>
<tr>
<td>R&amp;D employment</td>
<td>47866</td>
<td>68813</td>
<td>77275</td>
<td>79475</td>
<td>66</td>
</tr>
<tr>
<td><strong>Helsinki city-region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>1027</td>
<td>1965</td>
<td>2275</td>
<td>2758</td>
<td>169</td>
</tr>
<tr>
<td>R&amp;D employment</td>
<td>21928</td>
<td>29452</td>
<td>31789</td>
<td>33255</td>
<td>52</td>
</tr>
<tr>
<td><strong>Tampere city-region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>189</td>
<td>606</td>
<td>835</td>
<td>1066</td>
<td>464</td>
</tr>
<tr>
<td>R&amp;D employment</td>
<td>4675</td>
<td>8320</td>
<td>10552</td>
<td>10446</td>
<td>123</td>
</tr>
<tr>
<td><strong>Oulu city-region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>174</td>
<td>493</td>
<td>688</td>
<td>1008</td>
<td>480</td>
</tr>
<tr>
<td>R&amp;D employment</td>
<td>4032</td>
<td>6668</td>
<td>8145</td>
<td>8538</td>
<td>112</td>
</tr>
<tr>
<td><strong>South Ostrobothnia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>9</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>214</td>
</tr>
<tr>
<td>R&amp;D employment</td>
<td>118</td>
<td>349</td>
<td>393</td>
<td>312</td>
<td>164</td>
</tr>
</tbody>
</table>
Relative greatness
The GDP share of R&D expenditure
Source: OECD
### Absolute smallness

The share of world R&D

Source: OECD

**Exhibit 39: Despite its R&D intensity, in absolute terms Finland is tiny – Asia gains rapidly.**

<table>
<thead>
<tr>
<th>Share of world R&amp;D</th>
<th>Change in world R&amp;D share</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>34.03%</td>
</tr>
<tr>
<td>Japan</td>
<td>13.71%</td>
</tr>
<tr>
<td>China</td>
<td>7.13%</td>
</tr>
<tr>
<td>Germany</td>
<td>6.55%</td>
</tr>
<tr>
<td>France</td>
<td>4.24%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.69%</td>
</tr>
<tr>
<td>Korea</td>
<td>3.35%</td>
</tr>
<tr>
<td>India</td>
<td>2.40%</td>
</tr>
<tr>
<td>Canada</td>
<td>2.28%</td>
</tr>
<tr>
<td>Italy</td>
<td>1.87%</td>
</tr>
<tr>
<td>Russia</td>
<td>1.75%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1.70%</td>
</tr>
<tr>
<td>Finland (21.)</td>
<td>0.59%</td>
</tr>
</tbody>
</table>

Finland and the largest countries in terms of R&D in 2005 as % of the world total (left) as well as the 1995–2005 %-point changes (right).

Sources: OECD, UN, national sources.
Finnish manufacturing production volume by industry (€ billions in 2000 prices)
(adopted from Rouvinen et. al. 2003, 89)
Figure 1. ICT Cluster in Finland – Employment, sales, and number of establishments

Data source: Statistics Finland.

(Aiginger et al 2008)
Figure 4.14. Nokia in the Finnish business sector R&D in 2006

Notes: Sources are OECD Science, Technology and Industry Outlook 2008, p. 24; the Finnish breakdown by ETLA. * Business enterprise R&D intensity as a percentage of GDP. ** In the order of importance in terms of R&D conducted in Finland: Wärtsilä, ABB, Metso, Ericsson, Orion, Stora Enso, Kemira, TietoEnator and Amer Sports.

(Aiginger et al 2008)
In many respects Finland is at the forefront of innovation

(Source: International Evaluation of the Finnish NIS)
Contradiction 1: World class Innovators ... (dia pinched from Gordon Murray)
In high-potential entrepreneurial activity, Finland scores very low. Only two out of one hundred early-stage entrepreneurs expect to employ at least 20 employees within next five years.... Finland falls behind all Nordic and all European countries except for Greece.

GEM Finland 2005 p23
Contradiction 2: internationally at the hub of technological progress

(dia pinched from Gordon Murray)
but a long way (spatially, culturally and emotionally) from global markets

(dia pinched from Gordon Murray)
Figure 4.7. Share of R&D and turnover of affiliates under foreign control

Source: Adapted from OECD Science and Technology Industry Scoreboard 2007, p. 173.

(Aiginger et al 2008)
Figure 4.16. Non-national science and technology professionals in selected countries, % of in total S&T employment

<table>
<thead>
<tr>
<th>Country</th>
<th>% Non-national</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luxembourg</td>
<td>10.3%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>8.5%</td>
</tr>
<tr>
<td>Ireland</td>
<td>7.9%</td>
</tr>
<tr>
<td>Austria</td>
<td>7.2%</td>
</tr>
<tr>
<td>Belgium</td>
<td>5.3%</td>
</tr>
<tr>
<td>Norway</td>
<td>4.5%</td>
</tr>
<tr>
<td>France</td>
<td>4.1%</td>
</tr>
<tr>
<td>Denmark</td>
<td>4.1%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.4%</td>
</tr>
<tr>
<td>Finland</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

EU-27 average 5.7%

Share of foreign doctorate students as a percentage of total doctoral enrolment in host country

<table>
<thead>
<tr>
<th>Country</th>
<th>% Foreign Doctorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>42.4%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>40.3%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>36.6%</td>
</tr>
<tr>
<td>Canada</td>
<td>34.1%</td>
</tr>
<tr>
<td>Belgium</td>
<td>31.3%</td>
</tr>
<tr>
<td>Australia</td>
<td>26.4%</td>
</tr>
<tr>
<td>United States (2001)</td>
<td>26.3%</td>
</tr>
<tr>
<td>Austria</td>
<td>21.3%</td>
</tr>
<tr>
<td>Denmark</td>
<td>20.4%</td>
</tr>
<tr>
<td>Sweden</td>
<td>19.9%</td>
</tr>
<tr>
<td>Norway</td>
<td>18.2%</td>
</tr>
<tr>
<td>Spain</td>
<td>17.5%</td>
</tr>
<tr>
<td>Iceland</td>
<td>13.7%</td>
</tr>
<tr>
<td>Portugal</td>
<td>7.8%</td>
</tr>
<tr>
<td>Hungary</td>
<td>7.4%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>7.1%</td>
</tr>
<tr>
<td>Finland</td>
<td>7.0%</td>
</tr>
<tr>
<td>Italy</td>
<td>3.6%</td>
</tr>
<tr>
<td>Korea (2003)</td>
<td>2.4%</td>
</tr>
<tr>
<td>Turkey (1999)</td>
<td>1.9%</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>1.2%</td>
</tr>
<tr>
<td>Mexico (2002)</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Source: Eurostat, Statistics in Focus 75/2007 (see (Aiginger et al 2008))
Contradiction 3: Socially cohesive

(dia pinched from Gordon Murray)

The preferred Finnish model?
… but at the cost of (rarely) celebrating those risk taking individuals that act differently/entrepreneurially too conformist?
An era of reform - again

• A new national innovation strategy
  o Towards “demand- and user-driven innovation” and “broad-based innovation policy”
  o STI/DUI

• Main reforms
  o University reform (new law, mergers between universities etc.)
  o Reform of sectoral research system
  o New Strategic Centres of Excellence for Science, Technology and Innovation
  o Renewed Centre of Expertise Programme

• There seems to be a mismatch between the ambitions and philosophy of the new strategy and the actual reforms
Tech push / demand pull
What are the most important sources of new ideas
very important (important) / n=1026

Veugelers et al (2009)
Main innovation funding schemes in Finland

Strategic centres for science, technology and innovation
300 million euros yearly
- Forest cluster
- ICT and services
- Metal products and mechanical engineering
- Energy and the environment
- Built environment innovations
- Health and well-being

Tekes Programmes
500 million euros yearly

Centres of expertise programme
20 million euros yearly

Academy of Finland’s Programmes

Strategic research
Industrial research
Experimental development

Source: Tekes
The Finnish Strategic Centres for Science, Technology and Innovation (SHOK)

- Non-profit limited-companies with research programmes
- Concentrated funding scheme
- **Six selected:** forestry, ICT, metal products and mechanical engineering, energy and environment, built environment and, health and well-being
- **Expectations:** a) Industry will become more committed into 5-10 year R&D programs, b) increased co-operation between major partners, c) new more efficient way of funding R&D, and d) renewal of existing strongholds of the Finnish economy
Positioning of FIMECC in the Finnish innovation system
(Source: FIMECC ltd)
Criticism

- backward looking, based on the 90’s
- will become large company dominated
- will focus too much on process innovation
- will not deliver new and revolutionary changes and
- will play a conserving role in the economic structure
Competence Clusters and the Centres of Expertise
2007 - 2013

Living business
Joensuu, Hämeenlinna, Lahti, Helsinki

Digital Content
Hämeenlinna, Helsinki, Tampere, Kouvola

Food Development
Kuopio, Helsinki, Seinäjoki, Turku

Forest Industry Future
Joensuu, Jyväskylä, Kajaani, Kokkola, Mikkeli, Lappeenranta, Turku

Health Bio
Kuopio, Oulu, Helsinki, Tampere, Turku

Health and Well-being
Kuopio, Oulu, Helsinki, Tampere

Ubiquitous Computing
Jyväskylä, Oulu, Pori, Helsinki, Tampere

Nanotechnology
Joensuu, Jyväskylä, Kokkola, Mikkeli, Oulu, Helsinki, Tampere

Energy Technology
Joensuu, Jyväskylä, Vaasa, Pori ja Tampere

Tourism and Experience Management
Helsinki, Rovaniemi, Savonlinna, Turku

Cleantech
Kuopio, Lahti, Oulu, Helsinki

Intelligent Machines
Hyvinkää, Hämeenlinna, Lappeenranta, Seinäjoki, Tampere

Maritime
Lappeenranta, Pori, Turku, Vaasa, Raahe
Observation 1
Shared lead thinking cross the programs and cases...

Different clusters but shared lead thinking...

✓ Policies are facilitative, system-oriented, network promoting and indirect in nature – customer and user orientation stressed side by side with science and technology (at least in rhetoric)
  • Better balance between STI and DUI modes looked for

✓ Multi-actor innovation policy arenas (Kuhlmann 2001)
  • Policy decisions are negotiated in multi-actor arenas and related networks (state-region-municipality-firm-university-polytechnic)
DigiBusiness – making sense of rapidly evolving field

- “360 degree strategy”
- Simultaneously customized and generic
- Creation of awareness of rapidly emerging industry, reduction of fragmentation
- Real-life experimentation (living labs)
- Universities loosely connected
- Reactive gardening policy

...but customized strategies
Observation 2a
...but customized strategies
Observation 2b

**Mobile heavy machinery** – to fine-tune or not to fine-tune

- Maintaining and increasing R&D intensity (generic technology focus)
- Conscious efforts to tap into international knowledge hubs
- Highly focused and customized (large firm dominate)
- Intensive legwork
- **Proactive collaborative** policy
AgroTech – catching up learning for innovation

• Increasing local innovation capacity and culture – learning to innovate
• Tapping into national knowledge hubs
• Simultaneously very focused to serve the cluster and generic to serve regional development more broadly
• Usability and customer-orientation important (practice-based policy, rather craft than science or art)
• Distributed activity, experimentation (Agro Living Lab)
• Proactive policy
LET THE USER BE THE KING!
Observation 4
Building-blocks of the Finnish NIS

• **Innovation for survival** – improving research capacity (in STI)

• **Absorptive and implementation capacity** – high exploitation capacity - conscious emphasis on policy learning?

• The role of **Nokia**

• **Consensual policy** – well-developed integrative capacity
Observation 5
Not only sunshine

• “Finland is at risk of becoming a victim of its economic success” (Sabel & Saxenian 2008)
• Finland is mediocre in non-technical innovation
• Entire system is inward-looking and national in nature
• Growth entrepreneurship is very low
• Social cohesion is gone to its extremes
Dominant assumptions

- Customized and collaborative policy is a precondition for success
- Winners need to be picked
  - No fear for picking the winners trap – “small country, what else could we focus on?” – illusion of self-evidence
  - A need to support emergence of new ‘clusters’ not well recognized
- Social cohesion is good, cooperation is compulsory

Observation 6
Illusion of self-evidence

“From now on, it might be better to let the box think outside of you.”
Will these guys learn to play basketball among themselves?
There is an emerging need to redefine innovation policy

- Innovation policy is not only actions by public organisations to influence innovation but…
  - an *interactive* process; an act of balancing, re-conciling and co-ordinating for customization
  - Customization emerges from complex policy networks and discussions – *who influences who*?
  - Is innovation policy (at least to some extent) about creation of sheltered spaces for exploration and *interpretation*
    - Is innovation policy a collective sense-making process in a fast-moving and complex global economy
    - *Policy learning* for *self-renewal*


Sotarauta, M., Ramstedt-Sen, T., Seppänen, S. & Kosonen, K.J. [forth] Digital or Local Buzz, Global or National Pipelines: Patterns of Knowledge Sourcing in Intelligent Machinery and Digital Content Services in Finland. Accepted for publication in the European Planning Studies.

Sotarauta, M. & Kosonen, K.J. [Forth] Customized Innovation Policy for Regions. Accepted for publication in the the European Urban and Regional Studies