Industrial Innovation in Transition and the Innovation System Reform in Finland

Erkki Ormala
Senior Fellow, Aalto University

http://www.iit-project.eu/
### Sample

<table>
<thead>
<tr>
<th>Country</th>
<th>Interviews conducted</th>
<th>Interviews in analysis</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>CZ</td>
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<tr>
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<tr>
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<td>100 %</td>
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<tr>
<td>IT</td>
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<tr>
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<tr>
<td>UK</td>
<td>93</td>
<td>100 %</td>
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<tr>
<td>Total</td>
<td>694</td>
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+ 10 case studies and 400 web survey responses
Company size

Distribution of sample

<table>
<thead>
<tr>
<th>Size</th>
<th>Manufacturing</th>
<th>ICT</th>
<th>Cleantech</th>
<th>BiopharmaCle</th>
<th>Agrofood</th>
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<tr>
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<tr>
<td>&gt;3000</td>
<td>13,3%</td>
<td>10,6%</td>
<td>16,4%</td>
<td>14,1%</td>
<td>5,1%</td>
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Size: # of employees

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## Industry Sectors

<table>
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<tr>
<th>Sectors</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Agri-food</td>
<td>99</td>
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<tr>
<td>Biopharma</td>
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<td>13.3</td>
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<td>Clean technologies</td>
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<tr>
<td>ICT</td>
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<td>Manufacturing</td>
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Industrial Innovation in Transition

- Ecosystem game
- New Tools for Innovation Management
- Open Innovation
- Innovation Management and Practice
- Absorptive capacity of firms
- Policy conclusions

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Innovation Ecosystem
enable new ways of knowledge creation and utilization

From traditional large enterprise
to extended enterprise

with orchestration capability
Innovation ecosystems – an embedded approach?

Change in relevance of innovation ecosystems in the last 5-10 years

change in IES relevance

- Increased: 56%
- No change: 44%
- Decreased: 0%

ALL (n=464)

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IES Stakeholders

Customers have the highest importance for companies. Interestingly they are followed by PRB (interaction with knowledge providers is rated high).

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IES interactions: Most important elements

Knowledge flows are central for companies (reinforces the result of public research bodies being crucial for companies).
Big Data usage in Innovation; Industry Sectors

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IES interactions: OI-activities

All, N = 566
76% of the companies indicated that they engage in OI-activities.
Innovation management and practice

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Innovation management and practice

- State-gate model dominates
- Still most initiatives cost driven
- Top management has decisive role
- Dedicated central innovation committee
- Innovation knowledge sourced outside more important, but often difficult to absorb
- Changes in innovation management practice still in progress (customer involvement, business incubators, independent innovation units, web-enabled innovation platforms, etc.)
Innovation management: Learning from the experiences of European companies

- **Innovation Ecosystem (IES)** – characterised by the interdependence of innovation actors for flows of knowledge, finance, people and services.

- **New tools** - new innovation models and tools for innovation.

- **Open Innovation** - opening-up of innovation processes to allow ideas, new technologies or feedback from external partners to flow into the company.

- **Future environment / new ideas** – the need of mapping the future environment of the company.

- **Innovation process and management** – how to organize the innovation process.
Absorptive Capacity of firms

• Personal motivation and incentives
• Enabling management system
• Efficient use of web tools
• Extensive collaboration with external partners
• Stimulating corporate culture
• Creative and innovation oriented people
Open Innovation/Knowledge Sharing

- Complementary competence and excellence
- Genuine commitment for knowledge sharing/trust
- Collaboration platforms/joint campus presence
- Mobility of research personnel
- R&D/recruitment/education all involved
- Transparent management and collaboration rules
- Fair rules for IPR ownership and use
- Reformed reward and incentive systems
Public policy plays an important role

Barriers for industrial innovation

Includes only “yes”-answers, multiple choices were allowed.
Initiatives for innovation

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### Policy initiatives by countries

#### MOST IMPORTANT PUBLIC POLICY INITIATIVES

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<tbody>
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<td>UK</td>
<td>32%</td>
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<td>16%</td>
<td>5%</td>
<td>11%</td>
<td>6%</td>
<td>14%</td>
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<tr>
<td>PT</td>
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<td>0%</td>
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<td>3%</td>
<td>35%</td>
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<td>1%</td>
<td>3%</td>
<td>13%</td>
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<tr>
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<tr>
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<td>7%</td>
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Most frequently mentioned policy gaps

- Global trade difficulties.
- Difficulties in knowledge transfer from research sector.
- Bureaucracy and complexity in policy support.
- Lack of coordination and consistency over time in policy environment.
- Insufficient seed, venture and growth funding.
- Insufficient skilled people and development of talent/capabilities.
- Systemic bias/difficulties for small firms.
- Regulation around innovation (seen both as barrier and positive factor).
- Need for more demonstrators, pre-commercial procurement, procurement of innovation.
- Insufficient grant funding available.
Securing Finland’s competitiveness and economic growth in the 2020’s

Erkki Ormala
Aalto-yliopisto

Background, process and objectives of the exercise

- Common feeling and understanding that things are not OK
- Minister Mika Lintilä, Finland’s Minister of Economic Affairs invited June 4th 2018 prof. Ormala to review the recent developments and give recommendation on how to improve Finland’s innovation capacity, in particular, by evaluating the public policy instruments and the performance of the relevant actors.
- The results were published on January 9th 2019 in a major media conference
- The process involved a review of international evaluations of Finnish R&D&I policy (OECD, EU, WEF), relevant literature and research findings
- It involved also a wide discussion round with industry, academic institutions, funding agencies and ministries
- The study also encompassed a survey of current developments in industry. The data collection and analysis were performed by Gaia Consulting.
Conditions for a successful R&D&I policy

• Economic growth, productivity growth and job creation are dependent on successful R&D&I policy
• The linear innovation process thinking has been dead for more than forty years; innovation processes are systemic
• Innovation systems must be managed holistically and in coordinated a manner
• Key principles:
  – Sufficient, predictable and balanced funding
  – Good collaboration culture supported by clear incentives
  – Innovations emerge from ecosystems lead by a system coordinator
  – Knowledge sharing is the main function of the ecosystems, public research plays a key role
  – Grants are most effective; loans and tax incentives less effective
  – Skill shortages are taken care of proactively
  – Regulatory environment must support innovation
Elements of Favorable Innovation Environment

- Good understanding of the changing landscape
- Access to top-level research and high quality experts
- Easy access to Broadband; ability to use ICT
- Access to raw materials
- Access to raw materials
- Favourable regulatory environment; harmonized rules; IPR provisions; company statutes; taxation, etc
- Rich fabric of private partners; enabling vertical and horizontal integration
- Access to VC funding and support
- Access to market; Cost efficiency Macro economic stability

FIRM
Finland

- Foreign reviews (EU, OECD, WEF) all agree: the innovation environment in Finland has weakened significantly during the last five years.
- R&D&I policy is currently inconsistent and unpredictable.
- Increasing share of business R&D is moving abroad.
- Business/university collaboration decreased over 40% 2010-2017.
- Public support for business R&D (0.08% of the GDB) among the lowest (28th) among the OECD countries.
- Companies have a clear wish list for competences required in the future.
- Skill shortage is a growing problem for innovation in industry.
- Public support for innovation has declined dramatically and the rules are not appropriate (discrimination of large companies, bureaucracy, funding restricted only to prioritised themes, severe cuts of the funding supporting PPPs).
- Incoherence an increasing problem in the R&D landscape.
- Strategic objectives of the Government’s Research and Innovation Council impossible to achieve (Finland: R&D investments of the GDB 4% 2030, most attractive test environment in Europe, new billion € industry driven ecosystems, increased collaboration between industry and academia).
Government budget appropriations on R&D and the use of funds

- Industrial production and technology
- Health, welfare
- Advancement of science, incl. Universities
- TOTAL

Note: Break in statistical time series of university data
Changes in R&D expenditure by sector 2010-2018 (million EUR)

- **Business**
- **Public Sector**
- **Universities**

<table>
<thead>
<tr>
<th>Year</th>
<th>Business</th>
<th>Public Sector</th>
<th>Universities</th>
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<tbody>
<tr>
<td>2010</td>
<td>4855</td>
<td>692</td>
<td>1425</td>
</tr>
<tr>
<td>2011</td>
<td>5047</td>
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<tr>
<td>2012</td>
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<td>2013</td>
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<td>2014</td>
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<td>2015</td>
<td>4047</td>
<td>543</td>
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<tr>
<td>2016</td>
<td>3902</td>
<td>535</td>
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<tr>
<td>2017</td>
<td>4028</td>
<td>578</td>
<td>1567</td>
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<tr>
<td>2018 (arvio)</td>
<td>4156</td>
<td>583</td>
<td>1573</td>
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Industry funding to university R&D

The highest funding was 2008 EUR 81.1 million.
Business R&D in Finland and abroad 2015-2019, number of companies that responded (n=135)

Own internal R&D and ordered from outside

<table>
<thead>
<tr>
<th>Year</th>
<th>Finland</th>
<th>Abroad</th>
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</thead>
<tbody>
<tr>
<td>2015</td>
<td>83%</td>
<td>17%</td>
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<tr>
<td>2017</td>
<td>88%</td>
<td>22%</td>
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<tr>
<td>2019</td>
<td>92%</td>
<td>28%</td>
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</table>

Legend:
- Blue: Finland
- Green: Abroad
Business R&D share abroad 2015-2019
Main reasons to move R&D abroad (n=110)

- Lack of funding
- Natural part of internationalization
- Collaboration better abroad
- Skill shortage
- No change
- Staff abroad
- Improve market access

The bar chart shows the distribution of reasons for moving R&D abroad, with 'lack of funding' being the most significant reason, followed by 'natural part of internationalization' and 'collaboration better abroad'.
R&D aimed at generating new business and improving existing business by sector
The key problems of public support to industry R&D (n=215)

- availability/funding conditions
- bureaucracy
- other problem
- wrong priorities
- no information about funding
- discrimination of large companies
- too short funding commitment
- termination of shoks
- part of a foreign consortium
Conclusions and recommendations

• Restore the coordinated and predictable R&D&I policy practise with appropriate organizational reforms at the government level (money, knowledge, collaboration and regulatory environment)
• Increase innovation support funding by 300 million € 2020-2022
• Strengthening VTT’s role
  • opening up collaboration in EU-projects and R&D infrastructure usage,
  • increased collaboration with industry and academia both in Finland and with Nordic partners,
  • reforming the IPR policy and
  • volunteering to become an ecosystem coordinator if no other options are available
• New incentives for universities and public research institutes to increase collaboration with industry
Conclusions and recommendations

• Increase the flexibility of the education system to respond to skill shortage much more efficiently and provide opportunities for life-long learning

• Change the work permit principles to help foreign experts move in and be employed

• New funding principles and instruments:
  • Higher support to innovations which generate new business
  • Eliminate the existing restrictions of funding (company size, research area, etc.)
  • Longer time span for strategic national R&D&I programs (5-10 years)
  • Increase Business Finland and the Academy of Finland collaboration with joint programs
  • Proper preparation of the strategic R&D&I programs with better coordination and collaboration. (Each program must have a steering board where both the research community and the user communities such as industry are represented. Each project funded within the program theme portfolio must report to the steering board which also has the responsibility to help organizing the emerging ecosystems)
Four stages of the competitiveness of a country

- Concentration on production factors
- Concentration on investment
- Concentration on innovation
- Concentration on prosperity

Michael Porter 'Competitive Advantage of Nations'
Thank you

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