The evolution of Norway’s National Innovation System

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Main questions

• What characterizes innovation in **Norway** (compared to other countries)?
• Why has it developed the way it did? A historical and **evolutionary** perspective.
• Is its performance «satisfactory? What are the **challenges** ahead?
• **Innovation policy** in Norway: What characterizes it and (how) does it work?
• But first some «**stylized facts**» ...
Novel innovators, percent of all firms, 2008
(CIS 6)

Novel = new to the market (not only to the firm itself)
Innovative products, share of sales, 2008
(CIS 5)
Innovation cooperation, 2008 (CIS 6)

Average propensity to cooperate with external partners (outside the enterprise group)
Norway’s innovation performance not very impressive ….

• Norwegian businesses invest much less in R&D than other rich countries on Europe
• And it is also low on most innovation indicators
• To what extent can this be “explained” by cross-country differences in production structure?
• Some results from Fagerberg et al (20009) who investigated this …

“Structural” factors?
Share of business R&D in GDP, actual and adjusted for structural differences, 2001/2002 (OECD)
Same calculation for innovation, 2004
(CIS4, Eurostat)
A historical (evolutionary) perspective

- Innovation as an **interactive phenomenon**
- Innovation system as frameworks for such interaction
- National dimension important (users, suppliers, competence(labour), R&D infrastructure, policy)
- **Industries/sectors differ** in their needs; these contribute to shape the NSI through market relationships and political demands
- The resulting political and economic «set up» in turn influences who succeeds; **path dependency** («insiders» versus «outsiders»)
- And **lock-in**? A challenge for policy (Narula 2002)?
The Norwegian experience

• “Co-evolution” between industry, the R&D infrastructure and politics shaped the development of the Norwegian NSI

• Norway, rich on resources (land, forest, fish, metals, waterfalls, oil and gas), industries exploiting these advantages (natural resource based industries) developed

• These industries did innovate, but - as elsewhere - performed little (inhouse) R&D, and – if needed - bought R&D services (searched for competence) externally

• A national R&D infrastructure (and policy set up) adapted to the needs of these industries gradually evolved
The Norwegian NSI, continued ...

- The process started in **mining, agriculture/forestry and the maritime sector** and continued – from the first half of the 1900s onwards – with industries based on the exploitation of **hydroelectrical energy**

- Result: Little (own) R&D, but a relatively large sector of (mainly state-owned) **R&D institutes** serving these industries (up to 30-40% of the firms in these industries report cooperating closely with such institutes)

- The **oil and gas industry** shared these characteristics, and the national R&D infrastructure gradually (from the 1970s onwards) **adapted** to its **growing needs**

- Today the oil and gas industry **dominates the economy** and engages – directly and indirectly - a large share of the available **talent and competence**
Challenging path dependency?

• The dream of the «modernizers»: A «hightech» Norway modelled on US/UK defence industry
• A concerted effort by very influential people (Jens Chr. Hauge, Finn Lied ...)
• Realized through defence industry (KV), dedicated R&D establishments FFI, TFI) & policy (NTNF etc)
• Some technological successes (GSM - invention), less so commercially (innovation), crisis of the 70s
• Result: The competence/cabilities subsumed by the growing oil/gas industry
The Norwegian economy at a glance
European compensation per employee (industry, PPP, OECD)
The challenge ahead

- The Norwegian economy is strong – what’s the problem?
- Oil and gas epoch will not last for ever
- Where will future growth (in incomes and employment) come from?
- High dependence on oil and gas also makes the economy more vulnerable
- High costs and low innovation compared to other countries add to these problems
- Solutions: Decrease costs (welfare) or increase innovation?
- What can innovation policy contribute?
Norwegian innovation policy

- Policy tools: Support to projects (NFR, IN), loans (IN) og R&D-subsidies (Skattefunn: tax credits)
- NFR: Support mostly through targeted programs, only a small part open to applicants independent of industry/theme
- IN: Support mostly to primary industries, backward regions, and less innovative projects, criticism from «Riks-revisjonen» (2008) and evaluation (2010)

Innovation support in Norway

- Oil/gas-energy: 27%
- Other natural resource-based: 42%
- Genomics: 8%
- ICT: 8%
- Nanotechnology: 3%
- Maritime: 7%
- Rest: 5%

Compared with employment ....

- Oil/gas - Energy: 3%
- Other Natural resource: 6%
- Maritime: 4%
- Rest: 87%

Revealed nature of Norwegian innovation policy

- Concentrated on politically and economically important (powerful) **natural-resource based sectors**: agriculture, forestry, fishery, regions, shipping, oil and gas
- With a very small share of total employment
- Only a small share of the support open for competition independent of address and topic/industry
- Clear evidence of **path dependency**?
- Need for reform?
Jim March

- **A necessary balance?**
- Norway: Too much “exploitation” and too little “exploration”?
- “Group-think” and “cognitive lock-in” in the elite?
- “Broad” versus “narrow” innovation policies
- **Segmented** government – little **coordination** – The Finnish model
- **A new actor** needed? The Swedish example