



Nordic Innovation Policy in a Comparative Perspective

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CIRCLE (Centre for Innovation, Research and Competence in the Learning Economy)

- Multidisciplinary centre of excellence in research on innovation and entrepreneurship at Lund University (established in July 2004)
- CIRCLE has long term funding from the Swedish Agency for Innovation Systems (VINNOVA), the Swedish Research Council (Linnaeus grant) for centres of excellence, and Lund University
- Becoming one of the largest centres in Europe of its kind with around 35 researchers employed (50% non-Swedish). About to advertise 5 new positions
- <http://www.circle.lu.se/>



Some empirical observations

- Economic performance: Global competitiveness report (World Economic Forum)

	2005	2008	2009	2010
○ Finland:	1	6	6	7
○ Sweden:	3	4	4	2
○ Denmark:	4	3	5	9
○ Norway:	9	16	14	14



European Innovation Scoreboard: 2009 Findings

- *Innovation leaders*: Denmark, Finland, Germany, Sweden, Switzerland and UK (well above the EU27)
- *Innovation followers*: Austria, Belgium, Estonia, France, Iceland, Ireland (below the innovation leaders but close to or above that of the EU27)
- *Moderate innovators*: Czech Republic, Greece, Hungary, Italy, **Norway**, Poland, Portugal and Spain (below the EU27)
- *Catching-up countries*: Bulgaria, Croatia, Latvia, Romania and Turkey (increasing towards the EU27)



Nordic innovation strategies

- **Finland:** *Science-driven* high tech strategy focusing on *radical product innovations* (*STI* mode of innovation). Now adopted a *broad-based* policy combining *STI* and *DUI* modes of innovation
- **Sweden:** *Technology-based* strategy of *process innovations* and *complex product improvements*, through R&D investments in large industries (*STI* mode of innovation)
- **Denmark:** *Market/user-driven entrepreneurialism* characterized by *non-R&D* based, *incremental product innovations* especially within consumer goods sectors (*DUI* mode of innovation)
- **Norway:** *Resource-based* strategy for *process innovations* in large, export industries (*STI* mode of innovation) and *non-R&D* based innovations in SMEs (*DUI* mode of innovation)



Innovation Systems and R&D

- Promoting Innovation Systems approach:
 - *Finland*: Science and Technology Policy Council and TEKES
 - *Sweden*: VINNOVA (Swedish Governmental Agency for Innovation Systems)
- R&D as share of GDP (2007):
 - *Sweden*: 3.6% (3.74 in 2006)
 - *Finland*: 3.47%
 - *Denmark*: 2.55%
 - *Norway*: 1.64%



Innovation systems policy in Norway and Denmark

- Norway: NIS in oil and gas, and metallurgy. SIS in fishfarming. Engineering based STI-research in narrow defined IS.
- RIS (VRI) represents a broad defined IS approach (original contribution)
- Denmark: No overall IS approach. Linear model (Science and Technology policy: 'Fra forskning til faktura'). Exceptions: SIS in agriculture and pharma




Coordination of R&D policy

- Finland and Sweden strong coordination:
 - Finland: 'Science and Technology Policy Council', now renamed to 'Research and Innovation Council' with TEKES as operative agency
 - Sweden: VINNOVA (Swedish Agency for Innovation Systems)
- Denmark and Norway weak coordination:
 - Denmark: Science ministry (no innovation policy)
 - Norway: Very fragmented between ministries and RCN/Innovation Norway

Explanation I: Institutional framework: Varieties of capitalism – institutional complementarities (macro level)

VARIETIES OF CAPITALISM	Liberal market economies (LME)	Coordinated market economies (CME)
Financial regulation	Short-term financial markets, equity financing	Long-term patient capital, debt financing
Corporate governance	Shareholder value, limited business coordination; antitrust laws	Stakeholder value, strong business associations, intercorporate networks
Innovation systems	Radical innovation, involving sharp breaks with extant processes	Incremental innovation involving continuous process development
Capital-labor relation	Decentralized bargaining, contentious workplace relations	Coordinated bargaining, statutory worker representation
Training and employment	Basic education and firm-specific training, short tenure, high turnover jobs, high interfirm labor mobility	Vocational training, long tenure, low turnover jobs, low interfirm labor mobility



Explanation II: Forms of work organisation across European nations (micro level – DUI mode of innovation)

- **‘Learning’ forms of work organisation (CME):**
 - + : **Netherlands, Denmark and Sweden (and Norway)**
 - - : **Southern countries and Ireland**
- **‘Lean’ forms of work organisation:**
 - + : **UK, Ireland, Spain and France**
 - - : **Netherlands, Denmark, Sweden, Germany and Austria**
- **‘Taylorist’ forms of work organisation:**
 - + : **Southern countries and Ireland**
 - - : **Netherlands, Denmark and Sweden**
- **‘Simple’ forms of work organisation:**
 - + : **Southern countries**
 - - : **Netherlands, Denmark, Finland and UK**



Explanation III: Positive impacts of the innovation system approach

- New view on what constitutes 'international competitiveness' from relative wages (low road or weak competition) to non-price competitiveness national policies of promoting innovation and learning (high road or strong competition)
- The 'system' dimension of the IS concept - understood as innovation networks involving an intricate interplay between micro and macro - moved attention from *linear* to *interactive* thinking of innovation (from *science* and *technology* policies to *innovation* policy)



Consequences for Norway: From positive to negative lock-in

- Successful policy securing positive lock-in for traditional export industries
- Problems for manufacturing industries not in line with the needs of process industries
- Problems for emerging industries based on new knowledge and technologies different from the ones dominating the IS
- This may create negative lock-in



Consequences for Norway: Too strong specialisation

- Combination of a strongly specialised export sector and a highly specialised knowledge exploration system (NTNU/SINTEF) has created strong positive lock-in effects (thus no Norwegian paradox; incremental process innovations have led to high productivity)
- However, cognitive distance can become too narrow for supporting new and emerging industries
- Future competitiveness should be based on diversity, not on specialisation/specialised clusters (Krugman)



Consequences for Norway: CoE as specialised clusters

- CoE policy in Norway, Finland and Sweden:
 - Finland and Sweden: RIS based on a structure of regional industrial strongholds and regional universities/technical universities (especially in Sweden with 5 technical universities)
 - Norway: Regional clusters supported by a NIS with NTNU/SINTEF as the knowledge exploration node. Exceptions: Oslo Cancer Cluster and NCE Instrumentation, Trondheim
- This structure may further promote negative lock-in



Consequences for Norway: Cognitive lock-in?

- Not only negative industrial lock-in but also a cognitive one?
- Lack of basic social science research on innovation, innovation systems and innovation policy (in contrast to Sweden – CIRCLE, a VINNOVA supported CoE with more than 30 researchers today)
- Weak knowledge base – low analytical capacity for innovation policy (VEKSTFORSK's aim to correct)
- Low absorptive capacity towards new external ideas on innovation policy




Diversity not specialisation is the way forward

- Research has shown that a *combination* of the two modes of innovation improve the performance of firms (Berg Jensen et al. 2007)
- Research has also shown that broad sourcing for knowledge for innovation (i.e. not only collaborating with R&D institutions or basing innovation only on experience based knowledge) makes firms more innovative (Laursen and Salter, 2006)
- Where does this leave the *cluster* approach?
- Clusters represent sector *specialisation* exploiting *localisation* economies
- Cluster approach important in Norwegian industry/innovation policies (CoE, Arena) and resesarch ('Et kunnskapsbasert Norge')



Problems with Porter's cluster approach

- *Geographical* definition:
 - national industrial or regional clusters
 - if regional, how large a region (California as a wine region, a city-region, or a regional cluster as part of a RIS)
- Lack of causality explaining why clustering of firms promote innovation (Perroux' key industry factor)
- Business interactions vs. knowledge flows (exchange of knowledge or market information) – co-location/'being there' is not enough to promote innovation
- Should all the determinants of the diamond be inside the cluster? Small countries and regions vs. USA and Chinese regions
- Relative importance of endogeneous vs. exogenous factors (regional vs. non-regional) – distributed knowledge networks
- Localisation vs. urbanisation economies (specialisation vs. diversity/variety)



What is Constructing Regional Advantage (CRA)

- New regional development strategy promoting competitiveness on individual and systems levels to meet challenges of the globalising knowledge economy – *institutional* approach
- Building on the IS approach on how to increase competitiveness but advocating a more pro-active and collaborative approach and including the meso (firm) and micro (entrepreneurs and work organisation) levels in addition to the system/macro level
- Addressing system failures of weak connectivity and lack of transformative capacity within and between (regional) innovation systems
- Support openness and diversity of IS (differentiated knowledge bases/related variety/cognitive distance) in the promotion of platform based strategies of regional development



Evolutionary vs. Institutional perspectives

- Variety creation
 - Adaptation
 - Selection mechanism
 - Retention
-): 'Evolutionary' as well as 'institutional' perspectives on this evolutionary process
- Social ontology – role and scope of agency to influence windows of opportunity for regional policy
 - Innovation systems can play an important role in the various steps of the evolutionary process



Content of policies for Constructing Regional Advantage

- ***Proactive and trans-sectoral, platform oriented policies*** (transcending traditional industry/sector specific policies):
 1. *Differentiated knowledge bases* (synthetic, analytical and symbolic)
 2. *Related variety* (spillover effects)
 3. *Distributed knowledge networks* (open innovation)

Differentiated knowledge bases: A typology

Analytical (science based)	Synthetic (engineering based)	Symbolic (art based)
Developing new knowledge about natural systems by applying scientific laws; <i>know why</i>	Applying or combining existing knowledge in new ways; <i>know how</i>	Creating meaning, desire, aesthetic qualities, affect, intangibles, symbols, images; <i>know who</i>
Scientific knowledge, models, deductive	Problem-solving, custom production, inductive	Creative process
Collaboration within and between research units	Interactive learning with customers and suppliers	Experimentation in studios and project teams
Strong codified knowledge content, highly abstract, universal	Partially codified knowledge, strong tacit component, more context-specific	Importance of interpretation, creativity, cultural knowledge, sign values, implies strong context specificity
Meaning relatively constant between places	Meaning varies substantially between places	Meaning highly variable between place, class and gender
Drug development	Mechanical engineering	Cultural production, design, brands



Differentiated knowledge bases

- Characterise the nature of the *critical knowledge* which the innovation activity cannot do without (hence the term 'knowledge base' understood as an ideal type)
- Makes it not relevant to classify some types of knowledge as more advanced, complex, and sophisticated than other knowledge (e.g. to consider science based (*analytical* knowledge) as more important for innovation and competitiveness of firms and regions than engineering based (*synthetic*) knowledge or art based (*symbolic*) knowledge). Different knowledge bases should rather be looked upon as complementary assets, which all can constitute the platform for CRA

Regional innovation policies: A classification of policy instruments

	Support: Financial and technical	Behavioural change: Learning to innovate
Firm-focused	Financial support Brokers	Mobility schemes
System-focused	Technology centres	<i>Clusters</i> Regional innovation systems



What is Regional Innovation Systems (RIS) – narrow definition:

- A RIS is constituted by two sub-systems and the systemic interaction between them (and with non-regional actors and agencies - open innovation):
- The *knowledge exploration and diffusing sub-system* (universities, technical colleges, R&D institutes, corporate R&D, technology transfer agencies)
- The *knowledge exploitation sub-system* (firms in regional clusters as well as their support industries)
- *STI* (Science, Technology, Innovation) mode of innovation – supply/science driven; radical innovations



What is a RIS - broad definition :

- A wider system of organisations and institutions supporting learning and innovation, and their interactions with firms in the region. Integrating innovation policy with education and labour market policies (learning regions)
- *Developmental (creative) learning*: learning work organisations, interactive learning (user-producer relationships), inter-firm networks
- *DUI (Doing, Using, Interacting)* mode of innovation – market/user as well as employee driven; incremental innovations