

# Innovation policy for new path development: A Norway-Sweden comparison

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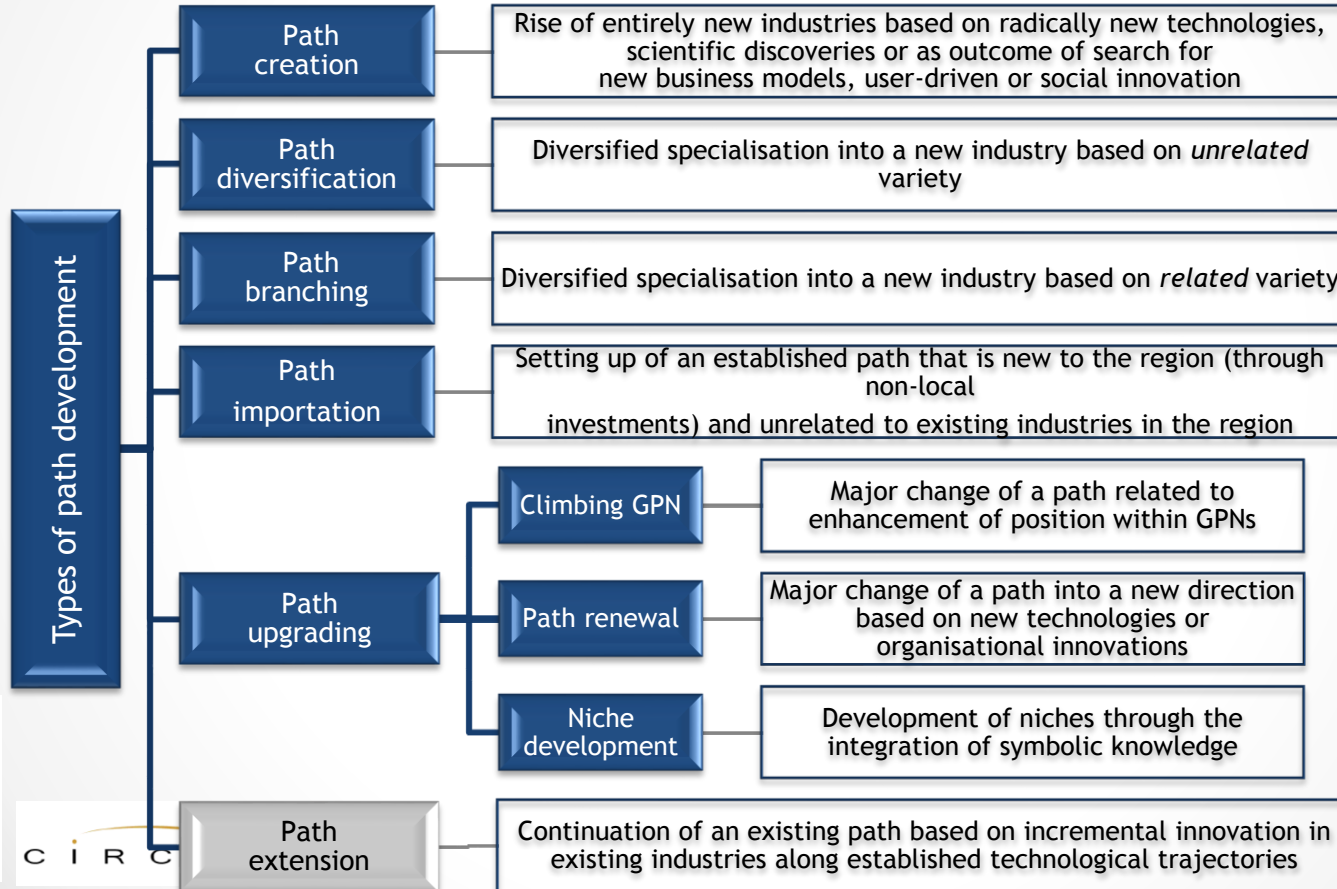


# Content of presentation

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- Comparison of innovation policy in Norway and Sweden with special focus on the promotion of capacity for new path development in the economy
- A high capacity for new path development is of strategic importance for economies to be resilient
- An interesting comparison as Sweden by OECD (2013) is characterised as the most resilient economy in Europe and is an innovation leader, while Norway is mostly pursuing path extension and is a moderate innovator
- This is not only determined by the size of the funding of R&D and innovation and the industrial structure, but also by how the innovation policy is organised as well as by the structure of the R&D system
- Norway as a raw material based economy might be a learning case for Brazil of a less efficient innovation policy for promoting new path development, while Sweden is an example of how to become an advanced high-tech industrialised economy and retain this position in a globalised economy

# Types of regional industrial path development



# European Innovation Scoreboard: 2016 findings

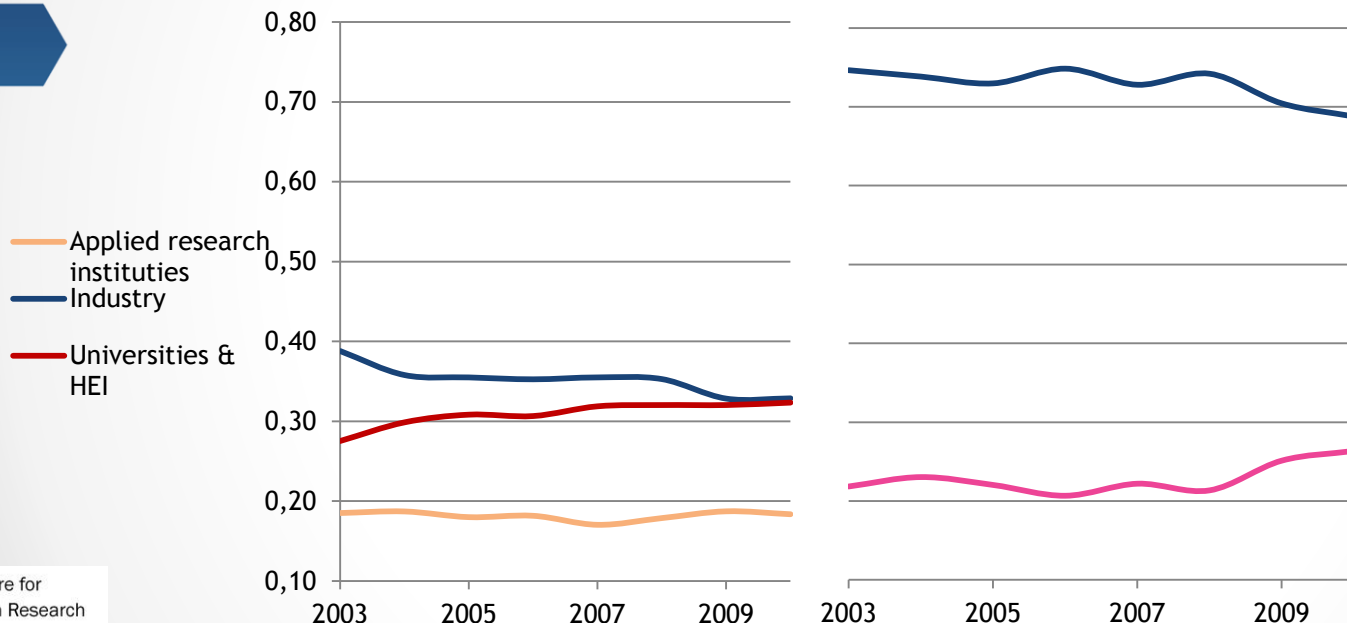
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- *Innovation leaders*: Switzerland, Sweden, Denmark, Finland, Germany, Netherlands (well above the EU28)
- *Strong innovators*: Ireland, Belgium, United Kingdom, Luxembourg, Austria, Israel, Iceland, France, (EU 28 average), Slovenia
- *Moderate innovators*: Norway, Cyprus, Estonia, Malta, Czech Republic, Italy, Portugal, Greece, Spain, Hungary, Slovakia, Serbia, Poland, Lithuania, Latvia, Croatia, Turkey
- *Modest innovators*: Bulgaria, Macedonia, Romania, Ukraine

# Two very different R&D systems

(R&D share of GDP (2011): Norway 1.8% - Sweden 3.6%)

Norway Sweden



Sector share of total R&D expenditures. Source: Nordic R&D statistics, NIFU.

The distinction between industrial firms and applied research institutes in Norway is made on the basis of supplementary national statistics.

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# Types of RIS

- **Territorially embedded regional innovation networks** consist of firms that base their innovation activity mainly on localised learning processes stimulated by geographical, social and cultural proximity without much interactions with research organisations. *Exploitation, path-dependence. Broad based RIS*
- **Networked regional innovation systems** emphasise complementary efforts aimed at upgrading regional research infrastructures and strengthen their interactions with local firms. Regarded as the ideal-typical RIS having the potential for combining science-based (STI-based) and experience-based (DUI-based) knowledge and thus for reducing the risk of negative lock-in through a systemic regional interaction between a knowledge exploration and exploitation subsystem of a RIS. *Stronger exploration capacity, planned character. Narrow based RIS*
- **Regionalised national innovation systems** involve interaction with firms and research organisations located extra-regionally. *Linkages formed on a project-to-project basis reflecting a linear rather than an interactive model of innovation*

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# The two faces of Norwegian innovation policy

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**Regionalisation and diversity:** Strong tradition for *innovation-based regional development policy* adapted to regional conditions. The VRI program (Program for regional R&D and Innovation) seeks to combine the two perspectives on RIS and is paralleled by cluster programs and regional research funds

- *From a broad - territorially embedded (Enterprise Development 2000, VRI I) - to a narrow (VRI II & III) definition of networked regional innovation systems*
- *Reflects a shift in emphasis from refinement of exploitation capacity and incremental innovations to regional ‘ambidexterity’ through build-up of complementary exploration capacity*

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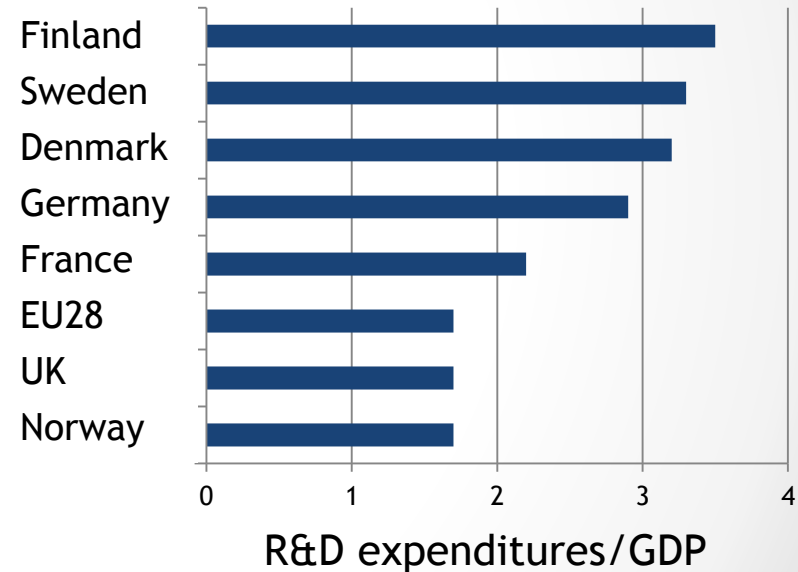
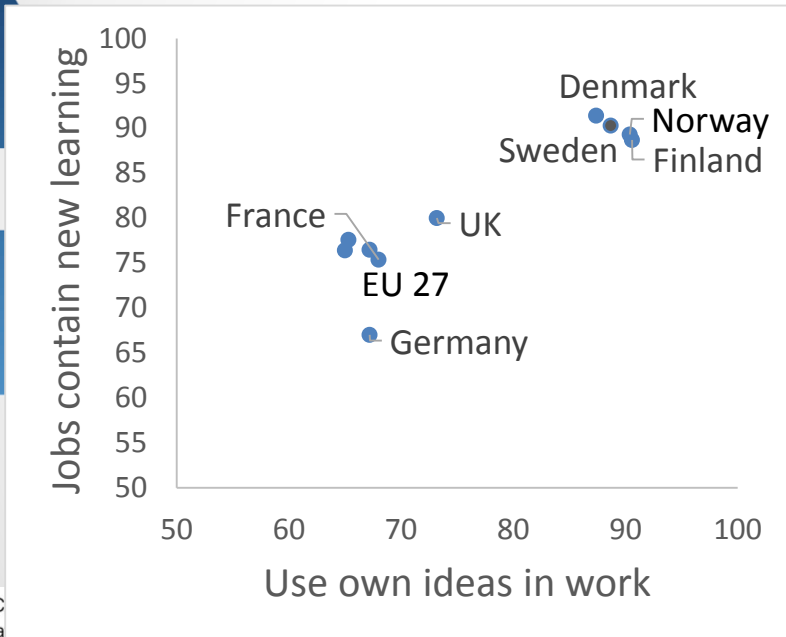


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# Learning work organisation/experience based (DUI) mode of innovation; level of R&D-expenditures





# The two faces of Norwegian innovation policy

**Centralisation and specialisation:** Dominant R&D funding instruments (e.g. ‘user-driven Innovation arena’, thematic research programs, tax credits) and sector neutral industrial policy more generally work towards *strengthening the ‘systemic lock-in’* (Narula, 2002; Strand & Leydesdorf) *between incumbent industries (exploitation) and stronghold (applied) research institutes (exploration)* as well as maintaining the *mismatch between specialisation and concentration of R&D efforts (‘exploration’) and a less geographically concentrated industrial structure* (Strand & Leydesdorf, 2010; 2013)

- *Regionalisation of the national innovation system narrowly defined*

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## The period 2006 - 2012 (Herstad & Sandven, 2017)

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The VRI program sought to *mobilise firms into development work and collaboration with local research institutions*

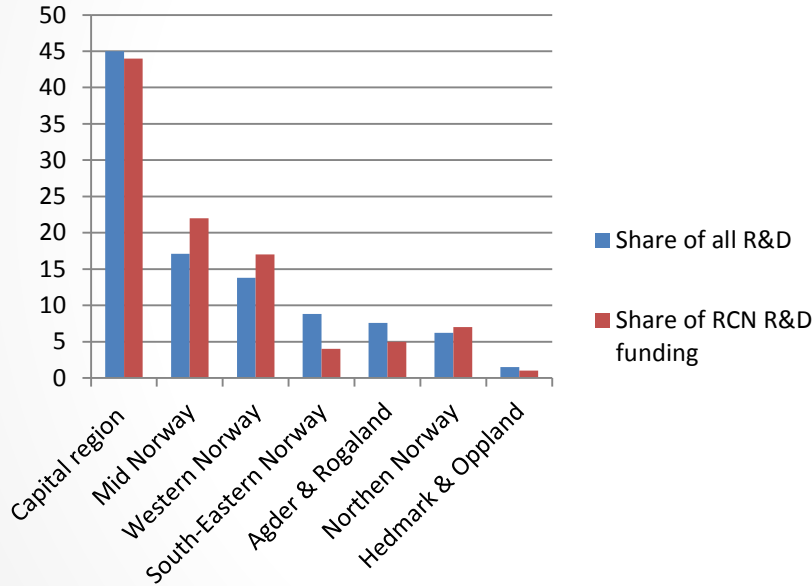
...but the industrial base of Norway *responded by reducing its overall commitment to innovation*

...by *strengthening linkages to national stronghold (applied) research institutes* instead of local institutions and/or research organisations abroad

...and by *strengthening linkages to international industrial networks* at the expense of local ones

# Spatial concentration is in Norway reinforced by the public R&D funding system

Share of total R&D and RCN funding



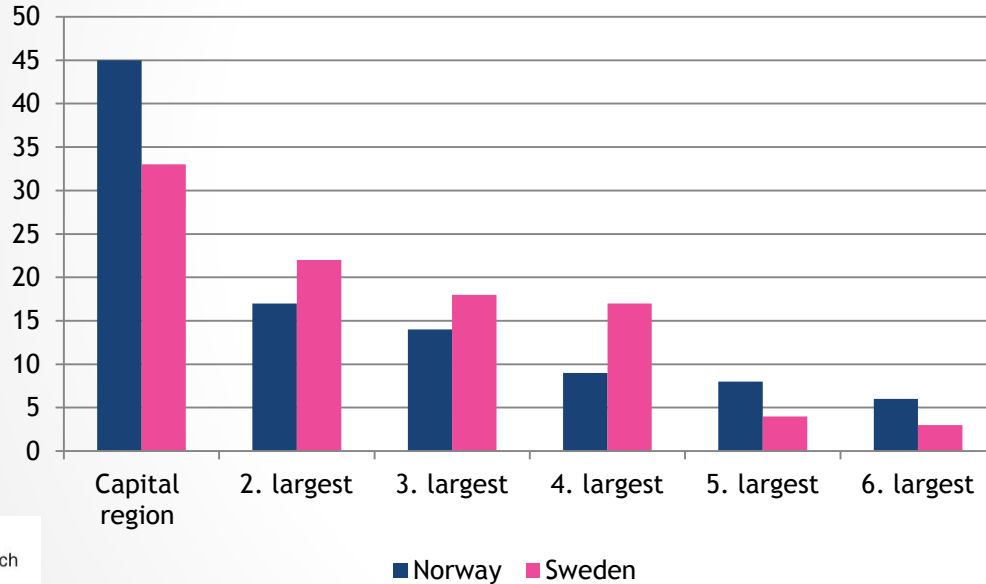
R&D projects funded through RCN is strongly concentrated in mid Norway and in the capital

53 % of RCN project funding was in 2011 (directly) allocated to universities or research institutes in these two regions

In addition to funds reallocated from receiving firms to R&D conducting institutes located in these two regions

# Spatial concentration of R&D

Share of total R&D by region & rank  
2010



Swedish R&D is (relatively) evenly distributed on the four largest R&D performing regions

Norway exhibit a much stronger concentration of R&D in the capital and technical research in Mid Norway

# Historical background - Sweden

- First promotion of strong R&I milieus in 1979 when STU (The Board for Technical Development) supported basic research in new and potentially important areas for Swedish industry (IT, microelectronics and biotech)
- First explicit promotion of strong R&I milieus in 1990 when 11 interdisciplinary material consortiums were established. This initiative had a 10 years perspective and was funded by the National Science Research Council
- In 1995 another ten years program was started (Competence Center Program). This is a further development of the concept which was introduced in the material consortiums. 28 centres were included in this program
- VINNOVA - Centres of Expertise - VINNEXcellence and VINNVÄXT - 10 years programs building strong, regional research and innovation milieus within
- VINNOVA has also programs to support early stages of innovation projects in SMEs (Research and Growth) and Small Business Innovation Research program. The SIBR program work as an incubator where small enterprises can prepare for obtaining potential funding from private business angles and VC

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# VINNOVA - Strong R&I milieus

Regional innovation systems

- Promote innovativeness and competitiveness
- Strong R&I milieus, focus on knowledge creation

Triple Helix

- University - industry - government
- Normative (regional) innovation policy approach

Mode 2

- Interdisciplinary, problem-oriented, application driven research - RIS and Mode II university

Regional Proximity/  
Globally connected

- Spatial and organisational proximity
- Global knowledge networks (open innovation)

Emphasis on global excellence

- In knowledge exploration and exploitation

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# Innovation policy in Sweden

- History matters: Longer industrial history; large, international companies; ‘pairing’ of public utility suppliers (e.g. Vattenfall) with producers of capital equipment (e.g. ABB). Later theorised as ‘development blocks’ (Dahmen) and innovation systems approach, today implemented as ‘strong Research and Innovation Milieus’ (RIS) by VINNOVA
- Sweden has - according to OECD (2013) - the most resilient economy in Europe by always coming out of crises by being technologically more advanced
- It had an accumulated economic growth over the past three years of more than 10%, the highest in Europe. Spain was second with 8%, however, starting on a much lower level, and not based on innovation but on cost reduction
- This is due to Sweden’s proactive innovation policy existing before ‘innovation’ was part of the political discourse
- Coordinated, long term innovation policy (10 years competence programs) focusing on new path development. Since 2001 VINNOVA as public agency responsible for innovation policy

# System Innovation - VINNOVA's new policy approach

## System Innovation Policy:

‘a horizontal policy approach that mobilises technology, market mechanisms, regulations and social innovations to solve complex societal problems in a set of interacting or interdependent components that form a whole socio-technical system’ (p. 7)

VINNOVA's new policy programs:

- Strategic Innovation Programs (2012)
- Challenge-driven innovation (in total 30% of VINNOVA's budget)



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# System innovation policy: From place-based to societal change driven

- This reorientation of strategic focus to thematic platforms transcending sectoral, geographical and organisational domains reflects a recent trend in European innovation policy
- Increased focus directed towards addressing the grand societal challenges through exploiting variety and new combinations
- This new strategy should secure international competitiveness within thematically coherent but technologically and cognitive diverse areas to promote economic growth and provide solutions to the grand societal challenges
- The Strategic Innovation Program includes more than 60 innovation agendas (identified strategic areas not yet operational programs) and 11 strategic innovation programs (consortia of stakeholders working together to promote a thematic agenda)
- The program targets diversification and is organised in a 'bottom-up' way

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# System innovation policy

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- This shift from a place-based to a societal challenge driven policy still mainly relies on R&D and science-driven innovation
- A strong focus on an R&D based policy serves as a barrier for successful transition
- The recent shift implies a greater need for policy coordination across different fields and scales
- This makes agencies like VINNOVA less autonomous with regard to design and implementation of innovation policy
- Points to the need for reaching a balance between demand-oriented and supply-led strategies in which place-specific context matters and innovation policy can be attuned to and embedded in the particularities of the regional and national economies it aims to target
- Linking S3 strategies with system innovation policy could be a solution

# Outcomes of Norwegian innovation policy and future challenges

*Path-extension through specialisation and centralisation* reflected in policy emphasis on university-industry linkages as externalisation of R&D through purchases from specialised public research organisations

- Clear division of labour between ‘exploration’ in leading (applied) public research organisations aiming at ‘exploitation’ in incumbent industries
- Strengthening over time the position and capacity of leading (applied) research organisations to support incumbent industries (path extension through ‘systemic lock-in’), which runs the risk of path exhaustion
- Limited emphasis, and impact, on the build-up of (intra-mural) exploration and exploitation capacity in new sectors to achieve a balance of exploration and exploitation of the innovation system

*New path development* involves large-scale capability building and broad-based human resource formation through experimentation in new sectors. Demand *incentives for industrial actors to build and refine new exploitation capacities through intramural R&D and collaboration with active industry participation*

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# Thanks for the attention

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