

Smart Specialisation - the role of universities: Scandinavian cases

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Why is Smart Specialisation important?

- Smart Specialisation (SS) is probably the single largest attempt ever of an orchestrated, supranational innovation strategy to boost economic development through diversification, and, as such, deserves to be watched closely
- Provide a framework/platform for promoting and implementing a broad based innovation policy, which is very critical taking into account the failure of the linear, R&D based innovation policy of EU since Lisbon 2000
- It is not about 'specialisation' as we know it but about *diversified* specialisation
- Regions should identify domains of existing and potential competitive advantage, where they can build capabilities and specialise in a *diversified* (i.e. different) way compared to other regions

What is Smart Specialisation

- Entrepreneurial discovery process should be understood broadly, i.e. not as the efforts of a single entrepreneur
- Important to place EDP within a (regional) innovation system perspective emphasising the need for a public innovation policy/funding and exploration as well as exploitation
- IS is a dynamic perspective on innovation and learning in the promotion of economic growth and competitiveness with an active role of government stimulating R&D and innovation (i.e. the 'high-road' strategy).
- Innovation as interactive learning between Triple Helix stakeholders (+ civil society) as well as within and between firms and organisations

Theoretical perspectives on Smart Specialisation

- an overview of key concepts

- **Regional Innovation Systems**
- **Broad based regional innovation policy: combining R&D and experience based modes of innovation**
- **Broad and comprehensive view on innovation: many drivers of innovation both supply and demand side (user driven, market demand, employee driven and social innovation)**
- **Constructing Regional Advantage**
- **Differentiated perspective on types of innovation-relevant knowledge**
No type of knowledge should be considered superior - all three (alone or in combination) can generate innovation and economic development:
 - *analytical (science based)*
 - *synthetic (engineering based)*
 - *symbolic (art based)*

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Multiple roles of universities

Universities: Multiple functions and outputs (Drucker & Goldstein 2007)

- Creation of knowledge
- Knowledge reservoirs
- Antenna function
- Human capital creation
- Transfer and commercialisation of knowledge
- Leadership role in regions
- Influence on image and identity of regions
- Social and societal engagement

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Roles of universities in Triple-Helix:

- Third mission (after teaching and research): direct interaction between universities and society as key actor in the *knowledge exploration* subsystem of RIS
 - Creating high-tech firms
 - Consulting for local industry
 - Delivering advice for politicians
 - Informing general public debates
- Universities are increasingly of strategic importance for regional development in the knowledge economy by often being the only actor bringing global state-of-the-art science and technology into the region
- Generative role: discrete outputs in response to specific demands
- Developmental outputs: development of regional institutional capacities (e.g. in the context of RIS)

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Roles of universities in Triple-Helix:

- *Deepening* contribution: from provider of human capital to an orchestrator of regional innovation support
- *Widening* involvement: through its national and international networks the university has extended the innovation networks of regional actors
- *Integrating* various sectors: innovativeness and competitiveness generated by related and unrelated variety in the regional economy with the university as a core
- *Increasing* activity level and overlap between different innovation activities > merging organisational units within the university (Centres of Excellence)

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Impact of universities on Smart Specialisation Strategies - from generative to developmental role

Impacts are direct or indirect

They depend on:

- Number of universities in the region
- Strength of universities in research and education
- Status of third mission
- Types of universities:
 1. Entrepreneurial university
 2. RIS university
 3. Mode 2 university
 4. (Engaged university)

Direct

- Formally recognised third mission
- Part of T-H policies
- Academic entrepreneurship/TTO

Indirect

- SS based on University's research excellence
- Support structures e.g. incubators, science parks
- Human capital

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University models

- Narrow view (economic/technological dimension)
 - Entrepreneurial university (triple-helix model)
 - Regional Innovation Systems (RIS university)
- Broad view (social, cultural, societal dimension)
 - Mode 2 university (interdisciplinary - societal challenges)
 - (Engaged university (societal challenges - broader community engagement))

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Entrepreneurial University

Entrepreneurial university: third mission ('economic development') complements traditional missions (research and teaching)

- Internalisation of technology transfer capabilities - capitalisation of knowledge (Etzkowitz 2004)

Universities' tasks: production as well as transfer and commercialization of knowledge

Aims: Revenue generation for the university and promotion of regional and national economic development

- **Contributions to regional development:**

Proactive commercialisation of academic knowledge by universities themselves (Grimaldi et al. 2011):

- Patenting
- Licensing of inventions / technologies
- Academic spin-offs

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RIS University

Regional innovation as collective learning process - interplay between various actors and organisations: universities as one player amongst others

Contributions to regional development:

Broad set of mechanisms of knowledge transfer:

- Commercialisation
- Collaborative research, contract research, consulting
- Providing ad hoc advice, networking with practitioners
- Knowledge transfer through skilled graduates
- Universities as actors in cluster initiatives and regional innovation strategies

→ emergence of the “connected university” (Kitson et al. 2009)

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Mode 2 University

Fundamental transformation of the science system: generation of 'relevant' knowledge and redefinition of the relation between universities and society: increase of interactions and interfaces:

- strategic research (Irvine & Martin 1984)
- strategic science (Rip 2004)
- post-normal science (Funtowicz & Ravetz 1993)
- post-academic science (Ziman 2000)

New production of knowledge (NKP) theory: Gibbons et al. (1994), Nowotny et al. 2001):
New forms of knowledge production (mode 2) complement traditional ones (mode 1):

- Mode 1: academic, disciplinary, homogenous, autonomous
- Mode 2: application oriented, transdisciplinary, heterogeneous, reflexive, social accountability, new forms of quality control (economic, political, social, cultural criteria)

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Mode 2 University

Contributions to (regional) development:

- Focus on knowledge that is produced in the context of application
→ production of knowledge that is highly relevant and connected to its environment
- Orientation on practical applications and societal needs
- Universities as co-producers of knowledge relevant to the regional industrial context; complex practice-based knowledge production
- Engagement in research projects to solve regional and societal problems such as urban planning, transportation, environmental and health issues

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Role of universities in smart specialisation

Narrow view (economic/technological dimension)		Broader view (social and societal dimension)
Entrepreneurial university	Regional Innovation Systems (RIS) university	Mode 2 university

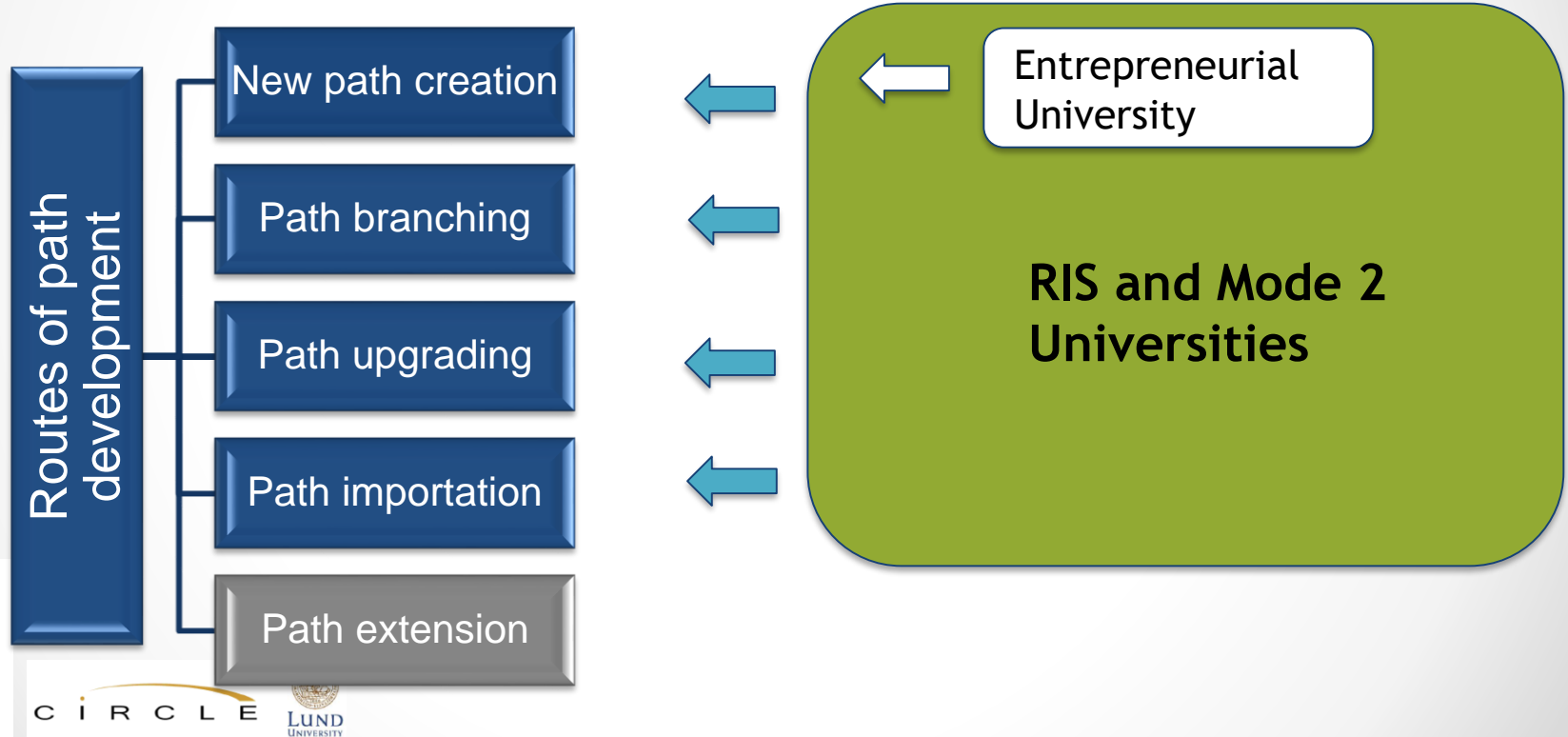
Activities by universities

Commercialisation activities:
Patents, licensing,
academic spin-offs

+ Collaborative & contract research,
consulting, ad hoc
advice, networking with
practitioners

+ Contributions to solve
big societal challenges;
interaction with wide
range of non-scientific
actors

University models and types of new regional economic path development



NDR - innovation and diversification potential

- NDR belongs to the innovation leaders among European regions according to the European Regional Innovation Scoreboard
- However, NDR has a relative low educational and competence level and a lack of investment in R&D in the traditional SMEs giving them a low absorptive capacity
- Problems of attracting and retaining highly qualified people
- Industrial structure has a dual character:
 1. On the one hand the traditionally dominating industries mostly SMEs, depending on an experience based mode of innovation (food, construction, maritime and tourism) - *path upgrading and path branching*
 2. On the other hand the research and knowledge intensive, mostly emergent, sectors representing front technologies - *new path creation and path importation*

Innovation strategies for traditional sectors (path upgrading and path branching)

- Strengthen the absorptive capacity of firms relying on an experience based (DUI) innovation mode by making them able to increase their research based competence (R&D/STI) (e.g. functional food)
- *University's role:* Knowledge transfer through skilled graduates; collaborative and contract research
- Move other traditional industries into high value-added niches through combining knowledge bases, where intangible knowledge, e.g. design (i.e. symbolic knowledge) is especially important
- *University's role:* Knowledge transfer through skilled graduates (Aalborg University offers a master degree in 'Experience Design'); collaborative research, consulting

Innovation strategies for emergent sectors (new path creation and path importation)

- Research and knowledge intensive sectors
- Based on research strengths at Aalborg university in front technologies within energy (energy efficiency), health and life sciences (medical technology), transport (intelligent transport) and ICT (embedded software)
- *University's role*: Knowledge transfer through skilled graduates; commercialisation; collaborative and contract research; university as actor in cluster initiatives
- Applying a STI/R&D based strategy can be a costly development and diversification strategy with a high failure rate and long term perspectives for a positive outcome - especially with long cycle technologies based on basic research (e.g. life science, biotech, nanotech)
- However, technologies building more on applied, engineering based research and a combination of analytical and synthetic knowledge bases (e.g. medical technology, energy efficiency, embedded software) can faster promote diversified specialisation, job creation and economic growth (shorter time span between exploration and exploitation)

Scania - innovation and diversification potential

- The region is ranked as an innovation leader - one of the most innovation intensive within OECD (knowledge and technology hub - Ideon Science Park, Medicon Village, MAX IV, ESS)
- Key strengths: High R&D expenditure in the business sector, a large share of population with tertiary education, and a strong endowment in science and technology - Lund university; the largest Nordic university
- Strongly developed analytical knowledge base and the prevalence of the STI mode of innovation
- Most important industrial sectors:
 - Life science industry
 - ICT (incl. new media)
 - Clean tech industry
 - Food industry (incl. functional food)
 - Packaging industry (Tetra Pak)

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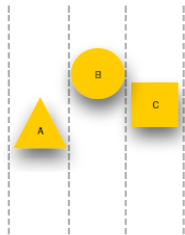


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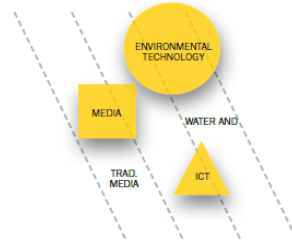
Innovation strategies for Scania (path branching and new path creation)

- National institutional conditions: Professors' privilege and long tradition to promote RIS university activities and mode 2 university model (VINNOVA's Centre of expertise programs -VINN Excellence, VINNVÄXT > structured (top-down/bottom-up), collective entrepreneurial discovery process)
- International Innovation Strategy for Scania 2020: three prioritised areas: Smart Sustainable Cities, Smart Materials and Personal Health (broad areas, not targeting specific sectors but global challenges, with a focus on combining regional strengths to address issues in "white spaces") → focus on societal problems - calls for Mode 2 university model

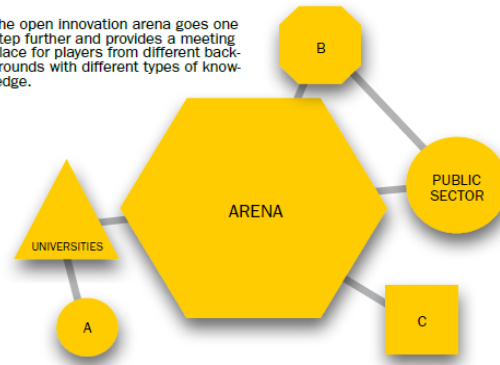
Traditionally, cluster theory was based on sectoral logic.



However, over time the boundaries have changed. Different industries have moved closer together naturally.



The open innovation arena goes one step further and provides a meeting place for players from different backgrounds with different types of knowledge.



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Innovation strategies for Scania (path branching and new path creation)

- Smart materials: Harnessing research strengths of Lund University and big science facilities (Max IV, European Spallation Source) → new path creation
 - *University's role:* Academic spin-offs, knowledge transfer through skilled graduates; collaborative and contract research
- Smart sustainable cities and personal health: combining university expertise with (related and unrelated) industrial knowledge bases and public sector competences → path branching
 - *University's role:* Knowledge transfer through skilled graduates, collaborative and contract research, consulting

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Møre and Romsdal – innovation and diversification potential

- Located in a semi-peripheral region in a high-cost economy
- Dominated by traditional manufacturing industries
- Strengths in maritime (global hub), marine, and furniture industries as well as material and manufacturing technologies and logistics related to the maritime industry
- Internationally competitive firms with global linkages
- Scores low on most innovation indicators as a moderate innovator (NUTS 3 level) but highly successful economically
- Innovation mostly DUI based, application development the most important type of innovation (not registered in CIS surveys). D - technological development - is the most important R&D activity.
- In the maritime cluster, there is a little R. The HEI system in the county has low R capacity but is being upgraded (SFI (Centre for Research Driven Innovation); merger of Aalesund University College and NTNU (Norwegian University for Science and Technology in Trondheim)

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Innovation strategies for Møre and Romsdal (path upgrading and path branching)

- Strengthen the cluster projects
- Cross-fertilisation between clusters (maritime and marine)
- Promote user-driven R&I
- Increase absorption capacity in firms and R&I organisations
- Increase involvement in national and international R&I networks
- Establish a SFI (Centre for research driven innovation) in the marine industry
- Develop and apply generic knowledge in industries through the establishment of a SFI
- Role of HEIs': Knowledge transfer through skilled graduates; collaborative research; HEIs as actor in cluster initiatives

Comparative perspectives

- Scania - RIS university with some movements towards Mode 2 university
- NDR - RIS university
- Møre og Romsdal - RIS university
- Earlier legislation on 'third mission' in Sweden than in Norway and Denmark
- Professors' privilege in Sweden (owning their own IPRs)
- *Challenges to universities' broader third mission roles (reference to UK):*
 - Marketisation (more dependent on students' tuition fees)
 - Commodification (education as a market good)
 - Commercialisation (of research - the entrepreneurial university)
 - Financialisation (increasingly dependent on the private financial sector)

Thanks for the attention

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