



# Knowledge-based learning

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

- New multidisciplinary centre of excellence in innovation system research at Lund University (July 2004)
- CIRCLE is financed by the Swedish Agency for Innovation Systems (VINNOVA), Lund University and Blekinge Technical University 2004-2010, and from 2006 for 10 years by the Swedish Research Council (Linnaeus grant)
- In autumn 2007 co-location of research and teaching in innovation and entrepreneurship together with LUIS (Lund University Innovation System) at LUCIE (Lund University Centre for Innovation and Entrepreneurship)
- Becoming one of the largest centres in Europe
- <http://www.circle.lu.se/>



# Policy challenges: Fragmented metropolitan and networked regions

- Fragmented regions
- Many and diverse industries/business services
- Lack of dynamic clusters of (local) innovative firms and knowledge spill-overs (unrelated variety of urbanisation economies)
- R&D departments and headquarters of large firms
- Many and high quality universities and public research organisation but weak industry-university links (weak connectivity in RIS)
- Networked regions
- Regions with cutting edge technologies and a high level of R&D as well as high connectivity in RIS)
- Exposed to new challenges and competition from emergent economies
- Diversify into new but related industries (related variety/differentiated knowledge bases)
- New ways of continuous innovation support



# From competitive to constructed advantage: Regional policy challenges

- Imitation and adaptation is not any longer a sufficient strategy for regions. Unique advantages have to be actively constructed
- Industrial renewal takes place in-between and beyond existing sectors – need for transcending traditional sector policies (platform policy)
- Innovation through combining existing knowledge, technologies and competencies with new generic technologies (IT, biotech (green and white))
- How to shape conditions for constructing regional advantage (CRA)?



# What is Constructing Regional Advantage

- New regional development strategy
- Advocating a more pro-active and collaborative approach
- Addressing system failures of weak connectivity within and between (regional) innovation systems
- Promoting innovativeness on individual and systems levels to meet challenges of the globalising knowledge economy



# Different *modes* of innovation and *forms* of learning

- *'How Europe's Economies Learn. Coordinating Competing Models'* : Different *modes* of innovation and *forms* of work organisation
  1. *STI* (Science, Technology, Innovation) – high-tech (science push/supply driven) - LME
  2. *DUI* (Doing, Using, Interacting) – *Competence* building and *organisational* innovations (*learning* work organisation) – market/demand/user driven - CME
- Different *forms* of learning
  1. *Developmental* (creative) learning – the 'logic' of knowledge exploration – learning work organisation
  2. *Reproductive* (adaptive) learning – the 'logic' of knowledge exploitation



# Nordic innovation strategies

- **Finland:** *Science-driven* high tech strategy focusing on *radical product innovations*, with NOKIA as the champion (**STI** mode 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)



# Empirical illustration

Economic performance: Global competitiveness

	2004	2005	2006-7	2007-8
○ Finland:	1	1	2	6
○ Sweden:	3	3	3	4
○ Denmark:	5	4	4	3

# Regional Innovation Systems (RIS)

## – narrow definition:

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



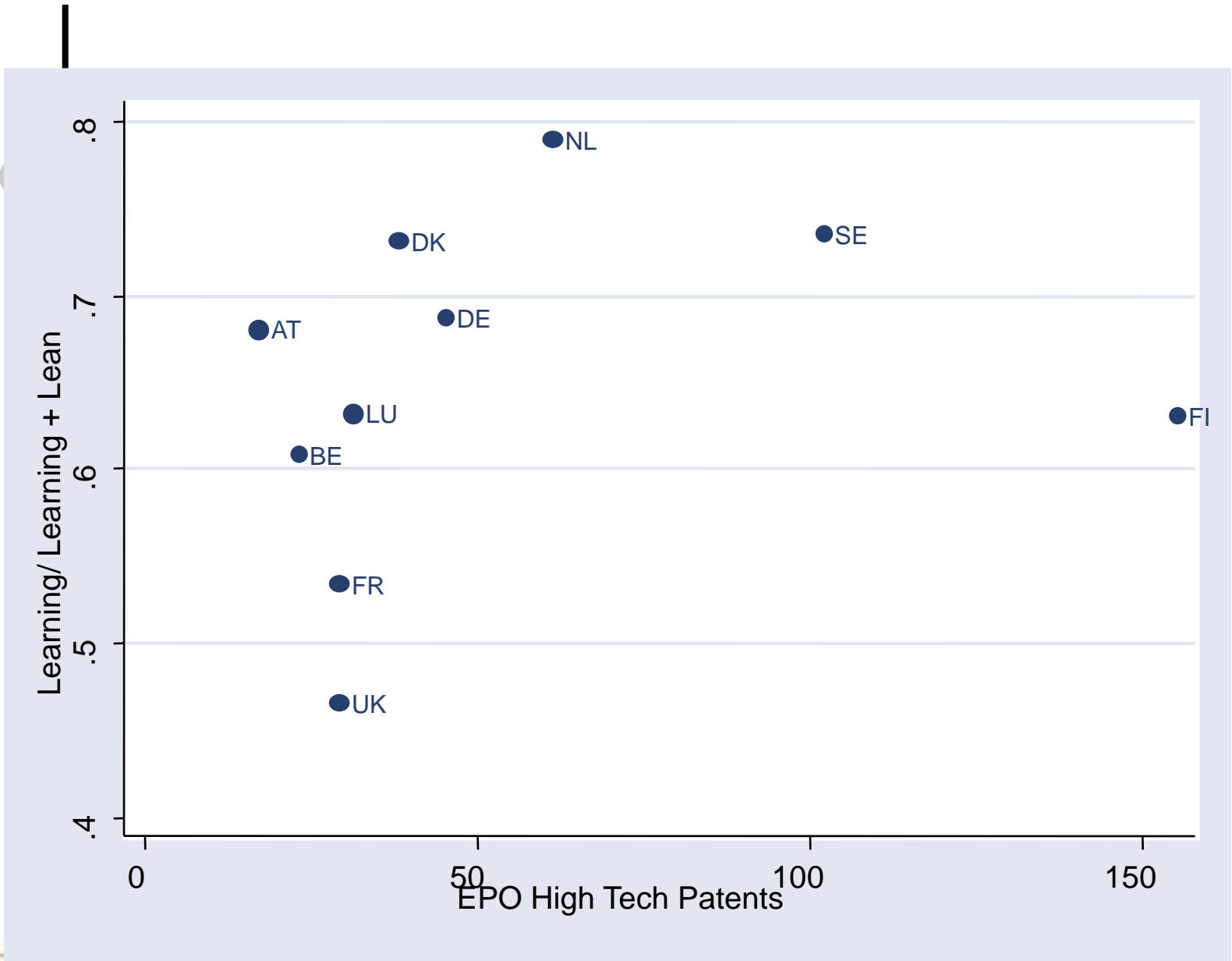
## RIS - broad definition :

- A wider system of organisations and institutions supporting learning and innovation, and their interactions with local firms
- *Developmental (creative)* learning: learning work organisation
- *Reproductive (adaptive)* learning: interactive learning (user-producer relationships) – inter-firm networks
- A market/demand/user driven system mostly generating incremental innovations
- *DUI (Doing, Using, Interacting)* mode of innovation – *competence building and organisational* innovations – market/demand/user driven



## Forms of work organisation across European nations – *DUI* mode of innovation (*micro* level).

- **‘Learning’ forms of work organisation (CME):**
  - + : **Netherlands, Denmark and Sweden**
  - - : **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**



Bjørn Asheim, 2009



# Regional Innovation Policy: A Typology

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



# Regional Innovation Systems as Creative Knowledge Environments

*Creative* knowledge Environments (CKE) are:

- Environments where new knowledge is generated by *people*, especially in their work settings (associating to the importance of talents (the *creative class*) and the policy implications of *people climate* complementing *business climate*)
- CKE can be found on *macro-* (RIS), *meso-* (universities/firms) and *micro-levels* (research groups/work organisations)
- CKE contains *physical*, *social* and *cognitive* characteristics



# Creative Knowledge Environments

- CKE covers a void in innovation studies (traditionally focusing on how knowledge is exploited) *by*
- Analyzing how *creation* of new knowledge occurs, as well as
- Focusing on what characterise the environments in which *people* carry out creative knowledge-producing activities (e.g. *learning* work organisations with autonomy in work and dynamic, *developmental* (creative) learning in a RIS context)



# Business Climate vs. People Climate

- *Business climate:*

- Clusters and Regional Innovation Systems emphasizing *localisation* economies
- Not discriminating along an urban-rural dimension

- *People climate:*

- Focusing on *diversity, creativity* and *tolerance* emphasizing *urbanization* economies
- Such an environment attracts *talents* which in turn attracts and generates *innovative, knowledge-based* economic activity



# The Urban Turn: What's new with Florida's ideas?

- The increasing importance of people climate
- People do not follow jobs, but jobs in high-tech and creative industries, which are the rapid growing activities in the new economy according to Florida, follow people
- Talents employed in these industries have a strong preference for an urban living in large city regions
- In the new economy the crux is, thus, to improve people climate by creating and cater for diversity, openness and tolerance in addition to more normal factors of urban attractiveness such as a rich cultural scene etc.



# The Urban Turn: Do the Creative class have the same priorities?

- The *Creative class* (30-40 % of people of the work force) belongs to *different knowledge bases* (analytical, synthetic and symbolic)
- Different *preferences* and *trade-offs* between *firms*, *occupations* and *places*
- *Synthetic/engineering* knowledge base: people follows jobs (*business climate* still most important)
- *Analytical/science* and *symbolic* knowledge bases: jobs follow people (*people climate* more important, especially for people working in *symbolic, artistic* based industries)
- Thus, focus on *people climate* should *complement* (not substitute) the traditional focus on business climate

# Differentiated knowledge bases: A typology

Analytical (science based)	Synthetic (engineering based)	Symbolic (artistic 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	Learning-by-doing, in studio, 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



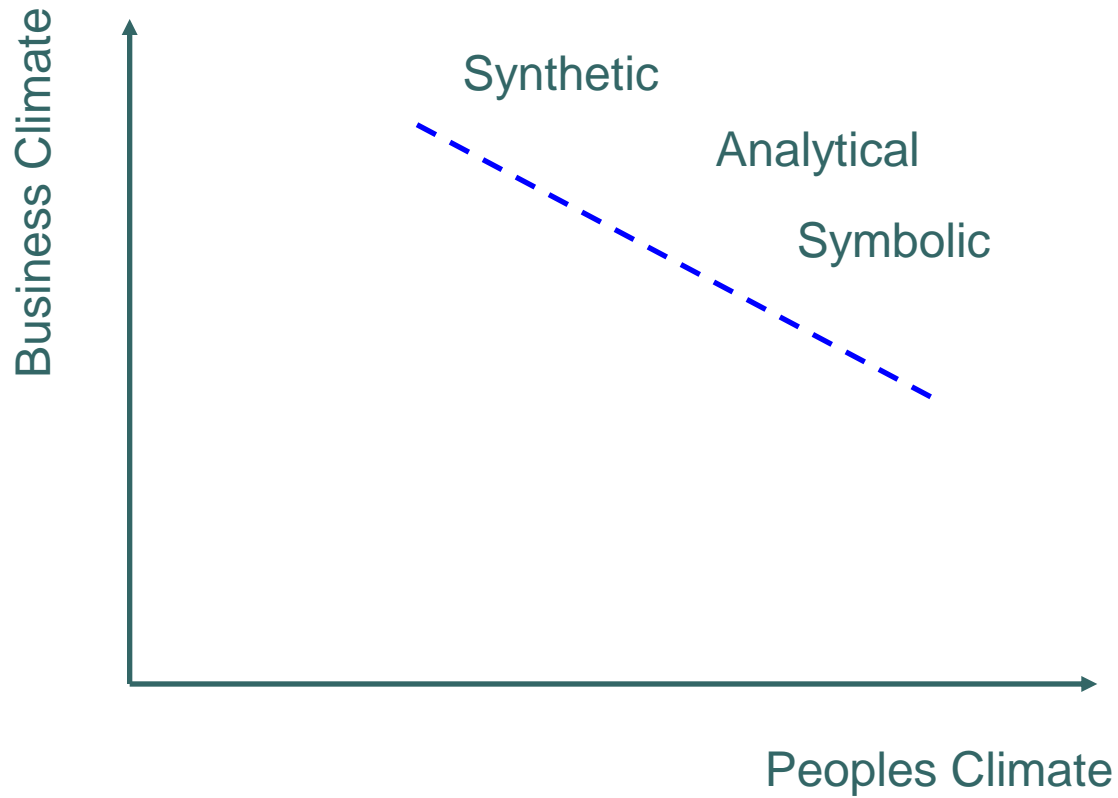
# People climate, business climate and knowledge bases

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Synthetic knowledge base	Analytic knowledge base	Symbolic knowledge base
<ul style="list-style-type: none"><li>• Architects, engineers and related professionals</li><li>• Physical and engineering science technicians</li><li>• Computer associate professionals</li><li>• Optical and electronic equipment operators</li><li>• Ship and aircraft controllers and technicians</li><li>• Safety and quality inspectors</li><li>• Life Science technicians</li></ul>	<ul style="list-style-type: none"><li>• Physicists, chemists and related professionals</li><li>• Mathematicians and statisticians</li><li>• Computing professionals</li><li>• Life science professionals</li><li>• College, university and higher education teaching professionals</li></ul>	<ul style="list-style-type: none"><li>• Writers and creative or performing artists (includes designers)</li></ul>

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# Theoretical relations





# People climate, business climate and knowledge bases

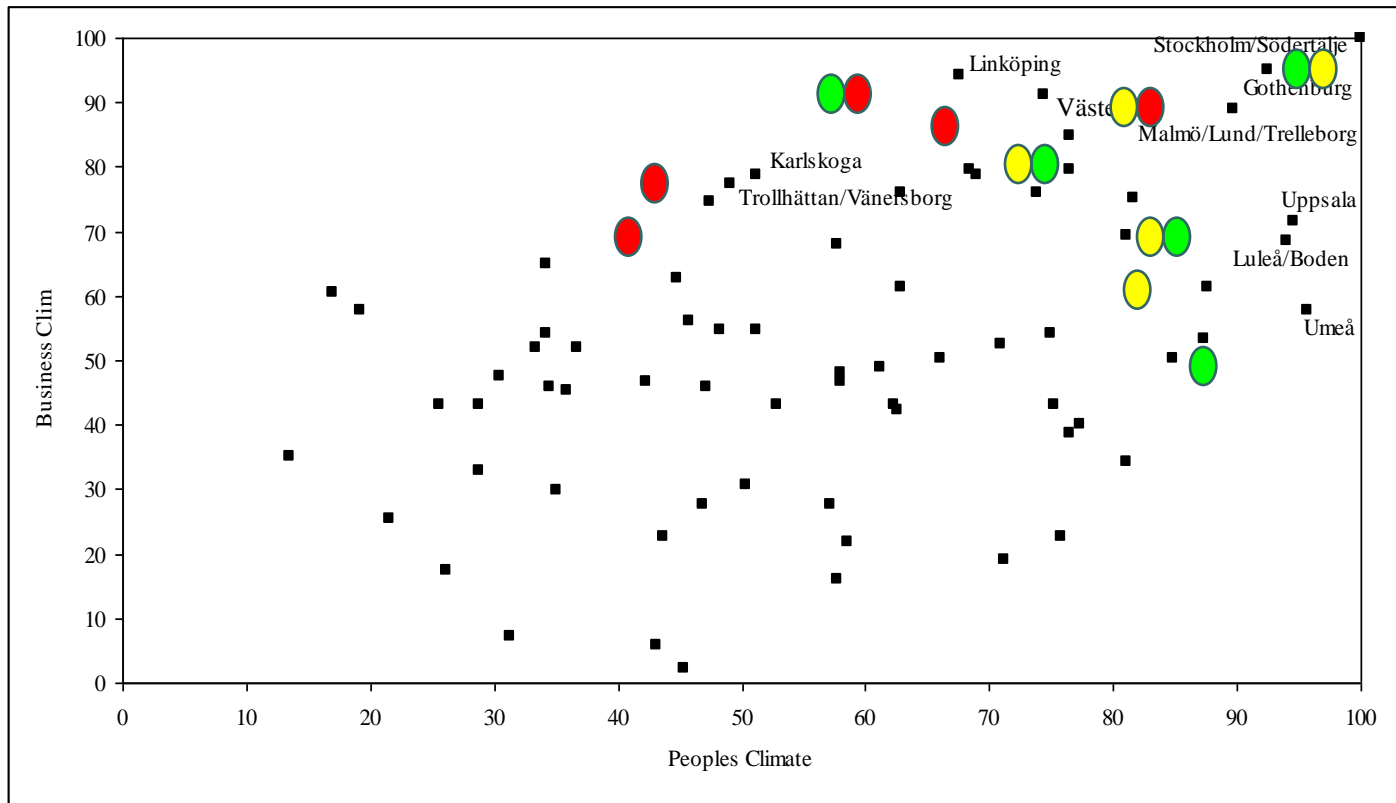
- *People Climate:*

- Bohemians pr. 1000 inhabitants
- Openness Index – share of non-western population
- Integration Index – difference between Swedish and foreign born population on the labour market (18-64)

- *Business Climate*

- TechPole Index
- Patents pr. 1000 in employment

# People climate, business climate and knowledge bases



Symbolic Analytic Synthetic



## People climate, business climate and knowledge bases

- A tendency for places with the highest concentrations of *synthetic* knowledge base workers to get lower People Climate scores than places with the highest concentrations of *analytical* knowledge bases
- The highest concentrations of *symbolic* knowledge base workers tend to co-exist with high concentrations of *synthetic* or *analytical* knowledge base workers
- Correlations with job growth are higher with concentrations of *symbolic* than *analytical* knowledge base workers and higher with concentrations of *analytical* than with *synthetic* knowledge base workers.

# Conclusions: Need for nuances and differentiations

- *The creative class*: Some prefer *people climate* of large city regions (*symbolic* and *analytical* knowledge workers), while others go for the *job* (*synthetic* knowledge workers)
- *Creativity* can be found in both the *STI* and *DUI* modes of innovation (*science* based/*analytical* knowledge base as well as *developmental* learning/*synthetic* and *symbolic* knowledge bases)
- Important to organise *RIS* as *Creative Knowledge Environments* to accommodate for *creativity* in both modes of innovation and all types of knowledge bases in creating Smarter Cities