ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

New innovation indicators for regions: policies and networks

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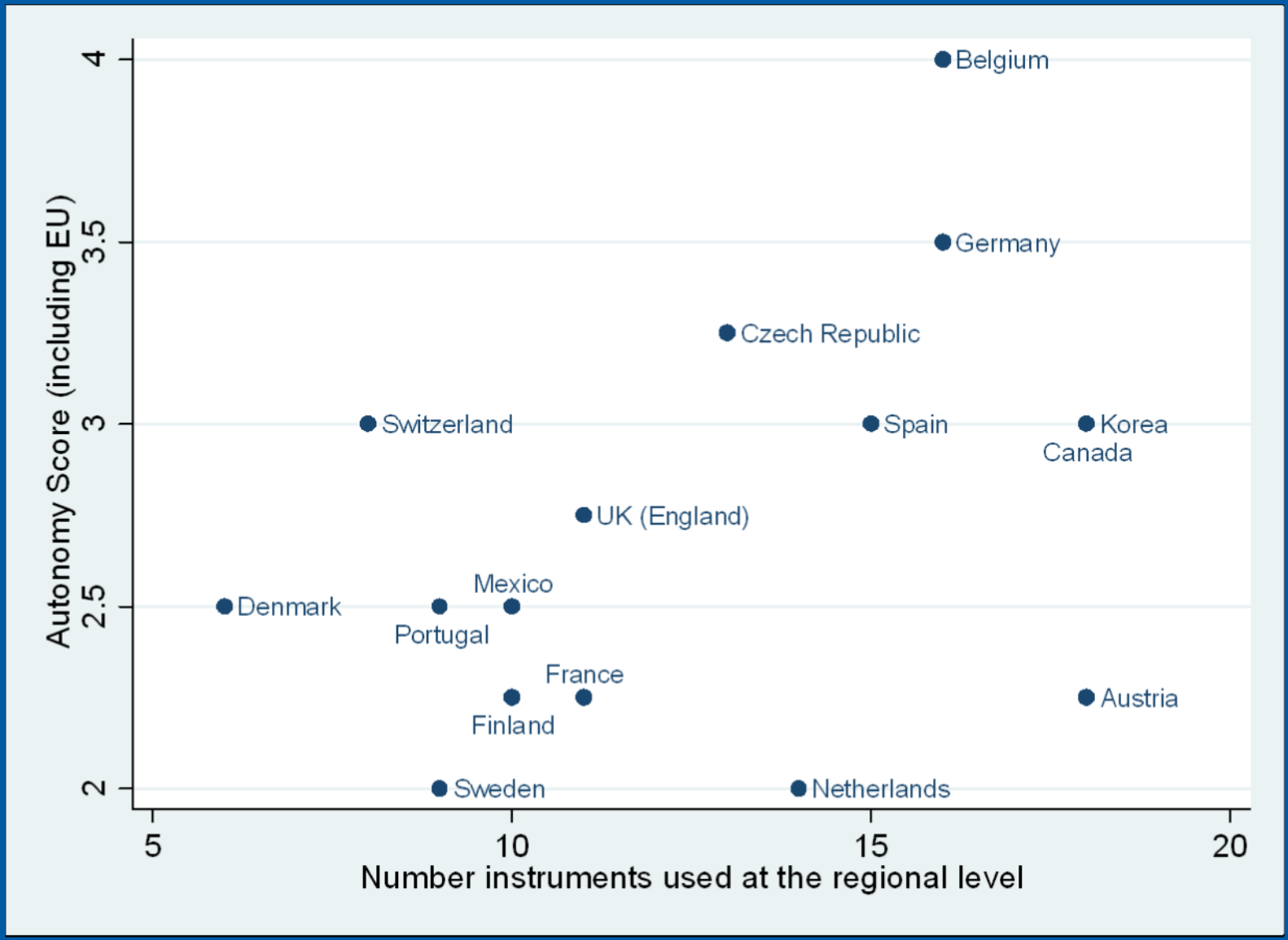
What exists for regional level?

- OECD Regional Database (RAAG 2009)
  - R&D intensity by actor, patenting, education, employment by technology level
- Other indices and scoreboards
  - EU (Regional Innovation Scoreboard, Key figures of science, technology and innovation)
  - Other institutions
  - Several country level analyses, regional indices
- Additional areas OECD considering as part of typology of regions for innovation
  - Policy indicators
  - Networking related variables

Policy Indicators

- OECD Multi-level Governance of Science, Technology and Innovation (STI) Survey
  - 20 OECD and 4 non-OECD countries thus far
  - Questions on several themes
- Measuring regional role in this policy area
  - Index based on ranking of role in strategy, policy, finance and assessment
  - Types of instrument used
- Challenges
  - Understanding real "autonomy" highly complex
  - Asymmetric regional role in same country

“Autonomy” and instruments: role of regions in innovation policy



Analysis using patenting data: some considerations

- Patenting reflects a certain firm strategy for inventive activity
- Patenting propensity varies considerably by sector
- Problem of small numbers for many regions
- Inventor versus applicant, date of application
- This regionalised database comes from filing with the European Patent Office
- Algorithm to assign categories of patent owners (applicants) is imperfect

Additional measurement considerations

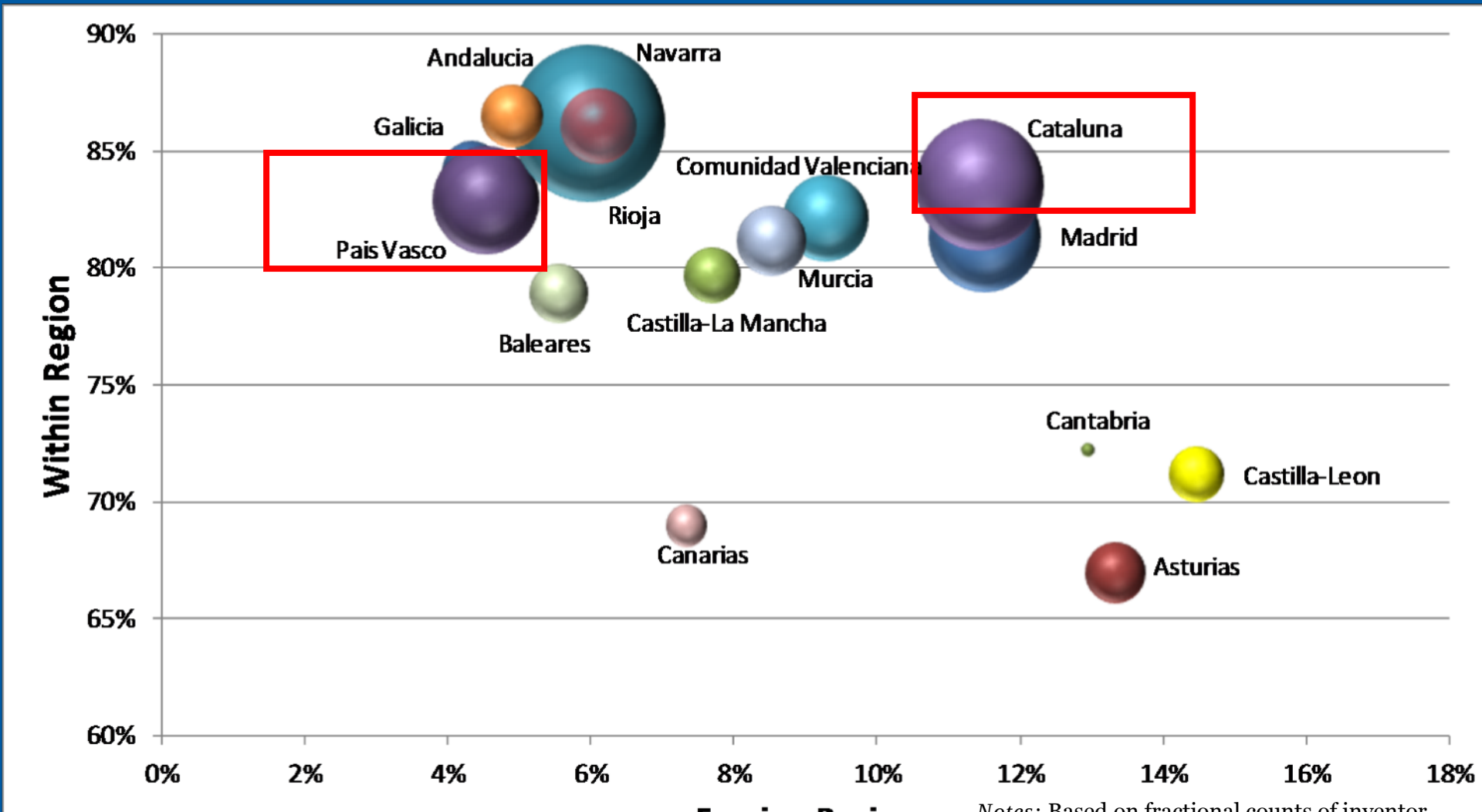
- Relations between regions or inventors
- Multiple algorithms can be used depending:

(1) **Integer count**: each co-patent is counted as 1 unit, e.g. if co-patent P has 2 co-inventors (or applicants) in region A of country X and 1 co-inventor (or applicant) in region B of country Y, then within-region=1, within-country=0 and within-foreign-region=1, thus double-counting and sum ≠100% for any given region.

(2) **Fractional Count**: each co-patent is counted as a fraction, depending on how co-inventors and/or regions are weighted. Taking the example above, we have, for patent P, within-region=0.5 and with-foreign-region=0.5 (if we count regions), or within-region=2/3 and with-foreign-region=1/3 (if we count co-inventors). In both cases sum = 100% for any given region.

Regional location of co-inventors

Spain 2005-2007

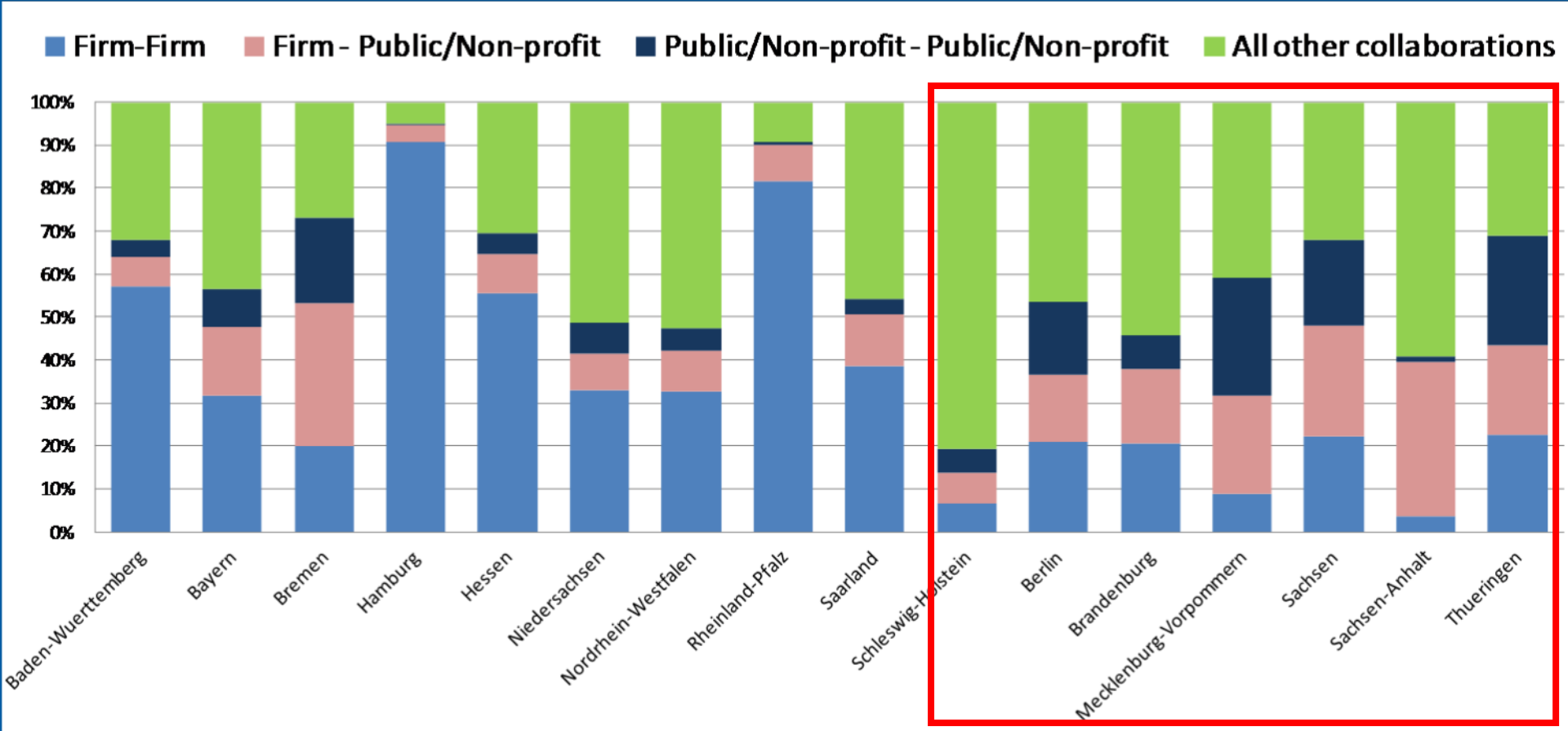


Source: Calculations based on OECD REGPAT.

Notes: Based on fractional counts of inventor region. Bubble size based on patenting intensity.

Share of co-patenting relationships by type of "actor"

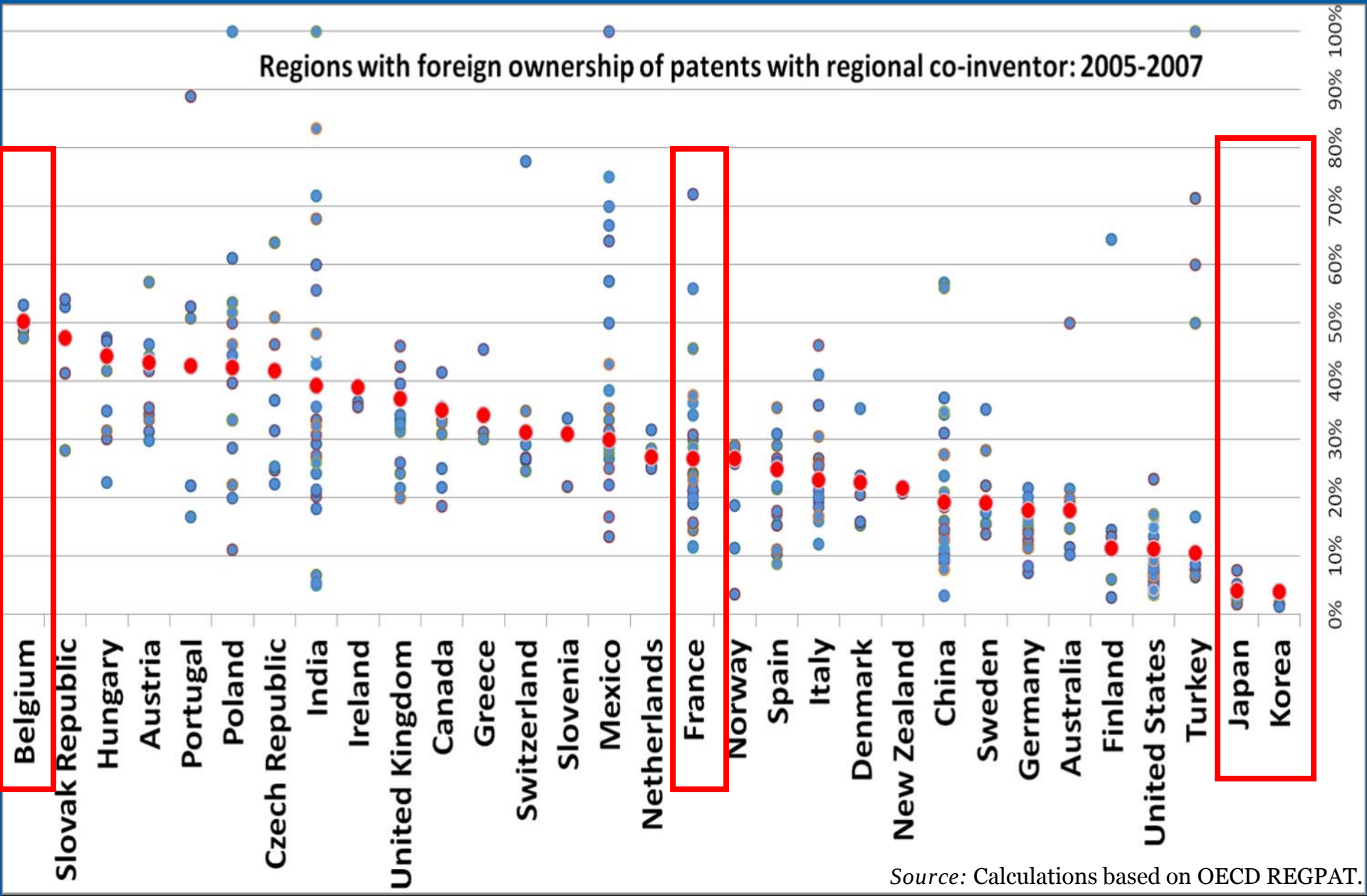
Germany, 2005-2007



Source: Calculations based on OECD REGPAT.

Notes: Public-Not-profit category includes universities, government, hospitals and non-profit entities. Other collaborations includes those involving individuals.

What regions may reap economic benefits?



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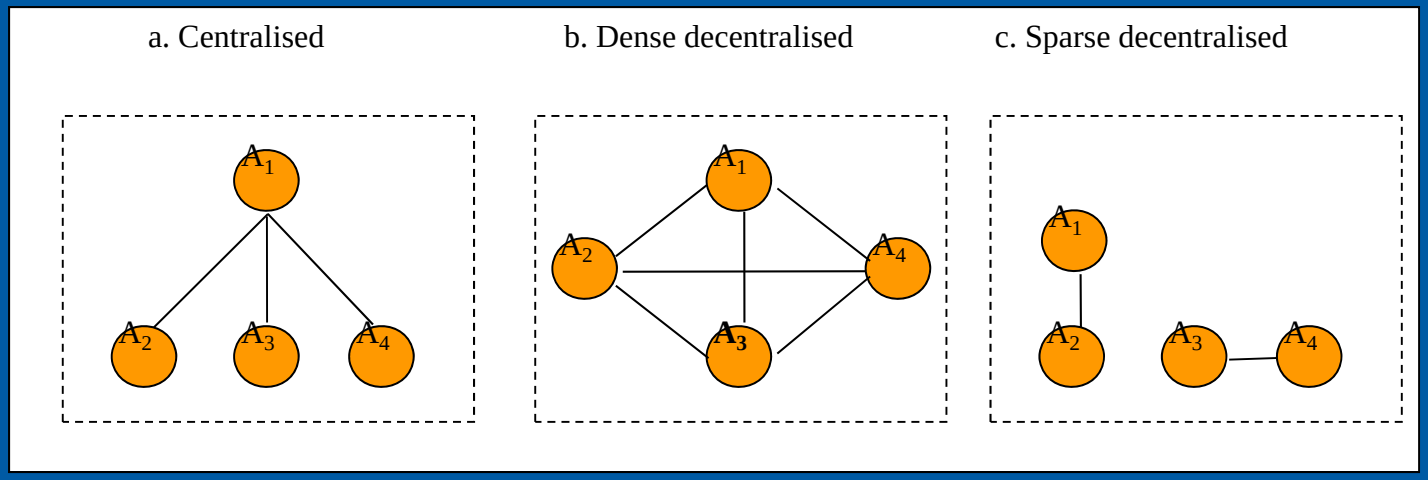
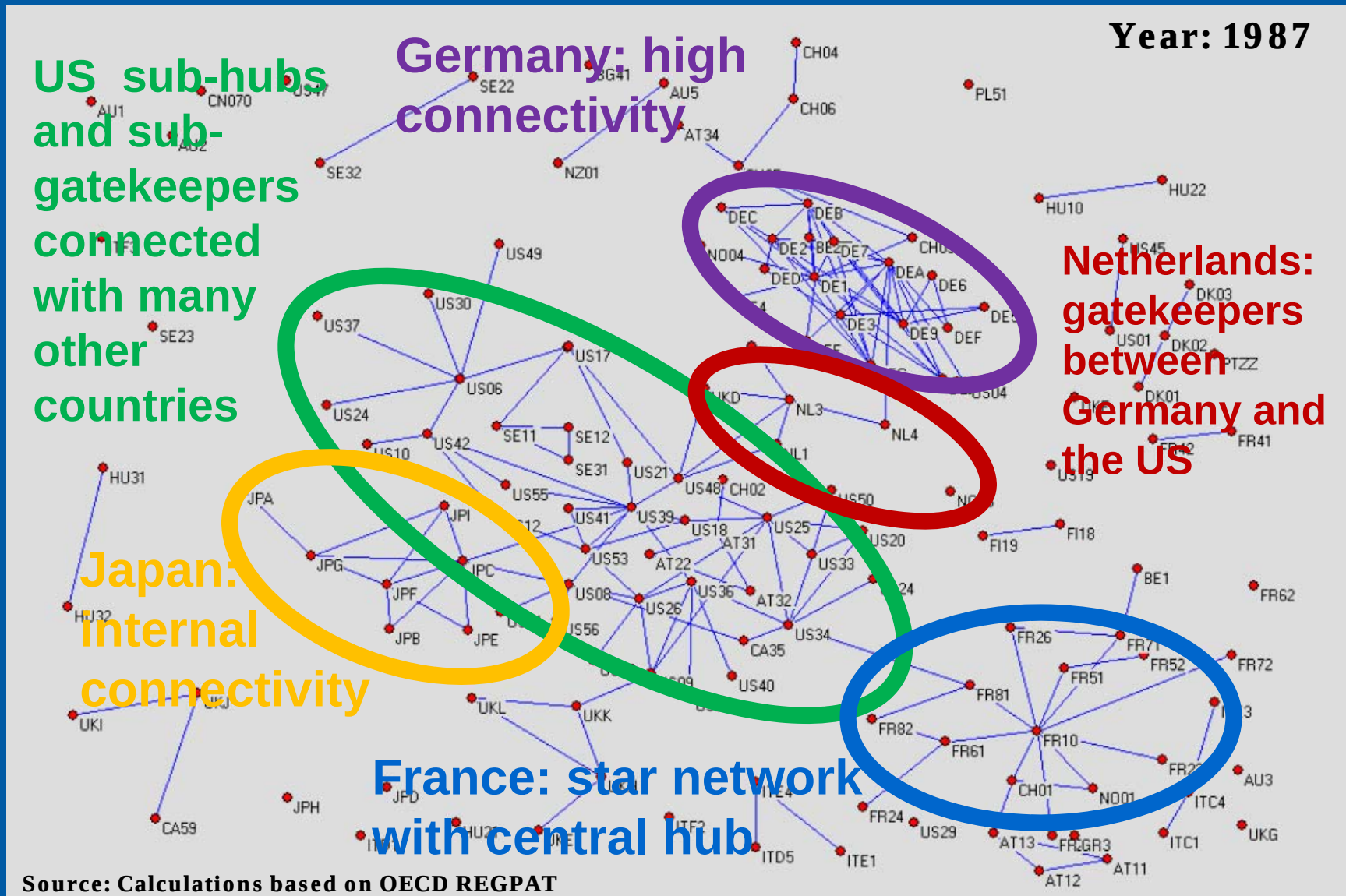
Typologies of regions based on networking: a framework

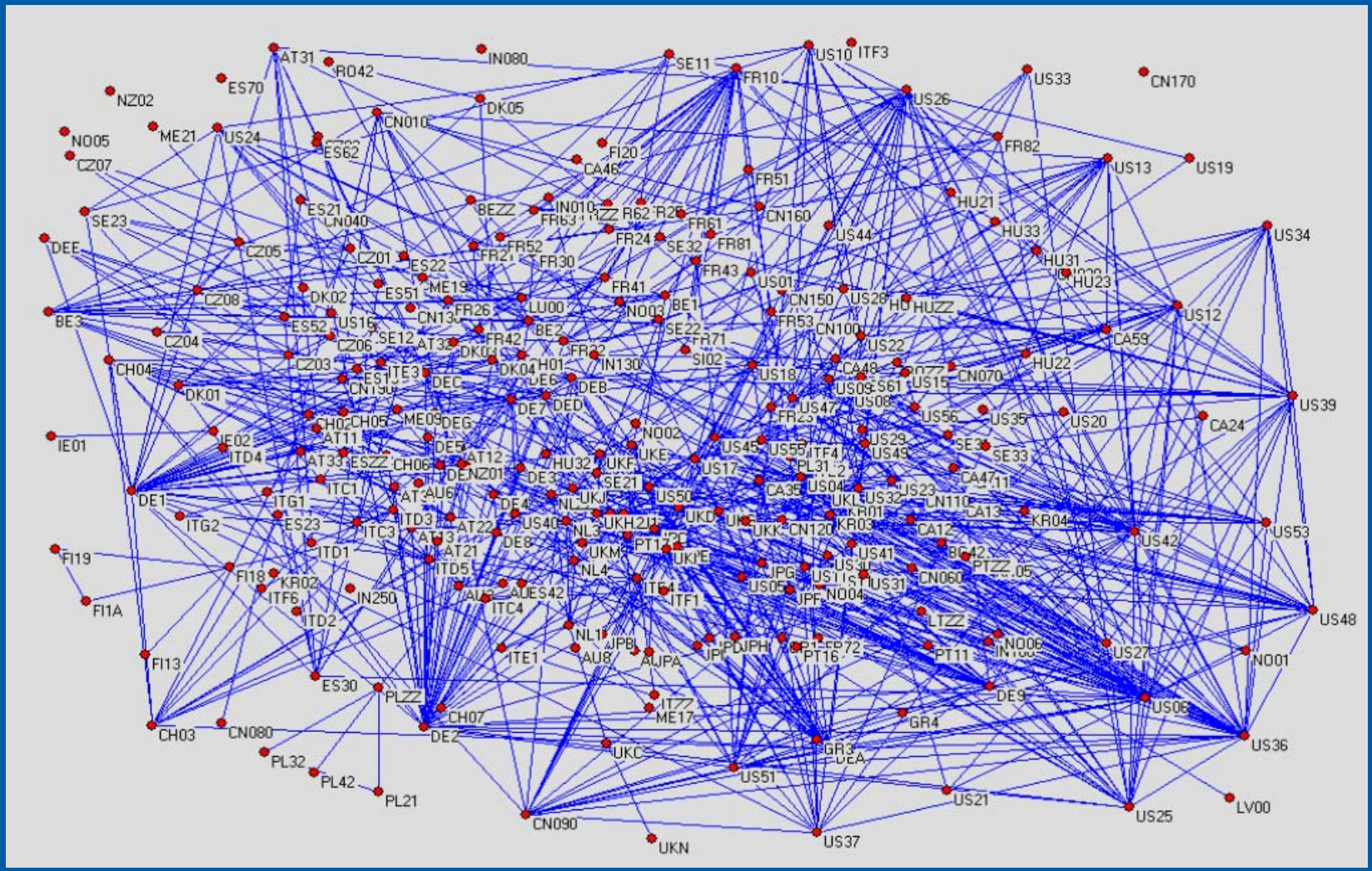


P. Benneworth for the OECD

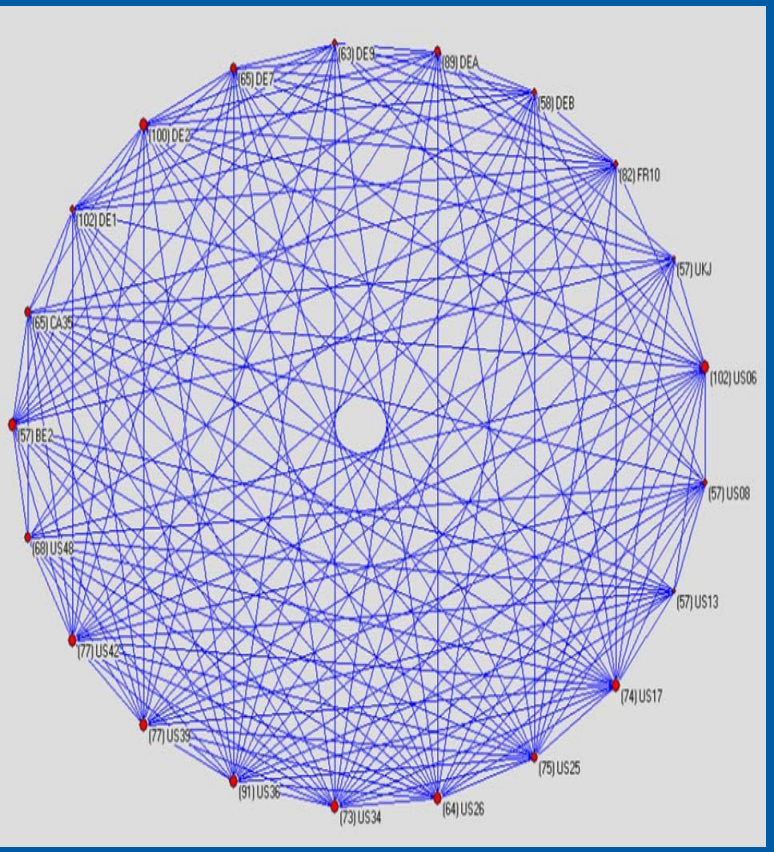
Green technology networks for patenting: international collaborations

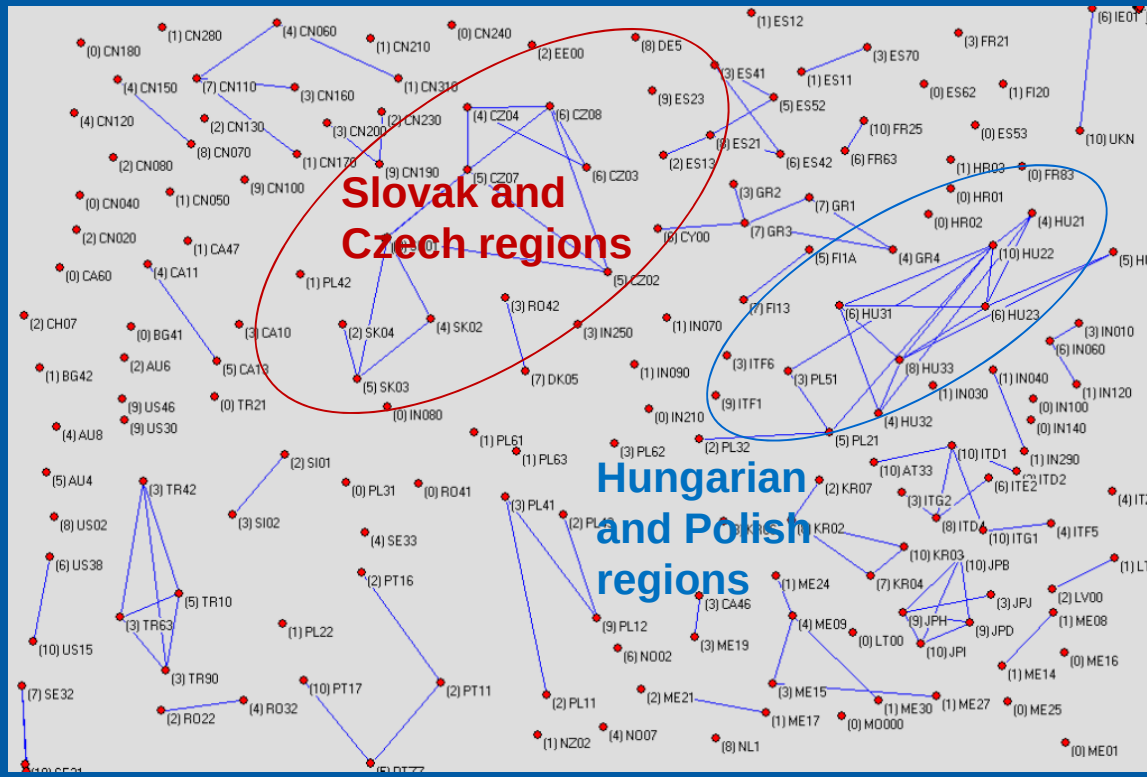


A much more interconnected global network in 2007



Club of the “rich” and “poor” in relative connectivity



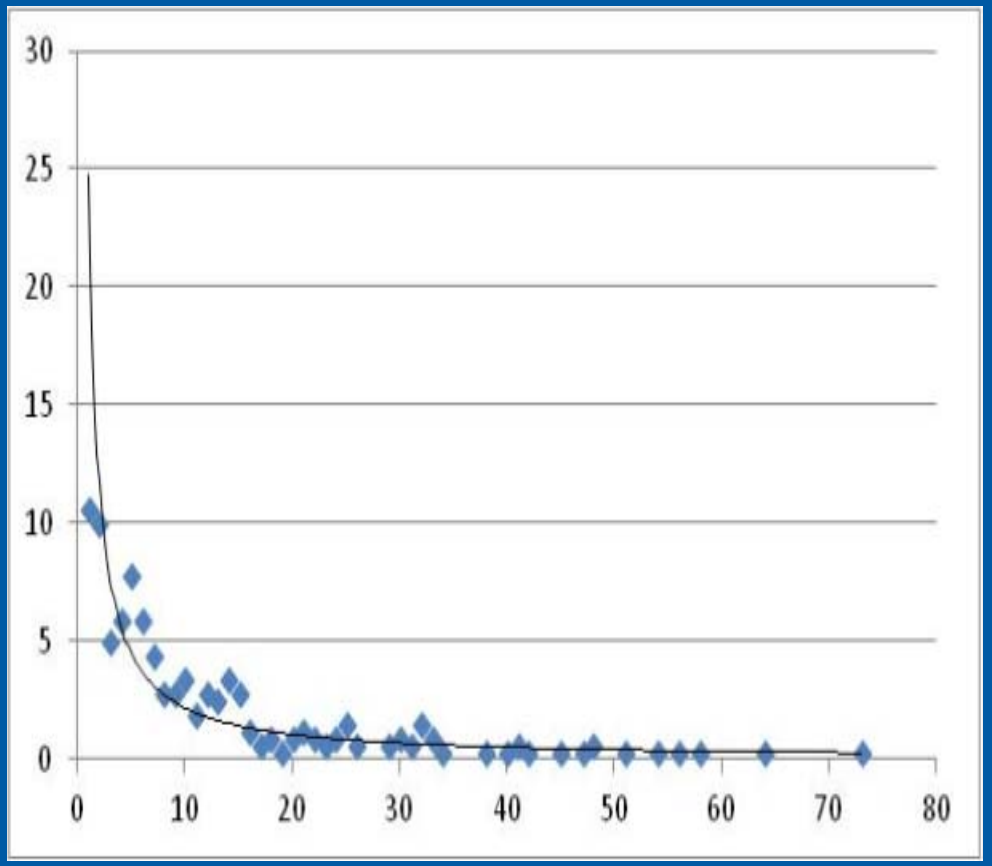


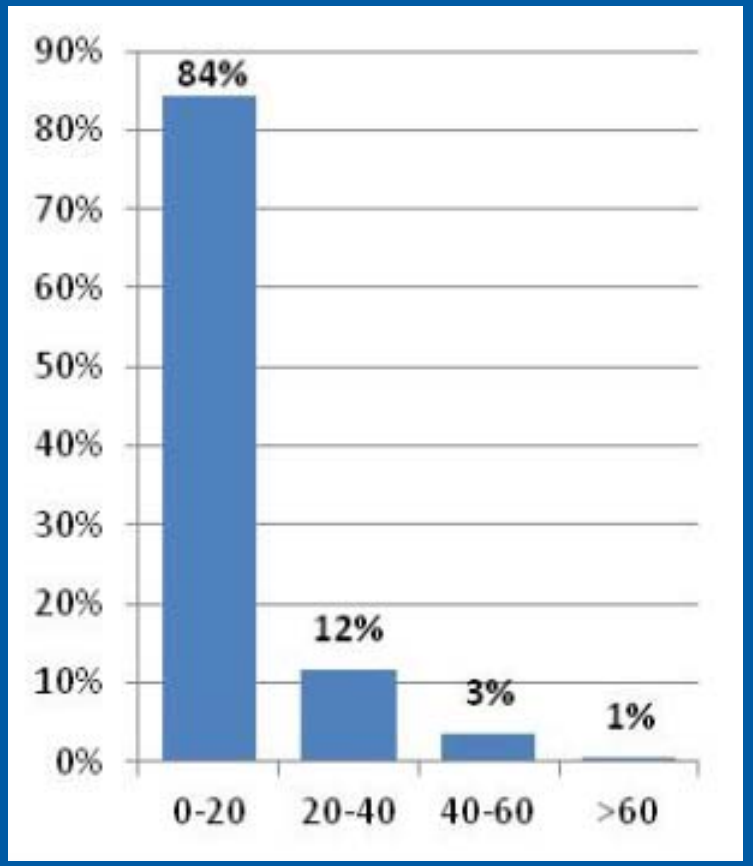
Green Tech- (1998-2007) – highest 15% region by degree distribution

Green Tech- (1998-2007) –lowest 50% region by degree distribution

Most regions are “poorly” connected , and a few regions are “highly” connected

A “scale-free” network with a Power Law distribution





Number of regional connections (Green Tech 05-07)

Differences by sector and over time: network statistics

	Average regional number of connections
Green 1977-1987	5.58
Green 1988-1997	11.65
Green 1998-2007	16.72
Biotech 1977-1987	11.11
Biotech 1988-1997	26.30
Biotech 1998-2007	38.38
ICT 1977-1987	14.46
ICT 1988-1997	27.49
ICT 1998-2007	48.37
TOTAL 1977-1987	27.85
TOTAL 1988-1997	50.58
TOTAL 1998-2007	83.54

Due to increasing connections in network:

- Average # connections
- Clustering co-efficients
- Between centrality

- ICT highest average connections, followed by biotech and then green tech (1/3 of ICT level)

Next steps

- Further work on patents (e.g., by sector)
- Understand the relationships between indicators and other measures of performance
- Test different network-related indicators in analyses of the sources of regional growth
- Use indicators in development of RIS typologies
- Apply networking approach to other areas beyond inventive activity
  - e.g., scientific publications, migration of high skilled
- Policy implications