

# Multi-level innovation systems and the need for intra-European innovation policy

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# Two trends

- **Towards 'post-national' innovation systems:**  
In Europe (but also elsewhere) national research and innovation institutions are losing their decisive role as a shaping factor (counter-intuitive?).  
'Local' and 'trans-national' forces are gaining influence.
- **Content matters:**  
Different knowledge dynamics correspond to different 'mixes' of governance patterns and policy instruments: 'One size does not fit all!'

# Two conceptual sources

- PRIME NoE (Policies on the Move towards a European Research Area); project 'ERA-Dynamics'

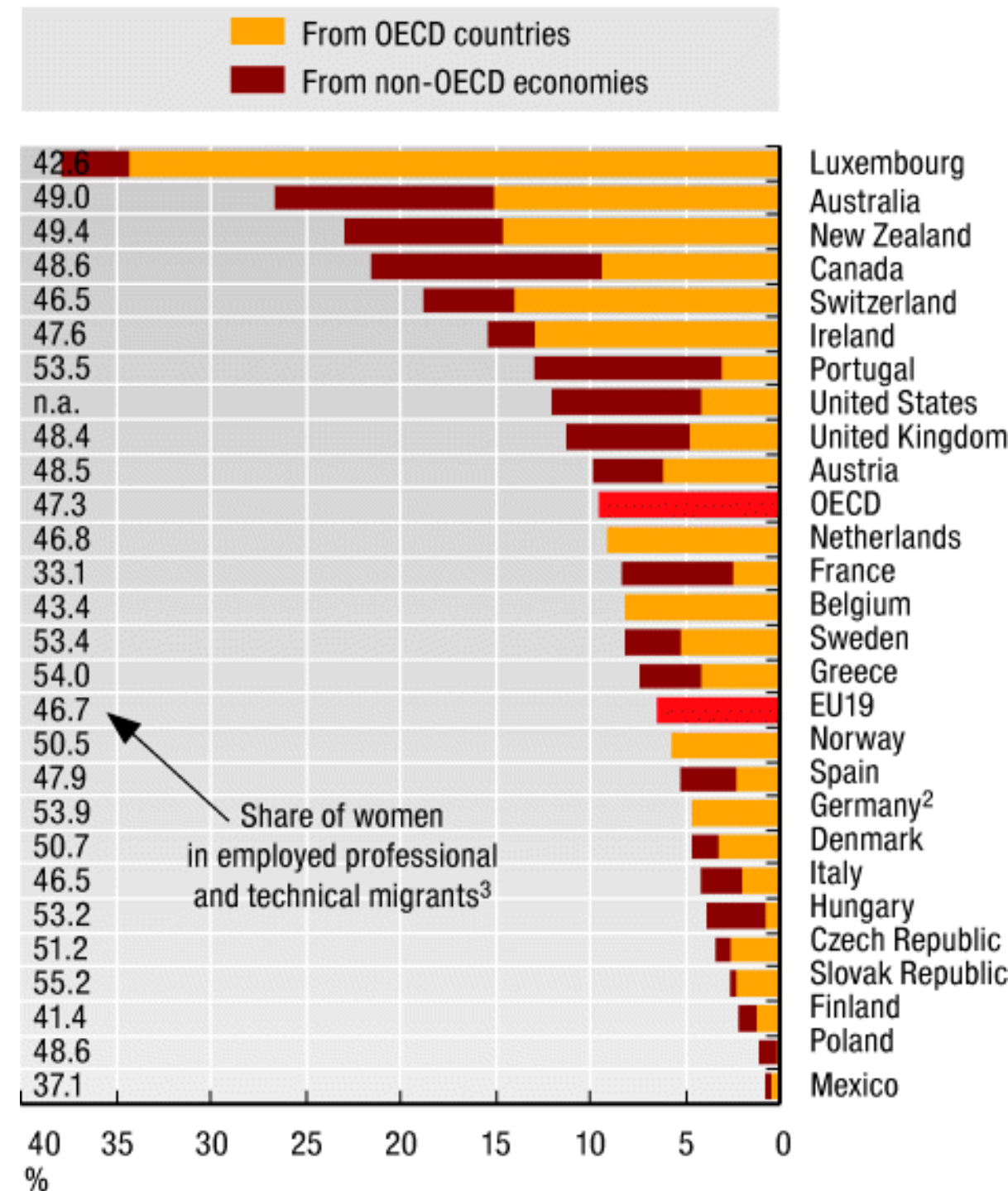
(S. Kuhlmann, P. van den Besselaar, D. Braun, J. Edler, L. Henriques, P. Larédo, T. Luukkonen, B. van der Meulen, M. Nedeva, D. Pardo, E. Reale, D. Thomas)

- EU Commission's 'Lisbon Expert Group' (LEG, follow-up of the research aspects of the revised Lisbon strategy, DG RTD)

(Leon, G.; Borrás, S.; Bucar, M.; Kneucker, R.; Kuhlmann, S.; Nauwelaers, C.; Romanainen, J.)

# National innovation systems (NIS)

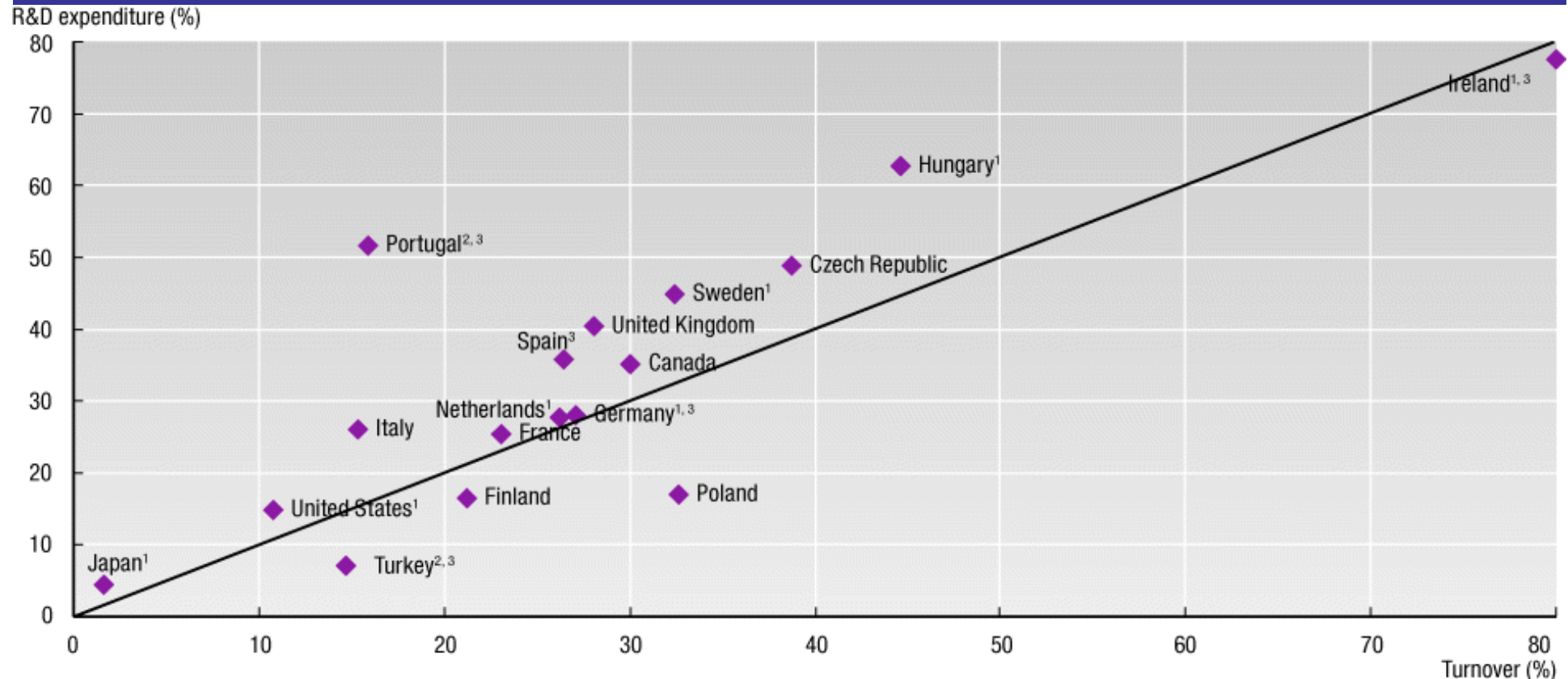
- NIS approach in OECD world largely agreed.
- NIS = “biotopes” of all institutions engaged in scientific research, accumulation and diffusion of knowledge, education and training of working population, technology development, production and distribution of innovative products and processes.
- NIS: Schools, universities, research institutions (education and science system), industrial enterprises (economic system), politico-administrative and intermediary authorities (political system), and formal and informal networks of related actors.
- Each NIS is different. Sustainable systems develop their special profiles and strengths only slowly, based on stable exchange relationships among the institutions of S&T, industry and the political system (= co-evolution).



# National IS ?

Employed **highly skilled professional and technical migrants** from OECD and non-OECD economies, by OECD country of residence, 2000 or 2001  
 (Source: OECD STI 2007)

# National IS ?



Share of **R&D expenditure** and turnover of affiliates **under foreign control** in total R&D and turnover, 2004  
(Source: OECD STI 2007)

# National IS ?

- **Producer-user chains** either 'local' or 'inter-local' (incl. internat.) – less and less within 'national' economy
- In many innovation domains **tacit knowledge** either 'local' or 'inter-local' (collaboration; internat. Migration) – less and less 'national'
- **Public knowledge institutions** (regulation; funding; policies; evaluation) structurally EU-wide alike (public sector reforms; NPM, ...)
  - *What differs is content + quality of 'configurations that work': 'local' and 'inter-local', less national*

# Need for a 'post-national' perspective (1)

- National profiles, resources, policies don't disappear – but are no longer decisive force
- Knowledge and sector dynamics, often cutting across national borders, drive 'post-national' innovation systems (in Europe)
  - Only small Member States with lingering identity of knowledge specialisation and nation-wide institutional arrangements
  - Large MS: Specialised regions, border-cutting clusters

# Need for a 'post-national' perspective (2)

- Still, policymakers (no wonder?) and analysts stick to national perspective:
  - National budgets major source of public investments
  - National polity provides democratic legitimisation (legislation)
  - Strategic data and information still mainly nationally collected and aggregated (→ pears and apples comparisons)
- Understandable – but in EU 27 reinforcing structural conservatism !

# Content matters – role of knowledge dynamics

Core hypothesis of PRIME NoE project  
'ERA-Dynamics':

- Different dynamics *knowledge* production

correspond to

- different *institutional arrangements* and *policies*

= evolving 'configurations', borne by institutional change

# Why ERA Dynamics ?

- Implications for an 'advanced' ERA: *different knowledge dynamics* appearing in different 'configurations' will evolve with *different policy mixes*:
  - ➔ **One size does not fit all!**
- Traditional EU subsidiarity policy model is too mechanic: In relevant (not all!) fields purely national policy approaches fall too short; also 'federal' policy approaches (like FP) don't suffice:
  - ➔ **new mixed 'intra-European' institutional settings and policy approaches** and institutionalization patterns are likely to emerge.

# Knowledge dynamics

## ‘Search regimes’ of knowledge production

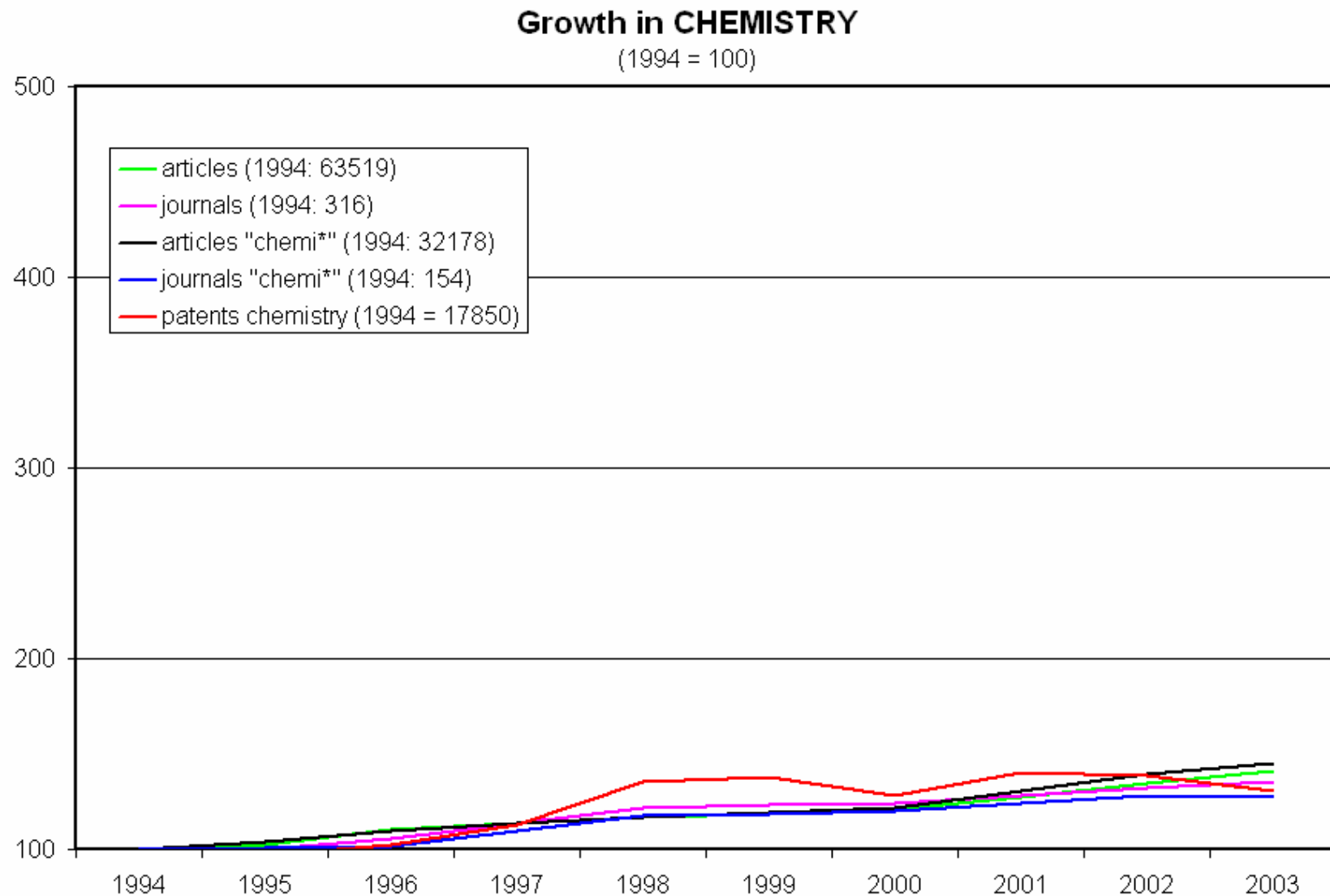
with three main ‘aspects’ (Bonaccorsi 2006):

- **Growth** = capacity to survive and/or prosper within the same institutional and organisational setting. Indicators: publications, patents, exports
- **Convergence** = modalities of knowledge flows, and in particular opposing ‘individual’ vs. ‘distributed knowledge’ and the collaboration patterns
- **Complementarities** =
  - **Technical complementarities** = role of large shared infrastructures or equipment (critical infrastructures)
  - **Cognitive complementarities** = collaboration patterns (bilateral vs. multilateral e.g. networks and clusters); critical mass, competences to be assembled to develop a relevant ‘research production unit’
  - **Institutional complementarities** = heterogeneous collaboration for efficient productive settings (e.g. strong relationship between clinicians and biologists in biotechnology); frequency of industry-university collaborations

# Chemistry: Knowledge dynamics and institutional setting

- Consolidated regime of chemistry as a discipline: low to medium growth, low diversity, low complementarity
- Institutional setting:
  - dominance of the laboratory based model in public research with established lasting hierarchy
  - key role of large firms turning multinational
  - long lasting I-U co-operations, bilateral
- Public national policies, delegated to 'agencies' (= 'operators') in a bottom-up peer review based model
- Limited European activities: strong industry association (CEFIC) for regulation; learned societies

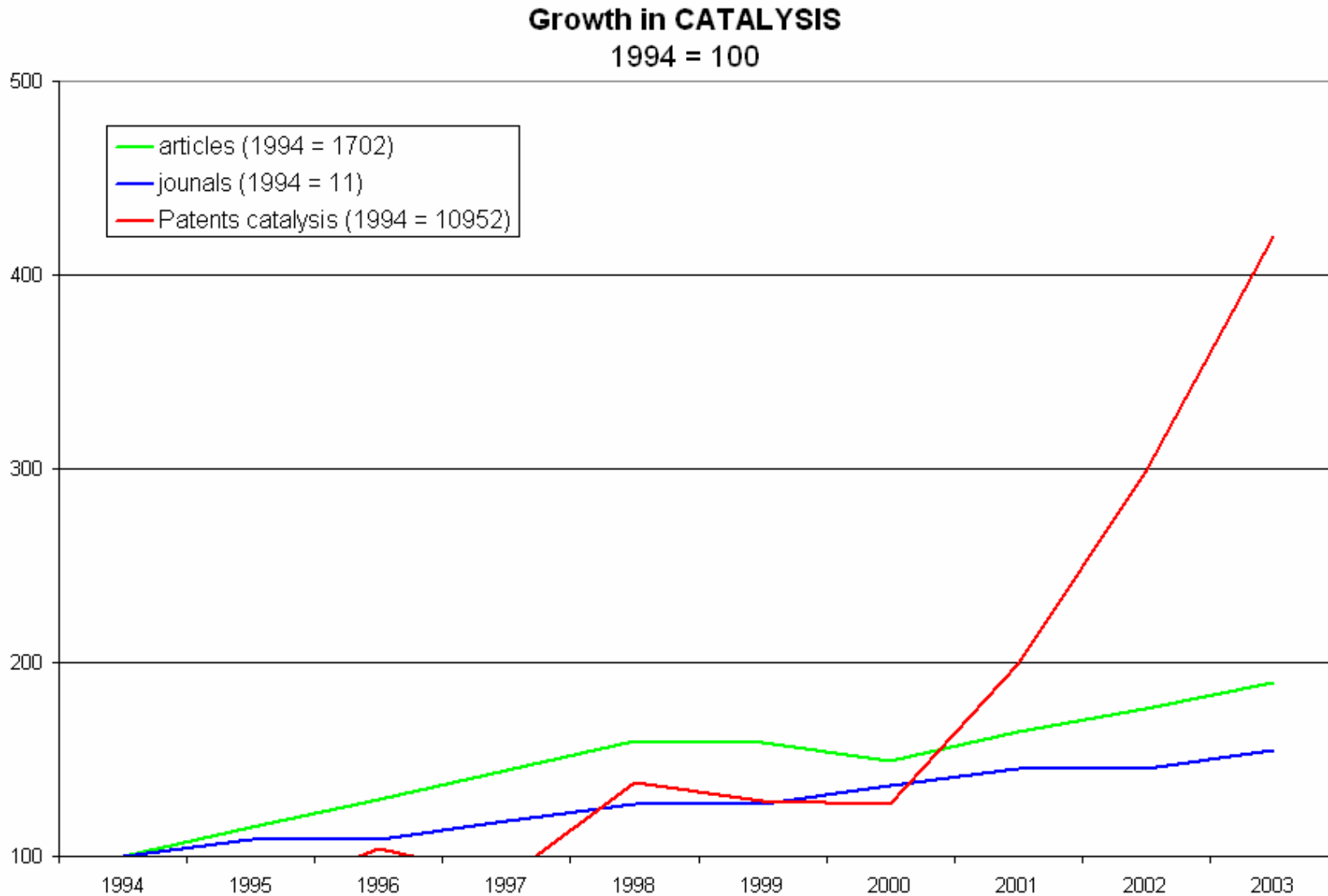
# Chemistry: slow growth



# Evolving configuration 'Catalysis'

- **Knowledge dynamics:** catalysis (and bio-catalysis) witness different dynamics
- **New institutional possibilities** at European level taken-up by actors in chemistry
- Combination drives to a **variety of views** with different consequences for intra-European policy initiatives

# Catalysis grows twice as fast



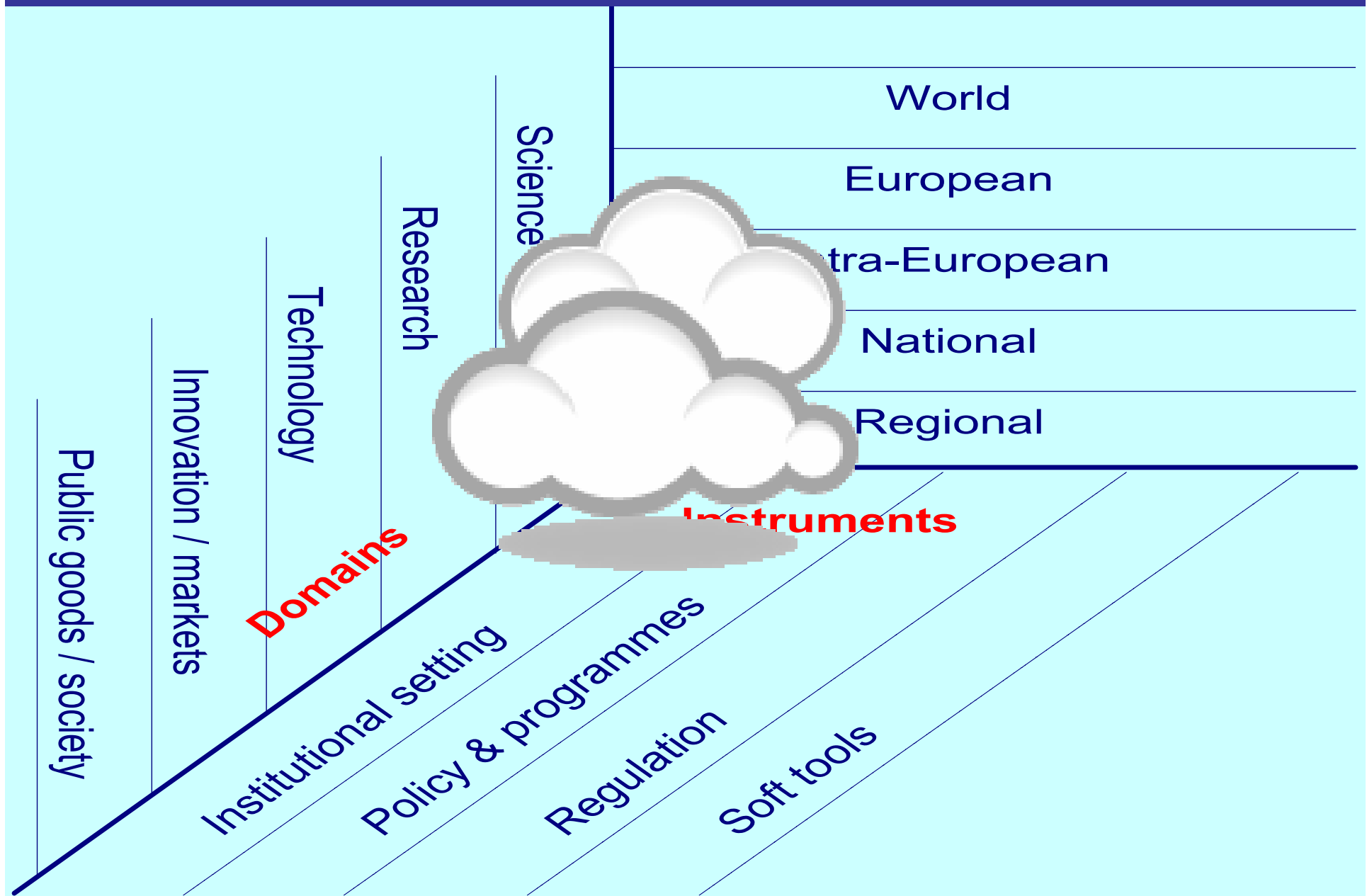
# Chemistry: One size does not fit all

- Europe is not the same for catalysis actors and chemistry actors
- **Chemistry** research actors continue to work with national support schemes, FP, and industry; new request for flexible post-national funding (beyond ERC)
- **Catalysis** research actors anticipate fully fledged European structure and “configuration” of its own covering academic and ‘targeted’ industrial dimensions
  - ERA Nets as a transition, disconnecting from their national origins?
- Can we consider these two futures as complementary? And if so what do they tell us about the need for intra-European instruments?

# LEG: A new conceptual framework

- Dynamic **'intra-European' perspective** with a systemic approach
  - Multi-level, multi-actor and multi-domain landscape
- Three interacting levels:
  - Societal and economic domains
  - Levels of relevance and action
  - Policy instruments
- Different **knowledge configurations** evolve at the intersection of domains, levels, and policies

# Intra-EU thematic policy space



# Recommendations of LEG (1)

- *Member States should be encouraged to create **trans-border bilateral and multilateral research and innovation platforms**, as a mechanism to integrate scientific or technological communities of several European countries.*
- *The Commission should facilitate and partly finance some specific **variable geometry mechanisms** across interested Member States implementing multi-level and multi-domain integrated actions.*

# Recommendations of LEG (2)

- *The Commission should continue to provide **platforms for experimentation** – such as OMC-Nets, ERA-Nets, Technology Platforms – and stimulate Member States to join in.*
- *Avoid an inward-looking European “fortress”: ERA should also embed a dimension of **openness towards third countries**, and favour intra-European initiatives targeting partners outside of Europe.*
- *Member States and Commission should facilitate the development, maintenance and use of advanced **Strategic Intelligence capacities for learning** (organisations, networks, databases, human resources).*

# Links

- LEG (2008): Lisbon Strategy: Between revolution and illusion - The governance challenge for knowledge policies  
(see [http://ec.europa.eu/invest-in-research/monitoring/leg\\_strategy\\_en.htm](http://ec.europa.eu/invest-in-research/monitoring/leg_strategy_en.htm))
- ERA-Dynamics project  
(see: <http://www.prime-noe.org>)