



Conference “knowledge for growth: European Strategies in global economy”

Toulouse – July 7-9, 2008

Knowledge dynamics and institutional change in fast changing science ‘sectors’

Session proposed by the PRIME network of excellence (Policies for Research and Innovation in the Move towards the ERA)

Presentations

- Articulating knowledge and institutional dynamics in Europe – a account of hypotheses made and activities developed by S. Kuhlman (University of Twente).
- Characterising ‘knowledge productive configurations’: the notion of search regimes, by Andrea Bonaccorsi (University of Pisa)
- Characterising ‘knowledge productive configurations’: an analysis of search regimes through evolving network properties, Peter van Besselaar (university of Amsterdam)
- Knowledge dynamics and agglomeration phenomena: the case of nanotechnology, Philippe Larédo (Universities of Paris-Est and Manchester).

Overview of the session

Within PRIME a number of researchers have taken as a starting point that if knowledge turns central to the growth of our economies, we need to further delineate knowledge productive situations. We know from the sociology of science that ‘doing science’ differs from one field to another, but up to now no ‘industrial economics’ has emerged that would consider the characteristics which justify that we consider different sectors in knowledge production as we have in manufacturing and should have in services.

If we follow the manufacturing image, we know that non only market structures differ, but also characteristics of actors and forms of regulations (standards and norms, but also direct market regulations such as authorisation to produce or authorisations to put products in the market as in telecommunication or pharmaceutical industries). Different sector characteristics drive thus to different policies and different forms of internationalisation of markets. This has had (and has still) strong implications for ‘industrial’ / ‘economic’ policies which have: (a) at any time to deploy policies in a way to take account of the variety of markets (and productive configurations); and (b) periodically to face the emergence of new scientific areas that propose new scientific or technological paradigms and generate radically new approaches and with them new needs for society and users. They entail what is often now labelled as breakthrough, frontier or transformative science, we speak of “new leading sciences’ and we can empirically propose a succession (Laredo 2007). After, physics, IT and biotech, we enter the realm of nanotechnology and already see it both as a sector per se and as a driving force towards a new agglomeration often qualified by the terms NBIC, little bang or convergence.

In turn we can observe empirically that previous leading sciences have all driven to very different institutional configurations and required very different policies: large programmes for the physics period, collaborative programmes for the IT times, new policies for IP, start-ups and venture capital for life sciences...

These leading sciences and the conditions they require do not disappear when a new leading science occurs, thus policies become more complex overtime, their portfolio of instruments increases and their policy mix evolves permanently. Not only does this happen at the national level, but since the second world war and CERN, need for handling aspects of it at an intergovernmental level has been recurrent. We have progressively witnessed with the EU the emergence of a new source of policies and a changing balance which is symbolised in the concept of multi-level governance (which has been at least for a while specific to EU research in social sciences). We assume that the 'move towards the ERA' entails another shift in the sources and conditions for policy-making in 'research and innovation', and requires/will drive to strong shifts of the institutional settings in Europe. Our assumption is that this movement and the nature of transformations will differ depending on the different 'knowledge productive configurations'.

If we are right, this has strong implications about policy articulations between the EU and member states, which would differ depending on these configurations (from 'federalised' to, at least for larger EU member states, 'decentralised' at regional or even city level). It also has strong implications on the actors themselves and their 'ecology', and on the institutional settings that will enable growth (which require to differ depending upon configurations).

The ambition of colleagues in PRIME has been to further explore these ideas and the possibility, should they be considered useful, to operationalise them. Three aspects have been dealt with.

a) We have further explored the ability of developing and operationalising the 'search regime' approach. Bonaccorsi (2005) has proposed the notion of search regimes to differentiate between 'science sectors' based of 3 attributes: rate of growth, degree of convergence/divergence within the sector, forms of complementarities required for producing and circulating science (cognitive, technical and institutional). This has driven us to methodological developments (new indicators) and to testing the operationalisation of it on two sectors: a new leading science (nanotechnology) and a more traditional 'sector' facing strong external (societal) pressures for change (chemistry).

b) We have explored how the institutional production of new instruments (networks of excellence, ERA Nets, Technology platforms and now JTI) are taken up and how these help in filling 'institutional gaps' when associated to the dynamics of given 'sectors', or on the contrary how this might be anticipating / pushing toward a shift of productive configuration.

c) and we have been considering how both could be linked in a dynamic model, focusing on policies to handle 'pressures for change' (may these come internally from the dynamics of science, or through external societal pressures as for the environment and for instance new regulatory approaches to chemistry via REACH).

The four presentations present the results arrived at and the methodological, theoretical and policy issues they raise. Some aspects of these can be seen in recent papers - the special issue

on nanotechnology that we have produced in Research Policy, July 2007), the recent paper by Bonaccorsi in SPP (2008) – in the presentations done by Laredo and Kulhmann on the articulation between productive configurations, institutional setting and policies (2007: Lisbon, Bern, Vienna...), and in the policy workshops organised during the German and Portuguese presidencies, respectively in Bonn (may 2007) and Lisbon (November 2007, see www.prime-noe.org, ERA dynamics project).