European Research Area

EUROPEAN POLICY BRIEF

SEARCH
SHARING KNOWLEDGE ASSETS: INTERREGIONALLY COHESIVE NEIGHBORHOODS

Sharing KnowledgE Assets: InteRregionally Cohesive NeigHborhoods (SEARCH) Project

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EUROPEAN INTEGRATION AS POLICY METAPHOR FOR FUTURE EU-EN KNOWLEDGE SHARING

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INTRODUCTION

THE CHALLENGE OF A POSSIBLE NEW ENLARGEMENT

A significant element of the EC's intention in pursuing a robust European Neighborhood Policy is to raise the standards and capabilities of neighboring states as active regional partners. While the factors underlying such improvements range widely over many spheres of action, the recent evidence in EU-15 and several subsequent accession countries points to the primacy of knowledge flows and innovative advances in stimulating such improvements.

We are interested in the EU and the ENC (European Neighbouring Countries) as places between which knowledge might be expected to flow following the enactment of successful ENPs (European Neighborhood Policies). The closest analog to this situation is the pre/post-enlargement situation experienced as the EU expanded from 15 to 27 countries, all 12 being post-socialist, **beginning in the mid-1990s**. While the ENP falls well

short of an enlargement scenario, the basic ideas remain the same: opening the EU borders to much greater interaction along a range of policies that are intended to stimulate greater trade, movement of capital, mobility of talent and knowledge flows.

To examine the potential for such interaction, this policy brief extends earlier and continuing efforts to understand the dynamics of patent citation across once-impenetrable borders that become open through EU initiatives. A set of **284 NUTS2 level regions of 27 current EU members, which is further enlarged by Turkish regional set, are selected**. The sample excludes Switzerland and Norway, which potentially leads to minor bias in description of the full spatial interaction system affected by ENP.

This policy brief forms part of SEARCH's policy brief series. It contains key observations on the potential impact of EU enlargement from the point of view of knowledge flow and innovation networks.

EVIDENCE AND ANALYSIS

THE PATENT CITATIONS FRAMEWORK: MAIN FEATURES

The extent of patent citation in **Europe** included more than 200,000 citation links **between 1999 and 2008**, about 48% occurring in the first 5 years and 52% in the second 5 year period, an increase of about 7%. Approximately ¼ of the patents cited came from applicants located within the same NUTS 2 region, with the share of same-region citations rising slightly between the two periods. **The 10,500 patent citations that crossed the East-West border grew instead by 23% between the periods, which shows the emergence of a vigorous exchange of patent-based knowledge.**

Patent citations do not appear to occur between random NUTS 2 regions, but **arise within relatively stable communities of knowledge exchange**. We detected 3 exchange communities in the first period: one dominated by Germany, another spread along the Atlantic-North Sea-Baltic seaboards, and a third north-south community running from Italy to Denmark. **These communities had shifted somewhat** by the second period, with the dominant German community essentially unchanged, Italy now joining the seaboard community, and the Danish-Swedish border community concentrating geographically and emerging as a post-EFTA community comprised mainly of Austria, Finland and parts of Sweden. These communities may be expected to evolve and perhaps fragment further as new accession countries become more fully assimilated and ENP relations filter through the system.

Looking more closely at the national presence, we see clearly the dominance of Germany in the European patent citation system and the relative absence of eastern concentrations of shared knowledge. Germany accounts directly for over 50% of all European citations, although it lost share—as was the case for other Western countries—between the periods even as, for example, patents issued in the Czech Republic, Hungary, Slovakia and Poland all gained citation-shares. Share convergence within the EU is entirely to be expected, although its continued pace and stable distribution remains unknown.

THE BORDER EFFECT

It is also possible to focus attention directly on the regions that adjoin the former East-West border to detect citation effects arising from physical adjacency. **Non-border region citations dominate those of border regions, the latter accounting for a bit more than 5% in both periods, rising slightly.** A strong asymmetry is revealed by the East border regions that are far more engaged in cross-border citations of West and West border

patents than are West border regions with their counterparts.

THE SECTORAL ANALYSIS: CROSS-BORDER EFFECTS

Using the same regionalization scheme, we examine citation patterns among the eight principal technology classes of patents (A-H). The plurality of patent citations emanate from class B (performing operations, transporting), about ¼ of both EU-wide and cross-border patents, while the others range from about 14% and downwards. Cross-border citation of cross-classified patents, while initially higher than the West average, has also gained slightly, while West cross-classified citations declined. The converse is that within-classification patents show an opposite pattern of change. Together, **these may indicate a further concentration or clustering of like-technologies in the West, while cross-border agents may be better positioned to take advantage of new innovative possibilities by cross-citing patent classes.**

POLICY RECOMMENDATIONS

THE POSITIVE EFFECT OF ENLARGEMENT ON PATENT ACTIVITY

EU and ENP countries might also expect cross-border citations to increase as a host of other policies take hold. **FDI policies that bring innovative firms to ENP countries should be supported** because they will **stimulate new innovative practices**, including patents which will cite others and eventually be cited.

Moreover, e**xpanded trade and mobility policies can also be expected to contribute to an expansion of patenting activity.** This is because supporting a further EU enlargement would mean encouraging a rise in innovative creation and diffusion.

GEOGRAPHICAL LOCATION MATTERS

As in the case of EU accession country experience, **only some ENP regions may cite and be cited more frequently in future, while others could do even less, including previously favored regions, should they become technologically less agile and unable to capitalize on related ENP policies** (e.g., FDI, trade, university exchange). The effects of several ENP initiatives will influence which ENC regions can take fullest advantage of potential knowledge flows within relevant citation exchange communities.

Border ENP region citations of Western patents can be expected to rise markedly, although the reverse citation flows are extremely unlikely in the short run. **Developing ENC regions are expected to be citation-knowledge consumers in early rounds**, similar to accession country experience, a dependence which may continue indefinitely for all but the most advanced or technically-specialized ENC regions.

In this perspective, **ENP should take care of regional differences also based on their location and on their current innovation endowment.**

Knowledge flows measured by patent citations across immediate cross-border regions are unlikely to be large, to grow rapidly, or to benefit other distant regions, although more standardized industrial process and business practice technologies could benefit ENC border regions initially from physical proximity.

There is a possibility that **cross-border firms in ENP countries may be better positioned to take advantage of new innovative possibilities by cross-citing patent classes as restructuring proceeds. Innovative restructuring of firms and industries is a possibility that can be exploited with timely and targeted absorptive capacity measures in ENC regions.**

RESEARCH PARAMETERS

Introductory statement

The policy brief summarises main findings and policy implications related a research analysis about knowledge flows and EU enlargement.

Objectives of the research

The main objectives of the research were to:

- examine the potential for such interaction opening the EU borders to much greater interaction with ENC;
- understand the dynamics of patent citation across once-impenetrable borders that become open through EU initiatives.

Methodology

Network analysis based on graph theory is the principal method of investigation employed in this research analysis, since it exploits the time, space and agent-varying nature of citation-based knowledge flows. A set of 284 NUTS2 level regions of 27 current EU members, which is further enlarged by Turkish regional set, are selected. The sample excludes Switzerland and Norway, which potentially leads to minor bias in description of the real spatial interaction system affected by ENP.

Flow data are represented in a standard interaction matrix of dimension 2842, elements of which located on main diagonal have a substantive meaning in description of the network structure. Diagonal elements represent network loops, or regional self-citations, in which the citing applicant and cited patent holder are domiciled in the same region. The share of citation links on the main diagonal is about one quarter of the overall interaction activity. The full decade-long, evolving network consists of 213,490.1 citation links, 103,119.3 of which (48.3%) are observed in first five years, and 110,370.8 (51.7%) in last five years. Our main interest is; however, not in the full interaction network, but rather a sub-network analysis that captures the exchange between two formerly divided regional blocks in the West and in the East. The sample of 284 regions is separated by the former geo-political barrier running between 223 vertices on the West side, and 61 vertices on the East side. The citation exchange between two sets of vertices has been arisen through channels cut by 10,522.1 citation links over a full decade, of which 4,716.5 have been realized in the former, and 5,805.6 have been realized in the later period.

PROJECT IDENTITY

Project name

Sharing KnowledgE Assets: InteRregionally Cohesive NeigHborhoods (SEARCH)

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14. International Centre for Black Sea Studies ICBSS
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Website

www.ub.edu/searchproject

Further Reading

Ondos S., Bergman E. “European Integration as Policy Metaphor for future EU-EN Knowledge Sharing” Search WP4.11