

---

# LOCATION PATTERN OF THE HEADQUARTERS OF RESEARCH-ORIENTED MULTINATIONAL ENTERPRISES IN EUROPE

Knut Koschatzky, Andrea Zenker, Elisabeth Baier

---



© iStockphoto.com/Nicholas Monu

---

---

**Prof. Dr. Knut Koschatzky**

Phone +49 721 6809-184

[knut.koschatzky@isi.fraunhofer.de](mailto:knut.koschatzky@isi.fraunhofer.de)

Competence Center "Policy and Regions"  
Fraunhofer Institute for Systems and  
Innovation Research ISI  
Breslauer Strasse 48  
76139 Karlsruhe  
Germany

---

# Starting point and research questions

---

## **Starting point of the paper:**

- Some authors argue that MNEs are footloose (e.g. Görg and Strobl, 2003), some argue that MNEs exploit advantages of regional interconnectedness (Bunnell and Coe, 2001; Cantwell and Piscitello, 2002).
- Research-intensive MNEs are expected to choose locations where favourable conditions could enhance innovative activity.

## **Research questions:**

- Does a relationship exist between the innovation relevant characteristics of regions and the location of (research-intensive) MNEs?
- Do MNEs favour those regions which display an above average performance with regard to R&D and innovation related indicators?

---

# Inputs from spatial theory: Economic geography

---

- Economic geography tells us that the regional environment of firms affects their innovative activity (e.g. through external effects and specifically knowledge spillovers; Carrincazeaux and Coris, 2011; Fujita and Krugman, 2004; Martin and Sunley 2011, McCann and Sheppard, 2003).
- The regional innovation system approach emphasizes the relevance of proximity relations between innovation actors (e.g. due to non-transferable person-embodied knowledge; Asheim et al., 2005; Maillat and Kébir, 1999).
- According to this concept, innovation processes are thus context-specific (Morgan, 2004).
- The regional innovation system approach also provides us with the institutional elements (sub-systems, environments) that could influence R&D and innovation activities of firms (Asheim and Gertler, 2005; Cooke, 1992 and other years; Edquist, 2005; Hekkert et al., 2007; Markard and Truffer, 2008).

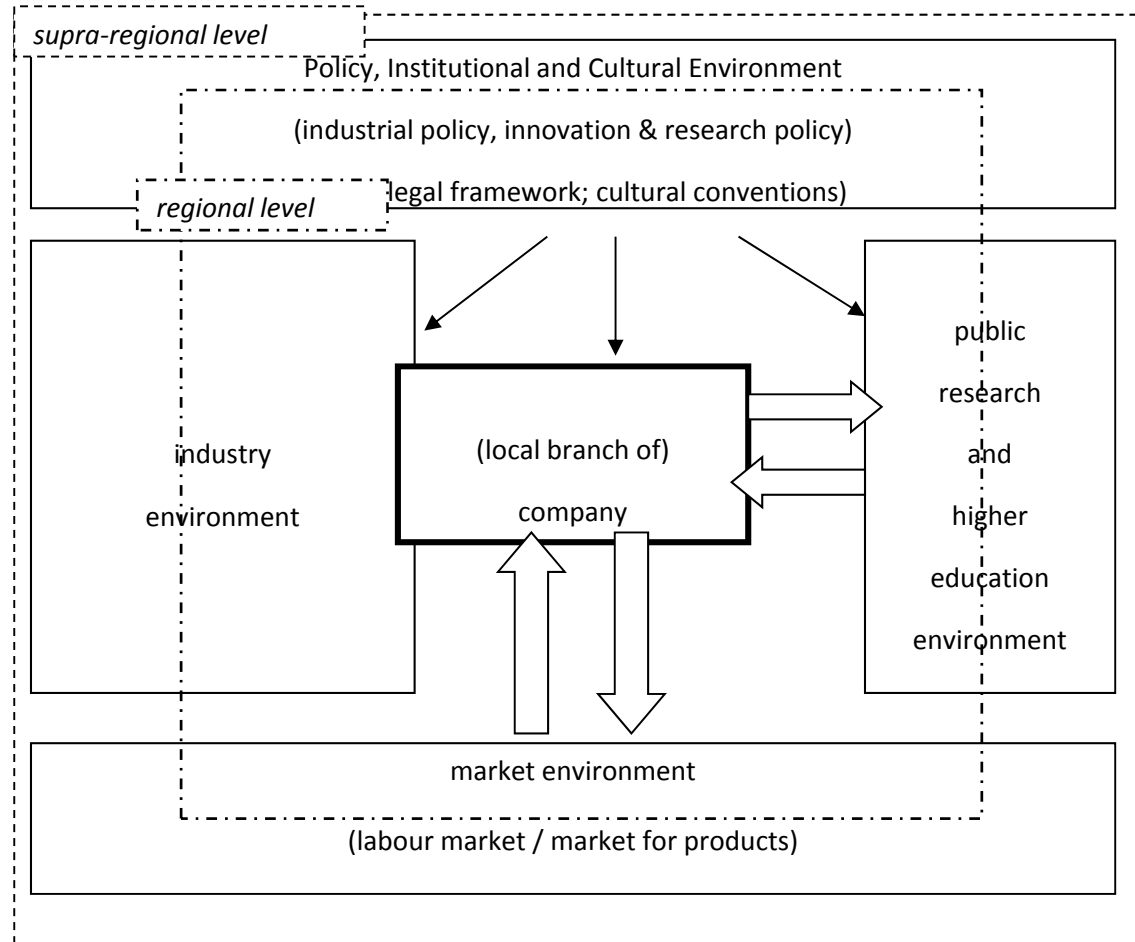
---

# Inputs from the MNE industrial economics perspective

---

- MNEs exploit and utilize different location-specific and market-related factors (Cantwell and Piscitello, 2002; Cantwell, 2009).
- Through internationalisation MNEs attempt to use specific competences in several markets (Chandler, 1992; Zander and Sölvell, 2000; Görg and Strobl, 2003; Giddens 1990; Defever, 2006).
- MNEs combine the advantages of globally-coordinated product and production strategies with the advantages of local proximity and specific locational factors (Cantwell and Mudambi, 2000; Dunning and Lundan, 2009).
- Applied strategies depend on the necessity to get access to specific localised knowledge and skills, on the direct access to specific markets, and on the necessity to become a player in a regional innovation system or a cluster (Andersen and Christensen, 2005; Enright, 2000).
- Regional environments must offer strategic advantages (Reger, 1997; Edler et al., 2003).

# Conceptual framework from the innovation system perspective



Source: Koschatzky, 2012

- Firms are interacting and influenced by different regional (and supra-regional) sub-systems (we term them 'environments')
- The endowment with these environments and their innovation supporting influence acts as location attracting factors (e.g. by generating positive external effects, the provision of public goods etc.).

---

# Resulting conclusions

---

## **Economic geography perspective:**

- Thesis 1: In order to get access to relevant knowledge resources and to exploit advantages of innovative locations, the number of MNEs is significantly higher in regions with an above average endowment of innovation relevant parameters.

## **MNE industrial economics perspective:**

- Thesis 2: Due to their global sourcing of knowledge and an independence from supportive regional environments, locations of MNEs do not significantly correspond with the regional endowment of innovation relevant parameters.

---

# Methodological approach and data

---

## **Two step approach:**

1. Characterization of European regions according to four institutional environments depicted in the conceptual framework (industry environment, market environment, research environment, policy environment) by using a set of indicators.
2. Matching of the characterization with the location of research-intensive MNE headquarters

## **Methodology: cluster analysis and non-parametric tests**

1. K-means cluster analysis for 215 NUTS 2 regions; discriminant analysis for testing which of the variables contribute to the discrimination between the clusters.
2. Kruskal-Wallis-test for validating differences in the absolute number of MNEs between the clusters.

## **Data:**

- Eurostat NUTS 2 (NUTS 0, NUTS 1) regional data for 2003; patent data for 2005
- EU Industrial R&D Investment Scoreboard 2005 (700 enterprises with highest R&D spending)



# Indicators (Industrial and public research environments as examples)

| Environments  | Variable   | Indicator for   |
|---|--|---|
| <b>Industry environment</b>                             | Location quotient for the manufacturing sector   | Regional concentration in manufacturing with respect to the national level                    |
|   | Employment in knowledge intensive services (% of total employment)                           | Importance of the knowledge-intensive business services sector (KIBS) in the regional economy |
|   | Employment in high and medium high-tech manufacturing (% of total employment)                | Importance of the medium and high-technology manufacturing sector in the regional economy     |
|   | Number of patent applications at the European Patent Office (EPO) (per million labour force) | Innovativeness of regional economy  |
| <b>Public research and higher education environment</b> | R&D personnel in the Government sector (% of total employment)                               | Potential in public research and higher education   |
|   | R&D personnel in the higher education sector (% of total employment)                         |   |
|   | Government expenditures on R&D GOVERD (% of GDP)   |   |
|   | Higher education expenditures on R&D HERD (% of GDP)   |   |

---

# Cluster analysis

---

**Cluster 1: Lagging regions at the periphery of Europe (n = 41):** slightly above-average industrial specialization, low shares of KIBS employment and patenting, low GDP/per capita, low degrees of regional autonomy

**Cluster 2: Regions dominated by international organizations and public administration (n = 2):** high GDP/per capita, above average share in KIBS employment, modest industrial specialization

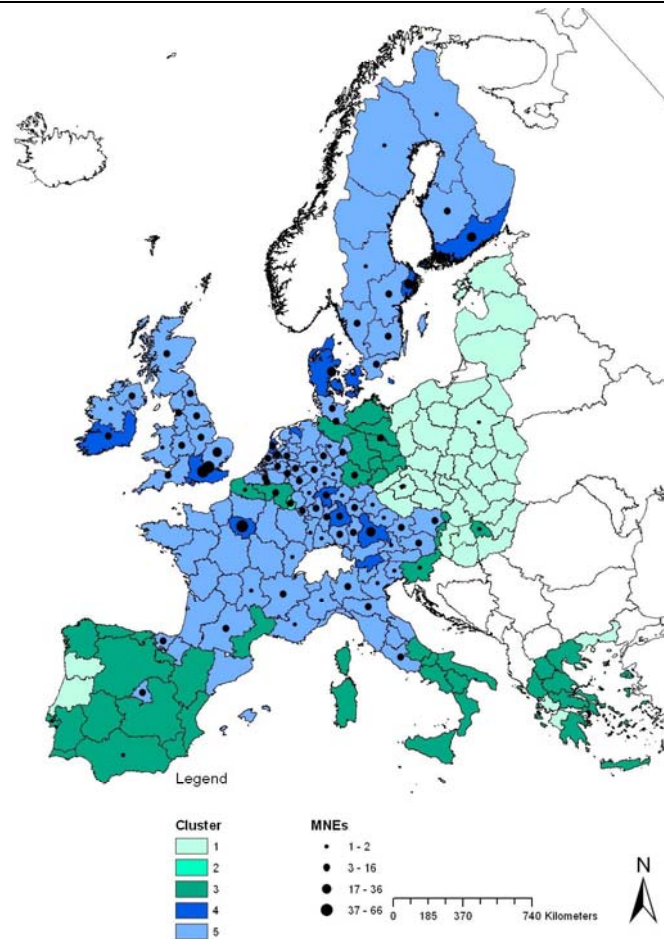
**Cluster 3: Catching-up regions (n = 56):** below average industrial specialization, below average shares of patenting, high average annual GDP growth rates, strong role of public research, below average rates of regional autonomy

**Cluster 4: Research and service oriented centres of Europe (n = 17):** high shares of employment in KIBS, average levels of GDP/per capita, high level of patenting activity, high degree of political autonomy

**Cluster 5: Technology oriented industrial regions (n = 99):** strong high-tech orientation in industry, high numbers of patent applications, slightly above average GDP/per capita, very high degree of regional autonomy

---

# Cluster and number of MNEs



Source: own draft based on Eurostat data

- The highest number of MNEs are found in **Cluster 5** (Technology oriented industrial regions):  $n = 369$  (range from 0 to 60, **mean: 3.73**).
- **Cluster 4** (Research and service oriented centres) ranks 2nd:  $n = 290$  MNEs (range from 0 to 65, **mean: 17.06**).
- **Cluster 3** (Catching-up regions) hosts altogether 18 MNEs (range from 0 to 4, **mean: 0.32**).
- **Cluster 2** (Regions dominated by international organizations) has 9 MNEs (range from 3 to 6, **mean: 4.50**)
- The lowest absolute and mean values of MNEs are found in **Cluster 1** (Lagging regions at the periphery of Europe):  $n = 2$  (range from 0 to 2, **mean: 0.05**)

---

# Results

---

- Kruskal-Wallis-Test verifies that the differences in the absolute number of MNEs between the clusters is statistically significant (null hypothesis that the MNE distribution is equal in the five clusters is rejected).
- The five clusters differ in significant manner concerning the number of MNE headquarters located in their regions.
- The distinct regional characteristics of the five clusters have a direct impact on the number of MNE headquarters (support for thesis 1).
- The attractiveness of regions as locations for MNEs seems to be related to regional market conditions, industrial and public research patterns and policies.
- MNEs are mainly located in regions with favourable innovation potential and economic conditions, as well as a strong public and university research and service orientation.
- There is also a certain share of MNEs that prefer industrial regions, however with strong technology orientation, as location for their headquarters.

---

# Conclusions and critical remarks

---

- Although our results support thesis 1, we cannot conclude that MNEs are not footloose. They favour certain types of locations, but they have the flexibility to shift between these locations and exploit their advantages globally.
- From a regional viewpoint those regions are attractive that pay high attention to an efficient economic environment and focus towards knowledge related industries.

## **Critical remarks:**

- Headquarter location is only a proxy, more information about different functions at the locations are necessary
  - Headquarters are much less subject to locational changes than subsidiaries
  - Changes in location pattern over time have to be included
  - Micro studies about the reasons for location decisions and the impacts of the regional environment on MNEs (and vice versa) are necessary (partially analysed in Heidenreich/Barmeyer/Koschatzky et al. (2012): Multinational Enterprises and Innovation. Regional Learning in Networks. New York/Abingdon: Routledge)
-

---

---

# **Thank you for your attention!**

Contact:

knut.koschatzky@isi.fraunhofer.de

andrea.zenker@isi.fraunhofer.de

elisabeth.baier@isi.fraunhofer.de

<http://isi.fraunhofer.de/isi-en/p/index.php>