Cross-Border Clustering Across the Baltic Region: Relating Smart Specialization and Cluster Categories

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Abstract

Clusters are complex cross-sectoral and inter-organizational formations stretching beyond the statistical limitations of industry classifications. Cluster mapping techniques often rely on core industries in defining core products or technologies acting as nucleus for bringing together the heterogeneity of economic entities. Awareness of non-synonymy between the notion of cluster and industry are essential in efficient implementation of regional development policies. Internationalization and cross-border integration of regional industries further complicates the delimitation process of clusters and brings up new challenges for smart specialization strategies. The study stresses on particular features of cross-border clusters and raises a non-trivial discussion over international division of labor in the context of regional smart specialization.

Keywords

Baltic region · Cross-border cooperation · Cross-border cluster · Smart specialization · Cross-sectoral cluster · International division of labor

Introduction

Regions are complex spaces differentiated by certain properties and qualities—environmental, institutional, socio-economic, cultural, historical, political, etc. Most particularities are being formed over a long period of time, with natural factors (e.g. climatic, geological, etc.) of the ecosystem determining the basic development trajectory of local societies. Some regional communities exhibit strong similarities,

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while others are completely different. Spatial proximity of borderland regions implies an increased probability of having identical natural environment, intensified social relations (including historical shifts in borderline), and even common institutional setup at cross-border or transnational level (e.g. Euroregions, European Union, etc.). At its extreme national border regions may have more in common with adjacent territories of the neighboring state than within a nation-state (causing preconditions to voluntary accession or even annexation) or a significant divergence from both, which might trigger referendum on sovereignty. Thus, inter-regional proximity factors define the intensity and scope of cross-border cooperation and integration of the two (or more) territorial socio-economic systems.

Cross-border cooperation is an ordinary process for resembling border regions. Often speaking the same language (e.g. the French-speaking region of Romandy in western Switzerland and the adjacent territories of France), dominated by same religious denomination, having close family ties, intensified population mobility and other linkages, these regions have sustainable historically grounded socio-economic relations. The narrow gap in intellectual, institutional, organizational, socio-cultural, technological setting of the regional community (incl. households, business, academia, etc.) makes networking easy, facilitating inter-organizational networking across borders (incl. informal knowledge dissemination—the 'local buzz' effect; Bathelt et al. 2004). Some scholars suggest that the innovation efficiency of these linkages is limited due to the little divergence in the knowledge base (Boschma 2005; Mattes 2012). However, it provides an increased absorptive capacity that extends the opportunity for utilizing synergies across industries.

The overwhelming majority of border regions in the Baltic region have initiated cross-border initiatives for boosting entrepreneurial cooperation (Kern and Löffelsend 2004; Mikhaylov and Mikhaylova 2014; Pacuk et al. 2018; Pikner 2008; Scott 2002). On average a quarter of all international cooperation projects are focused on supporting business activity over the border (Mikhailov 2014). Regions are active in engaging complementary stakeholders from adjacent territories of neighboring states. The cross-border regional clusters are being established setting the benchmark for all borderland territories.

The aim of the article is to assess the complexity of new cluster mapping techniques based on cluster categories and to discuss policy implication with regard to regional specialization strategies in cross-border regions. The paper proceeds with the review on conceptual grounds of spatial networking across borders and economy sectors. Section 3 gives an overview of the research methodology applied. The research findings are presented in Sect. 4. The article concludes with discussion on managerial implications of regional smart specialization.

Literature Review

Smart specialization implies a thought-through consolidation of resources on the major domains of regional territorial capital. With that, it is clear that regional industrial, educational, innovation, etc. policies should transcend their limited focus

area as to take into consideration not only the local nodes of competitiveness, but also the involvement in extra-regional networks of knowledge generation and exploitation (Chen 2015; Holl and Rama 2009; Sternberg 2007). Assessment of external synergies is particularly important for borderland regions, whose objective is to capitalize on regional strength and exercise measures for leveling out the impact of existing weaknesses (e.g. lack of individual infrastructure units, inconvenient logistics, raw-resources shortage, insufficient competences in a particular area, etc.) by integrating resources across borders.

For most borderland regions being the geoeconomic periphery of their countries, spatial proximity to an additional source of input is a significant competitive advantage. Knowledge is herewith the predominant input for boosting the innovation activity in the region. Locally established knowledge base is subjected to path-dependency for all institutional helices of the regional innovation system (Lagerholm and Malmberg 2009; Martin and Sunley 2006). Universities tend to be immobile with regard to their existing curriculum, with faculty adhering to established research areas (e.g. the focus tends to remain as new postgraduate students undertake their research on similar topics). Business displays a profound technological lock-in effect, as described by numerous scholars (Cowan and Hultén 1996; Uotila et al. 2017; Østergaard and Park 2015). The implementation of change in production process is complicated not only by need for investments, but the opposition of personnel as well, including the top management. Non-governmental organizations (NGOs) often represent the standpoint of low and middle-level staff being highly vulnerable to any radical shift in required competences and capabilities by the local labor market. Public authorities adhere to long-term development strategy, balancing between social tranquility and accelerated development. Therefore, reinforcement of cross-border contacts of regional communities is critical to sustaining innovation activity. This statement is confirmed by many researches, including those featuring studies on the western borderland of Russia (Druzhinin 2008; Fedorov 2010).

Cross-sectoral knowledge spillovers are the major source of radical innovation. Studies held on spatial-networking of related industries (e.g. by inputs, technologies, markets, etc.) reveal an increased performance of the actors involved (Delgado et al. 2016; Gaschet et al. 2017). Cluster mapping studies confirm the allegations on cluster policies made by Lindqvist et al. (2003), who advocate for inconsistence of industry classifications to regional clusters and objectify the need to differentiate between industrial and cluster policies. Numerous in-depth case studies further broaden the perception of clusters as inter-industry value chains by incorporating untraded relations with heterogeneous entities representing all institutional helices of the region—academia, government, NGOs, and society.

The broad range of actors engaged in a value co-creation process is accompanied by a wide spectrum of market offerings. Each given entity is a participant of numerous relations across networks and industries. Following a particular subject-specific activity (generally focused on industry sector) the services rendered and goods delivered can be ranked from primary to secondary ones. Therefore, the networking stakeholders may be defined as being of major or minor importance for

a given cluster specialization. This sets a prefiguration of concentric waves from conditionally the major actors of the networking—whose disappearance will lead to the collapse of a given network. For example, vineyards are primary for California wine cluster, while wine educational centers are secondary. This logic forms the basis for the new cluster mapping techniques that rely on so called cluster categories (or definitions). As suggested by Delgado et al. (2016, p. 1), these cluster categories represent "groups of industries closely related by skill, technology, supply, demand, and/or other linkages", thus, input-output tables or a supply chain is only part of existing interrelations (although being a great importance). Therefore, the main obscurity lies in the set of statistically defined indicators to be considered, being especially subjected to significant methodological limitations when considering an international configuration of clusters.

Methodology

The narrow connotation of the Baltic macro-region limits this area to countries and regions having direct access to the Baltic Sea. These are ten European countries, including Russia (the Kaliningrad and Leningrad regions), the Nordic countries (Denmark, Finland, and Sweden), the northern regions of Germany and Poland, and the Baltic States (Estonia, Latvia, and Lithuania). There are 18 borderland regions corresponding to second level of a common classification of territorial units for statistics (NUTS 2) of the European Commission (2015). A long-standing strategy for cross-border cooperation in the Baltic region has resulted in numerous Euroregions formed, some of which are among the first ones to be created—North Calotte Council, 1971 (Finland, Norway, Sweden), Kvarken council, 1972 (Finland, Norway, Sweden), Central North committee, 1977 (Finland, Norway, Sweden). Yearly studies suggest that Scandinavian countries are well ahead in creating a common socio-economic space (the Nordic Committee for Economic Cooperation est. in 1948, the Nordic Council est. in 1951), giving rise to striking (although not ideal) cross-border cooperation projects (e.g. Oresund cross-border region project; Hall 2008; Hospers 2006; Schmidt 2005). Of particular interest in this study is the cross-border area of Oresund region (Sweden) and Greater Copenhagen (Denmark). The Euroregion was officially established in 2000 with the opening of the Oresund Bridge connecting the two countries, giving rise to intensive cooperation across borders.

The Oresund cross-border region hosts widely recognized cross-border clusters of different specialization—life sciences, information technology, food processing etc. The most prominent is the Medicon Valley cluster of life science (see: www.mediconvalley.com). Being led by companies specialized in medical and biotechnology the cluster organization unites over 200 companies specialized in medical technology, 155 biotech organizations, 80 contract research organizations and other institutions with an overall employment reaching 40,000 people (Medicon Valley: facts and figures 018). Most member organizations are densely clustered around

Copenhagen—the capital city of Denmark, and the two major cities of the Scania province—Lund and Malmo (see: www.mediconvalley.com/industry)

The Medicon Valley has become a case of good practice for cross-border cluster initiatives and a benchmark for validating hypothesis and assumptions. Availability of qualitative and quantitative data on the cluster network as well as the long established reputation for one of the few de facto exiting cross-border clusters makes it the perfect sample for testing the predictive capacity of statistical indicators for the cross-sectoral cluster categories. The initial matrix of cluster categories applied is a combination of the originally presented scheme of related clusters developed by the Institute for Strategy and Competitiveness of the Harvard Business School in partnership with the U.S. Department of Commerce and U.S. Economic Development Administration (see: www.clustermapping.us/cluster) and the European Cluster Panorama 2016 project of the European Cluster Observatory (Ketels and Protsiv 2016). European approach has alienated the medical devices industry into a separate category, providing its unfolded categorization, whereas initial (i.e. American) cluster category merges the two groups. Current methodology implies cumulative account of the two cluster categories, while considering the detailed picture given by European Cluster Panorama. Further analysis is based on an assumption of two major (core) and four minor (supporting) interrelated industries in terms of Medicon Valley life science cluster. These are: (a) BIO: (1) Biopharmaceuticals; (1.1) Upstream Chemical Products; (1.2) Downstream Chemical Products; and (b) MED: (2) Medical Devices; (2.1) IT and analytical instruments; (2.2) Lighting and electrical equipment.

The source of industry-specific data is the European cluster observatory statistical data presented at the European Commission website (see: www.ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services). The study applies the following industry-sensitive indicators for a period of 2008-2013: (1) Number of employees in full time equivalent units, (2) Number of enterprises, (3) Specialization (calculated as location quotient—the ratio of total employment in a given region to the industry's share of total employment in all EU countries considered). The statistical data on regional employment and on total number of enterprises distributed in border regions of Oresund are sourced from Eurostat—the statistical office of the European Union, for 2008–2013 (see: www.ec.europa.eu/eurostat/data/database).

Research Results

The general overview of the Oresund cross-border regional statistics corresponding to the life sciences cluster categories is presented in Fig. 1.

Figures on location quotient (specialization) suggest that Hovedstaden is highly focused on biopharmaceuticals (higher than any other region of the EU), and features a significant number of personnel engaged in all inter-related sectors of life sciences. The bordering region of southern Sweden—Sydsverige, is clearly focused on medical devices with figures being nearly twice the values of the EU average.

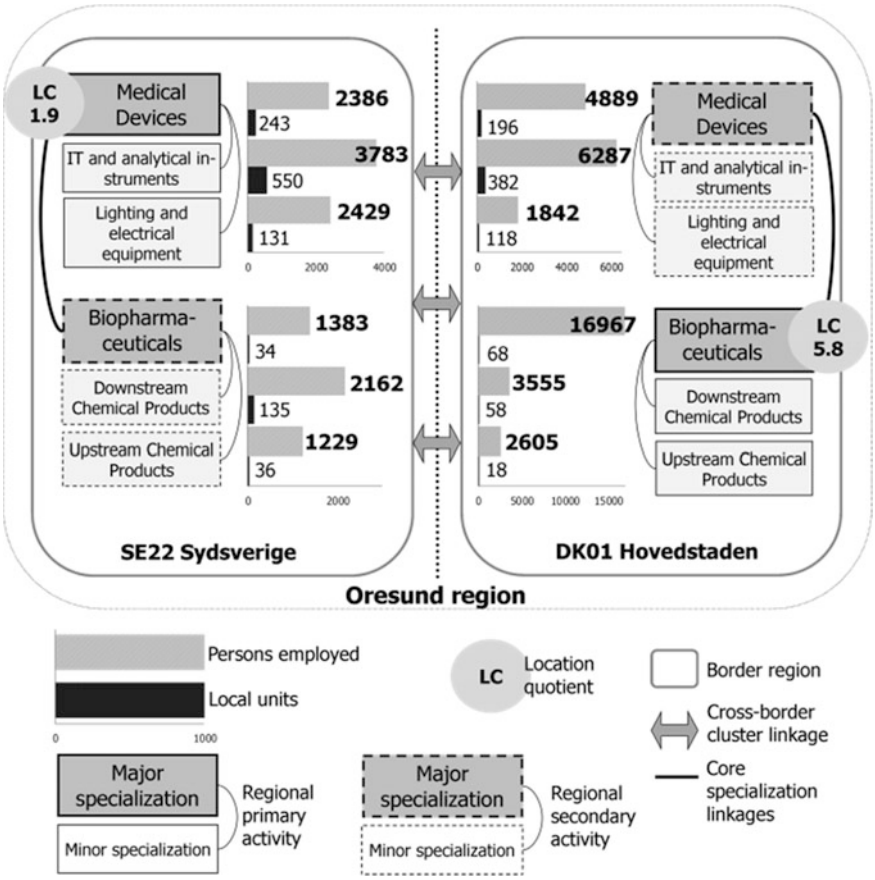

Fig. 1 The Oresund cross-border regional statistics corresponding to the life sciences cluster categories

Distribution of data across regions by core industries of the Medicon Valley life sciences cluster—biopharmaceuticals and medical devices, reveals strong polarization towards Hovedstaden—the capital region of Denmark.

The life science (biomed) cluster category employs nearly 50,000 people, which is 5% of the total employment of the cross-border region. The spatial distribution of employment figures (Fig. 2) shows that 70% (36.1 thousand people) are employed in Hovedstaden and 30% Sydsverige (13.3 thousand people).

This is despite having a greater number of companies on the Swedish side of the border. Over the past 6 years from 2008 to 2013 the share of persons employed in the cluster category decreased by 8.4% (or by 4568 people). The employment decline is found in both cluster definitions—MED and BIO, with medical devices

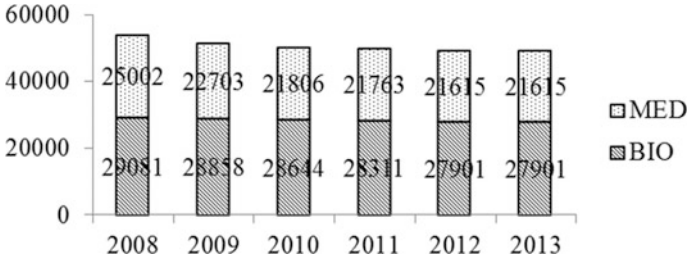

Fig. 2 Oresund region employment dynamics by specializations, people

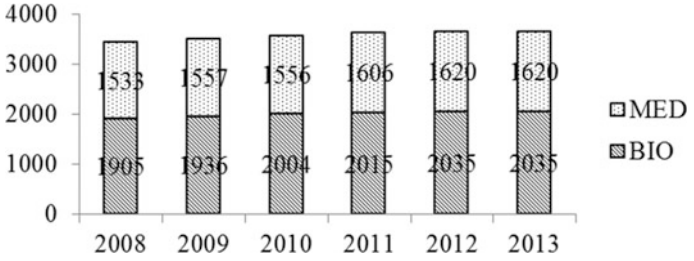

Fig. 3 Oresund region enterprise dynamics by specializations, units

featuring higher rates: 13.5 and 4.1% respectively. This tendency is unfolding against the background of the growing share of companies by 6.3% in all interrelated industries (Fig. 3).

The distribution of employed between BIO and MED major specializations is fairly equal with a slight preponderance towards medical devices by the proportion of employed and the number of companies (Fig. 4a, b).

The BIO specialization has the main reduction of personnel is in the secondary (accompanying) activity of downstream chemical products. In the MED, the main reduction in staff is found to be in primary activity of medical devices, and the interrelated secondary activity of IT and analytical instruments.

Over 1000 people were released in each of the interrelated industries. The only exception is BIO category of the Hovedstaden region, the Biopharmaceuticals и Upstream Chemical Products industries in particular. The BIO and MED categories have structural differences. For the BIO category the main concentration of people are engaged in the cluster-core activity—the Biopharmaceuticals (over 60% of employed and almost 90% of companies). For the MED category the cluster-core activity account for only 30% of companies and employees.

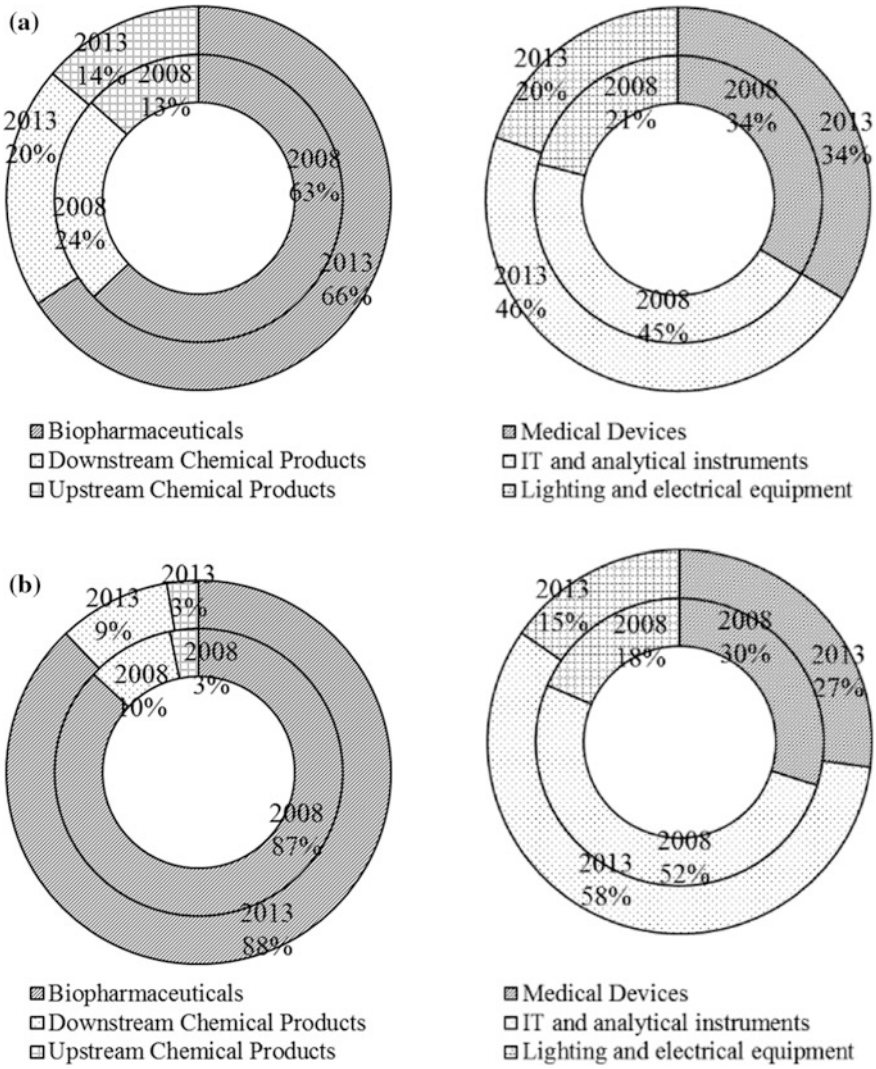

Fig. 4 **a** Oresund region employment distribution by specializations, share. **b** Oresund region enterprise distribution by specializations, share

Conclusion

Most border regions are subject to cohesion policies, both within and beyond the European Union. Regional convergence initiatives cover the social, economic, cultural, institutional and other domains, bridging the two regional systems. The intensified cross-border cooperation deepens the integrity of production networks,

create cross-sectoral clusters across national borders, and trigger the establishment of a single cross-border regional innovation system. The great public concernment in such cross-fertilization and synergies results in formation of cross-border regions supported by implementation of bilateral agreements, norms and regulations, establishment of a coherent institutional context. The growing trend for international (cross-border) division of labor imposes certain specifics of cluster mapping techniques and smart specialization policies. This is an especially prominent feature for borderland regions. The interdependence and complementarity of the industries across borders suggests that structural holes might occur in regional economy structure. Individual industries might be perceived as marginal or fractional, thus, not deserving individual attention in terms of state support. Identification and acknowledgment of secondary (minor) industries in value co-creation process enables to capture the regional specifics of established (or even potential) cluster categories, raising the effectiveness of regional smart specialization policy. Economic and innovation security should come to the forefront of smart specialization practice as regional competitiveness might shift to the adjacent region. This scenario is probable is case of general socio-economic divergence of regions or an inconsistency of regional development priorities, giving an asymmetrical preference on an industry level (e.g. to a certain extend this is found to be in horticulture sector at the Limburg region of Netherlands—the North Rhine-Westphalia borderland region of Germany). The case of the Medicon Valley cluster proves the effectiveness of the cluster mapping approach based on cluster categories, which provides accurate results on inter-industry linkages.

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