

Features of the Triple Helix Model in Cross-Border Clusters

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Abstract: The article is aimed at discussing the unique characteristics of the “triple helix” model that are unveiled while applied to cross - border cluster studies. The results of the case study method of the best practice on cross - border cluster formation at the Baltic Sea region shows evidence of the doubling of the number of helices represented in a complex collaboration system. Major factors of the dynamics and the transformation of the cross-border cluster interactions are stated. The hypothesis of the “double triple helix” model is suggested and the illustration of the case study example of the “Medicon Valley” is given.

Key words: Triple helix • Double triple helix • Cross-border cluster • Trans-border cooperation • Medicon valley • Øresund region

INTRODUCTION

The establishment of innovation clusters at various levels of geographical localization is seen to be one of the main methods to increase competitiveness of individual actors involved as well as of the host region itself. An increasing interest with regards to development of the peripheral border territories is paid to the international cluster cooperation phenomenon, which is studied under the cross - border cluster concept. However, the results of the relevant literature review demonstrate lack of attention to the specific issues of this economic formation [1].

Based on analysis of the existing approaches to define cross - border cluster [2-11] authors propose own elaborated definition. Cross - border cluster is a sustainable collaboration of a wide array of interconnected, interdependent and complementary stakeholders, localized in border territories of neighboring countries, operating in related industries, possessing similar level of technological development and co-creating goods and services that deliver synergy effect in development of respective territories and facilitate the diffusion of innovations among them.

Emergence and sustainable development of cross - border clusters demands establishment or improvement of a regional business environment up to certain quality that

will foster activation and reinforcement of mutually beneficial collaboration and skills exchange between cluster members. Among the most significant factors affecting the process of cluster formation in cross - border regions can be identified factors characterizing industry cooperation (business climate, innovation activity, etc.), interactions of governmental authorities (legal field of governance, level of governmental contribution, share in cluster initiatives, etc.) and cooperation in educational and R&D sectors (university partnerships, level of scientific and technological development of a cross - border region, etc.). Innovation potential, in this case, is defined by the degree of functional collaboration of the cluster members, joined into three main institutional spheres: university, industry and government [12]. The case study research of the “Silicon Valley” on collaboration system of actors from university, industry and government sectors conducted by H. Etzkowitz and L. Leydesdorff (1995) has led to development of the “triple helix” model, which gained extensive use as a tool for formation of innovation clusters [13]. The main thesis in the triple helix concept postulates the principal position of new knowledge creating institutes in the system of innovative development.

In line with the triple helix concept, the recent studies show the predominant importance of the institutional collaborations for successful cluster development [14-16].

However, the author argues that the triple helix model unveils its unique characteristics while applied to cross - border clusters. The paper is based on the case study method of the best practice on cross - border cluster formation at the Baltic Sea region.

Implementation features of the “Triple helix” model in the cross - border cluster based on the experience of the Baltic Sea region.

According to the “Association of European Border Regions (AEBR)” the transnational cooperation of the border regions at the Baltic Sea is taking place at the 25 territorial and organizational unions of various scales, within which the formation of international clusters is possible¹. High level of innovation development of the Nordic countries and Germany (According to the World Economic Forum they are on the third highest stage of development and are among the top ten countries in the world to create and promote innovation), as well as extensive joint transnational cluster cooperation policies² ensure a favorable environment for the development of international clusters. The “TCI - The competitiveness institute” database lists as many as 43 cluster initiatives at the BSR³. However, the study revealed an even broader scope of cross-border cooperation: 13 border regions of sustainable cooperation (e.g. Öresund region, Bothnian arc, Nordic Green Belt, Jutland route, Pomerania, etc.), which incorporate 23% of cross - border cluster initiatives on average (out of the total number of cross-border cooperation projects).

The allocation of a significant number of “mature” cross - border clusters (e.g. Medicon Valley, Öresund 55, MedCoast Scandinavia, Bothnian arc of knowledge, etc.) provide a substantial ground for research of successful implementation of the triple helix model in realization of cluster collaborations; generally aimed at socio - economic and innovation development of corresponding regions⁴.

The case study results on collaboration of actors within 20 cross - border clusters of the Baltic Sea region (ten Danish - Swedish cross - border clusters of the Øresund science region (e.g. Medicon Valley, Øresund IT Academy and Green eMotion); five clusters of the Bothnian Arc region - Sweden and Finland (e.g. Bothnian

Arc of Knowledge, Bothnian metal Arc “Steelpolis” and Bothnian ICT-Arc); two of the Østfold- Västra Götalands region - Norway and Sweden (e.g. MedCoast Scandinavia); and three Danish - German cross - border clusters of the Jutland region (e.g. Furgy Future Renewable Energy cluster)) demonstrate the corresponding organizational structure to the triple helix concept. Namely, the innovational base of the cross - border clusters reflected in the institutional collaboration of the three main pillars of the knowledge economy - the university, the government and the industry - have found the proof one again; as it has been done previously in a number of studies at the stage of innovation cluster concept development [16]. However, due to the fact that each of the cross - border clusters under study includes institutional spheres of the two independent states, it can be argued that the triple helix model is presented in a more complex form through the doubling of its helices.

According to the author’s approach, the interaction system of the cross - border cluster can be visualized in a form of “doubled triple helix” model, with allocation of two interconnected, interdependent and complementary regional systems (Figure 1a). At the same time, each regional system contains three basic helices (university, industry and government) - Figure 1b.

The system of cluster collaboration is designed of backward and forward linkages, as well as a net of formal and informal interactions between the elements that shape the dynamics of the main directions of its development. The dynamics of this system is characterized by stability on the one hand and uncertainty on the other, due to the cultural, legislative, infrastructural and other differences of the participating countries. Each of the helices have unique pass of development, where specific laws apply [17]. Interactions between them are constantly changing, that result in general transformation of innovation system of the cross - border cluster. Major reasons for such transformations are threefold: instability of the inner-cluster borders, caused by the change of number and structure of the cluster participants; interchangeable nature of actors’ roles (e.g. the university or the so called knowledge pillar can adopt the functions of business in a

¹Association of European Border Regions, (2012) http://www.aebr.eu/en/members/list_of_regions.php. Accessed 23/12/2012.

²Cluster policy in Europe: a brief summary of cluster policies in 31 European countries // Europe Innova Cluster Mapping Project. Oxford Research. 2008. http://ekstranett.innovasjon Norge.no/Arena_fs/Synthesis_report_cluster_mapping%20-%20final.pdf. Accessed 04/01/2013.

³TCI - The competitiveness institute (2013), <http://www.tci-network.org/cluster/initiatives>. Accessed 10/01/2013.

⁴Cluster observatory, State of the Region Report 2012. The Top of Europe Bracing Itself for Difficult Times: Baltic Sea Region- Collaboration to Sustain Growth. <http://www.clusterobservatory.eu>. Accessed 8/01/2013.

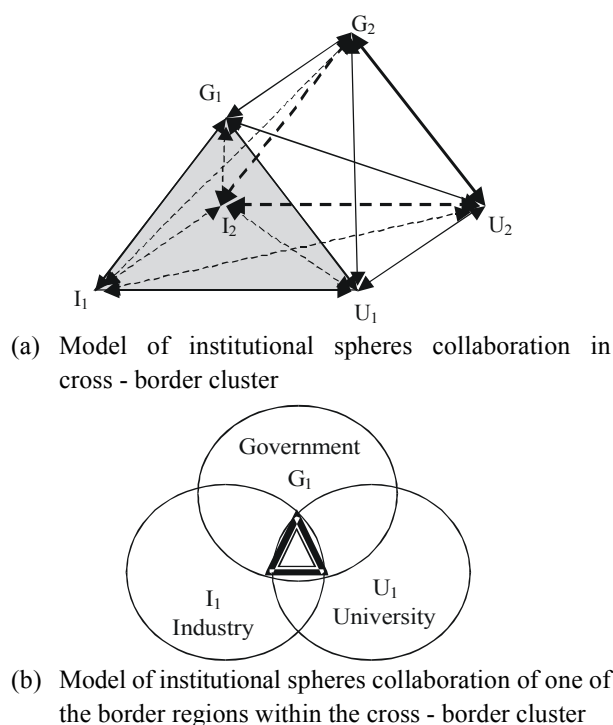


Fig. 1: The «Double Triple Helix» model
Source: own elaboration

form of business incubator); and the general shift in strategic priorities of the core actors of the cluster, leading to the change in common properties of the stakeholder system (e.g. a change of state support towards the particular innovative activities or the increased awareness in eco-technology). The complexity of the system is caused by interconnectedness of all participants of innovation process in cross - border cluster that is the efficiency of one participant is dependent on all of the other participants of this interaction. Yet the correspondence between the parties for each combination of interactions is determined separately.

The level of development for the sustainable collaboration system of actors in cross - border cluster is defined by its ability to continuous transformation, involving pursuit for integration and differentiation. The government control, in this case, aims to establish a rational compromise between differentiation and integration, preserving regional identity and sovereignty. Whilst the business and university helices are eager to form micro-specialization within the cluster and have aspiration to create a single value chain in the border area.

Case study of the “Double Triple Helix” model in the “Medicon Valley” cross - border cluster.

The «Medicon Valley» cross - border cluster is deliberately selected out of the list of other clusters under study since it is one of the few examples of management being aware of its extreme complex structure, different from the regular regional cluster⁵. «Medicon Valley» is one of the five most attractive bio-regions in the world due its favorable business environment, entrepreneurship culture, developed infrastructure (e.g. easy transport access) and highly skilled workforce. Collaboration of actors within the “Medicon Valley” cross - border cluster is based on the doubled number of helices of the “Triple helix” model, the so called “Double triple helix” model, consisting of regional representatives of university, industry and government from Denmark and Sweden - Figure 2.

At the stage of establishment of the “Medicon Valley” cross - border cluster the leading role was held by the regional and national authorities of the two countries (regions Hovedstaden - the capital region of Denmark and Sania - the southern county of Sweden) involved. In the last 20 years the joint cooperation of the authorities of various levels was directed at support and promotion of integration initiatives of the border regions into a single cross - border region - Øresund (through creation of an attractive business environment, motivation of productivity, ease of access to global markets and development of education and science sector [18]). However, the first cross - border cluster - the «Medicon Valley Academy», was initiated by the universities of Lund (Sweden) and Copenhagen (Denmark) under the «EU Intereg II» project (1995) as an association of regional clusters.

At the moment, the institutional spheres of the “Medicon Valley” cluster are present in the following structure:

Government: Ministries (e.g. Ministry of Science, Technology and Innovation, the Danish Ministry of the Environment, the Danish Ministry of Economic and Business Affairs), governmental agencies (e.g. the National Agency For Enterprise and Construction (NAEC), the Danish Agency for Science Technology and Innovation (DASTI), the Swedish Governmental Agency for Innovation Systems (VINNOVA), Swedish Agency for Economic and Regional Growth (Tillväxtverket)), special centers and departments

⁵Bengt Streijffert (2009), The Øresund Model, http://www.charta-universities.eu/fileadmin/downloads/oeresund_Luxemburg_5_juni_1_.pdf. Accessed 01/12/2012.

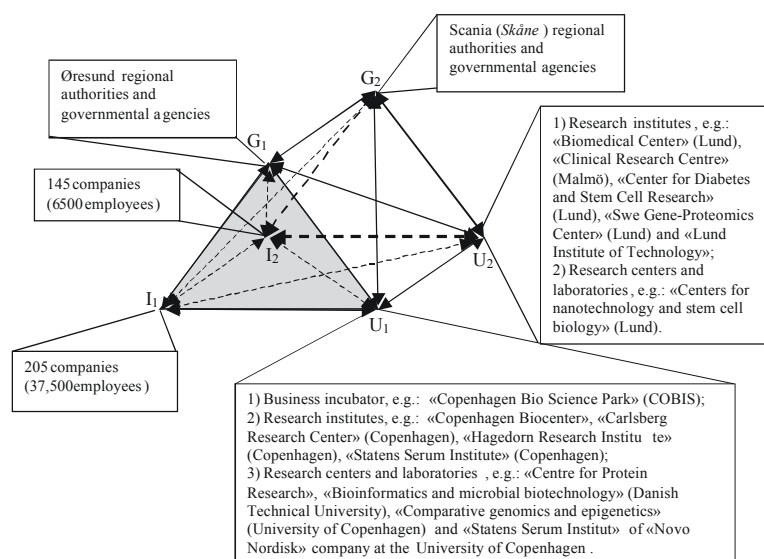


Fig. 2: Collaboration of actors within the “Medicon Valley” based on the “Double triple helix” model

Source: own elaboration

(e.g. Centre on Regional Development, Spatial Planning Department (SPD)) other institutions: European Employment Services, public venture capital funds Industrifonden and Vaekstfonden, the Øresund Committee.

University: 12 universities and 11 university hospitals, 9 research institutes (e.g. “Biomedical Center” (Lund), “Clinical Research Center” (Malmö), “Carlsberg Research Center” (Copenhagen)), 5 research centers and laboratories (e.g. “Centers for nanotechnology and stem cell biology” (Lund), “Bioinformatics and microbial biotechnology” (Danish Technical University) and “Comparative genomics and epigenetics” (University of Copenhagen)), 1 business incubator (“Copenhagen Bio Science Park” - COBIS).

Industry: 471 firms in total, 350 large life - science companies with more than 250 employees (e.g. NovoNordisk, Lundbeck, LeoPharma, Nycomed, Ferring, AstraZeneca, Pfizer, ALK Abelló, Coloplast), 119 biotech companies, 24 pharmaceutical companies and 183 companies involved in medical technology; the Swedish companies are generally specialized in medical technology, whereas the Danish companies in pharmaceuticals and medical devices; as well as the Øresund Science Region, representing the alliance of the five cross - border clusters (Øresund IT, Øresund Environment, Øresund Logistics, Øresund Food and Medicon Valley).

Further development is largely determined by the activities of the science and research sector. Formation of the sustainable system of the cluster interactions between the actors of the three main institutional spheres of the two independent states allowed creation of favorable conditions for the development of border territories by activation of cross - border cooperation.

RESULTS AND DISCUSSION

The unique characteristics of institutional collaboration within border regions that are economically united under the cluster umbrella have evidently created a new form of institutional interaction model - the “Double triple helix” model. The collaboration system of actors in a cross - border cluster that is based on doubled triple helix model can be determined by complex system of considerable number interrelated and interdependent participants influencing each other and working in various legal fields. Potential study of each of the helices’ elements is based on different methodologies and tools, as they are characterized by qualitatively different processes and is complicated by the lack of adequate measuring instruments for the occurring co-petition processes. There is a need for further research in this area for the purpose of methodology development for assessment of the extent and nature of the relationship between university, industry and government of the two countries involved in a single cross - border cluster.

REFERENCES

1. Mikhaylov, A.S. and A.A. Mikhaylova, 2012. On the possibility of Russian participation in formation of international innovation clusters at the Baltic region. In: 2nd International scientific conference: Economics, management, finance, pp: 171-78.
2. Birkinshaw, J. and O. Solvell, 2000. Leading-edge Multinationals and Leading-edge Clusters. *International Studies of Management and Organization*, 30(2): 3-9.
3. Burger, P., P. Džupka, O. Hudec, L. Suhányi and N. Urbančíková, 2010. Preconditions of successful cross-border cluster in renewable energy sources. In: 1st Knowbridge Conference on Renewables, pp: 9-16.
4. Karlsson, C.H., 2008. Handbook of research on cluster theory. Edward Elgar Publishing.
5. Royer, S., 2007. Crossing - borders: International clusters: An analysis of Medicon Valley based on value-adding web. Flensburg University Press.
6. Rugman, A.M. and J. D'Cruz, 2000. Multinationals and flagships firms: regional business networks. Oxford University Press.
7. Rugman, A.M. and A. Verbeke, 2002. Multinational Enterprises and Clusters: An Organizing Framework. University of Calgary.
8. Ter Wal, A., 2010. Cluster emergence and network evolution: a longitudinal analysis of the inventor network in Sophia-Antipolis. *Regional Studies*, 45: 1-18.
9. Zámorský P., 2012. Emergence of Transnational Clusters. *Journal for East European Management Studies*, 16(4): 464-479.
10. Pogoreckaya, V. Ya. and Zhuran, Ye. A., 2011. Transgranichnye klasteri - instrument formirovaniya korporativnoj strategii [Cross-border clusters - an instrument for shaping corporate strategy]. *Prometej [Prometheus]*, 2(35): 195-199.
11. Segedin, V.N., 2011. Perspektivy razvitiya transgranichnyh sistem predprinimatel'stva v sovremennoj Rossii. Avtoref. dis. kand. jekon. nauk [Prospects for the development of cross-border business systems in modern Russia. Summary of dis. candidate of economic sciences]. Volgograd, Voronezh State Technical University.
12. Smorodinskaya, N.V., 2012. Smena paradigmi mirovogo razvitiya i stanovlenie setovoy ekonomiki [Shift in the worlds' paradigm and the creation of the network economy"]. *Ekonomicheskaya sociologiya [Economic sociology]*, 13(4): 95-115.
13. Etzkowitz, H. and L. Leydesdorff, 1995. The Triple Helix - University - Industry - Government Relations: A Laboratory for Knowledge - Based Economic Development. *EASST Review*, 14: 14-19.
14. Arthurs, D., E. Cassidy, C.H. Davis and D. Wolfe, 2009. Indicators to support innovation cluster policy. *Int. J. Technology Management*, 46(3-4): 263-279.
15. Boja, C., 2011. Clusters Models, Factors and Characteristics. *International Journal of Economic Practices and Theories*, 1(1): 34-43.
16. Jukka, T., 2008. Regional science-based clusters. A case study of three European concentrations. University of Oulu.
17. Etzkowitz, H., 2003. Research groups as "quasi-firms": The invention of the Entrepreneurial University. *Research Policy*, 32: 109-121.
18. Sánchez-Carreira, M.C., X. Vence-Deza and O. Rodil-Marzábal, 2011. Strategic innovation policies for the emergence of new clusters: the comparative experience of the bi-national Medicon Valley. Santiago De Compostela.