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International Research Conference
“GSOM Emerging Markets Conference-2017”

St. Petersburg State University Graduate School of Management
October, 5-7th, 2017
St. Petersburg, Russia

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Technology Transfer in Post-Socialist Biotech Clusters: A Comparative Study of Central Siberia and Rhine-Neckar

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Abstract:

The focus of our study was to compare institutional forms and networks in an established Biotech Cluster in South-Western Germany with the Central Siberia biotech industry in transition. We were able to identify several institutional voids for further growth in both systems. While Siberian start-ups have to struggle with all types of complicated regulations, they found many hybrid institutional forms to find ways around existing barriers (e.g. bureaucratic). Such an experimentation and the birth of new organizational innovations seems much rarer in the much settled regional cluster in Southern Germany.

Keywords: *biotech, comparative study, innovation system in Post-socialist countries, in-depth case study, technology transfer*

6. Aim of Our Study

Innovation is regarded as the central driver for growth of firms and regions in the contemporary literature (Cimoli et al., 2011). Thereby, innovation results from interactive learning processes (Nelson and Winter, 1982) embedded in national (Lundvall, 1992; Nelson, 1993) or regional (Cooke et al., 2004) systems of innovation (SI). The transfer of knowledge and technology (TT) between the subsystems of a SI, especially the scientific sector and firms therefore plays an essential role in the competitiveness of regions and industries. A whole web of TT channels between science and business are in use in successful SI (Bekkers et al., 2008; Brennenraedts et al., 2006; Ruffer et al., 2016). However, the literature on TT has mainly focused on best practice cases in western countries, while largely neglected Eastern Europe and Russia. Due to the heritage of socialism, cooperation and TT exchange patterns can be expected to be rather different in these institutional systems. We provide a comparative study of TT in the Biotech industry in Siberia in comparison with a German Biotech Cluster. We follow a qualitative study approach targeting on semi-structured interviews with 16 firms, transfer enabling institutions and researchers in Siberia and 10 actors in Germany.

7. Literature Review

The international literature on TT between science and business in post-socialist SI is scarce. Radosevic (2003) identifies the linear model of innovation and technology as being the basis for the Soviet model of S&T. According to Klochikhin (2012) there is an urgent need for structural reform in Russia's innovation policy. Egorov and Carayannis (1999) discussing post-soviet research systems identifying a low productivity of the socialist economies SI. Some Russian studies devoted to TT in modern Russia have been carried out. Empirical research has shown that the efficiency of TT in Russia is determined by the technological environment in which the company operates, and by the level of complexity of technologies in the industry (Zaichenko, 2012; Gokhberg et al., 2010). Russian companies prefer to purchase equipment and technologies rather than to develop new knowledge (Zaichenko et al., 2014). Over time, the Russian economy is less and less able to develop its own scientific basis (Bukharova et al., 2016), which leads to the widening of the technology gap (Glazye and Yu 2015).

8. Biotech Clusters in Central Siberia and the Rhine-Neckar Region

The Biotech Cluster Rhine-Neckar is located in Southern Germany in and around the city of Heidelberg and is a holistically integrated and organized cluster. Among the regions of Siberia, Novosibirsk, Krasnoyarsk and Tomsk make the greatest contribution to the development of biotech. Clusters here cannot be considered fully formed, TT does not take place on a regular basis.

A horizontal network of formal and informal relationships can be found in the Rhine Neckar Region. A formal cluster management occupies a central position in the regional network and maintains strong ties to other organizations in the cluster. Research organizations as well as Biotech and Healthcare organizations maintain strong connections among each other. In Krasnoyarsk, the Biotech cluster cannot be considered as being formed as a dense cluster with many connections. Cluster effects are considerably deferred, i.e. the investment outcomes start to be evident in several years, not immediately. Elements of support infrastructure, created within the past decade, often modelled after western best practices, tend to function formally but do not fully comply its purpose.

With regard to Entrepreneurship, in the Rhine-Neckar region we found sharing of facilities especially in early phases of spinoffs from R&D organizations. Researchers from research organizations were using facilities of their research organizations in order to start businesses. Such arrangements seem to be supported by local TTOs. However, we also found the attitude that such arrangements of being in a dual functions should be separated after some time, as start-ups grew, researchers had to opt for academia or the business world. In Siberia one of the basic issues related to the topic of Entrepreneurship is the accessibility of equipment. University or research institutions are the most probable holder of equipment. However, it is presumed that setting an arrangement with a state research institution involves excessive bureaucratic obstacles

and a high risk of rejection. As result, all interested parties (entrepreneurs, researchers, sometimes even university officials) tend to collaboratively use university facilities without formal agreements. The mechanism that could possibly reduce the bureaucracy level involved in the external use of equipment are university spin-offs, i.e. a legal commercial entity within which the university holds shares. One of the major advantages of this mechanism is the access to university equipment. However, excessive bureaucracy when managing partly university owned spinoffs mitigates the positive effects of the opportunities of the easy use of university equipment.

9. Summary

The Biotech Cluster in South-Western Germany has been growing around highly regarded research organizations and with holistically organized government support for about 40 years. Several rounds of organized integration have been taking place and a dense organized network has developed. Meanwhile, while research in the field has been conducted already in socialist times, Siberian biotech researchers had to undergo tough times of spending cuts throughout the transition period and only recently there is a recognition and a political will to create more integrated SI. We were able to identify several institutional voids for further growth in both systems. While Siberian start-ups have to struggle with all types of complicated regulations, they found many hybrid institutional forms to find ways around existing e.g. bureaucratic barriers. Such an experimentation and the birth of new organizational innovations seems much rarer in the much settled regional cluster in Southern Germany. The latter can be regarded as an organized network economy, where organizations such as cluster management units are developed by a common approach of the triple helix actors. The much younger attempts of creating comprehensive and holistic SI in Russia, however, have not yet led to dense networks but the organizations oftentimes seem to be too much a top-down process. A significant increase of empowerment of bottom-up initiatives and an inclusion in institution building of all regional actors of the triple helix, might improve the success of the Russian innovation policies.

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