Research report

Research and Practice: Partners and/or Competitors?

General findings and regional specifics in the cooperation of research and practice sphere on the example of Czech-Saxon borderland

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Abstract: Innovations, innovation potential and innovation transfer are very actual topics in many fields of people's activities. This problematic intersects very broad spectrum of disciplines, from regional development crossing economy to much specified business management and engineering. In the geographical studies this theme appears most often in the connection to social-economic situation, internal or external potential and regional development on different hierarchical levels. This paper summarizes the results of research (questionnaires and interviews), which was carried out in the same time on both sides of the border (in the Usti region and in the Central Saxony¹). It was held under the cross border project "Innovation potential as a factor of increasing of the competitiveness of the Czech-Saxon borderland" (INPOK). Target respondents were on both sides the same: subjects from practices (companies), research and development institutions (high schools, universities, research institutes), then the public administration (above all the municipalities) and the regional actors (for example the economic chambers). We have focuses on analyzing the general framework conditions of the Czech-Saxon borderland, its strengths and weaknesses in the connection with active cross border cooperation above all between the research and practice field with the stress on the innovation behaviour in the study area.

Key words: Czech-Saxon borderland; innovation; innovation potential; cross border cooperation; business; research

Highlights for public administration, management and planning:

- this survey has shown that Czech-Saxon cooperative creative economies are limited
- the major constraints for cooperation are seen by actors in lack of sufficient institutional and policy support for the development of innovative business

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1. Introduction

Czech-Saxon borderland has been the long-time area of interest of the J. E. Purkyně University in Ústí nad Labem (hereinafter UJEP), which is studying cross-border cooperation, demographics, local identity, regional development and the landscape in general for several years. This research was recently promoted by the three-year cross-border project OP Objective 3 *Innovative potential as a factor in increasing the competitiveness of Czech-Saxon Borderland* (registration number 100088915) and implemented together with the Technical University of Dresden. The results of the mentioned project led to an effort to create a platform for proactive and effective communication in the field of applied science, research and development, to strengthen cooperation in the research and application spheres and to submit several proposals or measures to improve the situation and increase the economic competitiveness of the Czech-Saxon borderland. The complete results of the research are presented in a publication called *Region a inovace na příkladu česko-saského pohraničí* (Jeřábek et al. 2014).

The aim of this paper is to offer crucial results of survey and research which took place in the area of the Czech-Saxon borderland. This research was aimed to analyze a situation of the innovations, competitiveness and cross-border cooperation and to outline possible solutions. Presentation of its findings will be now preceded by some theoretical framework which was a basis of mentioned research.

The definitions of the term of *innovation* are differently perceived not only across disciplines but also in the different concepts or by specific authors - innovation in production, in the methodological process, innovations in work organization or upgrading the finished product (see e.g., Adair 2004). Trommsdorff and Steinhoff (2009) distinguish between innovation of products and innovation of processes and according to them innovation represents a new kind of a „business subjective item“ (product or process) which must be not only „invented“, but also pushed through both company and outside.

For instance Maier and Tödtling (1998) cite that there exist factors influencing the creation of innovations in concrete area - they are for example highly qualified labour force, universities and research institutes, sufficiently large market and good market access, access to capital, forms of interaction among the various actors in innovation system network and many others. In general the term of innovation can be seen as assumptions and means providing the ability to innovate companies and their employees that is necessary to achieve desired objectives in the sphere of innovative competitive environment.

The issue of innovations and regional development in compliance with socio-economic development can be studied in the theories of polarized development (e.g., Friedmann 1966), theories of localization (Malmberg et al. 2000) or for instance in economic geography and the new growth theory (Krugman 1991). Theoretical base can be for better orientation enriched with the theories of spatial division of labour (Massey 1984), theory of industrial districts (Sabel et al. 1989) or no less known theory of learning regions (Lundvall 1992).

The concept of regional innovation systems (RIS, Cooke 1992) is considered to be an essential concept in our research. This concept combines both innovative efficiency and competitiveness of regions and also tools of systematic assistance. As also other authors (e.g., Jensen et al. 2007) state „innovations are the results of interactive social process among innovation process agents, for instance among companies and science research organizations creating new knowledge and further among customers“. New knowledge and findings spread by a transfer process (of innovations, technologies). According to Pred and Törnquist (1973) this diffusion of innovation has got more complicated structure than like complex diffusion of innovation. Often we can meet some differences in perceiving of some terms, especially among different expert groups.

Innovation ability of companies and speed and quality of innovation implementation in company practice are important conditions of sustenance of competitiveness in global markets. Innovations are difficult when companies don't have own

capacities in science and research, when they don't follow a progress in the market and scientific progress in everyday practice, when they have low absorbent ability to external findings (e.g., from research institutes and universities) and when there is a limited information transfer inside the company eventually knowledge management (Jeřábek et al. 2012).

Technology transfer is one of the phenomena of the economy or society development from the 2nd half of the 20th century. It mediates the transfer of results of science, research and development in tangible and intangible form from their origin to their final use. The crucial here is know-how – not only in light of innovations development but also in terms of acceleration of technological changes. Not only because of this reason creation of knowledge and technologies should be understood as a cumulative and evolutionary process based on experiences (Bathelt, Glücker 2003). Not only companies and science research institutions are involved in these processes - there exist a number of other key agents (e.g., economic chambers, business institutions, regional administrations etc.) which must be considered. Their role and engagement can be well understood in the regional development concept of *triple helix* (Etzkowitz, Leydesdorff 1997 in Blažek, Uhlíř 2011).

These entrance findings were a part of more extensive theoretical study of regional development a innovation behaviour in interested area. Subsequent application phase took up this study. Complete output is available in already mentioned publication called *Region a inovace na příkladu česko-saského pohraničí* (Jeřábek et al. 2014a, 2014b).

2. Methods

For the first stage of the research, a standard questionnaire has been compiled, of course, it was identical on both sides of the border and it was in the Czech and German language versions. Respondents were divided into four target groups: companies (application sphere), research institutions (incl. colleges, universities, and

research institutes), municipalities and public administration, and regional actors (so called intermediaries²). Each of the target groups had its own – while maintaining the key issues for subsequent comparison – specifically modified questionnaire, only public administration and intermediaries had exactly the same questionnaire. The reason for this division was the need to determine how each group is reacting to the current situation, what the possibilities of active cooperation are and what is the difference between the views on scientific and application sphere cooperation among these respondents (groups). Before the questioning it was necessary to define innovation from the perspective of the respondents, because there are different meanings: innovation can be in the form of entirely new product, or in the form of new technology or production process or in the form of a new strategy for the introduction of a product on the market or in a totally new work organization in the company.

The surveyed companies³ were subjected to questions relating primarily to the approach to innovation, willingness to innovate and cooperation not only with research and development institutions on the Czech side, but also cross-border cooperation. Differences in approach to innovation and regional innovation potential is confirmed by for example Pokorný (2008), who defines the innovative potential and innovative environment and the indispensable role of regional authorities, which is assigned to so called intermediaries in the questionnaire (it often depends on the position and the role, the function of the intermediary can be performed in a given context by many actors). Generally, the innovation cycle or process is structured in several stages. The whole cycle covers a period of several years from the first idea, through the development, manufacturing of the product and its subsequent successful testing and introduction into production. We asked the respondents also about these stages. The questionnaire contained 12 to 26 questions of different types (character): open questions, both simple and multiple answer, classification according to the scale, Yes/No alternatives. Questioning took place both on Czech and Saxon

sides at the same time in the period from February to August 2012, the descriptive evaluation has been carried out by the German side for both parties, and graphical outputs have been created together.

The area of interest is the Czech-Saxon borderland defined by the territory of Usti Region

on the Czech side, and by the borders of the districts of Erzgebirgskreis, Kreis Mittelsachsen, Dresden – Kreisfreie Stadt a Kreis Sächsische Schweiz – Osterzgebirge on the Saxon side (see Fig. 1).

Fig. 1 – Location of the area of interest (original names).

Fig. 2 – The methodology of the study.

Fig. 3 – The territorial distribution of the questionnaire in the Usti region, the quantitative phase.

Table 1 Location, innovation and potential of the Czech-Saxon Borderland - SWOT Analysis. Source: Own research, 2012.

Strengths	Weaknesses
<ul style="list-style-type: none"> - Excellent geographic location - Significant poles of development (Usti, Dresden) - Integration thanks to cross-border links - Tendency to produce "macro-clusters" 	<ul style="list-style-type: none"> - The negative impact of the recent industrial past - High unemployment - Low competitiveness - Ignorance of innovative companies and VTP (R&D Park)
Opportunities	Risks
<ul style="list-style-type: none"> - The use of cross-border links in the economics ("to learn" / learning regions) - The creation of "knowledge" and "skills" - Emphasis on the knowledge economy - Support for education and business 	<ul style="list-style-type: none"> - Instability of the economic environment - Low ability to respond to changes - Outflow of skilled labor - Implementation of little sustainable measures

The second qualitative phase of the research (see e.g., [Hendl 2008](#)) was realized in the form of expert interviews, whose contents were targeted at deepening the knowledge gained in the first phase (survey). In the period between June and August 2013 several companies and institutions were addressed to implement the expert interview, which follows the survey of the previous year. Approximately 20 actors on the Czech side were contacted by phone or e-mail, 6 of them consented to the execution of the interview. The interview was conducted on the basis of the agreed form, in some cases audio recording was made. Subjects addressed were companies operating in the Usti Region, defined by CZ-NACE within Sections C (manufacturing), or G (wholesale and retail). The size of the companies ranged mostly in the order of several hundred employees, the smallest company had seven employees, and the largest had 800 employees. Methodological procedure with all the steps is shown in [Fig. 2](#). Overview of the number of respondents by target groups is given in the following [Table 2](#).

Colleges and universities are predominant among respondents who are the primary subjects of this paper, and according to the type of research, the majority of them belongs to applied research.

We have gradually specified a set of hypotheses within the project - based on the study of relevant literature (especially [Kislingerová 2008](#), [Petkov 2012](#), [Steinmetzová ed. 2008](#)) – and we have focused, among other things, on the verification of them through our own empirical research.

1. Communication and cooperation between the scientific research sector and the business sector is difficult to find common ground because of a lack of motivation, no common goals and interest.
2. Situation on the Saxon side is slightly better than on the Czech side.
3. Interest on the cross-border region is not so significant, but it is often the first place where the cross-border activity is focused on.
4. For regional businesses, cross-border market is more attractive (closer) than other international (more distant) markets.
5. Innovations in the Czech-Saxon Borderland are not carried out in a large scale.
6. Potential for transfer and development of innovation is not sufficiently exploited.
7. To promote innovation it is necessary to move away from the direct support for individual

enterprises in favour of supporting the overall regional innovation system.

8. The professionalization of knowledge and technology transfer has the great importance for the use of regional innovation potential.

Table 2: Number of questionnaires according to target groups

Target group	Usti Region	Central Saxony ^a	Total
Businesses	143	120	263
Research institutions	10	36	46
Municipalities and public administration	32	28	75
Intermediaries (regional actors)	15		
TOTALLY	200	184	384

Source: Own research, 2013 (Note: The cells with values of 28 and 74 for groups of Municipalities and Public Administration and Intermediaries are merged because the forms were merged when processing on the Saxon side due to an identity of both forms). ^aFollowing Saxon districts were involved in the project research: Erzgebirgskreis, Kreis Mittelsachsen, Dresden – Kreisfreie Stadt, Kreis Sächsische Schweiz-Osterzgebirge.

3. Results

This paper presents selected results of the survey for the first time in a specialized periodical⁴; the results represent the most important insights and key findings. These findings characterize the perception of the Czech-Saxon borderland as an area for active cooperation between the scientific and research community and business industry, cooperation between Czech and German companies and institutions.

3.1 Subjective perceptions of the area of interest by respondents

Respondents from the group of Municipalities and Public Administration and Intermediaries “were assigned to carry out the task” in the questionnaire to compile a SWOT analysis of the Czech-Saxon borderland. In their opinion the attractive scenery, significant tourist potential, support of active cross-border co-operation, relatively good transport infrastructure and a common history can be indicated the strong points of this territory. The weaknesses include the language barrier, as well as the unfavourable situation on the labour market, different

administrative and institutional structures and different social and economic levels. The greatest opportunities for Czech-Saxon borderland are defined as the creation and utilization of tourism potential, implementation of joint activities and projects including their support, as well as the common labour market and the intensification of economic cooperation. Economic, social and demographic situation is reflected in the assessment of the region in terms of risk, including in particular economic stagnation/recession, worsening the condition and quality of the labour market (incl. the brain drain process), limiting the amount of funds for financial support and the lack of sustainability of the ecological situation. Overall the respondents perceive the region of Czech-Saxon borderland as a region with the potential for further development, the readiness for carrying out other activities is not missing on either side, there are however barriers that have not been removed successfully for a long time, for example the language barrier and legislative framework conditions.

3.2 Innovative process of looking research institutions

Following results of the group of Research institutions were selected, the conclusions that capture the view on the self-identification within the innovation process, the nature and structure of the existing cooperation. As shown in Fig. 4, surveyed scientific-research institutions have declared that they are mostly in the early stages of the innovation cycle.

Cooperation between scientific-research institutions and the private sector is rather long-term, but the difference from the short-term and one-off types of cooperation is not too large (Fig. 5).

3.3 Innovative conduct of companies and cross-border cooperation

Surveyed companies follow already tested innovations rather than their own innovations. Lack the proper stimulus, financial resources and stability of contact with partners from science and research area often prevent the own innovative activity. Overview of the most common barriers is shown in Fig. 6.

The research showed that the Czech-Saxon borderland has a great potential which is not fully realized, however. Here it is confirmed the above mentioned SWOT analysis, that talks about the possibilities of development and the existing barriers. The surveyed companies prefer national and regional markets, instead of cross-border (Czech-Saxon) market. For active and effective cooperation within the border region, there are several barriers, they include the most striking - language barriers and different laws. Roughly half of the surveyed companies have worked with scientific-research institutions (national/state level) within the border area over the past three years. The spatial distribution of realized cooperation between companies and scientific-research sector is described in Fig. 7 that shows a very low, almost zero harnessing the potential of Czech-Saxon borderland. Implemented cooperation was targeted to the regions (Usti Region, Central Saxony), or nationally or internationally (it means to locations other than the Czech-Saxon borderland). Both parties also declared their interest in this area and the tendency to exploit its potential, but so far it did not happen.

Fig. 4 – Self-identification of R & D institutions in the innovation process, data in absolute numbers.

Fig. 5 – Predominant type of research for respondents - R & D institutions.

Fig. 6 – Internal barriers to establishing cooperation in the area of research. (percentages, multiple answers possible)

Fig. 7 – Localization of cooperation partners of companies. (percentages)

4. Summary of results of the qualitative phase of the research

4.1 Innovation, examples of good cooperation

The surveyed companies, except one of them, consistently stated that they have their employees or an entire department dedicated to innovation. Innovations are handled on an external site or in a central department very often. Good cooperation among companies is relatively diverse, some of them states collaboration with universities which carry out various measurements and research in labs for them as an excellent example, other companies indicate good relations with suppliers and customers, and others multiyear collaboration on projects with partners abroad. Impulses for the implementation of innovations come either internally or externally, it can be difficult to generalize, because the nature and focus of particular innovation always decide.

4.2 Cross-border cooperation

Czech companies don't separate the border region of Saxony from the rest of Germany, they

perceive Germany as a partner regardless of whether they are Dresden, Hamburg or Munich. Links to international trade and cooperation are often stronger and more traditional than the much closer connection to the border region. Companies appreciate their foreign partners, but examples of long and effective collaboration in the Czech-Saxon borderland are surprisingly little. Generally, the state border is not seen as a barrier.

4.3 Cooperation with the scientific research community - recommendations for improvement

The most common case is the cooperation with universities and high schools, where students attend companies to professional practice, or they write their thesis there. Companies are open to students, particularly the view untouched by practice and fresh young ideas are welcome. The problem is on the other hand, is insufficient practical knowledge – e.g., using machines, knowledge of production processes, and lack of practice. The companies indicate strengthening links with the practice, teaching students what

they really use later, customizing thinking of academics to current issues of practice as the most frequent recommendations for cooperation with academia.

4.4 Intermediaries role

Intermediaries play different roles for companies. Mostly they are a welcome help to the exchange of information, assistance with promotion and presentation of the company at various events, general knowledge about competition, etc. On the other side, there is a sort of scepticism and mistrust to these entities, as they cannot do anything specifically to run the company, they cannot involve and intervene in it, mostly, their role remains in a general and overarching level. Recommendations for more efficient work of intermediaries are their stronger links with production, because they have not developed so-called "sprint to the goal".

5. Discussion and conclusion

A total of 384 subjects were involved in the implemented questionnaire survey, they were divided into four target groups: Enterprises (application sphere), Research institutions, Municipalities and public administration, Intermediaries. The research yielded new insights about what is the situation in the Czech-Saxon borderland, whether the companies and scientific research institutions are willing to cooperate together on research projects, whether they implement innovation and whether they are active in cross-border cooperation.

Research cooperation, unfortunately, is not too frequent and active, there are rather the exceptions, which operate on the basis of longstanding personal contact between representatives of both sides. Likewise, it was confirmed that the potential of the Czech-Saxon borderland is not fully used, the tendency to strengthen cooperation and willingness to implement joint projects is strong enough on both sides, but there are barriers, mostly poor language skills and differences in the legislation. Innovations are implemented mainly in the form of the takeover of the completed upgrade of

another entity; development and production of its own innovations in this region is not quite common. The potential for the establishment and operation of technology parks and innovation, industrial and knowledge incubators is great, but it is rather a place that is rented to individual companies. For example, in Sebnitz or Rumburk (coincidentally, both examples of the Šluknov region) there is a certain form of business and innovation consulting, which can be one of the cornerstones for the development of high-quality innovation centre. Starting the knowledge economy as a competitive and innovative development of the region is a matter of long-term, however, its potential and importance is unquestionable (see e.g., [Kislingerová et al. 2008](#)).

Overall profitability of the position of Czech-Saxon borderland in terms of regional development confirms for example [Víturka et al. \(2010\)](#), who talks about the positional advantages of the regions and evaluates the quality of the business environment.

Both sides claimed during questioning that there is lack of sufficient institutional and policy support for the development of innovative business, grant sources are under very difficult mechanism of administration and small businesses often do not have sufficient capacity to achieve this support. Communication between scientific-research sphere and the sphere of application is not ideal, especially on the Czech side. The German side has better and more proactive tendencies and efforts to inform each other, but the Czech side does not seem to have sufficient interest in the joint / cross border communication.

The said research has established qualitative phase (especially summer 2013, supplementary also in 2012), which aimed to validate and deepen the results obtained in specific subjects, to analyze their innovation process and find examples of so-called best/good practices, significant suggestions for improving the current situation and others.

The concept of strengthening the scientific and technological transfer

Based on our results we specified thematic areas in which we propose recommendations that should contribute to the strengthening of cross-border research cooperation.

Area 1: Enterprise innovation culture

- General support for business innovation culture and innovation capability,
- formation and care for informal connections / links between business and research institutions,
- strengthening the absorption capacity of enterprises to adopt innovative external pulses,
- offer follow-up and further training of workers in innovation issues / processes.

Area 2: Research collaboration management

- Support of the project management from the beginning of the project until its completion using project management methods,
- providing legal expertise to legally effective protection (e.g., mediation of cooperation agreements models) and the protection and exploitation of intellectual property in joint research projects in the Czech-Saxon borderland.

Area 3: The cooperative climate and mediating contacts

- Creation of the (cross-border) communication platform for networking between companies and research institutions (e.g., also as an Internet platform),
- creation of informal (cross-border) contact options (e.g., innovation exchanges, program of visits, specialized workshops) as a starting point for creating relations of trust between the relevant groups of actors,
- allow convergence of science and economy, in which the public administration (e.g., support the economy) and intermediary institutions could perform certain functions.

Area 4: The framework conditions for research cooperation

- Mediation of language skills and intercultural basic knowledge,
- enable better linking of legal conditions, inter alia through the creation of legal expertise,
- improving the coherence of transport and telecommunications networks in the border regions.

Area 5: Means of support engagement

- monitoring of grant funds, with an emphasis on oriented consulting for target groups (e.g., through municipalities or intermediaries),
- bring closer grant programs and funding to needs of groups of actors in the region (especially businesses),
- support for submitting project applications and implementation of project plans (e.g., through cross-border networks of intermediaries).

Area 6: Availability / presence of professional staff

- Support enhancing thematically relevant qualifications of workers in enterprises,
- support in finding professional staff (mediation of universities, research institutions and enterprises, cross-border exchanges of jobs, introducing the possibility of traineeships stays during lessons).

Vision of solutions – cross-border innovation network:

We propose the creation of a cross-border innovation network. Its role would be primarily to roof and link all key stakeholders. Following issues can be offered through such a network: the implementation of measures to establish contacts between research sphere and the economy, organizing promotional events, determine problem areas for scientific and technological transfer, organization of individual support to companies or mediation of qualified personnel.

Linking all in terms of innovation relevant groups of actors into the formal innovative networking can contribute to continuous strengthening and appreciation of a similar innovative system. This creates a base that becomes innovation system "Czech-Saxon Borderland" visible at both the national and international level, represents the necessary interests of the region and contributes to increased competitiveness in European and global competition.

Notes

¹ Under the project, the Central Saxony doesn't mean the Kreis Mittelsachsen administrative unit / the district of Central Saxony, but ad hoc territory defined for the project. To mark the term in German language we use the term Mittleres Sachsen. Following districts are included in the region of Central Saxony: Erzgebirgskreis, Kreis Mittelsachsen, Kreis Sächsische Schweiz-Osterzgebirge and Dresden – Kreisfreie Stadt.

²Intermediaries are defined as specific regional actors, intermediaries, or persons intermediating contact between various disciplines, between companies and research institutions etc. A typical example in the Czech Republic are Chambers of Commerce, CzechInvest, etc. Such actors can be included neither among research institutions, nor among production companies; they are kind of "connector" between the two spheres.

³Size-structure of surveyed enterprises according to the number of employees in the study area (Czech and Saxon parts together; number of employees and percentage): 0-9 27.1 %; 10-19 19.6 %; 20-49 19.6 %; 50-99 10.2 %; 100-249 13.3 %; 250+ 10.2 %.

⁴Complete results are included in the Jeřábek et al. (2014a; information on www.inpok.eu).

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