

## RESEARCH AND DEVELOPMENT POLICY IN THE CZECH REPUBLIC: REGIONAL DIMENSION AND POLICY IMPLICATIONS OF CHANGING GLOBAL AND EUROPEAN CONTEXT

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**Abstract:** The aim of this paper is to provide an overview of the development of the Czech research and development (R&D) policy with special attention given to its regional dimension. Stress put on regionalisation of R&D policy is related to theoretical works arguing that global competitiveness is strongly linked to locally/regionally specific and embedded factors. This theoretical approach has been reflected in incorporation of a strong regional dimension to European research and innovation policy which has been partly transformed into policy aimed at regional development support. In the Czech Republic, the modern research and innovation policy is still at its very beginning and the regionally-based R&D policy advocated by the EU has been up to now translated and adapted rather formally. However, there is now an overwhelming academic agreement that there is no “one-size-fits-all” policy and that every “best practice” must be adapted to specific conditions under which it is implemented. The same goes for regionally-based R&D policy. Therefore, the qualitative analysis of the national strategic programming documents related to R&D policy in the Czech Republic was supplemented with more detailed case studies aiming at investigation whether there is real demand for such a regional dimension in R&D support schemes among both R&D institutions and firms in the Czech Republic.

**Key words:** research and development policy, regional dimension, Czech Republic, regional innovation systems

### 1. INTRODUCTION – THEORETICAL CAPTURING

Globalization, trade liberalization and rapid technological development, in particular of information and communication technologies (ICT), resulted in a rather strong ubiquitification process of many traditional production factors, which implies that the competitive advantage of high-cost regions and nations is steadily being undermined (Maskell 1999). Thus, in recent years, almost all have come to a consensus that today’s advanced economies are “knowledge-based” economies (sometimes called learning economies) – economies which are directly based on the production, distribution and use

of knowledge and information and where learning is the most fundamental activity for competitiveness (Lundvall 1992, OECD 1996).

Yet, while there is a relatively widespread consensus on the positive association among knowledge, innovation and competitiveness<sup>1</sup>, an important issue remains unresolved – that of the mechanisms and conditions through which new knowledge and innovations are produced and translated into economic growth. The system approach to innovation alleges that innovation is a social as well as a technical, nonlinear and interactive learning process between firms and their environment (Lundvall 1992). This so-called “interactive model of innovation” emphasizes the plurality of types of innovation systems, as science and engineering are relevant to some of them only (Asheim 1999). Its advocates go on and argue that the traditional linear model of innovation is rather timely and costly and thus can only be used efficiently in basic research in large R&D laboratories. However, the interactive approach leads rather to incremental innovations based on new combinations and/or new use of existing knowledge (Fagerberg 2005, Cooke 2003, Asheim 1994). Yet, according to Crevoisier (1994), in the long-term perspective economic growth might not rely only or primarily on incremental improvements as the stock of knowledge available might be sooner or later exhausted. Asheim also underlines this problematic aspect of incremental innovations as they are focused mainly on catching up and not on creation of new knowledge that could also prevent a lock-in situation in regional economy (Asheim 1999). Thus, he claims, “what is needed in a competitive globalizing economy is the creation of new knowledge through searching, exploring and experimentation involving creativity as well as more systematic R&D” (Asheim 1999. p. 346) which still remains the source of radical technological innovations.

The science system, basically public research laboratories and universities, still carries out key functions in the knowledge-based economy, including knowledge production, transmission and transfer (OECD 1996). Yet, it is known that R&D activities and thus also R&D funds are strongly concentrated in few, particularly most developed localities (see e.g. ESPON 2004, Oughton, Landabaso, Morgan 2002). Moreover, those localities or regions with strong R&D endowments are likely to attract more of these factors establishing strong processes of cumulative causation and, on the contrary, those that do not have R&D endowments may continue to lag behind. Whether such a spatial concentration is an effective allocation of R&D resources or not, has not been resolved in the scientific literature yet. The Schumpeterian endogenous growth approach advocates that spatial concentration of R&D activities is more effective as some minimum threshold need to be reached to carry it out effectively (Audretsch, Feldman 1996, Feldman 1999). Therefore, it is advantageous to invest in regions which already possess a relatively high density of R&D (Rodriguez-Pose 2001). Moreover, this approach assumes relatively strong knowledge spillovers to neighbouring and lagging regions. However, in reality, the ability to use new knowledge and technologies depends strongly on the absorption capacity of regions as for instance quality of local human capital and locally embedded codes which are usually missing in lagging regions and so possible spillovers are strongly limited.

On the other hand, the neoclassical view argues that strong concentration might cause also negative effects (e.g. due to the problem of lock-in which brings lack of

<sup>1</sup> This argument is supported for instance by Simmie (2006, p. 166) who mentions the OECD study estimating that between 1975 and 1995 about half of the total growth in output of the developed world resulted from innovation and this study also argues that between 25 and 50 per cent of economic growth comes from technological progress.

openness and flexibility) (see e.g. Hotz-Hart 2000, Boschma 2005) and leads to some congestion and thus relative inefficiency. Therefore, it advocates a higher cohesion and investments also in lagging or less socio-economically developed regions. Furthermore, R&D investment in lagging or peripheral regions should lead to a more balanced regional development. In other words, it is necessary to find a compromise for the dilemma between high (economic) competitiveness on one hand and social and territorial cohesion on the other. Solution for this compromise is also one of the key objectives of the EU policies. Pursuit of its fulfilment together with the recognition that competitiveness based on innovations is the principal prerequisite for economic success led to frequent discussions how to appropriately support R&D activities by public interventions. In the EU, an important part of R&D activities is still financed through public sector and those funds, or rather institutions using them, are strongly concentrated in few, particularly the most developed localities (see e.g. ESPON 2004, Oughton, Landabaso, Morgan 2002). So, it might be assumed that also the character of regional distribution of R&D policy financial resources might lead to enhanced regional disparities (see for example Oughton, Landabaso, Morgan 2002) and thus undermine the desired cohesive development.

The aim of this paper is to analyse how these debates and their reflection in European research policy outline, which will be discussed in the following part of this article, have been reflected in Czech research policy. Attention will be paid especially to regional dimension of Czech research policy as well as to R&D support in general. The overall research system structure will be evaluated mainly through qualitative analysis. Furthermore, as regional dimension in research policy (and in other state policies) is relatively new issue here, its perception among key stakeholders from both private and public sector will be also assessed in order to be able to assess its need in the Czech Republic and also to draft political implications for state and/or regional R&D policy.

## **2. KEY ROLE OF REGIONS FOR THE ECONOMIC COMPETITIVENESS IN EUROPEAN CONTEXT**

The reason for stronger regional dimension in European policies stems from the fact that since the 1980s a growing attention has been paid to regional level and regions as the venue where the competitiveness and economic growth is secured both at national and global level. This was emphasised for instance by Porter (1998, p. 77) stating that “paradoxically, the enduring competitive advantages in a global economy lie increasingly in local things – knowledge, relationships and motivation that distant rivals cannot match”. Jessop (1994) takes this point further and talks even about ‘hollowing out’ of the national state. The key role of regions is seen particularly in innovation process and innovation policy, yet, as traditional R&D activities still remain important for competitive advantage, its support in the EU has also shifted significantly towards a more integrated strategy with a strong regional focus and dimension.

Traditionally, R&D policy has been drawn up at the national level by central government and its bodies. Moreover, it was (and in some European countries still partly is) characterized by a rather sectoral approach that means that each key ministry supported research in its sphere often without strategic co-operation with other supporting entities. Current research policy in many European countries is often integrated into

coherent innovation policy or in case of single research and innovation policies they are strongly coordinated. Unlike innovation policy, research policy is still, with the exception of relatively few European countries, largely considered as a national matter (Blažek, Uhlíř 2007). However, the “new” research policy includes often a strong regional dimension (e.g. research policy in Norway and Finland) or it is even understood as a tool for enhancing regional development particularly in peripheral and less developed regions<sup>2</sup> so that they can catch up and initiate their economic and social development.

Within EU-25, Finland represents a country with a lot of experience with the implementation of the regional dimension of R&D policy. Its basic policy document called Science and Technology Policy Council of Finland 2003 interconnects regional development and regional knowledge creation support, i.e. regions need to enhance their own factors for development. Thus, besides sustaining centres of excellence, Finnish R&D policy also sustains regional research centres foundation (e.g. local units of research institutes or universities or other higher education units in peripheral regions), whereas the emphasis is put on region's own development factors and strengths. What makes Finland an interesting case from a policy point of view is that it has demonstrated that policies should be firmly embedded in national and regional strengths to stimulate new growth paths.

At European level, one of the best examples of this shift is the “Regions of Knowledge<sup>3</sup>” action which acknowledges that regions are key players for the creation of the European Research Area. The main impetus for this action is the fact that European regions that invest in R&D and innovation tend to achieve higher economic performance which clearly demonstrates the need for a greater involvement of a wider number of regions and regional actors in the activities aimed at stimulating the creation of knowledge-based economy. The main objective of this action is to strengthen regional capacity (and also willingness) for investing in and carrying out R&D activities. It enhanced capacity and concern for research activities would, apart from a better endogenous potential and competitiveness, enable them successful involvement in European research projects. This objective should be ensured mainly through trans-national and trans-regional collaborative projects aimed at enhancing regional public-private partnerships in researcher activities.

How have those changes influenced the Czech Republic is the subject of the following chapters beginning with a brief description of the Czech research support, followed by presentation of our research results. Finally, policy implications are presented.

### **3. RESEARCH AND DEVELOPMENT POLICY IN THE CZECH REPUBLIC: A REGIONAL DIMENSION?**

These recent developments and changes have also influenced the Czech Republic, however, its situation and position are still different than in Western European countries.

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<sup>2</sup> This change might be seen as shift from second generation innovation and technology policies focused on technology driven growth in larger cities to third generation policies focused on developing all parts of the country through integrated innovation policy (Virkkala, Niemi, 2006).

<sup>3</sup> Pilot Action on “Regions of Knowledge” was initiated by the European Parliament in 2003. After its success, the following Regions of Knowledge 2 was proposed for the 7th Framework Programme.

At the beginning of transformation, research policy was rather marginal and it attracted stronger attention first at the end of the 1990s. At this time, the Czech Republic had a relatively centralization tradition and self-governing regions were created only in 2001. However, till present time, their actual capacity for their own development policies and projects has been rather weak due to lack of finance and a shortage of professional development organizations able to carry out development projects in the interest of the regions (Blažek, Uhlíř 2007). This has been also reflected in research policy which is drawn up at national level with a strong sectoral and centralistic approach. Moreover, research capacities (e.g. research institutes, universities, etc.) are still highly concentrated in a few largest cities and metropolitan regions and so we can argue that research policy, supporting mainly existing public research capacities, might contribute to enhancing of existing regional disparities.

In terms of R&D performance, the Czech Republic still lags behind the EU-15 and even the EU-25 average in the majority of indicators of R&D performing. This pays for the gross expenditures on R&D (GERD) as a percentage of GDP (the Czech Republic only 1.42 % in 2005, the EU-25 and the EU-15 average of 1.85 % and 1.91 % respectively). Relatively favourable is on the other hand the share of BERD – business expenditure on R&D in total R&D expenditure which reached more than 60% in 2005, very close to the EU-25 average. Another indicator used to measure the performance of R&D systems seems to be one of the key weak points in case of the Czech Republic – according to R&D personnel, the Czech Republic is, with approximately 3 researchers per 1000 workforce, almost one of the worst in the EU-25 (Blažek and Uhlíř, 2007).

**Table 1** Basic R&D performance indicators of the Czech Republic

	GERD (share in %)		From which public expenditures (share in %)		From which public expenditures per capita (CZK)		Number of researchers per 1 000 inhabitants	
	2000	2006	2000	2006	2000	2006	2001	2006
Capital city of Prague	41.7	38.4	64.6	57.8	6415	7012	10.7	14.8
Středočeský	21.7	17.1	6.3	6.4	667	974	1.9	2.6
Jihočeský	2.9	3.4	2.9	4.7	553	1171	1.7	2.3
Plzeňský	2.2	2.7	2.1	2.5	456	567	1.9	1.6
Karlovarský	0.2	0.1	0	0	17	14	0.5	0.2
Ústecký	1.2	1.2	0.7	0.6	97	70	0.5	0.7
Liberecký	2.9	3	1.2	1.1	317	371	1.4	2.3
Královéhradecký	2.2	2	1.7	2.2	355	1115	1.3	2.2
Pardubický	3.3	3.9	1.4	1.4	320	366	2	3.1
Vysočina	1.4	1	0.9	0.1	193	30	0.4	0.6
Jihomoravský	8.4	10.1	12.1	16.1	1250	2087	4.9	6.2
Olomoucký	2.8	2.7	2	2.8	375	628	1.6	2.3
Zlínský	1.9	3.3	0.7	0.6	132	166	1.1	1.6
Moravskoslezský	7.3	11.1	3.5	3.7	323	395	1.6	2
<b>ČR celkem</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>1147</b>	<b>1446</b>	<b>2.8</b>	<b>3.9</b>

Source: CZSO - Research and Development Indicators

As for the regional level, R&D capacities in the Czech Republic are highly concentrated primarily in the largest cities and metropolitan regions, or more precisely in the most socio-economically developed regions. Therefore, as Czech research policy has not included any regional dimension, R&D inputs (investments and human resources) are concentrated as well (see Table 1). This stands in particular for the public expenditures

which are from more than 50 % concentrated in the capital city region. On the other hand, there are regions with almost no R&D inputs, for instance Karlovarský and Ústecký ones. Moreover, even though the concentration has lowered during the five years in focus, it has been the result of increasing R&D capacities in other metropolitan and developed regions as for instance Jihomoravský region rather than of enhancement of the peripheral regions.

A new research policy was adopted lately in the Czech Republic. So, having those disparities in remembrance, the following part of the paper focuses on how the shift in drawing up of R&D policies experienced in the Western countries is reflected in the relatively new conception of the Czech R&D policy and whether there has been a genuine change towards a more regionally-based research policy.

For that purpose, an analysis of the institutional and legislative framework of the Czech R&D policy was carried out. Qualitative investigation of assessment of the relevant programming documents devoted to R&D public support (especially at national level) has been worked out in order to learn whether and how regional dimension is defined. Attention has also been paid to an overview of public expenditures on R&D in regional perspective even though this stage of the research was limited by the lack of appropriate data (see Macešková, Žížalová, 2007). Further, a few selected representatives of public institutions responsible for drawing up R&D policy were interviewed with the aim to obtain their perception and understanding of regional dimension in R&D policy.

The body responsible for framing of the research policy in the Czech Republic is the Government and its expert and advisory body in the field of R&D – the Research and Development Council (see Figure 1). At the beginning, the Council was composed of highly reputable experts and researchers; however, currently it can be considered as a rather political body due to the fact that its members are mainly representatives of R&D support providers<sup>4</sup>. The task of the Council is to draw up long-term and mid-term objectives and schemes for the R&D development and to propose the amount of total expenditure on R&D and its allocation on individual budget chapters. Subsequently, on the basis of these objectives and R&D analyses conducted by the Council, the Ministry of Education, Youth and Sports frames the National Research and Development Policy (NRDP) in cooperation with other bodies and institutions. The NRDP for 2004 – 2008 was adopted by the Government in January 2004. The document expresses basic goals for the R&D support and principles for allocating financial subvention. The priorities specified in the NRDP are further elaborated into concrete programmes for financing research from public funds through the National Research Programme II (2006 – 2011). R&D support in the Czech Republic is unfortunately not concentrated in the hands of the Government as each ministry and few other research institutions prepare their own R&D conceptions and R&D support schemes. Currently, there are about 22 of such entities; for instance industrial research is granted in particular by the Ministry of Industry and Trade or research in the field of transport is supported by the Ministry of Transport.

Apart from the NRDP, there are a number of other strategic programming documents closely related to R&D support, for example National Innovation Strategy of the Czech Republic, Long-term Basic Research Directions or Economic Growth Strategy.

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<sup>4</sup> Those include representatives from various ministries, Academy of Science, universities, Czech Science Foundation, etc.

The range of priorities incorporated in the strategic objectives of individual programming documents confirms their comprehensiveness, yet the presence of almost identical priorities and objectives in various documents indicates some fragmentation and existence of somehow competitive strategies. Moreover, a high number of departmental conceptions and their implementing programmes make harder the coordination of the support and the evaluation of their consistency with the NRDP. Thus, even in the sphere of R&D, the term “over-programming” and high fragmentation of the support might be used to describe the Czech R&D Policy. This fragmentation is seen as an important weak point by R&D performers and researchers as it often leads to support of large number of rather small projects without any strategic and long-term research objectives. Other weak elements found during the analyses and interviews are indicated in Box 1.

**Box 1 Key weak points in Czech R&D support**

- Too bureaucratic system and time-demanding administration of projects
- Unsatisfactory independent expert reviews of research project proposals in public grant schemes – a substantial role of personal contacts
- Necessity to strictly follow the structure of the budget proposed – even in the case of multi-annual projects, the budget is not flexible
- Necessity to increase grant financial resources and reduce the share of institutional expenditures in order to support only quality research projects
- Evaluation of R&D results is not sufficient and does not enable to distinguish properly between quality and prosperous and low-quality research
- Low-quality of scientific management (unsatisfactory education of researchers in this field)

Source: interview survey, own elaboration

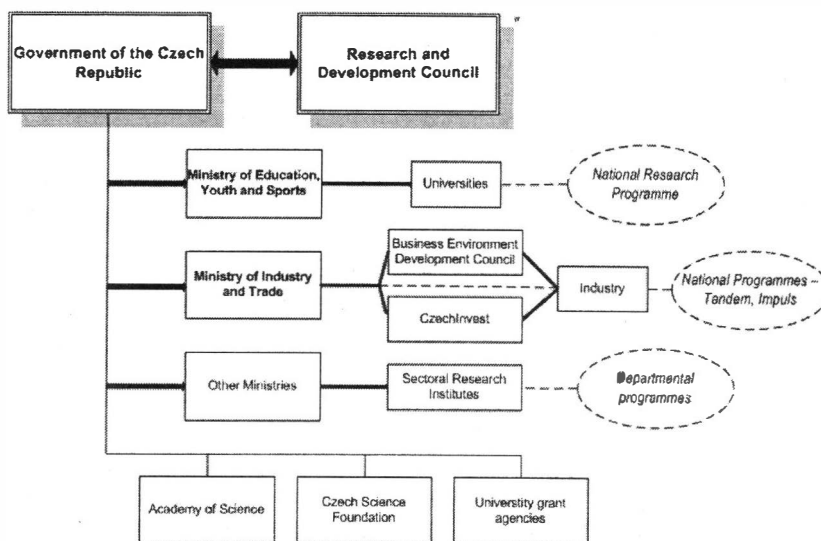


Figure 1 System of Czech public research support

Source: own elaboration based on ERAWATCH Research Inventory

With respect to the regional dimension of R&D policy, it is currently, and for the first time, set as one of the systemic priorities of the NRDP. Nonetheless, its determina-

tion seems rather general and formal – “the provisions for the support of the transfer of R&D results will be proposed in such a way that they will influence the situation in the regions efficiently“. Thus, this issue mentioned seems more as being influenced by wishful thinking and popular catchphrase chase than by real willingness to implement it. Regional aspects are understood only as a support to regional universities and regional and international co-operation in R&D. Although it is emphasised that R&D participation in solving perspective needs of people and the society requires a wider spread of the R&D capacities' division, the proposed implementation does not reflect it adequately. In addition, based on interviews with several state policy makers it might be assumed that regional aspects of the R&D policy are hardly “grabbed” and thus actually not understood and too little promoted. The only tool mentioned during the interviews was the possibility to increase the amount of funds provided according to the regional map of public support in the Czech Republic<sup>5</sup>. Though, this tool might be used for any public support.

Consequently, on the ground of the analysis and interviews carried out it is possible to argue that regional dimension of the R&D policy depends extremely on the own pro-active approach of particular units applying for financial support. Implementation of each programme announced by the state administration bodies and prospective “regional dimension” depends on the fact who will apply to take part in it.

#### **4. FIELDWORK ANALYSIS OF REGIONAL DIMENSION IN THE RESEARCH POLICY IN THE CZECH REPUBLIC**

In the following stage, the aim of our research has been to find out whether there is a need for spatial dimension in the Czech R&D policy from the side of regional stakeholders. In other words, we wanted to find out whether scientists and R&D performers in regions perceive a necessity of specific regional R&D support in order to be able to better participate in research and innovation performance. This support is understood here as a R&D subsidy which mirrors territorially specific and/or unique circumstances and conditions which also induce the research field and activities. Such a R&D support would help researchers and scientists involved in the research themes which are rarely employed in R&D policy as R&D policy is usually focused on more progressive and/or generic research fields.

##### **4.1 Methodology**

For that purpose, a qualitative case study by means of two kinds of research methods was conducted in three selected self-governing regions – Jihočeský, Jihomoravský and Pardubický ones. These regions were selected based on a quantitative analysis of main R&D indicators and a comparison of their economic structures and development so that they represent different types of regional economy (see Box 2).

The qualitative case study has been composed of two parts. First, research institutions (both public and private) were identified, randomly selected and altogether

<sup>5</sup> Regional map of the public support in the Czech Republic for 2002-2006 – Government decree number 1315/2001



35 interviews were conducted either with management representatives or research teams' leaders in June and July 2007. Interviewed organizations include universities, Public Research Institutions (relatively recently established legal entity and private research institutes. The following topics were questioned about: spatial relations and linkages with other actors; cooperation and means of its creation, its subject and benefit; participation of the interviewed experts in preparation of R&D policy (at national and regional levels); funding R&D activities and using public R&D support; and finally questions concerning regional dimension and perception of a need for regional specific support in R&D.

#### **Box 2 The case study regions**

*In the previous chapter, basic R&D indicators were introduced for the Czech regions which already show some basic differences among the three selected regions for the case study analyses. In addition, the regions vary according to their knowledge base and economic structure. The differences and knowledge base characteristics are discussed as follows.*

##### **Jihočeský region**

This region is the weakest among the selected regions according to its R&D inputs. It has the lowest level of total R&D expenditures which is from more than 50 % formed by BERD expenditures and also the lowest number of R&D personnel. Contrary to the other two regions, research in Jihočeský region is focused on the fields of natural sciences (42 % of total R&D personnel). It significantly lags behind also in R&D outputs (its relative number of patents comes up to only 40 % of the national average). However, measured by GDP per capita, the region has been the second by its economic level and even the first by its economic growth since 1995 (25 % compared with 22 and 21 % respectively for the two remaining regions).

##### **Jihomoravský region**

Based on R&D inputs, Jihomoravský region might be considered as the best endowed among the three selected regions particularly due to its high concentration of public universities and research institutions. Therefore, BERD expenditure forms less than 50 % of the total R&D expenditure in the region. Research activities are focused especially on engineering (46 % of R&D personnel); with a large margin, the second place belongs to natural sciences (19 % of R&D personnel). This region scores as the best among the selected regions also as to the number of granted patents to Czech originators which might be attributed partly to the research focus.

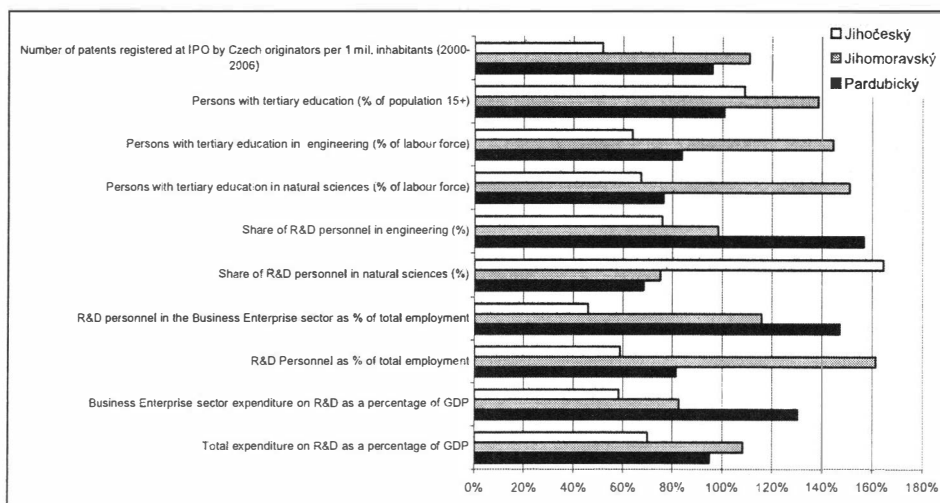
##### **Pardubický region**

Pardubický region is highly focused on business research – BERD share in GDP is the highest among the selected regions and the second highest in the Czech Republic. From the total expenditure on R&D, BERD forms almost 90%. Research is also clearly focused on engineering – 75 % of total R&D personnel are employed in the field of engineering. However, despite of its high share of engineering and business research, the region lags behind the Czech average in R&D outputs (number of patents). This might be due to a lower level of total R&D expenditure which lags behind the national average as well

Second, an e-mail questionnaire survey among private companies was carried out. The questionnaires were sent in total to 1000 selected companies. The sample consisted of companies with R&D as their line of business and other randomly selected companies which are engaged in manufacturing activities. However, only 44 completed questionnaires returned and were thereafter included in the analysis.

## 4.2 The perspective of regional scientists on regional dimension in the research policy: interview results

First of all, it is important to underline that most of the interviewees did not imagine in the first instance anything under the terms of regional dimension of R&D policy. Nevertheless, after a short explanation given by interviewers, most of them were able to outline their understanding of these terms and to propose how regional specific support could be put into practice.



**Figure 2** Selected indicators for the case study regions (Czech Republic = 100), 2006 Note: IPO = Industrial property office, Source: Czech Statistical Office

Territorial specific R&D support, according to the interviewees, appears to be a disputable topic and voices saying that regional dimension should be a valuable measure of the R&D policy are distinctive. Roughly a half of the experts agree with a specific regional support regardless if the support would be ensured at national or regional level. On the contrary, approximately a third of the interviewees take an opposite stand – they consider regional dimension in R&D policy useless as they do not believe it could be possible to implement it.

**Table 2** Selected questions from the interviews answered by regional researches (answers in %)

Region	Do you perceive a need for a regional R&D specific support?			Do you think a regionally specific R&D support should be designed at the national level?		
	Yes	No	I do not know	Yes	No	I do not know
Jihočeský	71	14	14	71	29	0
Jihomoravský	55	40	5	20	55	25
Pardubický	13	38	50	25	38	38
<b>Total</b>	<b>49</b>	<b>34</b>	<b>17</b>	<b>31</b>	<b>46</b>	<b>23</b>

Source: interview survey, own elaboration

The greatest support for regional specific R&D might be identified in the Jihočeský region (see Table 2) which is in accord with the fact that only in this region a clear relatedness between research focus and natural and socioeconomic conditions was confirmed. Research activities bound tightly to the region's characteristic are mainly those conditioned by its natural ecosystems, for instance, hydrobiology, water toxicology and genetics of fish, photosynthesis and wetland ecosystems. On the other hand, prevailing technical research in the other two regions is embedded here mainly due to a long (industry) tradition rather than to their specific conditions. Therefore, demand for regionally specific R&D support is rather limited. However, the researchers interviewed would welcome a specific R&D subsidy promoting research in traditional fields. This is in accordance with the statement of Havas (2006) that national policies aimed at promoting research and innovation hence competitiveness should focus on the actual activities performed, rather than confusing them with the classifications of sectors and thus aim at supporting only high-tech intensive sectors.

As far as possible ways of the regional dimension implementation were concerned, two basic suggestions were given by the interviewees. Firstly, a slightly prevailing proposal suggested that regionally specific R&D support should be ensured at regional level through regions' own support schemes funded by their own resources. However, interviewees were aware of the fact that the Czech regions do not have sufficient financial resources to enable them to finance R&D in such a way. Even though their revenues have increased almost nine times since 2001, most of them have been in fact only transferred to allowance organizations. As a result, regions do not operate with adequate own financial resources for long-term developmental goals among which R&D outputs belong to. Not only for this reason, Structural Funds might represent an unrepeatable opportunity to finance large projects of research infrastructure. Self-governing regions are in such a case reckoned as an essential basis for coordination and guarantee for those projects. Arguments for and against a stronger regions' engagement in R&D activities support are summarized in the following Box 3.

### **Box 3 Arguments for and against regions' engagement in R&D support**

#### *Arguments for*

- Regions "are aware of what is needed in their territory" – have better knowledge of their "environment"
- They might play crucial role in drawing up regional innovation strategies
- They have better reflection of particular needs of firms in the region

#### *Arguments against*

- The Czech Republic is a too small country for such a diversified R&D support
- Just another administration level for redistribution of financial resources
- Further fragmentation of limited finances devoted to R&D
- Absence of own financial resources
- Absence of qualified specialists to assess research projects proposals
- Inability to provide an accurate and precise assignment of research themes
- High role of personal contacts and acquaintances, danger of corruption
- Necessity to support long-term projects which is not an interesting goal for regional politicians
- R&D is a strategic interest of the state while regions shall support local (regional) interests

Source: interview survey, own elaboration

On the contrary, one third of the interviewees consider state as the key actor when implementing the regional dimension. However, a stronger emphasis and consciousness

of regional specific conditions for R&D on the central level was required as the current situation is not considered as sufficient. Furthermore, the regional dimension should be implemented through ministerial departmental programmes and/or Specific Programmes which currently cover NRDP thematic priorities. Nevertheless, it is important to note that by this way regional specific R&D support would be ensured through a rather sectoral approach, while the regional approach would not be put into practice again. In addition, number of national budget chapters (in total 22) providing finance and grants for R&D were intensely criticised as the dramatic reduction of those sectoral budget chapters for R&D support would stand against the proposed system of regional dimension's implementation.

Another proposal included collecting suitable (regional) research topics which could be later covered by national R&D grant schemes. As research topics would be collected from researchers from all regions (in an aliquot manner), they would mirror potential regional specificities and they might thus ensure regional dimension in the national R&D policy.

To sum up the findings, different elements of possible regionalization of research policy in the Czech Republic as well as different sphere where regional authorities should play key role might be identified (see Table 3 and Box 4).

**Table 3** Potential for regionalisation of research policy in the Czech Republic

Policy element	Meaning of regionalization	Suggestions for the Czech Republic
Objectives	Region-specific vs. nation-wide objectives	More region-specific objectives
Operation	In certain regions only vs. nation-wide	Nation-wide; regional authorities responsible for their own regional projects/programmes
Instruments	Differentiated by regions vs. identical in all regions	Central support identical in all regions
Administration	Within the regions vs. at the central level	Both – regional authorities for region-specific research and central body for strategic (excellence) research
Decision competencies	Regional authorities vs. central body	Both – regional authorities for region-specific research and central body for strategic (excellence) research
Finance	From within the region vs. from the central level	Both – national policy and regional policy separately

Source: adapted from Fritsch and Stephan (2005, p. 1124) and supplemented from our interview survey

**Box 4 Suitable spheres of R&D support for involvement of self-governing regions**

- Be aware of key innovation and research subjects in the region and their needs
- Ensure suitable environment for R&D organizations in broad terms
- Guarantee integrated programmes to develop R&D activities and R&D infrastructure
- Establish that science and R&D are important for the region and among regional stakeholders and politicians
- Be a platform for R&D cooperation in the region
- Support R&D and innovation co-operation and networking and shift slowly from hard infrastructure support toward soft measures and projects
- Subsidize R&D from financial resources of self-governing regions – develop their own financial instruments
- Be involved in projects supported by Structural Funds

### 4.3 Private company perspective on the research and development policy in the Czech Republic

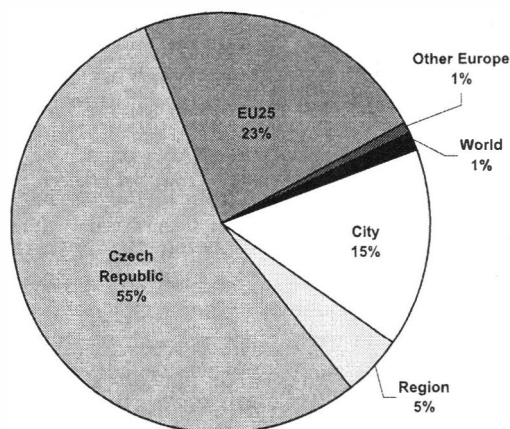
In the Czech Republic, R&D activities are still to a large extent carried out by public research institutions and universities. However, firms belong to the key actors who ensure transferring of their knowledge into commercially used innovation. And innovation is actually the factor enhancing economic development, not just R&D activities. Our aim was, inter alia, to shed light on how the firms in the Czech Republic use the public support (as they do not use only external R&D results but often carry out their own research) and how they co-operate in the field of R&D and innovation.

The sample used for this analysis includes 44 companies, predominantly SMEs, out of which 8 are under foreign control. Table 4 presents some basic characteristics of this sample according to their own R&D activities. Most of the companies might be considered as innovative because only 3 of them have not undertaken any kind of innovation during the last three years. In addition, most of them operate even their own R&D department and are called here R&D companies.

**Table 4** Characteristics of the companies in the sample

	Total	R&D companies
Total number	44	25
Number of employees	4751	3358
Number of R&D employees	-	312
Number of employees with tertiary education	-	181
Number of PhD employees	-	53
Share of in house R&D activities (%)	66 %	82 %

Source: Questionnaire survey, own elaboration

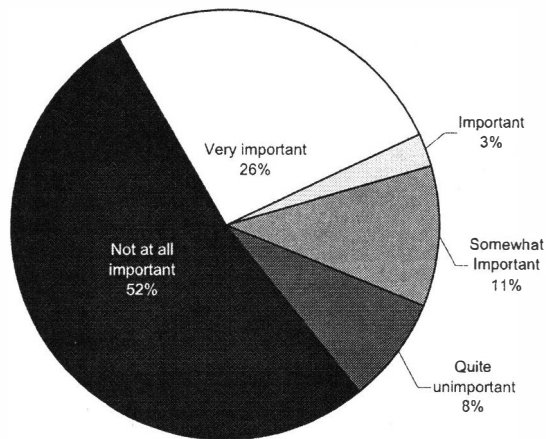


**Figure 3** Business contacts towards sources for R&D and innovation  
Source: questionnaire survey – own elaboration

However, the addressed companies carry out their research activities mostly in house or in collaboration with other private companies. These results point out to one of the key weak points of the Czech innovation system – rather limited research-industry links and co-operation (for discussion of its reasons see Blažek, Uhlíř 2007). Any kind

of co-operation with either university or research institutes regarding research activities was mentioned only by approximately one fourth of the companies (while 40 % of the companies carry out joint research with other private companies). Besides, this co-operation represents only a relatively small share of the total R&D activities undertaken (in average 9 %).

In addition, the companies were asked about the spatial range of their business contacts towards sources for R&D and innovation to assess their links and local/regional embeddedness which should enable us to evaluate whether there is private regionally specific research or whether the companies undertake rather nationwide or even global research activities. As for their spatial behaviour, more than a half of the companies collaborate rather at national than at regional and/or local level and none of them has stated any direct link between natural and/or socioeconomic conditions in the region and its research activities. Their research is either of generic nature or its location in the region might be considered rather arbitrary as stated in the OWLO concept (open windows of local opportunities)<sup>6</sup>.



**Figure 4** Importance of public R&D support  
Source: questionnaire survey – own elaboration

Moreover, the main sources for R&D are companies' own resources while public support is considered as rather unimportant (see Figure 4). Rather limited use of public support<sup>7</sup> is the result of its highly complicated bureaucracy and its evaluation criteria – firms analysed tend to prefer commercial outputs which could be used in their production and contribute to enhance their competitiveness (either by offering new products or by lowering their production costs) while the most important result in public R&D support evaluation has been till recently reviewed articles in scientific journals. In case of public support use, the most important are ministries departmental programmes, particularly those of the Ministry of Industry and Trade which are aimed directly at industrial research and research-industry collaboration. Other public support schemes

<sup>6</sup> According to this concept (see e.g. Boschma, Knaap 1999), it is rather uncertain where new hi-tech industries will emerge as they place new demands on economic conditions which they can actually create themselves by their own creative ability.

<sup>7</sup> This is also confirmed by the CIS 4 data – according to this source, only 6 % of Czech enterprises receive public funding for innovation (Eurostat – Community Innovation Survey 4)

prefer support of basic research, usually carried out by public research institutes or universities – this sustains the still prevailing separation of the basic and the applied research in the Czech R&D system.

To sum up, the companies selected in the case study regions carry out R&D activities rather by themselves (in house) or in collaboration with other private companies. Their co-operation with public research organization and/or universities and also use of public R&D support is rather limited mainly due to bureaucratic “intensity” and orientation towards rather basic research. However, they state willingness to use public grants for R&D activities – therefore, they would welcome intensive bureaucracy reduction as well as shift towards more applied activities. As for the regionally specific support, the companies do not present any significant demand for such a subsidy, probably due to their research focus which is mainly of national or even international character. Besides, the importance of the self-governing regions administration is seen more in general entrepreneurial support including networking of regional actors.

## 5. TO CONCLUDE: POLICY IMPLICATIONS

Under a high pressure of the changing factors for successful economic competitiveness, the Czech Republic has attempted to include regional dimension while drawing up its most recent conception of R&D policy. Nevertheless, the issue of regional dimension is persisting to be a rather formal element and it mirrors the general weak point of Czech strategic planning which is often characterized by wishful thinking and vogue phrases rather than by real commitment to action (Blažek, Vozáb 2004). This is partly due to the fact that design and implementation of R&D policy are carried out at national level, without any stronger involvement of local and regional actors. On the other hand, interviews conducted in research organizations showed a relatively strong demand for R&D regionally specific support, especially in the research fields related to natural characteristics of the regions. Regional dimension can be implemented through a combination of regionalisation of various elements of the policy. First, by the “bottom-up” approach on the side of self-governing regions which would encompass particularly support of R&D infrastructure and applied research through their own programmes or together with use of EU (structural) funds. However, it is necessary to shift this support slowly toward more soft measures as R&D infrastructure needs to be accompanied by creation of the capacity which will (effectively) use it. Second, it is worthwhile to engage national level in regional dimension in R&D policy, too. The state needs to be familiar with research thematic specifics in the regions and reflect them adequately in provided grant schemes for basic research. Therefore, further elaboration of regional dimension shall involve recognition of regional specific topics in R&D so that “a regional map of R&D themes” is produced. Subsequently, this map might serve as a base for regional R&D support on central level. However, first of all, key actors have to be involved in research policy drawing up.

On the other hand, business research has rather generic character as no company mentioned its need for regionally specific research support in our analysis. This is probably partly due to their relatively weak co-operation with (public) research organizations and/or universities at local and/or regional level. This analysis thus has proved one of the key weak points in the Czech research (and innovation) system. The

lack of cooperation stems from scepticism among business community that research organizations are able to produce such results they need as in many public research organizations are still biased towards basic research and some researchers even mentioned that applied research is a forbidden word. Moreover, research funded by public funds is still evaluated rather through publications in reviewed scientific articles which, for many researchers, are the most important research results than by more practical results which would enhance its commercialization. In other words, we might say that universities and research institutes focus rather on how to create new knowledge from allocated funds while companies' aim is to make money from new knowledge creation. Therefore, R&D policy shall concentrate on diminishing barriers between public research organizations and business companies and public-private co-operation in research and innovation activities.

Yet, we do not argue that there is no need of basic research, on the contrary, as showed for example by Dosi et al. (2005), Europe lacks excellence basic research which would produce new knowledge and radical innovations. However, beside this, business should also use specific characteristics of its locations, for instance in form of region-specific research, as they often present hardly transferable competitive advantage. One of those region-specific advantages would be also specific character of the regional innovation system and co-operation among its actors, which is unfortunately still missing in the Czech milieu.

## References

- ASHEIM, B. T. 1994. Industrial districts, inter-firm co-operation and endogenous technological development: the experience of developed countries, in *Technological dynamism in industrial districts: An alternative approach to industrialization in developing countries?* New York and Geneva: UNCTAD: United Nations, 91-142
- ASHEIM, B. T. 1999. Interactive Learning and Localised Knowledge in Globalising Learning Economies. *GeoJournal*, 49, 345-352
- ASHEIM, B. T. 2000. Industrial Districts: The Contribution of Marshall and Beyond. In: Gordon, L. C., Feldman, M. P. and Gertler, M. S. (eds.) *The Oxford Handbook of Economic Geography*. Oxford: Oxford University Press, 413-431
- AUDRETSCH, D. B., FELDMAN, M. P. 1996. Innovative Clusters and the Industry Life Cycle. *Review of Industrial Organization*, 11, 253-273.
- BLAŽEK, J., UHLÍŘ, D. 2007. Innovations and innovation policies in the Czech Republic: the case of Bohemian Regional Innovation Strategy, *European Planning Studies*, 15, 7, 871-888.
- BLAŽEK, J., VOZÁB, J. 2004. Institutional, organizational and programming context for support of regional development in the Czech Republic: a critique. In Drbohlav, D., Kalvoda, J. and Voženilek (eds): *Czech Geography at The Dawn of the Millenium*. Olomouc: Česká geografická společnost, 255-268.
- BOSCHMA, R. A. 2005. Proximity and Innovation: A Critical Assessment. *Regional Studies*, 39, 1, 61-74.
- BOSCHMA, R. A., KNAAP, G. A. 1999. New High-tech Industries and Windows of Locational Opportunity: the role of labour Markets and Knowledge Institutions during the Industrial era. *Geografiska Annaler*, 81 B, 73-89.
- COOKE, P. 2003. *Strategies for Regional Innovation Systems: Learning Transfer and Applications*. Vienna: United Nations Industrial Development Organization [online], [Cited on 05. 8. 2007]. Accessing on the Internet: <[http://www.unido.org/file-storage/download/?file\\_id=11898](http://www.unido.org/file-storage/download/?file_id=11898)>
- CREVOISIER, O. 1994. Book review (G. Benko and A. Lipietz (eds.) – *Les regions qui gagnent*, Paris 1992). *European Planning Studies* 2, 258-260



- DOSI, G., LLERENA, P., SYLOS LABINI, M. 2005. Evaluating and Comparing the innovation performance of the United States and the European Union. Expert report prepared for the TrendChart Policy Workshop.
- FAGERBERG, J. 2000. Innovation: A Guide to the Literature. In Fagerberg, J., Mowery, D. C., Nelson, R. (eds.): *The Oxford Handbook of Innovation*. Oxford: Oxford University Press, 1-26
- FAGERBERG, J. 2003. The dynamics of technology, growth and trade: a Schumpeterian perspective. Working Papers 25. Centre for Technology, Innovation and Culture, University of Oslo (online), (cited on 31. 01. 2007). Accessing on the Internet: <http://www.duo.uio.no/publ/tik/2004/17038/wp25.pdf>
- FRITSCH, M., STEPHAN, A. 2005. Regionalization of innovation policy—Introduction to the special issue. *Research policy*, Volume 34, Issue 8, 1123-1127.
- GERTLER, M. S. 1993. Implementing Advanced Manufacturing Technologies in Mature Industrial Regions: towards a social model of technology production. *Regional Studies* 27, 665-680.
- GHEORGHIU, R., TURLEA, G. 2006. The Need for New Pradigm in Policy-making for the Knowledge-based Economy: Stimulating knowledge production in Romania. In: Piech, K., Radosevic, S. eds.: *The Knowledge-based Economy in Central and Eastern Europe. Countries and Industries in a Process of Change*, New York: Palgrave, 280-294.
- HAVAS, A. 2006. Knowledge intensive Activities versus High-tech Sectors: Learning Options and Traps for Central European Policy-makers. In: Piech, K., Radosevic, S. eds.: *The Knowledge-based Economy in Central and Eastern Europe. Countries and Industries in a Process of Change*, New York: Palgrave, 259-279.
- HOTZ-HART, B. 2000. Innovation Networks, Regions and Globalization. In: Gordon, L. C., Feldman, M. P., Gertler, M. S. eds.: *The Oxford Handbook of Economic Geography*, Oxford: Oxford University Press, 432-450.
- JESSOP, B. 1994. Post-Fordism and the state. In: Amin A. (eds): *Post-Fordism. A Reader*. Oxford: Blackwell, 251–279.
- KOSHATZKY, K. 2001. The regionalisation of Innovation Policy in Germany - Theoretical Foundations and Recent Experience. Working Papers Firms and Region No. R1/2000. Fraunhofer: Institute for Systems and Innovation Research.
- LUNDVALL, B. Ľ. 1992. National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. London: Pinter, 342.
- LUNDVALL, B.-A., MASKELL, P. 2000. Nation States and Economic Development – From National Systems of Production to National Systems of Knowledge Creation and Learning. In Gordon, L. C., Feldman, M. P. and Gertler, M. S. (eds.) *The Oxford Handbook of Economic Geography*. Oxford: Oxford University Press, 353-372.
- MACEŠKOVÁ, M., ŽÍŽALOVÁ, P. 2007. Regionální aspekty politiky výzkumu a vývoje v České republice. In P. Švec and M. Vančura (eds.): *Česká geografie v evropském prostoru – Vyžádané přednášky, Sociogeografické procesy. Sborník příspěvků z XXI. sjezdu České geografické společnosti. České Budějovice: Jihočeská univerzita v Českých Budějovicích, Pedagogická fakulta, katedra geografie, 161-168, ISBN 978-80-7040-986-2.*
- MAMLBERG, A. 1997. Industrial geography: location and learning. *Progress in Human Geography* 21, 4, 573-582.
- MASKELL, P. 1999. Globalisation and industrial competitiveness: The process and consequences of ubiquitousness. In: Malecki, Oinas (eds.): *Making Connections: Technological learning and regional economic change*, Aldershot: Ashgate, 35-59.
- MORGAN, K. 1997. The Learning Region: Institutions, Innovation and Regional Renewal. *Regional Studies*, 31, 5, 491-503.
- OECD 1996. *The Knowledge-based Economy*. Paris: OECD, 46.
- OUGHTON, C., LANDABASO, M., MORGAN, K. 2002. The Regional Innovation Paradox: Innovation Policy and Industrial Policy. *Journal of Technology Transfer*, 27, 97-110
- RODRÍGUEZ-POSE, A. 2001. Is R&D investment in lagging areas of Europe worthwhile? Theory and empirical evidence. *Papers in Regional Science* 80, 275-295.

- ROBERT, J. et al 2001. Spatial Impacts of Community Policies and Costs of Non-co-ordination, Study carried out at the request of the Directorate General „Regional Policy“ European Commission.
- SIMMIE, J. 2006. Do clusters or innovation systems drive competitiveness? In: Asheim, B., Cooke, P., Martin, R.: Clusters and Regional Development. Critical reflections and explorations. New York: Routledge, 164-187.
- STORPER, M. (1995): Regional technology coalitions. An essential dimension of national technology policy. *Research Policy* 24, 895-911.
- THE ESPON MONITORING COMMITTEE 2004. ESPON 2.1.2 Territorial Effects of EU Research and Development Policies, final report [online], [cited on 10.09.2006]. Accessing on the internet: [http://www.espon.eu/mmp/online/website/content/projects/243/266/file\\_399/fr-2.1.1\\_final.pdf](http://www.espon.eu/mmp/online/website/content/projects/243/266/file_399/fr-2.1.1_final.pdf)
- UHLÍŘ, D. 2004. Regional versus National Development: What sort of Policy for new Czech Regions? In: Drbohlav, D., Kalvoda, J., Voženilek, V. (eds.): *Czech Geography at the Dawn of the Millenium*. Olomouc: Palacky University in Olomouc, 269-277.
- VIRKKALA, S., NIEMI, K. (eds.) 2006. *Peripheral Localities and Innovation Policies – Learning from good practices between the Nordic countries*. Norden: Nordic Innovation Centre
- WISHLADE, F., YUILL, D., DAVEZIES, L. 1997. Economic and Social Cohesion in the European Union: The Regional Distribution of Member States' Own Policies. Paper for European Urban and Regional Research Network “Regional Frontiers” Conference, Frankfurt (Oder), Germany.

**Key governmental and programming documents of the Czech Republic:**

- National Research and Development Policy (2004 – 2008)
- National Research Programme II (2005)
- Long-term basic research directions (2005)
- Departmental R&D conception of individual ministries
- National Innovation Strategy (2004)
- National Innovation Policy (2005 – 2010)
- Economic Growth Strategy (2005)

**Research and development policy in the Czech Republic: regional dimension and policy implications of changing global and European context**

**Summary**

This paper gives an overview of the development of the Czech R&D policy with a special attention given to its regional dimension. Stress put on regionalisation of R&D policy is related to theoretical work on competitiveness and innovation which stresses “locally based” global competitiveness of both companies and regions and also the importance of regionally specific and embedded factors. The system of the Czech R&D policy with respect to its regional dimension was described on the basis of qualitative analysis of the national strategic programming documents related to R&D policy and regional analysis of the public R&D expenditures. Subsequently, a qualitative research was conducted among research organizations in three self-governing regions. The aim of this investigation has been to find out how the R&D support schemes are in fact used and to discuss the potential demand for regional dimension in the Czech R&D policy and also its possible implementation.