

# Chapter 13.

## Regional pathways towards the knowledge economy – experiences from Slovakia

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### 13.1. Introduction

The launch of the European Union's (EU) Lisbon strategy with the self-imposed goal

*to become the most competitive and dynamic knowledge-based economy in the world* (EU, 2000, p. 2)

opened some fundamental issues with regards to the Europe's future. It could be argued that one of the biggest challenges the continent is facing today is how to maintain and strengthen its competitiveness within the globalising knowledge-based economy and to simultaneously guarantee the social and territorial cohesion. Following the recent EU enlargements involving the former state-socialist economies in East-Central Europe, the challenge has grown even bigger.

Meanwhile, one of the most significant developments in the European policy debate has been a growing realisation that the regional scale may hold important clues both in terms of competitiveness and in terms of cohesion. Indeed, for many policy makers, mobilising regions and unlocking their potentials is seen as the best way for both advancing the knowledge economy and enhancing territorial cohesion. The hopes associated with the policy intervention at the regional level have been accompanied by a vibrant academic debate in economic geography and related social sciences.

Numerous approaches have been developed within the so-called 'new regionalism' (Lovering, 1999) inspired by various institutionalist and evolutionary economics insights. Building on an earlier work on national and regional innova-

tion systems, and drawing from the 'knowledge economy' discourse, these approaches invariably identify localised forms of *knowledge* production and *learning* and various supporting *institutional* settings as the key factors behind regional economic growth and prosperity (see Cooke, 1998, 2002; Malecki, 2000; MacKinnon *et al.*, 2002; for recent reviews). Consequently, economically successful regions are conceptualised as 'learning regions' (Florida, 1995; Asheim, 1996; Morgan, 1997; Boekema *et al.*, 2000) allegedly acting as 'collectors and repositories of knowledge', with a strong ability to learn and innovate, supported by an appropriate regional 'institutional thickness', 'untraded interdependencies' and 'entrepreneurial culture' (Amin and Thrift, 1994; Storper, 1999; Saxenian, 1994). These institutional endowments are claimed to remodel production structures into 'clusters' (Porter, 1998) organised around regionally based production nodes (cf. Amin and Thrift, 1992). Thus, 'resurgent regions' (Storper, 1999) and 'region-states' (Ohmae, 1993) are theorised with the power to determine their own economic fortunes (Florida, 1995; Storper and Scott, 1995; *inter alia*) or to 'choose' their prosperity (Porter, 1998), and are claimed to be the most important organisational units of today's global 'knowledge-intensive capitalism' (Florida, 1995; Storper, 1997, 1999; *inter alia*).

While the above approaches have been developed in the context of advanced capitalist economies of the West, more recently, various approaches based on learning, knowledge, networks and innovation have been gaining currency in the context of post-socialist Central and Eastern Europe, as well (e.g. Dyker, 1997; Radosevic, 1998, 1999; Dyker and Radosevic, 1999; Petrakos, Maier and Gorzelak, 2000; van Zon *et al.*, 2000; Mickiewicz and Radosevic, 2001; Petrakos and Tsiapa, 2001). However, little is still known about the way individual regions cope with the change on the ground. In other words, there is a distinct gap in our understanding of regional trajectories towards the knowledge economy in Central and Eastern Europe.

This chapter aims to contribute to the process of addressing this gap by presenting evidence from Slovakia, while focusing on its research and development (R&D) and innovation infrastructure. This will be done in the following way. First, we will argue that in order to understand current regional trajectories one needs to acknowledge the legacies of the past. Since much of the scientific and research capacity in Slovakia has been created under the state-socialism, section 13.2 will briefly outline the way it was organised institutionally and spatially during the period of state-socialism. The subsequent section 13.3 will focus on the trajectories of Slovak regions after the collapse of state-socialism and the opportunities and challenges the regions are facing with regard to their innovation and R&D sector. This will be further developed in section 13.4, while paying specific attention to developments in the "post-Lisbon" period and reporting on a number of most recent initiatives aiming at strengthening of the innovation

capacity of the Slovak regions. Finally, conclusions will reflect on the experience from Slovakia and its significance for a wider European policy making. We will argue that the implementation of the learning-based or innovation-centred policies in the new member states represents a formidable challenge that may require new and bolder policy responses, if the hope for more balanced regional development is to be achieved.

### **13.2. Historical legacies of the state-socialist period**

During the era of socialism, science and technology policy was formulated on a centralised basis of state authorities in charge of science and technology, which were subject to frequent reorganisation and renaming (SGI, 2002). The whole system of the science and technology policy was based on the top-down model. The science and technology policy was formulated in the state plans and programmes drawn up for one to five years supplemented with departmental plans of ministries as well as enterprise plans. Regional authorities were only administering plans of the central government, without any independent actions.

The structure of the science base followed the Soviet model in that fundamental research was given priority. In Slovakia fundamental research was performed by the Academy of Sciences (founded in 1952). Although the institutes of higher education were also actively participating in the fundamental research, their contribution was marginal, due to limited funding. Applied research was incorporated into state-owned production enterprises. The need for innovation was limited as the economic system was basically dominated by the state monopoly. Orientation of the enterprises on low-tech markets in developing countries further eroded their interest in innovation. According to Klas (2006, p. 58), 65% of the exports to developed countries was based on low-tech commodities, only 12% of exports was science- and research-intensive.

International scientific co-operation focused on COMECON countries did not provide enough stimuli to scientific sector either as it often pursued political rather than scholarly objectives (Klas, 2006, p. 59). Co-operation with Western countries was generally limited to selling and purchasing licences.

Science and technology policy, based on the linear innovation model, expecting commercial success of R&D expenditures, proved to be unrealistic. It should be noted that the R&D expenditure was generally very high, reaching 4% of GDP. However, research was fragmented to many disciplines and thus, relatively inefficient. Several attempts to establish more efficient co-operation and to strengthen relations within the innovation systems were introduced at the end of the state-socialist period, however their real impact was somewhat unclear. The

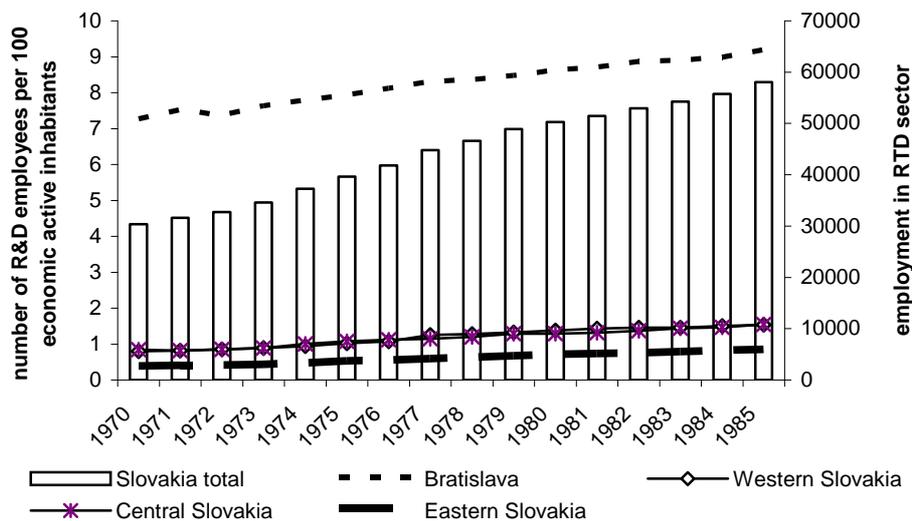
whole system was characterised by fragmentation, lock-in problems, and the lack of creativity and competition.

Nevertheless, the upside of the state-socialist planning system was its committed to the eradication of regional inequalities. In Czecho-Slovakia, this translated into rapid industrialisation of Slovakia and investment in its science and education base. Within Slovakia itself, the aim was to reduce regional differences between the more developed Western Slovakia and generally much less developed regions of Eastern Slovakia.

The above policies had the following regional effects.

1. On the one hand, the higher education sector proved to be one of the main engines of human capital growth in the regions, with the main expansion experienced in the period between 1949 and 1960. While the capital city of Bratislava remained the major centre of the higher education, number of new higher education establishments was set up in larger regional cities such as Nitra, Trnava, Zvolen, Banská Bystrica, Žilina, Prešov, and Košice. This contributed to the reduction of regional disparities in terms of human capital in Slovakia.
2. On the other hand, the opposite can be said about the R&D sector, where Bratislava region strengthened its position. Employment in the R&D sector in Bratislava region increased from 13,922 people in 1970 to 22,548 people in 1988 (see also figure 13.1).

Figure 13.1. Development of the R&D capacities in Slovak regions 1970-1985



Note: right scale – total employment in RTD sector (bars).  
 Source: Rehák (2004).

Following the Soviet principles of creating industrial complexes, the objective in the lagging regions was to establish large industrial centres. Based on the inter-organisational linkages (existing or potential) and industrial structure Mládek (1990) identified seven so-called industrial macro-regions. Innovative activities within these regions were however dependent on responsible ministerial decisions within state plans and rather than a result of regional innovative milieu. Potential regional linkages were not used as a source of efficiency improvements or innovation because, as Radosevic (2000) argued, geographical proximity was not an asset in socialism. The dominant linkages were inter-regional and were organised within individual sectors or within large combines. This created dependence of the regions on the centre and reduced regional policy to a sectoral policy for the industrialisation of rural peripheries (see also Gorzelak, 1996). Given that the technology gap with advanced market economies substantially widened, innovation under state-socialism often relied on technology transfers and/or imitations of technologies from foreign (Western) countries, thus pushing domestic firms further into a position of technology followers.

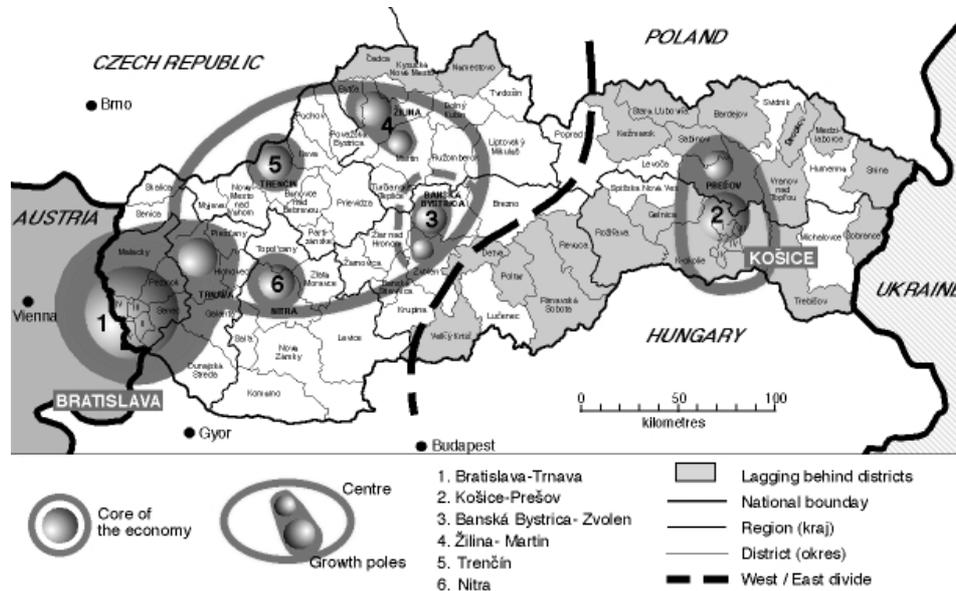
### **13.3. The collapse of state-socialism and development of the innovation systems during the 1990s**

In the decade following the 1989 Velvet revolution, the centrally-planned state-socialist system was abandoned and structural reforms were introduced in Slovakia, paving a way for privatisation, marketisation and liberalisation. The introduction of the market economy has been accompanied by the reversal of the regional economic convergence. Indeed, the period after 1989 has been characterised by strong polarisation trends in regional development. The dominant characteristics of the economic structure and potential of the Slovak regions could be described in terms of centre-periphery relationship (see figure 13.2). In the majority of economic activities and indicators, the dominant position of Bratislava is clearly evident, followed by Košice, the second largest city. Smaller engines of economic growth are represented by regional cities of Žilina, Banská Bystrica, Prešov, Trnava, Trenčín, and Nitra. The remainder of the country seems to be increasingly marginalised with clear East-West divide re-emerging on the landscape of the Slovak space-economy (see figure 13.2; Sokol, 1999).

The East-West divide is further enhanced by the capital city Bratislava, located at the very Western extreme of the country directly on the borderline with the EU in close proximity to Vienna. Bratislava benefited from the re-orientation of foreign-trade relations to the advanced market economies of the West and was able to capitalise on the new development impulses. While the city contributes a lion's share to regional inequalities in Slovakia (e.g. in terms of share of foreign

direct investment – FDI) it could also be seen as a gateway through which development impulses for other Slovak regions can be mediated. The picture of regional inequality thus needs to be seen within the above development and time context (Buček, 1998).

Figure 13.2. Space-economy of Slovakia



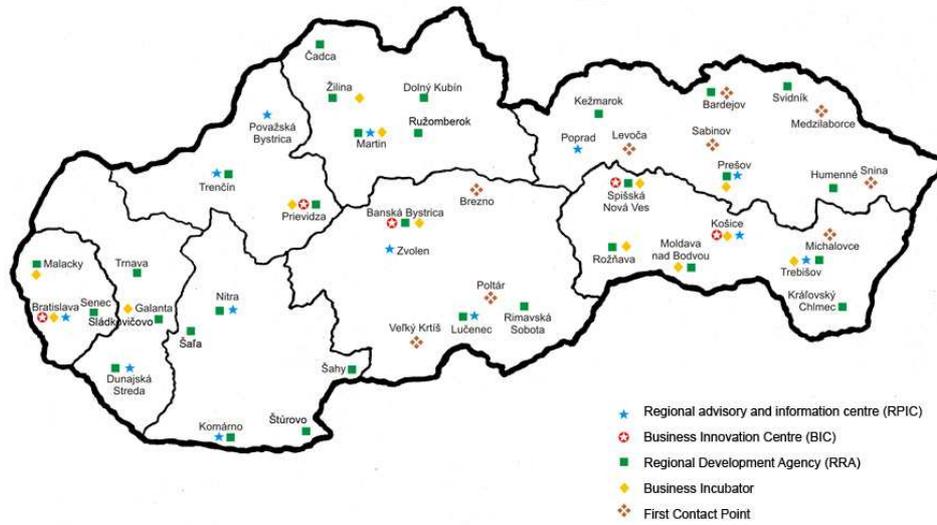
Source: Sokol (1999).

Further to this, capitalising on the academic and research-scientific potential of the capital city, Bratislava was expected to become part of the Central European ‘Silicon Valley’ and to assist Slovakia’s ‘passage to a knowledge-based society’ (Ivanička, 1996, p. 91). In truth, Bratislava has recently emerged as the second wealthiest region in Central and Eastern Europe. However, rather than being the outcome of an institutional effort, the relative success of Bratislava can be attributed more to the operation of market forces and the circular and cumulative causation process, and should be seen in the context of growing social and regional inequalities in Slovakia (Sokol, 2003).

Meanwhile, efforts have been made to encourage entrepreneurship and innovation across the national territory. In 1993, the former Ministry for Economic Strategy Planning pioneered the establishment of *Regional Advisory and Information Centres* (RPIC) in all 38 districts of Slovakia, focusing on small and medium enterprises (SMEs). Many of these centres were subsequently transformed into private businesses or incorporated into the network co-ordinated by the Na-

tional Agency for Small and Medium-Sized Enterprises (NADSME). At present, there are twelve RPICs (with five more branch offices) and five *Business Innovation Centres* (BICs) operating in Slovakia. Since the current institutional support provided by the NADSME network (BICs and RPICs) is not comprehensive in terms of geographical coverage, another supplementary network of *First Contact Points* has been created more recently to act as a basic source of business information in the most economically depressed regions of Slovakia. Simultaneously, there were efforts to create *Regional Development Agencies* (RDAs) further supporting regional development goals. Figure 13.3 shows the geographical distribution of the SME support infrastructure including RPIC, BIC, RDA, First Contact Points and Business Incubators.

**Figure 13.3. Regional support infrastructure in Slovakia (2006)**



Source: authors.

In addition to this, Slovak policy-makers paid special attention to the legislative, administrative, and institutional framework of regional policy at the central level. In 1996, the second reform phase of the local public administration was introduced, which changed the territorial administrative structure to eight self-governing regions (“*samosprávne kraje*”).

However, the above institutional framework is not free of problems. The role of the advisory network in supporting innovative firms, for instance, has been frustrated by the lack of demand from the business sector. Therefore, the institutional support provided is often limited to a distribution of information. On the

other hand, some clusters of dynamic SMEs are emerging despite an absence of a strong institutional support. For instance, as Smith (1997, p. 65) noted in his case study in northern Slovakia

*... it is ironic, that greater SME dynamics is found in Liptovský Mikuláš where institutional scarcity rather than thickness has been dominant.*

The situation in Slovakia was further complicated by the fact that FDI inflow during the first part of 1990s was surprisingly low, probably reflecting political and economic uncertainties. Integration of the new firms in the regional production networks proved to be limited. Smith and Ferenčíková (1998, p. 170) thus concluded that

*... FDI while having important impact on individual firms (albeit often negative), has had rather limited external effects on regional economies within which joint ventures have been established.*

The evidence showed that the impact of FDI on modernisation of technologies and the introduction of new managerial techniques were limited to the firms concerned, while knowledge spill-overs to the regional economies were rarely found. It is important to notice that foreign firms are profit-seeking organisations mainly attracted by low cost, while their innovation strategies do not necessarily correspond with hosting region's development strategies (Pavlinek, 2004).

Amid the general process of socio-economic transformation, the R&D sector has undergone important changes. The most visible side of this is a dramatic reduction of the employment in the sector – from 58,815 to 24,896 during the first years of transformation. The job losses were recorded mainly in the Bratislava region (14,000) and in the western part of Slovakia, where following the collapse of the military industry and heavy machinery industry, the R&D capacities were reduced to one third. Industrial R&D restructuring in Slovakia has been part of a complex transformation process. We may presume that some of the former researchers were employed by private firms or started their own business, but there is no empirical research evidence that would help us to provide a more detailed picture. What is clear, however, is that the radical transformation during the 1990s influenced not only the behaviour of the macro-economy itself, but modified existing knowledge value chains, as well. While formal contacts between business sector and science sector basically vanished, deeper regional study in the Bratislava region (Buček *et al.*, 2003) showed that, informal relations and personal contacts were quite common and are considered to be the most important form of knowledge transfer. The structure of gross domestic expenditure on R&D among fields of science has also changed. Natural sciences recorded gain – with an average growth rate of 142.9% – between the period

from 1997 to 2003, while technological sciences had to face losses (-46.2%) over the same time-span. The Slovak science system is thus currently characterised by two main challenges.

1. On the one hand, it has to cope with a very weak R&D performance in particular in the business sector.
2. On the other hand, fundamental research is playing an increasingly important role, while applied research is losing ground even further.

#### **13.4. Towards knowledge based regions? Recent “post-Lisbon“ development**

In recent years Slovakia has successfully accelerated its catching-up process and become one of the fastest growing OECD economies, with an annual gross domestic product (GDP) growth of well above 4% since 2001, reaching 8.3% in 2006. Interestingly, while Slovakia has been catching up in general economic terms, its performance in research and development (R&D) remained disappointing. Thus, we may observe a „*growth paradox*“, in which a country is achieving high growth rates while decreasing expenditures on R&D.

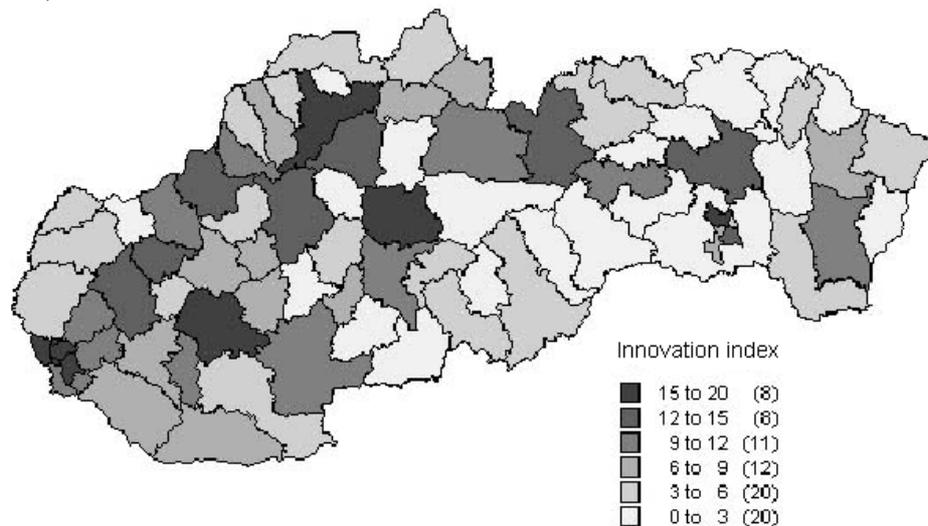
Indeed, in terms of R&D Slovakia belongs to the group of economies that, according to the European Commission’s evaluations in the field of innovations are “loosing ground”. Slovakia holds 22<sup>nd</sup> position on the European Innovation Scoreboard, while in partial indicators such as establishing knowledge and innovation, and business, the country occupies the last, not-flattering place. Thus, the Slovak Republic belongs to the group of economies with low innovation capacity, which fails to keep pace with other EU regions. Share of enterprises that successfully introduced new or significantly innovative product/services in the market was 74% in EU25, while Slovakia (63%) obtained the third worst result among all regions (Innobarometer, 2004). A deeper analysis points at some further relations, e.g. sub-standard support from the part of the state in fostering innovations, preferential orientation of enterprises to the local and national markets, low rate of own either contract-based research, the second lowest cooperation of enterprises with universities and research centres, but also with other enterprises. Since 2000, the Slovakian economy and innovation activity has largely been driven by (foreign) investments in infrastructure and enabling technologies (such as ICT), rather than endogenous knowledge creation or innovation activity in enterprises (European Commission, 2004, p. 89).

Another interesting feature of this period is the fact that although the annual national rate of growth has been very high, it has not been associated with a substantial reduction of regional disparities. Indeed, the GDP per capita of the poorest regions remained at about the half of the level of the GDP per capita of the best performing region. Substantial share of economic activity is still concen-

trated in the capital region – Bratislava. With one quarter of national product produced in the region, Bratislava reaches 119.7% EU25 GDP per capita average (data from April 2005). Regional disparities persist, showing similar pattern from the previous periods. The catching-up process has been noticed primarily in western parts of Slovakia due to agglomeration effects of development of the automotive sector in Trnava (PSA) and Žilina (Kia) and supplier network and electronics in Trnava (Sony) and Galanta and Nitra (Samsung). Lagging regions in the eastern part of Slovakia attracted some investments; however, they concentrate mainly in the regional centres. After the devolution of regional policy powers (from January 2001), the self-governing regions (“samosprávne kraje”) have played an increasingly central role in the practical implementation of regional development policy. Current regional development policy is programme-based, i.e. each region has compiled one or more programmes that translate a region’s development strategy into specific measures.

The challenges that regions are facing are substantial, however. We may structure the main problems of regions according to their economic characteristics and try to identify barriers they face. Following the Todling and Tripple (2004) classification of innovation barriers of problem areas we may cluster typical characteristics of Slovak regions as shown in table 13.1 (see also figure 13.4).

**Figure 13.4. Innovation disparities and regional innovation typology in Slovakia (2004)**



Note: The index is based on the scoring method using data on educational level, R&D employment, high and medium tech employment in industry and service).

Source: Rehak (2005).

In general, metropolitan regions are regarded as centres of innovation, benefiting from scale and agglomeration economies. We may consider Bratislava region as metropolitan, especially when taking into consideration its proximity to Vienna (see OECD, 2003). Bratislava region enjoys the status of the region hosting capital city with high concentration of governmental R&D capacities (44% of national R&D capacities). Institutions such as the Academy of Sciences and existing universities provide mainly fundamental research with emerging albeit still limited transfers and knowledge spill-over to the business sector. Comparisons with the EU according to the European *regional innovation index* (European Trend Chart on Innovation, 2006) show that the Bratislava region is on the 27<sup>th</sup> place (0.66 points), through it is nominated as one of the three new member regions into the first fifty regions. This rank was reached mainly due to above-average values of indicators related to human resources in the field of science and research (157% of the EU average), life-long learning (144%) and employment in high-tech services (249%). 25.74% of the population of over 25 year-olds in the Bratislava region has a university degree, which is twice as much as the national average. In addition, 42% of the citizens with completed doctoral study of Slovakia live in the region. The presence of 11 higher education institutions and the broad scale of opportunities of following education further boost the educational level of the region.

**Table 13.1. Regional innovation barriers in Slovakia**

	<b>Rural and peripheral regions</b>	<b>Old industrial regions</b>	<b>Fragmented metropolitan regions</b>
<b>networking</b>	seldom, over long distances	lock-in problems, dual economy	developing but few or missing global networks
<b>competition</b>	local, isolated national firms	national and global	intensive and global
<b>R&amp;D</b>	almost no R&D capacities	existing capacities, seeking for strategic orientation	oriented at fundamental research, weak but emerging B2U links
<b>intermediate organisations</b>	thin structure	fragmented, weak co-ordination	thin public structure but developing, emerging private initiatives
<b>education and skills</b>	few or low profile, low absorption capacity	emphasis on technical skills; missing managerial skills	many but weak industry links

Source: inspired by Todling and Trippl (2004).

Notwithstanding, research at universities is still limited due to the lack of resources and its quality being considered relatively weak (European Trend Chart on Innovation, 2006). At present, 100 science and research organisations (47.7% of the national total) are localised in the Bratislava region employing 10,135 people (of this number, 7,889 are researchers, which represents 48.9% of the national capacity). However, international comparisons show that top world-class research is rare. Innovation capacity of the region is further hampered by the lack of significant specialisation and the absence of critical mass of research activities. In recent years, the issue of critical mass has been by-passed by the participation of the region's research institutions in international research networks and projects (e.g. FP6). This participation has been growing, mainly in the field of technical sciences (Slovak Technical University Bratislava) and natural sciences (Comenius University of Bratislava). However, participation of enterprises (SME) on such activities is traditionally low. Only 11.7% of Slovak organisations partaking in the FP6 were the small and medium-sized enterprises, and so a direct contribution for the economy is rather limited (APRD, 2006). However, there is an emerging part of innovative fast growing small and medium sized firms in Bratislava region that are either new start-ups or spin-offs from university or Academy of Sciences.

On the other hand, the indicators of financing R&D indicate, that the region allocates only 1.12% of GDP (2003) to research, a figure that falls short of the EU25 average (1.86%). Despite the above-average expenditure of the governmental sector (0.56% of GDP), that finances half of research activities of the region, the problematic point is the insufficient level of R&D expenditure by businesses (0.39% of GDP) ,and universities (0.17% of GDP), figures that are deep below the EU25 average. The financial provision of innovation activities is one of the main problematic issues of the region. Accessibility to the venture capital is critically low, reaching only 6% of the EU average. Short-term development programmes are preferred in enterprises aiming at quick returns. Concept and patent research of a long-term character are projected and financed only sporadically (Mrázová, 2003). Performance of the region, evaluated by number of patents, reaches only one fifth of the EU15 average (with 31.88 patent per million citizens).

One of the problems is that the support for enterprises from the part of the public sector is still very low. In addition, international comparison based on surveys of innovative SMEs shows that only 18% Slovak enterprises used public support, compared to the EU25 average of 31.2% (Arundel, 2004). Enterprises implement their innovation development almost exclusively from their own resources and are not subject of systematic support from the public sector.

Meanwhile, recent major regional initiatives are associated with development of joint training programmes and innovation strategies, establishing necessary

innovation infrastructure, and marketing activities of R&D results. Bilateral cooperation among key regional players within innovation system (mainly university – business) is slowly developing. Currently, the main incentive is to initiate reconstruction of training programmes at the university which will correspond with requirements of (mainly) large foreign investors. The technology-based and most dynamically growing segment of the economy – larger foreign-based companies – has still only marginal impact on domestic research, even if its technology potential may soon contribute to more intensive interchanges between domestic research community and industry. Joint bilateral, especially long-term R&D activities, are still missing. Current capacity for absorption of more sophisticated R&D projects is low, but may increase once their R&D infrastructure improves (Baláž, 2006).

What is interesting is that no explicit innovation policy has been developed at the national level, although some of its elements are comprised in the more general development plans. The most significant of them all is the Slovak Lisbon strategy introduced by the Slovak government in 2004 following the publication of the EU Lisbon strategy. The Slovak Lisbon strategy played the role of the policy framework and raised necessary awareness of innovation issues among stakeholders. This may help to overcome the situation, where most innovation policies in Slovakia overlap with science and technology policies formulated within isolated dimensions of the Ministry of Education and the Ministry of Economy and the whole system suffers from the lack of co-ordination. Involvement of regional authorities in active innovation policy has also been weak so far, with the majority of Regional Innovation Strategies launched only during recent years (see table 13.2).

**Table 13.2. Overview of Regional Innovation Strategies in Slovakia**

<b>Region</b>	<b>Period</b>	<b>Coordinator</b>
Bratislava	2002-04	BIC Bratislava
Nitra	2002-04	VUNAR Nové Zámky
Žilina	2005-07	University of Žilina
Košice	2005-07	Košice region + TUKE
Banská Bystrica	2005-08	Banská Bystrica region
Prešov	2006-08	Prešov region
Trnava	2005-08	Trnava region
Trenčín	2005-08	University of Trenčín

Source: Rehak (2007).

The strategies are usually co-ordinated by regional self governments or leading regional universities. Due to insufficient involvement of all innovation actors during the whole strategic process and scarcity of financial resources for implementation, regions are struggling to speed up the innovation processes. So far, two already completed strategies (Bratislava, Nitra) failed to provide substantial innovation impact on the region. However, they at least raised necessary awareness among the key players in the region.

The Innovation Strategy of the Bratislava Region (BIC Bratislava, 2004) has been completed but its general acceptance and practical implementation in the region has been limited so far. Identified fields of support included in the document were the development of innovation infrastructure, establishment of clusters in the selected technological sectors (car industry, ICT, new materials etc.) and establishment of the system of financing innovation activities and capital funds. It is anticipated that the implementation of the Strategy will depend on the support from the European Communities in years 2007-2013.

In addition, the Bratislava region can gain from several international initiatives that can deliver involvement into the international innovation networks within the EU framework programme. Developing the CENTROPE region is a promising initiative in this field, too, where considering the recent support of regional government, common activities can be expected also in the field of support of business and innovations predominantly in cooperation with the Vienna region. The CENTROPE region is considered to be a possible magnet for the investment in the field of higher technologies.

Meanwhile, it is useful to remind ourselves that the innovation infrastructure of the Slovak regions still suffers from the lack of appropriate “institutional thickness” of intermediary organisations and the whole regional innovation system is very fragile (OECD, 2003). It could be argued that the number of and the quality of existing incubation centres, counselling centres, enterprises with venture capital, technological centres and parks is rather insufficient. Nevertheless, several new initiatives have emerged recently including Technology park with incubator in Žilina (2001), Technology incubator in Bratislava (2003) and Technology incubator in Košice. Other significant developments include involvement of private capital in R&D initiatives such as CEPIT Bratislava, Eurovalley Malacky, CASA Zina Žilina, and IT Valley Košice. Several R&D information hubs have also emerged, including STRINet (Slovak Technology Research and Innovation Network, in 2005) and Know-how Centre (in 2000) based on the on-line web searching engines and presentations of projects, laboratories, research centres and innovative companies. While these initiatives are welcome, it remains to be seen to what extent they will contribute to strengthening the innovative potential of Slovakia.

### 13.5. Conclusions

What lessons can be learnt from the Slovakian case? We believe that the evidence presented above may be valuable for both theory and policy. In terms of theoretical considerations, the conceptual understanding of regional development in the knowledge economy is open to scrutiny. Indeed, as the Slovakian case demonstrates, it is possible to achieve dynamic economic growth without a coherent innovation system, appropriate institutional thickness or strong localised learning. In this sense the “growth paradox” experienced in Slovakia somewhat undermines the claims made by the “new regionalist” literature. Instead, it draws our attention towards the workings of the wider political economy and the way in which this impinge upon the fortunes of regions and whole countries (see also Sokol, 2001, 2003).

On the other hand, one could ask whether the relative economic success of Slovakia is sustainable in the long run. This raises a critical question, whether a country or a region can rely on development based mostly on the foreign investment, or whether some form of local indigenous innovation capacity is necessary to safeguard long-term prosperity. The latter case would imply that some form of an innovation support system may eventually need to be put in place in order to stimulate knowledge-intensive, high value-added economic development. The process of setting up such an innovation system may include a search for “animateurs” (Morgan 1997, 1998), whose role would be to instigate a “high-road strategy” (Cooke, 1995) to regional economic development. This, in turn, should deliver high-skill, high-wage regional economies that would not be resigned to the position of the followers, but could “learn ahead” (see Storper and Scott, 1995; Hudson *et al.*, 1997) of the game. Such “animateurs” could perhaps be fashioned along the lines of well-established and often celebrated regional development agencies (RDAs) in Wales and Scotland, or Industrial Development Agency (IDA) in Ireland.

However, as shown on the example of Slovakia, such innovation support systems are very difficult to create and operationalise in the post-socialist context. Indeed, political, economic and institutional conditions surrounding the transformation to the market economy in Central and Eastern Europe are such that the implementation of the learning-based or innovation-centred strategies may represent a formidable challenge. Within a fragmented, cash-strapped and continuously changing institutional environment, it is not clear, who should take a lead in organising strategic innovation networks in the regions. It could be further argued that this challenge is the biggest in the regions that are the most economically disadvantaged.

This, in turn, creates fundamental policy dilemmas for regional, national and European policy-makers. It may well be that solutions to some of the problems

experienced by the regions in Central and Eastern Europe are well beyond the possibilities of the regions (or even nation-states) concerned. If this is the case then the new member states may require new and bolder policy responses from the EU level, if the goal of a more balanced regional development in Europe is to be achieved.

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