Innovation policies in the Bratislava Region

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Abstract: The Bratislava Region accounts for the highest level of economic development in Slovakia. The region, however, has underdeveloped innovation governance structures. It has no innovation council and/or other high-level forum for innovation policies. There is limited evidence on use of policy intelligence tools aimed at regional benchmarking and evaluation of policy impacts. The key challenge is to improve regional innovation governance in terms of organisational support and policy co-ordination. The main opportunity is that integration of monitoring and evaluating policy measures provides for better design and fine-tuning of innovation policies implemented in the region. The region will have to improve its knowledge base as to keep its competitiveness once the effect of low wages wanes.

Key words: regional innovation policy, policy mix, knowledge-based economy, Bratislava Region

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1. INTRODUCTION: REGIONAL INNOVATION PERFORMANCE

1.1 Major trends in regional development

The Bratislava region is the most developed region in terms of per capita GDP, housing, employment, higher education and science and technology in Slovakia. Economic history of the Bratislava region points to importance of technology and organisational innovations introduced by the multinational companies (MNCs) for formation of regional structures of production (Lipietz 1992). Growth in labour productivity and GDP was generated by influx of FDI and massive transfer of technology and know-how by the MNCs. The region accumulated some 59.3% of total stock of FDI in 1990-2008 in Slovakia. A dual economy established in Slovakia in the late 1990s and early 2000s. Branches of the MNCs form one sector, typical with world-class technology imported from abroad and high productivity levels. Some 119 thousands of Slovak small and medium enterprises (SMEs, of which 39 thousands in the Bratislava Region) and few large companies owned by domestic investors form the second sector, typical with low productivity levels and low R&D intensity (Zajac and Baláž 2007). Average labour productivity was 2.3 times higher in foreign-owned sector than in domestic-owned one in 2008. Investments in the automotive and IT industries helped to increase shares of population employed in the mid- and high-tech manufacturing and knowledge-intensive services.

1.2 Trends in science, technology and innovation performance

The Bratislava accounts for above-average volumes of human resources and spending on R&D in Slovakia (Table 1, Figures 1 and 2|. It concentrates about half of total Slovak stock of human capital and financial resources in R&D. Numbers of researchers per 1000 inhabitants were about 5 times higher than national average in 2009.

Table 1: Basic indicators of regional R&D capacities and performance in Slovakia in 2009

Region / Indicator	Bratislava	Western Slovakia			Central Slovakia		Eastern Slovakia		Slovakia – national totals
		Trnava	Trenčín	Nitra	Žilina	Banská Bystrica	Prešov	Košice	
R&D personnel in FTE	8066	975	1063	1080	1166	879	462	2261	15952
of which researchers	6526	831	631	856	1020	722	354	1938	12878
GERD total, €m	156.02	13.13	41.43	13.89	19.89	18.37	11.23	29.04	302.99
of which capital exp.	16.08	4.11	1.69	1.04	2.29	3.56	0.22	2.14	31.13
GERD by type, %									
basic research	61.2	16.5	0.6	56.6	15.8	50.6	18.1	62.0	45.5
applied research	22.7	19.9	21.5	34.2	32.5	39.2	8.2	28.0	24.4
development	16.0	63.6	78.0	9.2	51.7	10.3	73.8	10.1	30.1
GERD by field of science, %									
natural science	39.0	1.1	0.6	6.2	2.2	3.8	13.2	19.3	23.2
engineering	36.1	35.1	98.9	15.0	89.1	45.9	77.7	51.3	50.8
medical	9.3	49.6	0.0	0.0	1.2	0.1	0.2	6.8	7.7
agricultural	1.5	5.7	0.0	49.6	1.1	33.1	1.2	13.9	6.7
social science	9.7	4.4	0.5	5.0	3.1	6.3	2.6	6.6	6.8
humanities	4.4	4.0	0.0	24.2	3.3	10.7	5.2	5.2	4.8
BERD total, €m [1)]	55.55	10.49	40.16	4.94	12.85	8.36	8.73	8.72	149.79
Share GERD/GDP, % [2)]	0.93	0.31	0.66	0.35	0.30	0.20	0.17	0.48	0.46
Share BERD/GERD, %	35.61	79.89	96.96	35.57	64.61	45.50	77.70	30.01	49.44

Source: The Statistical Office of the Slovak Republic and author's own computations. Notes: 1) By source of funding. 2) Refers to 2007. All other data refer to 2009. Exchange rate was 1 € per 33.781 SK in 2007. GERD = Gross research expenditure on R&D; BERD = Business expenditure on R&D. FTE = Full time equivalent. The Bratislava, Western Slovakia, Central Slovakia and Eastern Slovakia are NUTS II regions. The Trnava, Trenčín, Nitra, Žilina, Banská Bystrica, Prešov and Košice are NUTS III regions.

The 2009 Regional Innovation Scoreboard (based on the 2006 survey data, Hollanders et al 2009) ranked regions on normalised scale, where the best performing region in the EU has a score of 1 on the indicator and the worst performing region a score of 0. The scoreboard found 'average performance' of the Bratislava Region in most indicator groups[2]:

- The region accounted for excellent performance in the non-R&D innovation expenditures (0.87, 179.1% of the EU27 average), employment in knowledge intensive services (0.71, 156.3% of the EU27 average), and life-long learning (0.66, 143.5% of the EU27 average).

[2] EU27 regional averages are computed for regions where the 2006 and 2009 regional innovation scoreboard data were available.

- The region accounted for above-average performance in shares of population with tertiary education (0.51, 125.2% of the EU27 average), public R&D expenditure (0.56, 114.2% of the EU27 average), employment in medium-high & high-tech manufacturing (0.45, 112.9% of the EU27 average) and new-to-market sales (0.53, 109.8% of the EU27 average).
- Average performance was found for new-to-firm sales (0.47, 102.5% of the EU27 average), marketing and/or organisational innovators (0.48, 99.9% of the EU27 average) and shares of innovative SMEs collaborating with others (0.41, 95.5% of the EU27 average).
- Significantly below average were scores in broadband access (0.22, 48.0% of the EU27 average), resource efficiency innovators – energy (0.30, 71.3% of the EU27 average), numbers of EPO patents (0.32, 77.8% of the EU27 average), business R&D expenditure (0.38, 78.2% of the EU27 average) and shares of SMEs innovating in-house (0.34, 83.8% of the EU27 average).

Analysis of the 2006 scoreboard (based on the 2004 data) and 2009 scoreboard (based on the 2006 data) indicates mixed performance by the Bratislava Region in its competitive strengths compared to the EU27 average. Some improvements in the innovation-related performance referred to life-long learning (133.4% of the EU27 average in 2004 versus 143.5% in 2006), employment in medium-high & high-tech manufacturing (93.5% versus 112.9%) and shares of SMEs innovating in-house (47.0% versus 83.8%). Competiveness levels did not change with respect to share of population with tertiary education, broadband access, numbers of EPO patents, and public and business R&D expenditure in period 2004-2006. Competitiveness levels decreased for employment knowledge-intensive services (184.0% of the EU27 average in 2004 versus 156.3% in 2006), new-to-firm sales (126.2% versus 102.5%), and new-to market sales (114.9% versus 109.8%)

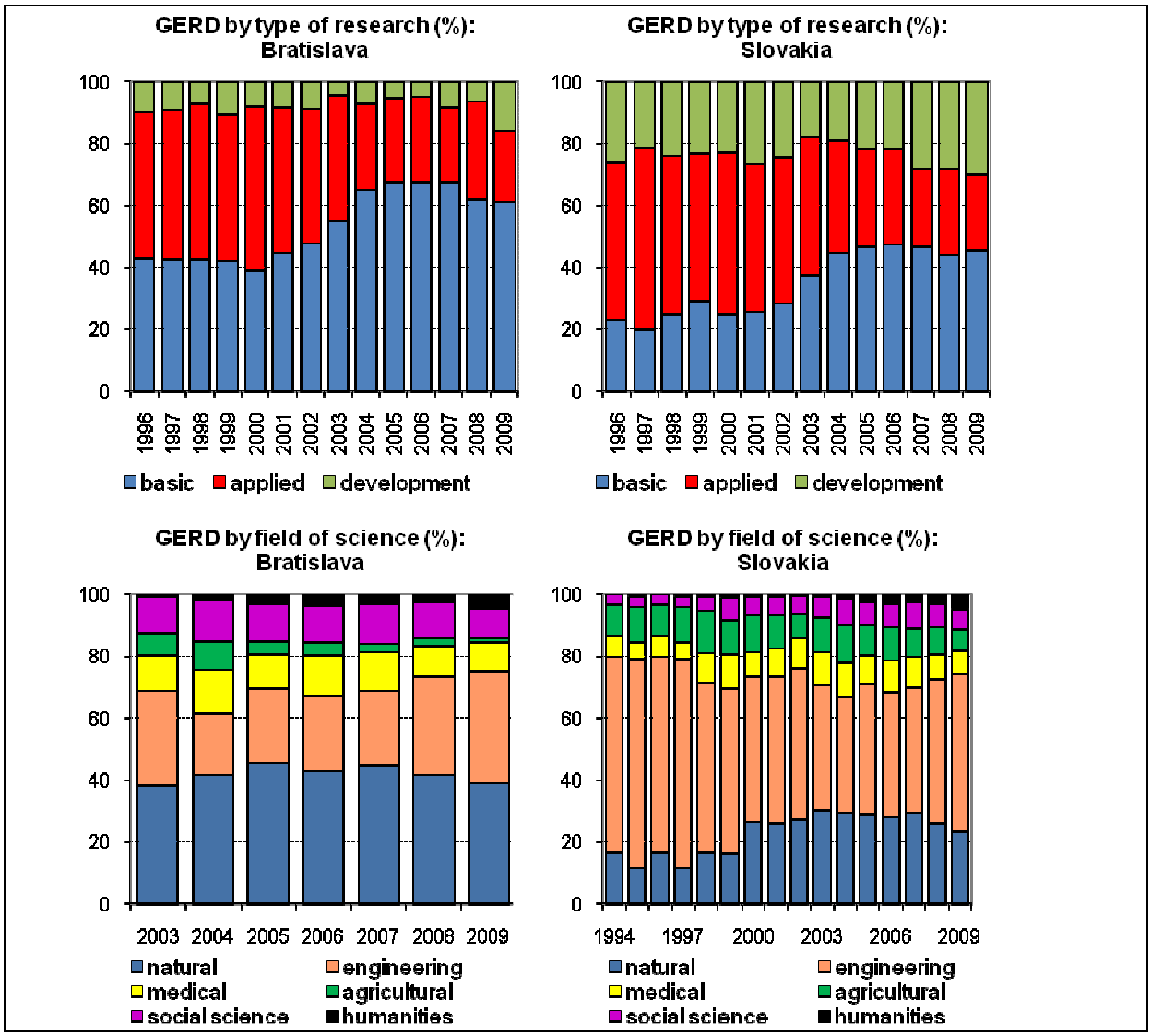

Figure 1: Selected data on R&D spending in the Bratislava Region. Sources: SOSR (Regstat) and author's own computations.

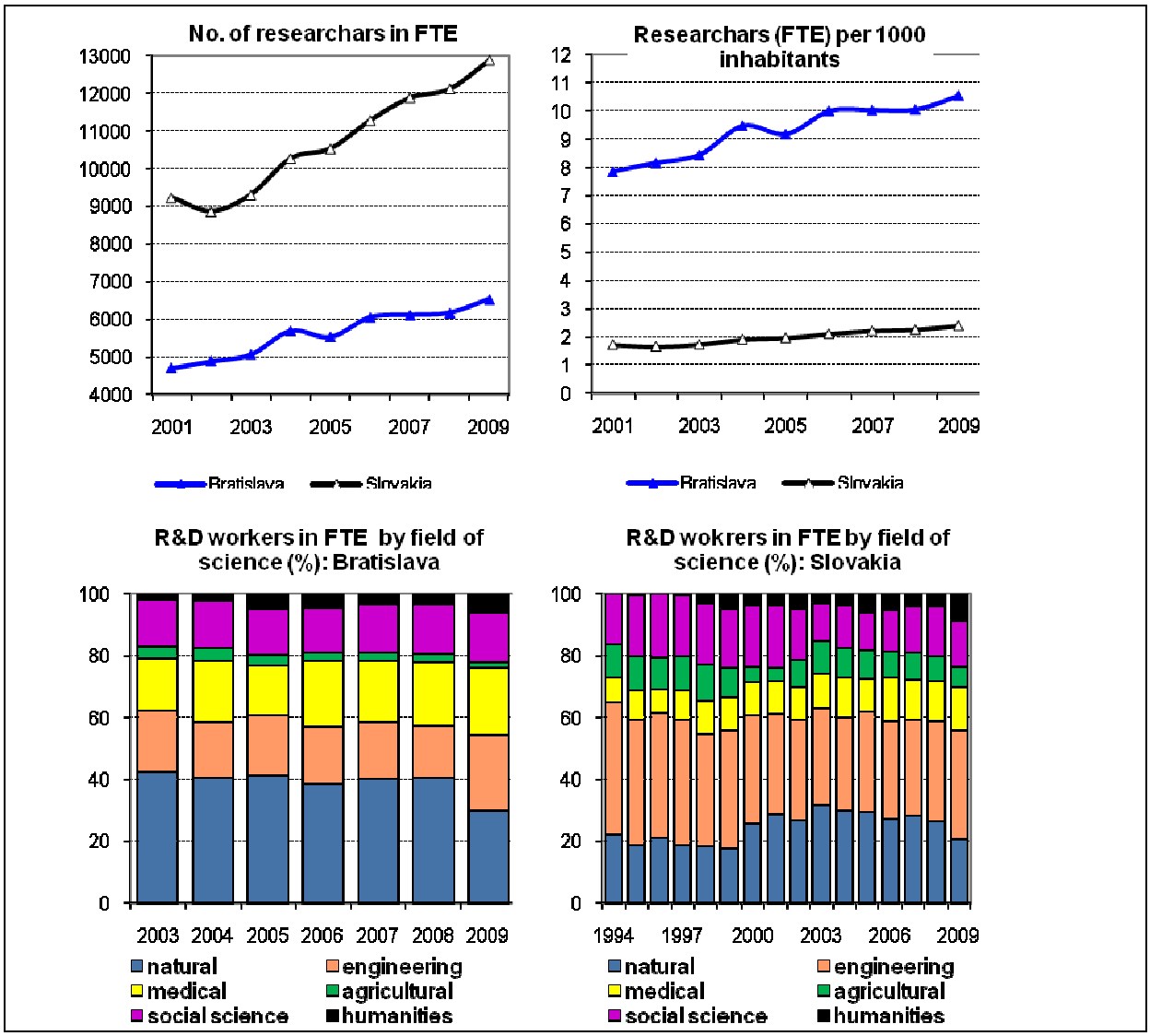

Figure 2: Selected data on human resources in R&D in the Bratislava Region. Sources: SOSR (Regstat) and author's own computations.

The 2006 and 2009 regional innovation scoreboards indicated that the Bratislava Region was able to establish knowledge-based economy and benefit from relatively high stock of human capital and well-developed innovation infrastructure. Major strengths of the regions concentrated in the enablers and output group of innovation indicators (stock of human capital and employment in medium-high and high-tech sectors). Major weaknesses related to low business R&D expenditure, low shares of SMEs innovating in-house and numbers of EPO patents.

National data on innovation spending reveal that process innovations prevail over product ones in the Bratislava Region, unlike Slovak average. Most innovations concentrated in the technology and nature science groups in the Bratislava Region. Innovations related to medical, agriculture and social science fields were less pronounced in the region when compared to Slovak average. Research organisations' own resources and the state budget were main sources of financial assistance to innovation in the Bratislava Region. This structure of support reflects high shares of public R&D bodies in the capital city. Other Slovak regions have to rely more on (scarce) private resources.

Major weaknesses of the region origin in dual character of economy, Branches of the MNCs in the automotive and IT industries do research in their headquarters, while some 39 thousands regional SMEs competed with low costs of inputs. Structure of regional economy was reflected in low business R&D expenditure, low shares of SMEs innovating in-house and low numbers of EPO patents.

2. REGIONAL INNOVATION POLICIES

2.1 Regional institutional set-up: Layout of legislative and financial powers

Slovakia used to be a strongly centralised country. Regional governments in the eight self-governing regions (SGR) (NUTS III level, 'Vyšší územný celok', VÚC in Slovak) were established as late as in 2002. Parliaments and presidents of the SGR are elected by permanent residents of the SGR. Each SGR president appoints a regional government, and has executive authority at the regional level. The regional parliament is authorised to decide upon the principal issues of the SGR. The 302/2001 Law on Self-Governing Regions provided eight regional governments with considerable responsibilities related to the 'design and implementation of programmes for the social, economic and cultural development of the regions'. The SGR were given powers in regional planning and development, regional transport, secondary-level education, healthcare and social welfare, culture and cross-border co-operation. The real powers of the SGR are limited by their low financial resources. The estimated share of the SGR budgets in Slovak gross domestic product was about 1.7% in 2010.

The 302/2001 Law made no special reference to research and innovation policies and/or governance. Competences in higher education, innovation, research and development has traditionally been matters of central government in Slovakia. Research and innovation policies are designed and implemented by the central government ministries and their agencies, and funded from the state budget and European resources. The only field related to innovation and managed by the regional governments is secondary education. The regions manage several types of secondary schools (a) 'gymnasium' providing general secondary education in humanities and nature science, (b) professional secondary schools providing education in economics, technical sciences and vocational training, (c) musical schools and (d) language schools. Most programmes managed by the regions and developed by particular secondary schools aimed at building informatics and language classrooms, implementing quality management systems, supporting gifted students, etc.

Government of the Bratislava Region had total budget of €120.6m in 2010 (about 0.7% of regional GDP estimated for the same year). Non-targeted allocations (44.1%), and targeted allocations and grants from state budget (37.7%) were the most important income items. The most important expenditure items related to regional secondary schools (33.2%). Other important items included strategic planning and Geographic Information System (€6.5m), European Territorial Co-operation activities (Interact) (€3.9m) and administrative support to implementation of the Operational Programme Bratislava Region (€0.2m).

Layout of legislative and financial powers implies multi-level co-ordination mechanisms for innovation policy making in Slovakia. Limited legislative powers and financial resources of the self-governing regions are reflected in limited activities of regional governments in support to their regional innovation systems in Slovakia. The support is most visible in (a) preparation of regional innovation strategies, and (b) organisational support to cluster creations. Support to innovation on regional and local levels is provided via competences in spatial planning and development policies. Regional development and innovation strategies are developed on regional (NUTS III) levels and funded from national and European resources. Central government authorities and agencies are responsible for drafting and implementing policy measures supporting research, development, innovation and higher education. Selected innovation policy measures are drafted and managed by agencies of

central government, but implemented by local authorities (e.g. industrial and technology parks, business and innovation incubators).

2.2 Major innovation policy documents

There have been no significant changes in division of legislative and financial powers among central, regional and local governments since 2002. Co-ordination and implementation mechanisms for innovation policies, however, accounted for significant improvements.

Slovakia's accession to the EU (2004) was a significant impetus for development of innovations in Slovakia. Prior to 2004 innovations were not mentioned in list of development priorities by Slovak government. The first national innovation strategy was adopted as late as in 2007. In this respect the Bratislava Region has been rather exceptional in Slovakia. It was the first Slovak region to have its own Regional Innovation Strategy (RIS) in 2004. The project was initiated by the regional government and was co-financed and methodologically led by the European Commission. It was implemented by the Business and Innovation Centre in Bratislava. The target group of the project included technology oriented small and medium enterprises with an innovation potential. The RIS project conducted an analysis of the needs of enterprises and the supply of an 'innovation infrastructure' in the Bratislava Region. The RIS suggested three horizontal and three direct measures to support innovation development in the Bratislava Region:

1. Horizontal measures included (a) communication and networking, (b) regional technology policy - regional foresight, and (c) implementing single programming documents.
2. Direct measures included (a) supporting innovation infrastructure development, (b) creating clusters in selected technology sectors, and (c) financing system and creation of capital funds for innovation activities.

The Bratislava Region was the only Slovak region not eligible for the Objective 1 assistance. It benefited from the Objectives 2 and 3 programmes in planning period 2004-2006. The development of innovation in the region was based on the Single Programming Documents 2 and 3 (SPD 2 and 3) for the NUTS II – Bratislava Region and almost entirely financed from the European Social Fund (ESF) and the European Regional Development Fund (ERDF) (MLSAF 2004). The SPD were drafted and approved by the central

government authorities. Representatives of the Bratislava Region participated in the drafting and monitoring implementation of the SPD policy measures. In planning period 2004-2006, the SPD 2 and 3 allocated some €223.8m under four policy measures intended for development of innovation in the Bratislava Region. Priorities and policy measures stated in the Bratislava RIS continue also in planning period 2007-2013. The Bratislava RIS was a pilot regional innovation strategy and generated great interest by other Slovak regions. They consecutively prepared their own strategies inspired by the 2004 Bratislava Region RIS.

Since 2007 the Bratislava Region adopted several documents on regional planning, innovation and R&D development. Basic document of regional planning is the 2007 'Programme of Economic and Social Development of the Bratislava Region for 2007-2013' (PESDBR). The document refers to the National Development Plan, National Strategic Reference Framework for 2007-2013, operational programmes, the abovementioned Bratislava 2004 RIS and the 2003 Strategy of Development of the Bratislava Region. The PESDBR states its global priority 'developing territory and quality of life, and increasing regional competitiveness'. Increases in regional competitiveness should emerge from support to (i) R&D and human resources, (ii) education, and (iii) introduction of innovations and new technologies. The PESDBR defines 15 specific priorities. Priority No 3 is 'Knowledge-based economy, research and development'. Typical activities for the priority include:

- investments into the R&D infrastructure;
- purchase of new, top-notch technologies and equipment;
- purchase of software for R&D;
- support to introduction of broadband technologies;
- support to applied research;
- support to E-government and internet access by households;
- increases in quality of management;
- support to strategic research projects;
- support to innovative firms;
- support to data procession and repository institutions.

The Bratislava Region participates in 16 policy measures implemented under four operational programmes in planning period 2007-2013. These measures provide bulk of finance for the abovementioned R&D activities. Research, development and human resources receive about one third of all expenditures planned under the PESDBR. The PESDBR contains several indicators for evaluation of operational programmes. Numbers of inhabitants with tertiary education, for example, should increase from 107.0 thousands to 125.0 thousands, numbers of R&D workers from 10 to 12 thousands and shares of households with broadband access from 35% to 50% in period 2005-2013.

As for the total indicative volume of financial resources for implementation of the PESDBR in period 2007-2013 (€1526.6m), private sector (45%), EU funds (25%) and local authorities (15%) should be the main contributors. The regional government should provide only some 5% of the total PESDBR budget.

2.3 Problems in innovation policy design

Use of intelligence tools for innovation policies is rather limited in Slovakia. There, for example, was just one technology foresight exercise on national level (in 2003-2005). The 2004 Regional Innovation Strategy for the Bratislava Region refers to 'regional technology foresight activities' for design, implementation and evaluation of innovation policies, but no foresight activity has been implemented so far. The 2004 RIS has never been evaluated, but stays in force, as no new strategy was drafted.

The government of the Bratislava Region participated in the 'Euro-Coop' project in 2005-2008[3]. The FP6 project connected 12 regional governments and targeted regional innovation policy impact assessment and benchmarking process and development of cooperation for sustainable regional innovation in the EU. The 'Euro-Coop' project provided its participants with a handbook on evaluation and benchmarking methods for regional innovation policies. There is no evidence on use of the handbook by the regional government.

[3] The main objective of the Euro-Coop project was to develop a research and innovation policy impact assessment system at the regional level in order to improve the measurement of the various impacts of regional research and innovation policies. This impact assessment system should be transferable and applicable to all regions in Europe and their different circumstances. The pilot project also intended to stimulate further development in regional research and innovation policies as well as their adaptation to future needs and opportunities in the regions. Project description and results are available at: http://www.iccr-international.org/eurocoop/index2.html

Evaluation and benchmarking regional innovation policies is rather difficult given limited powers of regions in innovation development. Policy measures (supported from the Structural Funds) are implemented by the central government authorities and subject to regular monitoring and evaluation. Government of the Bratislava Region has its representatives in monitoring and evaluation committees, but there is no integrated overview of all policy measures implemented in the region.

2.4 New agendas

A new agenda emerging in regional policies is related to clusters. Several regional governments and local authorities signed up agreements on institutional support to clusters, in manufacturing, electronics and ICT industries in particular. There is no cluster policy by central government. Establishment of clusters is an example of a bottom-up initiative. The Bratislava Region, however, was rather hesitant to participate. Government of the region, for example helped to establish the Danube Knowledge Cluster in 2010. The cluster was co-founded by the Bratislava City government and three other municipalities, two Universities and two water companies. The cluster is inspired by the Strategy of European Union for the Danube Region and wants to 'create a competitive, knowledge and innovation-based economy' along the Danube river. Regional government later decided withdrawing from the cluster, because of financial costs of the membership.

2.5 Key challenge: Improving regional governance

The Bratislava Region accounts for the highest level of economic development in Slovakia and among the new Member Countries. It has enjoyed substantial influx of foreign direct investment and benefits from high numbers of higher education institutions and research organisations. The region also profits from significant assistance to research, development, innovation and human resources provided by the Structural Funds in 2007-2013 (€457.8m). Given these strengths the region has rather underdeveloped innovation governance structures. The region has no innovation council and/or other high-level forum for innovation policies. Innovation policies are monitored by the Department of the Regional Development Strategy. The department has three people. Most of the department activities relate to general

issues of regional development rather than innovations. There is limited evidence on use of policy intelligence tools aimed at regional benchmarking and evaluation of policy impacts.

The key challenge is to improve regional innovation governance in terms of organisational support and policy co-ordination. Policy monitoring and evaluation must be performed on regular basis and use benchmarking tools standard in the EU. Monitoring should not be limited to the Operational Programme Bratislava Region, but cover a broad portfolio of policy measures aimed at knowledge based economy. The regional government also may consider establishing regional innovation council. The council should include key stakeholders of innovation development in the region (representatives of businesses, HEIs, central, regional and local governments) and suggest key policies for supporting innovations.

The main opportunity is that integration of monitoring and evaluating policy measures provides for better design and fine-tuning of innovation policies implemented in the region. These will be badly needed in the future. While star performer in Slovakia, economy of the Bratislava Region relies more on low prices of inputs (price/quality ratio for labour force in particular) than inputs of knowledge generated by regional knowledge institutions. The 2009 Regional Innovation Scoreboard found just 'average performance' of the Bratislava Region in most indicator groups. The region will have to improve its knowledge base as to keep its competitiveness once the effect of low wages wanes.

3. CURRENT MIX OF THE REGIONAL INNOVATION POLICY

Since 2004 Slovak regional policy mixes have relied on assistance provided by European funds. Except for the secondary education, Slovak self-governing regions have almost none financial resources for support to innovation. The innovation policy mixes, envisaged in the regional innovation strategies, may by only as far successful as far the regions obtain and absorb Structural Funds (Baláž 2006).

3.1 Role of the EU funding

In planning period 2004-2006 most regional governments tried to incorporate innovation policies into the regional operational plans (ROPs) and to link them to the National

Development Plan (NDP). They hoped to obtain additional funding from EU sources as their own financial resources were quite narrow. However, the strategy of the NDP has changed. The government dropped idea of ROPs and adopted idea of sectoral operational programmes directed by the central government ministries. Some topics of ROPs are reflected in Sectoral Operation Programmes, but there were no specific regional innovation programmes. Each region is free to compete for innovation policy schemes launched by the central government and supported by the Structural Funds. The only notable exception is the Bratislava Region, which has its own Operational Programme Bratislava Region and also may benefit from several special priority axes contained in three other operational programmes.

The Bratislava Region is too rich to qualify for assistance by most European funds. The National Strategic Reference Framework (NSRF) originally allocated quite limited resources for support to R&D and innovation in the Bratislava Region. The region, however, accounts for half of the R&D capacities in Slovakia. The absorption capacity for R&D-related programmes outside the capital is low. Final version of the NSRF increased volume of assistance to Bratislava Region to €458m, most of which aims at R&D and innovations. Despite this change, the region receives just some 4% of the total Structural Funds and some 30% of the R&D-related assistance in period 2007-2013 in Slovakia.

The Bratislava Region benefits from four operational programmes aimed at research, development, technology and human resources in period 2007-2013: the Operational Programme Research and Development (OPRD), the Operational Programme Education (OPE), the Operational Programme Bratislava Region (OPBR) and the Operational Programme Employment and Social Inclusion (OPESI). Total volume of assistance to R&D, innovation and human resources is €457.9m, of which €389.2m is provided by the ERDF and ESF, and the rest by the Slovak state budget (Table 2). European programmes provide for significant increases in funding for knowledge-based economy. The total volume of the four programmes, for example, is four times higher than public expenditure on R&D in the Bratislava Region in 2009. Exact volume of assistance to development of knowledge-based economy, however, is difficult to compute. Assistance levels are indicative and set for priority axes, but not policy measures levels. Some priority axes contain policy measures with diverse targets and final allocation of resources among measures may change over time.

The EU funds are disbursed via (a) calls and (b) national projects. The calls usually are specified for the Bratislava and non-Bratislava Regions. The national projects mostly refer to

national infrastructure and human resource programmes, and are directly assigned to pre-selected participants from public sector. An overwhelming majority of national projects is implemented by the Bratislava-based agencies and experts of central government. The real share of the Bratislava Region in total Slovak spending on research, development, technology and human resources, therefore, is higher than indicated in the operational programme documents.

The most important innovation policy measures include:

- the Operational Programme Bratislava Region (priority axis 2);
- the Operational Programme Research and Development (priority axes 3 and 4);
- the Operational Programme Education (priority axis 4).

Table 2: Major Structural Fund programmes in the Bratislava Region aimed at research, development, technology and human resources in 2007-2013, €m

Programme	ERDF and ESF	Slovak state budget	Total public funds
OPRD, Priority Axes 3 and 4	316.1	55.8	371.7
OPE, Priority Axis 4	17.8	3.1	20.9
OPBR Priority Axis 2	37.6	6.6	44.2
OPESI, Priority Axis 3	17.8	3.1	20.9
Total	389.2	68.7	457.8

Sources: Programmes' documents and author's own computations. Note: differences due to rounding.

The regional innovation policy aims at four major areas of innovation policies: (a) support to public research organisations, higher education institutions (HEIs) and research infrastructure, (b) support to human resources, (c) support to organisational innovations, and (d) support to sectoral innovation in manufacturing. Areas of policy intervention overlap with those stated in the 2004 Regional Innovation Strategy and the Programme of Economic and Social Development of the Bratislava Region for 2007-2013 (see chapter 2.2). There were no major shifts in overall policy directions, but total amount of support increased about four times between planning periods 2004-2006 and 2007-2013.

Support to public research organisations, higher education institutions and research infrastructure is by far the most important area of innovation policy intervention and receives €371.7m in period 2007-2013. Policy measures implemented under the priority axes 3 and 4 of the OPRD support (i) creating centres of excellence, and (ii) building and modernising research infrastructure. The Bratislava's HEIs, the Slovak Academy of Sciences and other public research organisations are major target groups of the measure.

Support to human resources is provided via the priority axis 4 of the OPE and priority axis 3 of the OPESI. Policy measures implemented under the priority axes allocate some €41.8m and support (i) reforming and developing general and vocational training in primary and secondary education, (ii) developing innovative forms of education, rationalising and raising quality of curricula in tertiary education, (iii) developing human resources in research & development, and (iv) raising quality of life-long learning in period 2007-2013. Young population, tertiary students and research workers are main target groups of the abovementioned policy measures.

Support to organisational and sectoral innovation is provided via priority axis 2 of the OPBR. The measure allocates some €44.2m through support to co-operation by the small and medium enterprises (SMEs) and public research organisations, organisational innovations and improving access to information and communication technologies. Start-ups and innovative SMEs are main target groups and beneficiaries of the OPBR.

3.2 Current policy mix: opportunities and weaknesses

This chapter is based on analysis of existing innovation policies applied in the region and five interviews with regional and national innovation policy stakeholders.

There are eight regional innovation strategies (RIS), but none was formally evaluated in Slovakia (including the 2004 Regional Innovation for the Bratislava Region). The Department of the Regional Development Strategy considered carrying out a formal evaluation of the 2004 RIS and drafting new RIS in 2009. The government of the Bratislava Region, however, referred to impacts of World financial crisis and discarded financial support to new RIS4. Proposal for financing new RIS was incorporated into the 2011-2013 programming budget of

[4] The 2004 Regional Innovation Strategy was paid from the European resources.

the Bratislava Region. Whether drafting new RIS is supported, depends on decision by regional parliament in 2011.

The current policy mix has not originated in a special policy document. It rather reflects combination of policy measures (heavily subsidised) by the Structural Funds) for which the Bratislava Region was eligible in period 2007-2013 (Table 2). Areas of intervention and policy instruments resemble to those (a) envisaged by the 2004 Regional Innovation Strategy, and (b) applied in all Slovak regions. One notable difference is that the Bratislava Region allocates very high share of support to research and development (81% of total) and relatively low share to other forms of innovation. This difference is given by the fact that the Bratislava Region (i) concentrates over half of total Slovak R&D capacities and (ii) was not eligible for support from the Operational Programme Competitiveness and Economic Growth (OPCEG). The OPCEG provides bulk of innovation finance and supports technology transfers, business and technology incubators, and industry-academia networking initiatives in regions outside Bratislava.

All stakeholders interviewed considered high shares of R&D investment in the Bratislava Region sensible, given low absorption capacity for these investments by the non-Bratislava regions. Some stakeholders, however, pointed to a threat that European assistance would strengthen importance of basic research. Basic research already accounted for 61.2% of total research performed in 2009 in the Bratislava Region. Major financial instruments (priority axes 3 and 4 of the Operational Programme Research and Development) invest in research infrastructure, centres of excellence, and applied research but do not provide support to building innovation infrastructure in the region. Flagship project of the 2007 Innovation Strategy, the Regional Innovation Centres (RICs), got into difficulties and is unlikely to continue[5]. The RICs likely are replaced by the competence centres (set up by the higher education institutions and research institutes)[6].

[5] The policy measure Building Regional Innovation Centres (RICs, Trendchart measure SK 11) targeted the promotion of regional innovation systems via establishing innovation poles, that is, RICs. The measure should invest approximately €150m in the period from 2008 to 2013 and generate capacity for development of innovations in SMEs. The measure also should improve links between the business sector, applied industry research organisations and higher education institutions. The RICs should create platforms for cooperation in the field of innovations on regional, national and international levels. The RICs project should be implemented by three ministries: (a) the Ministry of Economy and Construction (MEC), the Ministry of Education, Science, Research and Sports (MESRS) and the Ministry of Labour, Social Affairs and Family (MLSAF). The MEC and MESRS should provide finance for building RICs tangible and intangible infrastructure, and administrative capacities. The MLSAF should pay for training RICs managers. The measure proved to be more complex than

Stakeholders interviewed considered underdeveloped innovation infrastructure and weak ties between industry and academia sectors major challenges for development of innovations in the Bratislava Region. The regional government established no technology/innovation agencies providing advisory or technological services to start-ups and/or technology companies. The stakeholders also noted lack of strong policy focus by the government of the region. The regional government was busy with day-to-day matters related to regional secondary schools and transport. Long-term development visions and tasks were rather neglected. The region, for example, has established no regional innovation council and/or platform. The regional government co-founded the Danube Knowledge Cluster, but withdrew later. It also was unable to support drafting new regional innovation strategy.

Innovation policies had so far limited impact on business innovation related investment and/or increases in scientific productivity. Direct funding aimed at science base is much more important than funding of business innovation and/or indirect funding via tax incentives and innovation support services. There is no regional budget for innovation and R&D policies and all funding is provided from the state budget (about 90%) and EU resources (roughly 10%). Most EU resources are channelled to building and modernising research infrastructure and supporting centres of excellence. They expand the types of support provided through (central) government policy instruments.

Co-operation by the business sector, higher education institutions (HEIs) and the Slovak Academy of Science (SAS) in regional innovation system remains weak. The HEIs derive

expected. The central, regional and local governments discussed details on numbers of the potential RICs, their legal form and activities. Regional governments, for example, should play a significant role in establishing and running RICs. These governments, however, accounted for limited legal powers in the field of innovations and low financial resources. It was originally understood that the ERDF and the state budget would provide approximately 90% - 95% and the founding members (regional and local governments, universities and companies) the remaining 5%-10% of the total budget. The MEC, however, was unsure how to implement Article 55 of Council Regulation (EC) No 1083/2006. Should the RICs generate revenues, they would have to be established as limited liability companies. Founding members would have to reimburse approximately 50 % of the costs. The regional and local governments, universities and companies refused to become the RICs founding members under such conditions. The MEC asked the MESRS to introduce the RICs project under different legal framework (allowing 95% support by the ERDF) and provide the necessary finance. The MESRS did not agree with the proposal and the RICs project effectively stopped (the MEC and MESRS are run by different parties of the government coalition). The MLSAF launched a call for training RICs managers in 2o10, but whether the RICs would be established remained unclear.

[6] The competence centres should strengthen links between Slovak higher education institutions (HEIs) and the Slovak Academy of Sciences (SAS), and businesses. The HEIs and SAS are the centres' founders. Unlike RICs the competence centres do not associate some key stakeholders of regional innovations (regional and local governments, industry and employee associations, etc.). Calls for establishing competence centres are supported from the Operational Programme Research and Development and relate to non-Bratislava regions.

their main income from numbers of students and, by a lesser degree, from research grants. They concentrate on teaching and have low motivation to co-operate with local businesses. The SAS receives bulk of funding from the state budget and orientates on basic research. Regional SMEs mostly compete with low costs of inputs and show limited interest in co-operation in research with the HEIs and SAS. The stakeholders suggested regional policy mix should allocate more resources to policy measures supporting

- regional innovation governance (RICs or similar bodies, technology platforms and regional innovation councils);
- evaluation culture and policy intelligence tools (including regional technology foresight);
- networking schemes for industry and academia sectors;
- innovation culture in enterprises.
- As for the regional technological specialisation, IT services and manufacture of 'smart car parts' were considered most promising fields.

3.3 Best practices in regional innovation policies

History of innovation policies is rather short in Slovakia. All innovation policy measures are designed by the central government bodies and implemented by the central government agencies. Good practice case selected in this chapter does not reflect top-of-the-range innovation policy, but provides an example of pragmatic solutions addressing existing needs in all regions of small and less developed Member State (including the Bratislava Region).

The Support for Purchases of Innovative Technologies and Creation of Quality Management Systems Scheme (SPIT & CQMS, former Trendchart SK 02 measure), may be considered a case of "best practice" in the Slovak innovation system as it was able to support a large number of small and medium-sized companies. The original scheme was \running in 1999-2006 and had two parts. The SPIT part of the scheme paid for costs related to the purchase of tangible investment assets (costs of machinery, tools and equipment). The CQMS part of the scheme paid for costs for the purchase of intangible investment assets related to introduction of organisational innovations (ISO certificates in particular). The maximum amount of support to introduction of a quality management system was €2500, or 50% of the total project budget. The CQMS part of the scheme probably was more important than the

SPIT part. The scheme has supported a great number of small and medium-sized companies. From 1999 to 2005, some 418 projects were supported with €1.295m. Grants paid by CQMS were relatively small, but, unlike grants approved under the Structural Fund schemes, were easy to access and did not distort market operations. Despite their small size, CQMS grants were important tools to increase the competitiveness of Slovak SMEs. Only one fifth of SMEs had introduced quality management systems before the scheme was launched. Organisational innovations are becoming at least as important for increases in competitiveness levels as technological ones. Slovakia has a small and open economy (total volume of exports of goods and services accounted for some 85% Slovak GDP in 2009). The ISO certificates, for example, were a necessary tool for tapping export markets and/or becoming suppliers of the multinational companies.

The main reasons for identifying CQMS as an example of good practice include the programme's longevity, its popularity among the users and its flexibility. Unlike some other schemes, SPIT & CQMS addressed real demand for innovation among SMEs and was popular with the users. The scheme accounted for relatively simple administrative procedures, was quite flexible and took account of user feedback. In 2004, for example, the scheme management was able to amend the eligibility criteria, thus allowing a larger number of participants to access the scheme.

The former SPIT-CQMS scheme was financed from the state budget in period 1999-2006 and inspired two schemes funded from the Structural funds in period 2004-2006 (former Trendchart ASMES SK 09 and SISME SK 07 schemes), plus two new policy measures (SK 12 and SK 13) in planning period 2007-2013. The SPIT-CQMS scheme also re-emerged in the Operational Programme Bratislava Region (OPBR). The policy measure 2.1 'Innovation and technology transfers' of the programme distributes grants supporting organisational innovations and intellectual property rights in the Bratislava Region SMEs. The ERDF allocates €3.01m to projects supporting introduction of the quality management certificates, patent applications, industrial designs, etc. The measure repays up to 95% of eligible costs (€100,000 maximum), but average support is €25,000. The latest available OPBR interim report (June 2010) states that contracts with some 30 applicants and worth €769,836 were signed since 2008.

3.4 Innovation policy mix: major support measures

Portfolio of innovation support measures by large degree overlaps with measures supported from the European resources in Slovak regions. Regional governments were established as late as in 2002 and their competences in research and innovation were minimal. First draft of the National science and technology policy appeared as late as in 2002. Key Slovak government documents on research and innovation the 2007 Innovation Strategy (MEC 2007), the 2008 Innovation Policy (MEC 2008) and the 2997 Long-term Objective of the State S&T Policy up to 2015 (MESRS 2007) use to set targets on national level. They also are fairly generic and do not set limits for regional allocations of public funds.

Since 2004 portfolio of innovation support measures has been heavily dependent on the European assistance in Slovakia. The European assistance to research and innovation has strong regional dimension in Slovakia. The Bratislava Region does not qualify for Objective 1 assistance and receives lower per capita funding than rest of Slovakia. Structure of allocation, however, is quite different for the Bratislava Region and rest of the country. The Bratislava Region allocates significantly higher shares of support to policy measures aimed at building knowledge-based economy:

Two single planning documents (SPD 2 and SPD 3) supported technology transfers, business and technology incubators, organisation innovations and human resources in higher education, public research sector and life-long learning with €103.2m (of which €39.5m by the ERDF and ESF) in planning period 2004-2006 in the Bratislava Region. Policy measures supporting knowledge-based economy accounted for 46.1% of total spending by the SPD2 and SPD3 in the Bratislava Region.

Portfolio of innovation policy instruments in planning period 2007-2013 essentially resembles to that in previous planning period, but (i) receives considerably higher assistance from the European resources (€389.2m out of total €457.9m) and (ii) accounts for higher share of R&D investment in the Bratislava Region. Contribution by the regional government to total spending by Structural Funds is limited to 5% of total spending. Policy measures supporting knowledge-based economy account for some 80% of total spending by Structural Funds in the Bratislava Region in period 2007-2013.

The most significant policy measures aimed at knowledge based economy are contained in the Operational Programme Research & Development (OPRD). The OPRD has seven priority axes, two of which refer to the Bratislava Region.

The priority axis 3 'Infrastructure of research and development in the Bratislava Region' has objective 'modernisation and improvement of quality of technical infrastructure for research and development in the Bratislava Region in 2007-2013 with a view to increase the ability of research and development institutions to efficiently cooperate with renowned research institutions in the EU and other countries, as well as with entities of the social and economic practice through the transfer of knowledge and technologies'. The priority axis allocates €148.7m, of which €126.4m is provided by the ERDF and €22.3m by the Slovak state budget. The axis contains policy measure 3.1 'Modernisation and building of technical infrastructure for research and development in the Bratislava Region'. It supports following activities:

- modernising R&D infrastructure and equipment of higher education institutions, research institutions, research centres and other R&D organisations;
- building and modernising research infrastructure in areas of strategic importance for the further development of the economy and the society;
- building, modernising and sustainable development of ICT infrastructure of research and development in R&D organisations, including the support to broadband networks.

The priority axis 4 'Support to research and development in the Bratislava Region' has objective 'improving the efficiency of the system for the support of research and development so that it contributes to the growth of competitiveness, redressing of regional disparities, creation of new innovative (high tech) small and medium-sized enterprises and jobs creation in the Bratislava Region'. The priority axis allocates €223.1m, of which €189.6m is provided by the ERDF and €33.5m by the Slovak state budget. The axis contains two policy measures.

The policy measure 4.1 'Support to networks of excellence in research and development as the pillars of regional development and support to international co-operation in the Bratislava Region' is aimed at following activities:

- supporting exchange and joint research programmes carried out by R&D and educational institutions in the Bratislava Region in co-operation with renowned foreign R&D institutions;
- supporting important research and development projects in the Bratislava Region in areas of strategic importance for the further development of the economy and the society;
- supporting co-operation between regional structures and R&D organisations, including co-operation between R&D institutions and secondary schools in the Bratislava Region;
- supporting international co-operation in research and development;
- supporting return of Slovak scientific workers working abroad to Universities and research institutions in the Bratislava Region;
- supporting human resources in areas of strategic importance for the further development of the economy and society.

The policy measure 4.2 'Transfer of knowledge and technology from research and development into practice in the Bratislava Region' aims at following activities:raising innovation culture in the academic sector in the Bratislava Region by incubators;

- supporting applied research and development in the Bratislava Region;
- improving the quality of internal management of transfer of knowledge and technology from the academic sector in the Bratislava Region into practice;
- increasing use of intellectual property rights by public research and development organisations in the Bratislava Region;
- building and supporting regional innovation centres in the Bratislava Region.

The Operational Programme Bratislava Region (OPBR) contains priority axis 2 'Knowledge-based economy'. The global goal of the axis reflects good chances of the Bratislava Region for developing competitive economy: 'supporting competitiveness of the region through support to innovations and accessing information and communication technologies (ICT) mainly in the field of small and medium enterprises (SMEs)'. The axis has

total budget of €44.2m, of which €37.6m is provided by the ERDF and €6.6m by the Slovak state budget. The axis contains two policy measures: 2.1 'Innovation and technology transfers' and 2.2 'Information society'. Core indicators for measure 2.1 include (i) number of supported projects (50); (ii) number innovative and technology-based start-ups (10), and (iii) numbers of projects aimed at collaboration by SMEs and public research organisations (20). The measure 2.2 has one core indicator 'number of supported projects aimed at increase in information society' (75). Innovative SMEs are main target groups and beneficiaries of the OPBR. Typical grants supported introduction of the certificates of the quality management systems, purchases of innovative technology equipment and ICT systems by SMEs.

4. CONCLUSIONS: POLICY CHALLENGES AND OPPORTUNITIES

4.1 Policy challenges

The 2004 Regional Innovation Strategy (RIS) assessed strengths and weaknesses of the Bratislava Region in early 2000s. It noted geographical proximity of substantial capacities in automotive industry. The Bratislava Volkswagen factory, for example, was the largest Slovak enterprise in 2004. The Peugeot-Citroen factory was based 50 km away in the Trnava city and Hyundai-Kia factory 200 km away in the Žilina city. Some 13 automotive industry plants (with planned output 1 million cars per year) operated in area of 500 km around the Bratislava city. The region accounted for one of the highest concentration of the automotive industry capacities in Europe. The 2004 RIS assumed specialisation of R&D and innovation capacities in automotive industry and suggested establishing automotive cluster. Research and innovation activities aimed at automotive industry could be later complemented by activities aimed at car electronics and IT solutions for car industry. The government of the Bratislava Region, however, showed limited interest in innovation development and provided no support to establishing automotive clusters and/or technology parks by 2010 (the Trnava Region and Trnava city proved more understanding for innovation development and established the 'Autoklaster West' in 2007).

The Department of the Regional Development Strategy (DRDS) of the Bratislava Region government arranged an informal meeting of selected stakeholders in regional innovation development in 2009. The meeting was attended by the representatives of regional

Universities, public research organisations (the Slovak Academy of Sciences, SAS) and the Slovak Innovation and Energy Agency. The meeting should indicate likely future patterns in regional specialisation in R&D and innovation. The meeting did not produce expected outcomes. The Department of the Regional Development Strategy assumed the Universities and SAS to take lead in defining main areas of R&D specialisation. The Universities and SAS, on the other hand, assumed this was job of the regional government. Smart specialisation (if any) is likely to be initiated by market forces rather than public research policies in the Bratislava Region (sources: personal communications with the DRDS and SIEA managers).

The greatest challenges for development of innovations have been generated by factors outside the scope of the explicit innovation policies in the Bratislava Region. Challenges posed by low wages and dual structure of the Slovak economy are more likely to be addressed by market forces and framework-supportive regulations than interventionist policies. With wage levels rising, companies will have to look for other competitive advantages than low costs of labour. Demand on innovative solutions in the Bratislava Region has been relatively low, but is likely to rise in the future.

4.2 Policy opportunities

As for the supply-side support measures, policies aimed at elitist university education and high quality research may help to generate pools of highly professional human resources. Population ageing is likely to decrease numbers of tertiary students and regional HEIs and the SAS will have to look for new sources of income in next decade. Co-operation with local business and life-long learning programmes seem likely candidates for diversification of income activities by the HEIs and SAS. The Bratislava region may develop a rich network of market institutions, establish well-operating associational economy and increase its ability to attract and retain sophisticated production (Cooke and Morgan 1998). As for the ‘smart specialisation’ (Forray et al 2009) the Bratislava Region may invest in development of the applications of general purpose technology, in car and IT industries in particular. High current levels of investment in research and human resources seem adequate to start smart specialisation in the Bratislava region.

Underdeveloped innovation governance is a considerable weakness of the Bratislava Region. Regional government should pay more attention to issues related to long-term competitiveness of the region. The regional government may consider following recommendations:

- drafting new regional innovation strategy and integrating innovation policy mix into broader strategies of regional development;
- establishing permanent regional innovation council and/or platform for improving innovation management, coordination and monitoring; these bodies should include representatives of business, and central, regional and local governments;
- improving co-operation with branches of multinational companies established in the region; the multinationals could increase shares of sophisticated products and services produced in the region;
- ensuring that the RTDI initiatives supported by the Structural Funds primarily aim at projects with a high innovation potential;
- paying more attention to development of impact assessment techniques and procedures, as well as to the training experts in evaluation procedures.

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