Strategic Evaluation on Innovation and the Knowledge Based Economy in relation to the Structural and Cohesion Funds, for the programming period 2007-2013

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LOGO TECH Innovation & Development

Report produced by:
Mr. Ruslan Stefanov,
Center for the Study of Democracy
Mrs. Zoya Damianova,
Applied Research and Communications Fund
Ass. Prof. Milanka Slavova,
University of National and World Economy

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Executive Summary

Bulgaria has recorded sound economic recovery and growth during the period 2000 – 2005. The Bulgarian economy grew robustly at an average rate of 5% annually, i.e. twice higher than EU-25. Bulgaria's economic growth was fuelled by capital investment and export growth to EU trading partners. Unemployment[1] fell from 17% in 2000 to below 10% in 2005 and productivity grew in line with GDP. Still in 2005, Bulgaria's GDP per capita at purchasing power parity (PPP) and productivity stood at 32% and 32.5% of EU 25 average, respectively[2].

The Bulgarian Law on Regional Development specifies **6 planning regions** in terms of implementation of the country's regional policy: Yugozapaden (South West), Yuzhen Tsentralen (South Central), Yugoiztochen (South East), Severozapaden (North West), Severan Tsentralen (North Central) and Severoiztochen (North East). The current analysis shows that all Bulgarian regions fall under the "convergence" priority of the Cohesion Policy, i.e. their per capita GDP is less than 75% of Community average. In terms of knowledge and innovation there is a clear concentration of resources and capacity in the Yugozapaden region, which hosts the capital city Sofia while Severozapaden (North West) and Yugoiztochen (South East) region lag behind national average. **Yugozapaden region** stands out from the other Bulgarian regions as a member of cluster 5 "Ageing Academia". The other five Bulgarian regions belong to the cluster 8 "Rural Industries". The major innovation and knowledge economy weaknesses that are typical for the country and all regions are the very low business R&D investments, low and ineffectively channelled public R&D expenditures, high share of unproductive agricultural sector, disturbing fall in secondary education quality, etc. In terms of sectors Bulgarian economy is currently dominated by low-tech production with a low level of uptake of new knowledge and innovation though some high tech sectors and high value added services have begun to emerge in the past 1-2 years (e.g. pharmaceuticals, electronics, telecommunications, etc.)

According to the latest European Innovation Scoreboard 2005, Bulgaria was among the countries that were "further falling behind" in their overall innovation performance compared to EU-25 average. Bulgaria has just started on its way to a knowledge-based innovation economy from a very low level compared to EU-25 average and faces a number of challenges mostly connected to innovation "outputs" and the more efficient utilization of innovation "inputs"[3].

Until the country's accession into the European Union, the National Phare Programme can be seen as the major predecessor to the ERDF knowledge economy and innovation actions of the Cohesion policy. The National Phare Programme has been designed to meet broad objectives, which represent the areas in which the Government of Bulgaria and the European Commission believe that Phare support can most helpfully assist Bulgaria to meet the accession criteria: economic reform and the

[1] Bulgarian National Statistical Institute
[2] Eurostat estimates.
[3] European Innovation Scoreboard.

acquis, economic and social cohesion, strengthening public administration, and ethnic integration and the civil society. The measures targeting innovation fall under the economic and social cohesion objective and for the first time such measures were implemented under the 2000 Phare National Programme. The major contribution of the National Phare programme to the development of Bulgaria's innovativeness and knowledge-based economy in the period 2000 – 2006 has been the payment of entry tickets for the participation of Bulgaria in the EU-supported programmes in the field of research, technology development and innovation, and vocational training. In terms of direct financial support for RTDI Phare programme funds have been limited, and only few projects have had a focus on innovation. It was only after the National Innovation Strategy was approved by the Government of Bulgaria in the fall of 2004 that innovation – support projects were foreseen under the Financing Memorandum for the 2005 National Phare programme – *Support to the implementation of the National Innovation Strategy* and *Cluster Development Initiatives*. Both projects are to commence in 2006, and their outcomes and impact can only be analysed at a later stage. There is no regional dimension in terms of support to innovation in the Phare projects implemented so far in Bulgaria.

Key conclusions from the analysis:

- Bulgaria suffers from low level of gross expenditures on R&D. Public R&D spending does not leverage private sector resources.
- There is weak collaboration among National Innovation System actors and the links between science and business sector are missing.
- The country has not yet developed a regional dimension to its national innovation policy and capacity at regional level for innovation governance and coordination is limited.
- The project preparation capacity for Structural Funds' management at beneficiary level is low: municipalities, regions and the private sector.
- Bulgaria needs to ensure better coordination between policy priorities, the Operational Programmes and the specific measures contained in them.

Strategic focus for the future support from the Structural Funds:

- Increase the overall level of public R&D financing through competitive funding schemes and alternative financial instruments.
- Strengthen the national research potential through support to research infrastructure and enhancing industry – science links.
- Enhance the development of a vibrant business, technology brokerage and innovation support system, clustering and networking initiatives
- Develop the regional dimension of innovation policy governance through implementing regional innovation strategies and project pipelines for innovation and knowledge-based economy and support RIS governance structures
- Improve policy decision – policy implementation coherence in planning and monitoring (national – regional and between various sectoral policies)
- Develop quality human capital with regard to innovation

1 Introduction

In March 2000, the EU Heads of State and government launched an ambitious political initiative for the European Union to become "the most competitive, dynamic, knowledge-based economy by year 2010". The agenda, which has become known as the 'Lisbon Strategy', has included a broad range of policies and regulatory measures to achieve this goal.

At the 2005 Spring Council of European Union, Heads of State and government concluded that all appropriate national and Community resources, including those of Cohesion Policy, should be mobilised in order to renew the basis of Europe's competitiveness, increase its growth potential and its productivity and strengthen social cohesion, placing the main emphasis on knowledge, innovation and the optimisation of human capital. In short, the Council recognised that while some progress has been made since 2000 in moving towards the goals enshrined in the Lisbon Strategy there remains a need to create "a new partnership for growth and jobs"[4]

In launching the discussion on the priorities for the new generation of cohesion policy programmes, the Commission published on 6 July 2005 draft Community Strategic Guidelines entitled "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013". One of the specific guideline is to improve the knowledge and innovation for growth. More specific areas of interventions, which are proposed by the Commission, include: improve and increase investment in RTD, facilitate innovation and promote entrepreneurship, promote the information society for all, and improve access to finance.[5]

Innovation is an important factor in releasing the potential of the Lisbon agenda. The knowledge captured in new technologies and processes can drive growth and competitiveness and create new jobs. But knowledge must be treated as part of a wider framework in which business grow and operate. Developing knowledge-based economy requires adequate levels of investment in R&D, education, and ICT as well as creating a favourable environment for innovation.

Less developed areas of the Union are also confronted with this new competitiveness challenge. Increasing cohesion leads to improvements in living standards and the reduction of economic and social disparities, which depend to an important extent on increases in productivity. Increasing competitiveness implies economic change through the introduction of new technologies and new methods of production as well as the development of new skills. Innovation is at the heart of this process. Technological and organisational change and new demands generated by rising income levels and factors which create new economic opportunities and therefore, contribute to the growth potential of these countries.

Structural Funds are the main Community instruments to promote economic and social cohesion. In the past and current programmes, they have contributed to

[4] Communication to the Spring European Council (2005) "Working together for growth and jobs: A new start for the Lisbon Strategy", COM(2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm.

[5] Communication from the Commission (2005) "Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013", COM(2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm.

enhance the research potential and innovation in businesses and to develop the information society, particularly in the less developed areas. Cohesion policy has also promoted the development of regional innovation strategies and other similar initiatives in the field of the information society.

The overall objective of the strategic evaluation study, as set out in the terms of reference, is that the study should provide conclusions and recommendations for the future of Structural Fund and Cohesion policy. In particular, the Strategic Evaluation will be used to prepare the negotiations with the Member States for 2007-13, to prepare the next operational programmes and to provide input into the 4th Economic and Social Cohesion Report.

In line with the tender specifications, this country report addresses the following issues:

- Analysis of the current situation in the field of innovation and the knowledge-based economy at national and regional level. For the national level, performance is compared to the average performance for the EU25 Member States plus Romania and Bulgaria; and at regional level, where possible given available statistics, compared to a typology of EU regions;
- Lessons from the past and current experience of implementing innovation and knowledge economy measures in the Structural Funds, both in terms of priorities and strategic approaches; as well as in terms of operational implementation;
- Main needs and potential for innovation in the eligible regions drawing on available studies, strategy development and future and foresight studies; and
- Recommendations on main investment priorities for Structural Funds over the programming period 2007-2013 and their implications for regional development.

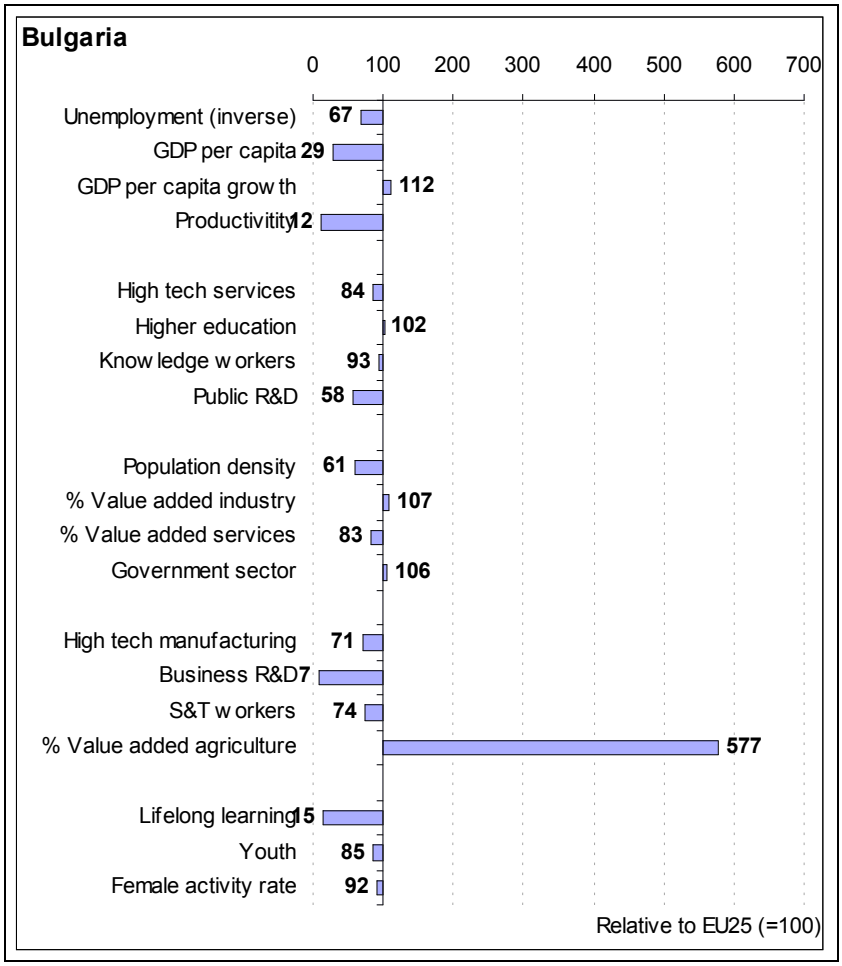
2 Investing in innovation and knowledge: a comparative overview of regional performance

This section provides a synthetic overview of the relative performance of the country, and where relevant main regions, with respect to the EU25 average for a number of selected key structural indicators of innovation and knowledge. The analysis aims to identify **main disparities and needs** at national, and wherever possible, regional level with a view to supporting the definition of priorities for future Structural Funds interventions (see sections 5 and 6 of this report).

2.1 Country overview: innovation and the knowledge economy

Exhibit 1 below provides a snapshot picture of the relative position of Bulgaria compared to the EU-25 average for a series of key knowledge economy indicators.

Exhibit 1: Relative country performance for key knowledge economy indicators



Source: calculations of MERIT based on available Eurostat and national data from 2002-2003 depending on indicator. Detailed definitions and data for each indicator are provided in Appendix B.

Although Bulgaria has recorded sound economic recovery and growth during the period 2000 – 2005, it still lags behind the EU-25 level of knowledge economy development in all but four indicators (Exhibit 1). During the last five years, the Bulgarian economy grew robustly at an average of 5% annually, i.e. twice higher than EU-25. Unemployment[6] fell from 17% in 2000 to below 10% in 2005 and

[6] Bulgarian National Statistical Institute

productivity grew in line with GDP. Still in 2005, Bulgaria's GDP per capita at purchasing power parity (PPP) and productivity stood at 32% and 32.5% of EU 25 average, respectively[7]. Bulgaria's economic growth was fuelled by capital investment and export growth to EU trading partners. The main growth drivers in Bulgaria during the period 2000 – 2005 have been:

1) the recovery of manufacturing production following privatization and restructuring. **On average manufacturing gross value added (GVA) grew faster than services and agriculture GVA**;
2) the rapid rise of financial services (credit to the private sector more than doubled in the past 5 years surpassing 40% of GDP in 2005[8]);
3) booming construction and real estate market fuelled by a rapidly expanding tourism sector and the impending EU accession;
4) expanding telecommunications sector following privatization and deregulation (mobile phone and Internet penetration more than quadrupled reaching 48% and 20.4% in 2005, respectively[9]).

Bulgaria's economic growth during the period 2000 – 2005 has been based primarily on rebuilding lost capital during the transition recession and increasing the efficiency of utilization of existing resources through privatization, foreign investment, and deregulation. It was only in 2004 – 2005 that the country neared its potential growth levels and the characteristics of a mature market economy. Throughout this period, Bulgaria's manufacturing, and hence the country's industrial production and employment, **has been dominated by low- to mid-tech economic sectors. Bulgarian competitiveness has been based on homogenous, labour- and material-intensive products, which rests on cheap labour rather than on innovation[10].** Thus, the sound economic growth of recent years was accompanied by a reduction in unemployment and a somewhat slower growth in productivity. However, in 2004 – 2005 there are signs that the Bulgarian economy, though somewhat later than its peers in Central Europe, moved towards higher-value added manufacturing and services. Bulgaria is showing above average performance in ICT expenditure and average performance in employment in high-tech services. Exports of high-technology products have increased by 30.6% in 2004 on a yearly basis though from a very low level – 2.9% of total exports[11]. The driving sectors behind such an increase are to be found in IT (software development), pharmaceuticals, agrochemical industry[12], etc. These have been sectors with high foreign investment and low local labour cost structures. Although on average Bulgarian companies are four times less innovative than EU-15 ones, there are sectors that perform relatively better. In Computer Technologies, Architecture and Engineering, R&D the share of Bulgarian companies with innovative activities is only two times lower than EU-15 average. In Financial Intermediation the ratio is 1/3.[13]

[7] Eurostat estimates.
[8] Bulgarian National Bank
[9] *e-Bulgaria* Report 2004 (in English) and 2005 (in Bulgarian), Applied Research and Communications Fund
[10] *Innovation.bg*: Measuring the Innovation Performance of the Bulgarian Economy, Applied Research and Communications Fund, 2006
[11] European Innovation Scoreboard 2005, Comparative Analysis of Innovation Performance, European Trend Chart on Innovation, 2006
[12] Innovation Potential of the Bulgarian Economy, Vesti Bulletin No. 4/2004, Bulgarian Innovation Relay Centre
[13] *Innovation.bg*: Measuring the Innovation Performance of the Bulgarian Economy, Applied Research and Communications Fund, 2006, based on data from Eurostat

According to the European Innovation Scoreboard, Bulgaria was among the countries that were "further falling behind" in their overall innovation performance compared to EU-25 average. Bulgaria has just started on its way to a knowledge-based innovation economy from a very low level compared to EU-25 average and faces a number of challenges mostly connected to innovation "outputs" and the more efficient utilization of innovation "inputs"[14].

Similar to some of the EU-10 new member states from Central Europe, Bulgaria inherited from the 1980s a strong education system with a very high degree of both secondary and tertiary education attainment among the population. Not surprisingly at a level of 102, higher education in Bulgaria performs better than the EU-25 average (Exhibit 1). Two disclaimers apply to this performance: (i) Bulgarian education has lost a lot of its quality during the years of transition in the 1990. This is particularly true of secondary education, for which data shows an almost double decline in 8th-graders' performance in science and math in 2003 compared to 1995[15]; (ii) due to the central planning heritage Bulgarian higher education still cannot prepare students adequately to meet market demand[16]. The latter is even more worrying as it is coupled with a very low life-long learning participation rate (1.3% of the population aged 25 – 64), which could have compensated for such deficiencies (Exhibit 1). One of the areas of persisting high performance of Bulgarian higher education is S&T graduates and in particular, computer science graduates. Though, the level of S&T graduates of Bulgaria is only 68 relative to EU-25 average, it is higher than the average for EU-10 and enrolment continues to grow. This seems consistent with higher than average ICT spending in Bulgaria. Still, the science profession remains unattractive in Bulgaria due to the low income level and the obsolete research infrastructure. This is seen by the very low level of new PhDs compared to EU average and by the decreasing trend in the numbers of S&T workers that had been observed since 1996. The latter are predominantly employed in government sponsored public institutions (Bulgarian Academy of Sciences and universities) with the private sector playing a disproportionately small role.

Overall expenditure on R&D in Bulgaria has remained at 0.5% of GDP on average, way below EU-25 levels in the past five years. **This is particularly true for private R&D expenditure, which is the weakest knowledge-economy performance indicator for Bulgaria (Exhibit 1).** Private R&D expenditure in Bulgaria is barely 20% of total R&D outlays. Though, as a share of GDP public R&D expenditure is comparable to peers from Central Europe, such as Czech Republic and Slovakia, in absolute terms it is rather low to sustain the still over-sized public S&T system inherited from central planning. It is expected that with the development of a coherent national innovation policy after 2004 and the continued strengthening of the Bulgarian science policy, including Bulgaria's participation in ERA, both public and private expenditure will rise in coming years. An optimistic scenario would be an increase of R&D expenditure in Bulgaria to 1.2 – 1.3% of GDP by 2013 with the private sector accounting for some 40 – 50% of it. Thus, Bulgaria faces the triple challenge to increase the levels of both public and private spending on R&D, to upgrade university curricula to meet the market demand and to reform the system of the secondary education.

[14] Ibid.

[15] Trends in International Mathematics and Science Study (TIMSS), International Association for the Evaluation of Educational Achievement, 2004

[16] *Innovation.bg*: Measuring the Innovation Performance of the Bulgarian Economy, Applied Research and Communications Fund, 2006

The innovative potential and performance of the Bulgarian economy as well as the respective policy formulation are very much dependent on the structure of its enterprises by size. According to the report of the Bulgarian SME Promotion Agency in 2003 more than 99% of all enterprises in Bulgaria were SMEs, of which micro enterprises (less than 10 employees) represented 90.8%, small enterprises (10 - 49 employees) – 7.3%, and medium enterprises (50 - 250 employees) – 1.9%.[17] Bearing in mind that Bulgarian micro-enterprises have average employment rates of 2.1 persons and that in terms of assets Bulgarian SMEs are several times smaller than EU SMEs there is a clearly pronounced need for a differentiated innovation policy towards the different classes of enterprises. Thus micro and small companies need seed and expansion capital while small and medium companies require innovation finance, technological upgrade and R&D development[18].

2.2 Regional disparities and recent trends

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables into a small number of factors by means of factor analysis. These factors are:

- **Public Knowledge (F1):** human resources in science and technology combined with public R&D expenditures and employment in knowledge-intensive services is the most important or common variables in this factor. Regions with large universities will rank high on this factor.
- **Urban Services (F2):** The most important variables for this factor are value-added share of services, employment in government administrations and population density. A key observation is that academic centres do not necessary co-locate with administration centres.
- **Private Technology (F3):** This factor is most strongly influenced by business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries.
- **Learning Families (F4):** The most important variable in this factor is the share of the population below the age of 10. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

In a second step, the 200 plus EU27 regions were grouped into 11 types of regions (see appendix A) displaying similar characteristics by means of a cluster analysis. In the case of Bulgaria the six planning regions[19] fall under Cluster 5 and Cluster 8, and are grouped as follows (Exhibit 1a): (1) **Cluster 5 "Ageing Academia": Yugozapaden region** (South West Planning Region); (2) **Cluster 8 "Rural Industries"**: **Severozapaden (**North West Planning Region**), Severen Tsentralen**

[17] Annual Report on the Condition and Development of SMEs in Bulgaria – 2004, Bulgarian SME Promotion Agency, www.bepc.government.bg

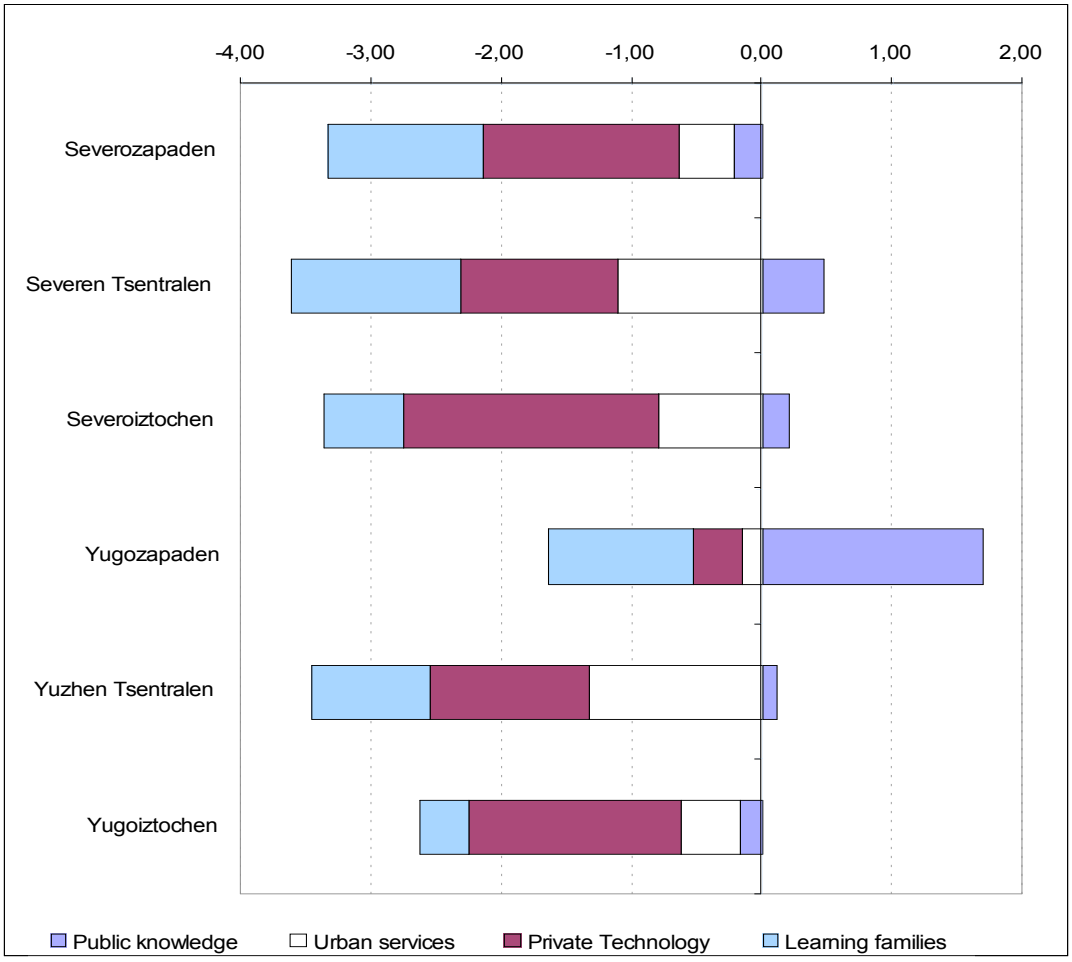
[18] *Innovation.bg*: Measuring the Innovation Performance of the Bulgarian Economy, Applied Research and Communications Fund, 2006

[19] Regional development in Bulgaria is regulated by the Law on Regional Development, promulgated in State Gazette No.14/ 20.02.2004, amended in State Gazette No.32/ 12.04.2005. According to the Law **Six Planning Regions** on the territory of Bulgaria were set up, mainly for the needs of regional planning and the requirements of Bulgaria's accession to the European Union, rather than based on economic principles.

(North Central Planning Region**), Severoiztochen (**North East Planning Region**), Yugoiztochen (**South East Planning Region**) and Yuzhen Tsentralen (**South Central Planning Region).

Regional factor scores of Bulgarian regions follow the broader characteristics of their territorial and demographic development such as population dynamics, arable land, etc. There is a clear cut disparity in the development of only two Bulgarian regions – Severozapaden (the smallest and increasingly agrarian region) and Yugozapaden (the Capital region, which concentrates the highest share of the population). The rest of the regions have a fairly homogenous performance (Exhibit 1b&1c). In terms of knowledge-based economy scores all Bulgarian regions, with the exception of Public Knowledge in Yugozapaden region, share common national specific weaknesses compared to EU 25 average. **These are: low per capita GDP, productivity and private R&D expenditure, high value added locked in agriculture and very low levels of life-long learning.** Thus regional innovation policy need to be less differentiated regionally and should reinforce national innovation policy to address areas of common concern to all Bulgarian regions.

Exhibit 1a: Regional factor scores per region



Source: MERIT. The bars are stapled factor-scores showing the deviation (1=standard deviation) per factor from the average of 215 EU regions (0.00). The longer the bar, the bigger is deviation. Detailed regional scorecards can be found in Appendix B.

Exhibit 1b: Administrative -Territorial Zoning of Bulgaria with Six Planning Regions (NUTS 2 Level) and 28 Districts (NUTS 3 Level)

Source: Cadastre Agency

Exhibit 1c: Planning Regions in Bulgaria – Main Characteristics (2003)

Planning regions	Area 2003 (km^2)	% of the total area of the country	Population 2003 (persons)	% of the National total	Population Density (persons/km^2)	Arable land 2003 (dca / capita)	Number of districts	Number of municipalities
Republic of Bulgaria	**111001.9**	**100.0**	**7801273**	**100.0**	**70.3**	**6.4**	**28**	**264**
Northwest	10288.2	9.3	512593	6.6	49.8	11.9	3	32
North Central	18320.0	16.5	1165806	14.9	63.6	8.6	5	41
Northeast	19923.4	17.9	1285803	16.5	64.5	9.3	6	49
Southeast	14647.6	13.2	782653	10.0	53.4	8.6	3	22
South Central	27516.2	24.8	1944382	24.9	70.7	5.0	6	68
Southwest	20306.5	18.3	2110036	27.0	103.9	2.5	5	52

Sources: Cadastre Agency; NSI, current demographic statistics

Yugozapaden region (South West Planning Region) is the leading and most developed region in Bulgaria. It performs better than the average for the Aging Academia cluster on a number of variables: in Public Knowledge on all variables but specifically on high-tech services and public R&D; in Urban Services on employment in the government sector; in Private Technology on S&T employment; and in Learning Families on youth and female activity rate. The performance of the region is strongly influenced by the presence of the capital Sofia. The region has a very high concentration of publicly funded universities and research institutes. It hosts more than half of the 42 universities in Bulgaria and receives 80% of the government expenditures on R&D.[20] The universities in the region educate 48% of all Bulgarian students and the share of people with tertiary education is higher than the average for both the cluster and the country. Most of the institutes of the Bulgarian Academy of Sciences, the biggest publicly funded science and R&D centre in the country, are also located in the Yugozapaden (South West) region. As Sofia hosts the Government of Bulgaria the region concentrates the bulk of the country's government sector employment. Yugozapaden region scores higher on Urban Services, Private Technology and Learning Families compared to the other five regions in Bulgaria.

The main weaknesses of the region are **low business R&D expenditures, high-tech manufacturing and life-long learning.** The low labour cost and productivity do not stimulate businesses to innovate and invest in R&D. Though the region concentrates the highest Bulgarian R&D potential, technology transfer from research organisations to the business is occasional, which hampers innovative development. The number of spin-off companies is low. Therefore, the competitiveness of the regional economy and particularly of SMEs outside Sofia is low. A major weakness of the region is the inter-regional disparity in the scientific and economic development of the capital Sofia and the other districts. Sofia concentrates 83% of the population in the region with tertiary education (1/3rd of the whole Bulgarian population with tertiary education) and provides 87% of the net revenue from sales in the region. The rural areas and the areas in decline have a monocultural economic structure and an old business infrastructure. The region needs strengthening and encouraging of innovation networking between actors and among districts.

The other five regions - Severozapaden, Severen Tsentralen, Severoiztochen, Yugoiztochen and Yuzhen Tsentralen, are classified under cluster 8 "Rural Industries". However, they differ in their innovative performance. Though differences are not well discernible at the current stage of development the closest to the average for the EU features of the Rural Industries cluster are Severozapaden and Yugoiztochen regions. All regions perform better than EU25 average for the cluster in public knowledge, which is due to the presence of many publicly-funded universities. The highest concentration of universities is in the Severen Tsentralen (North Central) region, which also has a higher score than EU25 in the high- and medium-tech manufacturing. Due to the presence of large state monopolies, the Nuclear Power Plant Kozlodui in Severozapaden and the sea port in Yugoiztochen region, they perform closer to EU 25 average in Urban Services than the typical Rural Industry region. Disparities between the regions require a differentiated regional innovation policy. While Severen Tsentralen and Yuzhen Tsentralen need more targeted support

[20] Regional Plan for the Development of Jugozapaden (South West) Planning Region for the Period 2007-2013, Ministry of Regional Development and Public Works, December, 2005; National Regional Development Strategy of the Republic of Bulgaria 2005-2015, Ministry of Regional Development and Public Works, 2005. For more information see Ministry of Regional Development and Public Works, www.mrrb.government.bg/pdocs/doc_1415.doc

for upgrading educational and R&D institutions and linking them to industry, the rest of the regions require a more general innovation development approach.

The main weaknesses of the Bulgarian regions included in the cluster Rural Industries are similar to the region included in Ageing Academia. **All of them have low scores in business R&D expenditures and life-long learning. In Rural Industries regions the share of public R&D spending and the high-tech services employment is also lower compared to the Yugozapaden (South West) region and the EU-25.** Despite the relatively high number of educational and R&D establishments the **link between R&D institutes, the educational establishments and businesses is still very weak** and is one of the reasons for the low added value and poor competitive capacity of the production output in the regions.

Exhibit 2: Recent trends per region in key indicators

		Unemployment	Per capita GDP	Industry share	Agriculture share	Population density	Tertiary education	R&D intensity
		1996-2003	1996-2002	1996-2002	1996-2002	1996-2002	1999-2002	1996-2002
		%-pnt ch.	% growth	%-pnt ch.	%-pnt ch.	% growth	%-pnt ch.	%-pnt ch.
EU25		--	--	--	--	--	--	--
Bulgaria		--	5,32	-1,66	-2,94	-5,97	2,91	--
Severozapaden	BG 01	--	6,06	-7,42	7,58	-14,01	1,01	--
Severen Tsentralen	BG 02	--	5,62	-3,17	2,31	-6,50	3,88	--
Severoiztochen	BG 03	--	4,60	-8,52	-3,77	-5,52	1,63	--
Yugozapaden	BG 04	--	6,53	3,95	-1,79	-2,45	3,66	--
Yuzhen Tsentralen	BG 05	--	3,14	-6,70	-3,87	-6,79	3,76	--
Yugoiztochen	BG 06	--	4,81	7,19	-13,62	-6,41	0,48	--

Source: MERIT based on Eurostat data for period indicated

The current disparities and needs in terms of innovation and knowledge economy of the Bulgarian regions are easily discernible in the recent trends of their economic development. ***Industry***, which is the core bearer of innovative performance and faces the highest international competitive pressure, has declined in all Bulgarian regions with the exception of Yugozapaden and Yugoiztochen[21] during the period 1996 - 2002 (Exhibit 3). While this has been the result of a deep financial crisis and subsequent privatisation and restructuring, which eventually resulted in a revival of industrial production in all regions, it clearly demonstrates the leading position of Yugozapaden region. Coupled with the highest average GDP growth, strong tertiary education and only slightly declining population, it shows that the Yugozapaden region has the highest innovative potential. On the other hand, the share of ***agriculture***, which is associated with backwardness and low-tech intensity, has remained high at 11.4%. In the case of Severozapaden regions it has increased by 7.6% during the period 1996 – 2002, which is a clear sign of the economic distress of the region. Agriculture in all the planning regions is faced by a number of restrictions: dispersed ownership, reduced irrigated areas, obsolete facilities, shortage of investments and innovative technologies, deficiencies in the integration with the food-and-beverages industry, etc. The fall in the share of industry has been offset by an increase in the share of ***services***, and in reticular tourism and tourism related services in the Black Sea regions – Severoiztochen and Yugoiztochen. In the Yugozapaden region as well as nationally the most dynamic service industries are telecommunications and financial services. In conclusion, the disparities between Bulgarian and EU regions are considerably larger than the country internal ones. Bulgarian planning regions are some of the least developed in the EU.

2.3. Conclusions: innovation and knowledge performance

All regions in Bulgaria lag considerably behind the EU Member States' regions average performance in terms of technological/innovation potential for growth.

The economic restructuring of the regions continues and they are still in search of the most adequate sustainable economic structure. Despite the predominance of the service sector in the economic structure of all planning regions, this sector is characterized by underdevelopment of the services in support of business. There is room for improvement of the quality of the services in general. In the five planning regions the share of employment in agriculture still remains high. Irrespective of the good educational characteristics of the human resources, the skills level of the workforce is not adequate enough to meet the challenges of a knowledge economy.

[21] This result in the Yugoiztochen region was most probably brought about by a single company – Neftochim, the only active Bulgarian oil refinery, which produces as much as 7% of GDP. It was privatised in 1999 by the Russian Lukoil. Had it not been for this transaction, the share of industry in the region would have also declined.

Exhibit 3: Summary of key disparities and needs per region

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and the knowledge economy
Yugozapaden region ***Cluster 5 Aging Academia*** **Facing weaknesses in terms of business R&D expenditures, high-tech manufacturing and life-long learning.**	• Low level of industry RTDI spending • Workforce skills do not meet adequately the market demand • Low innovation demand by companies • Low share of high-tech companies and low competitiveness of the SMEs in particular those located outside the capital Sofia • Old business infrastructure • Low level of cooperation between the universities and the industry • Lack of investments in educational infrastructure • No VC funds • No regional R&D priorities • No sectoral priorities	• Increase both public and private spending for RTDI, which implies taking strategic decisions for (i) economic restructuring and support to the development of high-tech industries; (ii) reforming the system of public research; (iii) reforming the system of secondary and higher education and (iv) investments in human capital • Life-long learning programmes for the businesses in the region; development of entrepreneurial skills of the young people and the researchers • Support for the development of innovative clusters and rebuilding the science – industry links based on the outcomes of the ongoing RIS initiative (for those sectors that will be identified as the drivers of the regional development)
Severozapaden, Severen Tsentralen, Severoiztochen, Yugoiztochen and Yuzhen Tsentralen regions ***Cluster 8 Rural Industries Facing weaknesses in terms of*** **low levels of business R&D expenditures and life-long learning, poor education - science – industry collaboration.**	• Regional economies dominated by low-tech and medium-tech industries • Not fully upgraded economic structures and high share of employment in and gross value added from agriculture • Not fully developed and insufficiently effective business structure. Underdeveloped practice of public-private partnerships. • Low innovation capacity at the regional level due to shortage of material base for research, lower levels of expenditure for research and development and the weaker links between the R&D centres and businesses in comparison to the South West region of the country • RTDI potential is less in comparison with the South West region • No VC funds • Low level of industry RTDI spending and low industrial innovation demand • Mismatch between companies' demand and skill level of university and high school graduates	• Increase both public and private spending for RTDI • Life-long learning programmes for the businesses in the region; development of entrepreneurial skills of the young people and the researchers • Support for the development of innovative clusters and rebuilding the science – industry links based on the outcomes of the ongoing RIS initiative (for those sectors that will be identified as the drivers of the regional development) • Support for the low-tech and traditional industries in the regions to become more innovative through the introduction of advanced technologies and ICT • Create conditions to attract FDI for upgrading the technological level of industry • Networking with the Yugozapaden region and facilitating technology transfer to the other Bulgarian regions

3 Innovation and knowledge: institutional context and policy mix at national and regional levels

Structural Fund support for innovation and knowledge is contingent on and seeks to generate strengthen the existing national (and/or regional) innovation system[22] in each Member State. In particular, institutional, legal and financial factors in the innovation system can limit the potential for certain types of intervention. Moreover, within the framework of the EU's "Lisbon objectives", Structural Fund interventions are expected to complement and provide added value to national (or regional) policy framework. In some Member States, Structural Fund interventions in favour of innovation and knowledge are marginal with respect to the national investment and policy effort, in others Structural Funds provide a main source of funding for such interventions. In both cases, there is a need to identify relevant national and EU policies which can have an impact on decisions on funding priorities.

3.1 Institutional and legal framework for innovation and the knowledge economy

This section of the report appraises two broad factors that condition the potential for coordinated intervention of EU and national (regional) policies in favour of innovation and knowledge:

- The first concerns the organisational structures of public and semi-public bodies responsible for the design, implementation and monitoring of innovation and knowledge economy policies. In particular, the analysis considers the responsibilities for funding or managing specific types of measures liable to be considered for support under the Structural Funds;
- The second concerns the institutional, legal and financial frameworks, which condition the linkage of national (regional) financing with EU financing.

Similar to other countries of Central Europe who have recently become members of the EU, the institutional development of Bulgaria's research, technological development and innovation system (RTDI) has been shaped by two factors (i) the reform of the large state sponsored science and R&D system and (ii) the development of market-rules-based national innovation system. Thus currently at national level Bulgaria possesses all major public RTDI institutions characteristic of developed European economies. The regional dimension of the RTDI system is still rudimentary and its development is highly dependant on the country's accession to the European Union. The evolution of the institutional setup at national level, particularly in the area of information technologies, has been greatly influenced by political changes in the country, while coordination between public institutions though improving remains somewhat low.

[22] The network of organisations, individuals and institutions, located within or active within national or regional boundaries, that determine and shape the generation, diffusion and use of technology and other knowledge, which, in turn, explain the pattern, pace and rate of innovation and the economic success of innovation.

Exhibit 4: main organisations per policy area.

	Type of organisation	
Policy objectives	**National (&/or regional) public authorities and agencies**	**Key private or non-profit organisations**
Improving governance of innovation and knowledge policies	• Council of Ministers /CoM/ (Council on Economic Growth /CEG/, State Agency on Information Technologies and Communications /SAITC/); • Ministry of Economy and Energy /MEE/ (National Innovation Council /NIC/, Bulgarian Small and Medium-sized Enterprises Promotion Agency /BSMEPA/); • Ministry of Science and Education /MES/ (National Science and Research Council /NSRC/); • Ministry of Regional Development and Public Works	• Business Associations (Bulgarian Industrial Association, Bulgarian International Business Association, Bulgarian Chamber of Commerce and Industry); • Applied Research and Communications Fund /ARC Fund/ (National Innovation Forum, *Innovation.bg* report) • Bulgarian Academy of Sciences /BAS/ (National Science Forum) • The organisations coordinating the implementation of the regional innovation strategy projects
Innovation friendly environment	• CoM (CEG); • MEE (NIC); • MSE; • Ministry of Labour and Social Policy /MLSP/ (National Employment Strategy); • Ministry of Finance /MF/	• Business Associations (through services to member companies and consultations with the Government); • ARC Fund (National Innovation Forum, *Innovation.bg* report)
Knowledge transfer and technology diffusion to enterprises	• MEE (BSMEPA – National Innovation Fund, National Centre for Information and Documentation); • MSE (NSRC – National Science Fund)	• ARC Fund (Innovation Relay Centre); • Business Associations; • for-profit private consulting companies; • Bulgarian Academy of Sciences
Innovation poles and clusters	• MEE (Phare)	• Different cluster initiatives started in the private sector
Support to creation and growth of innovative enterprises	• MEE (BSMEPA – National innovation Fund); • MSE (NSRC – National Science Fund)	• National Business Development Network • various seed financing schemes and private banks
Boosting applied research and product development	• MEE (BSMEPA – National innovation Fund); • MSE (NSRC – National Science Fund)	n.a.

Source: study team based on national/regional policy documents, TrendChart reports, OECD reports, etc.. See appendix C for a detailed definition of the policy categories.

Two ministries develop and implement RTDI policies at national level. The **Ministry of Economy and Energy** (MEE) has only recently developed an innovation component to its work with the adoption in 2004 of the National Innovation Strategy though it has long been responsible for the development of SMEs, the business

environment and foreign direct investment policies. The Ministry has developed an innovation policy consultative body, the National Innovation Council, consisting of representatives of all major government, business, academia, and NGO RTDI actors. The main implementation body of the Ministry's innovation policy is the Bulgarian SMEs Promotion Agency (BSMEPA), which manages the National Innovation Fund. The Fund is the main public financing mechanism for supporting innovation in SMEs and applied research and development of innovative projects. Science and research policy has since 1990 been the domain of the **Ministry of Education and Science** (MES). The National Science and Research Council (NRSC) is the main consultative body to MES, while the National Science Fund is the major funding tool of the Ministry for the implementation of its science and research priorities. Its policy is guided by the National Research and Development Strategy for the period 2005 – 2013, which was adopted by the Council of Ministers but is still pending in Parliament. The Bulgarian Academy of Sciences and Bulgarian universities receive direct budget support for their operations, which is also influenced by the Ministry of Education and science. The regional dimension of the Bulgarian RTDI system is still under construction. Only Yuzhen Tsentralen region (South Central Region) has elaborated a Regional Innovation Strategy[23]. The other five regions will first have their RIS ready in January 2008.

There is a need for further improvement in the coordination mechanisms between MEE and MES with regard to the functioning of the respective councils and funds. The political uncertainty surrounding the adoption of the National R&D Strategy needs to be resolved. The two RTDI strategies prepared by MEE and MES need to be better aligned and coordinated. Additionally the institutional capacity of MEE to formulate and implement RTDI policies needs to be strengthened. In this respect, MES can share its more than 16 years of experience implementing funding programmes and in coordinating national and EU financial resources. The competitive instruments for funding RTDI initiatives (i.e. the funds schemes) need to be expanded, while direct budget subsidies need to be accompanied by better planning, monitoring, and international-indicators-based quality control.

The country has yet to develop a true regional dimension to its RTDI policy with a special emphasis on regional development funding mechanisms to pull together existing regional development organisations. Currently, financing is rather centralized and there are neither structures nor financial means at the regional level to support innovation in the Bulgarian regions. Such structures and mechanisms for financing might be developed under the ongoing RIS projects in all regions of the country. A pilot initiative in the most advanced region – Yuogozapaden in the first years of accession might give a boost to regional innovation financial capacity. There are a number of positive examples of public-private structures set up at the regional level in member-states, which could serve as an example to the Yugozapaden region. The funding mechanism might be institutionalised at the Regional Development Council of the region with support from EU structural funds. It can be managed by a private company under the guidelines of the regional authorities and local NGOs.

[23] For more information see Applied Research and Communications Fund at www.arcfund.net. The region is currently involved in two projects – the 5Schemes (non-financial aspects of innovation) and the Innovation Coach (financial aspects of innovation), under which technical assistance by international experts from the EU15 will be provided for devising specific measures and projects for the implementation of the Regional Innovation Strategy with support from the Structural Funds and the Cohesion Fund.

There are no particular institutional, legal or financial frameworks which condition or limit the linkage of national financing with Community funds, as most Bulgarian legislation has been aligned to relevant European *acquis*. The main long-term challenge to the implementation of community funding would be the development of proper national co-financing mechanisms and the ensuring of necessary co-financing in the presence of a currency board arrangement in Bulgaria as well as the development of local capacity for project financing among the major beneficiaries of EU funding – Bulgarian municipalities and SMEs. Presently there is no national or regional system for co-financing projects approved by the Structural Funds or by EU Framework Programmes. Both the National Innovation Fund and the National Science Fund can serve the purpose but they need to be urgently staffed, their mandate upgraded and their capacity expanded. Both however do not possess any regional expertise, which calls for the creation of additional co-funding mechanisms, which might have a geographical focus rather than a thematic focus.

The private institutional framework for innovation in Bulgaria is still rudimentary and is mainly related to Europe-wide projects or networks, like the Innovation Relay Centres. Though many business associations and public research organisations, such as the Bulgarian Academy of Sciences, universities, etc. have recently established innovation units these are generally understaffed and mainly dealing with fundraising rather than specifically innovation. There is a need to target Structural Funds assistance towards established innovation centres with proven track-record with European programmes so as to ensure preservation and concentration of scarce knowledge and expertise in the country. At the same time knowledge diffusion out of existing centres should be encouraged. This can be done through stimulating cooperation and networking with the Innovation Relay Centre, Euro-Info Centres, etc.

3.2 Policy mix assessment

This section provides a summary overview and analysis of the national and regional policy mix in favour of innovation and knowledge in which the Structural Fund interventions take place. The analysis is conducted with respect to seven broad categories of objectives of innovation and knowledge policies (see appendix C for an explanation of each category).

Measures identified per category of the policy objectives are then further sub-divided in terms of the direct beneficiaries of funding (or legislative) action. To simplify, the report adopts three broad types of organisation as targets of policy intervention:

- Policies supporting academic and non-profit knowledge creating institutions;
- Policies supporting intermediary/bridging organisations involved in innovation support, technology transfer, innovation finance, etc.;
- Policies supporting directly innovation activities in private sector.

The matrix below summarises the current policy mix at national level. A simplified coding system is used with intensity of support (financial or political priority) for different policy areas and targets indicated by a colour coding system.

Exhibit 5: Policy mix for innovation and knowledge

	Target of policy action		
Policy objectives	**Academic /non-profit knowledge institutions**	**Intermediaries/bridging organisations**	**Private enterprises**
Improving governance of innovation and knowledge policies	National R&D Strategy	National Innovation Strategy National R&D Strategy	**Bulgarian Economic Development Plan 2000-2006** **Bulgarian Development Plan 2007 – 2013** **Restructuring the Bulgarian SMEs Promotion Agency** **National Innovation Strategy** **Phare Programme Improving the Competitiveness of the Bulgarian Enterprises**
Innovation friendly environment	National Science Fund National R&D Strategy	National Innovation Strategy National R&D Strategy	National Innovation Strategy National Innovation Fund
Knowledge transfer and technology diffusion to enterprises	National Science Fund National Innovation Fund	Phare project on the Implementation of the Bulgarian National Innovation Strategy: technology transfer offices at Bulgarian universities	National Science Fund National Innovation Fund
Innovation poles and clusters	-	FP6 programme – project "5 Schemes" – support to clusters	Phare programme – Pilot cluster initiative
Support to creation and growth of innovative enterprises	-	Development of business incubators and regional development agencies	Phare BG grant scheme for advisory services to enterprises
Boosting applied research and product development	National Science Fund National Innovation Fund	-	National Science Fund National Innovation Fund

Legend

Top policy priority
Secondary priority
Low priority

Source: calculations of study team based on national/regional policy documents, TrendChart reports, OECD reports, etc.

It is difficult to come to a straightforward assessment of the overall innovation and knowledge-economy policy mix in Bulgaria during the past 6 years due to the multiple existing strategies that governed different aspects of the mix. These have been developed over the years by different governments and line ministries and their objectives and instruments have been overlapping. It was only recently, with the progress of the country's EU accession, that strategic policy development has been streamlined in the Operational Programmes of the National Development Plan and the National Strategy for Regional Development (and their subdocuments).

The first and main strategic pillar governing the policy mix on innovation and knowledge economy in Bulgaria at the present moment is the National Innovation Strategy (NIS) adopted in 2004. Its aim and objectives are closely related to the National Development Plan and the draft operational programme on competitiveness for the period 2007 – 2013. NIS is developed in accordance with the Law on SMEs and relates to the Strategy for Encouraging the Development of SMEs.

The second pillar, the National Research and Development Strategy for the period 2005 – 2015 was adopted by the Council of Ministers in 2005 but has still not been endorsed by the Bulgarian parliament.

Both strategies do not have a regional dimension, which is incorporated into the National Strategy for Regional Development, and will be completed with the development of the Regional Innovation Strategies of all six NUTS II regions.

Improving governance of innovation and knowledge policies

Improving the overall administrative capacity of the Bulgarian public administration to develop and implement national policies in line with EU accession has been one of the priorities in the Bulgarian Economic Development Plan 2000 – 2006 and the Bulgarian Development Plan 2007 – 2013. The latter includes a separate operational programme on administrative capacity building.

In the period 1999 – 2005 the Ministry of Economy and Energy has completed five projects on improving its administrative capacity, including projects on: (i) restructuring the Bulgarian SMEs Promotion Agency (BSMEPA) and developing a network of regional development agencies (The Bulgarian Association of Regional Development Agencies /BARDA/); (ii) twinning projects on preparing MEE for managing the competitiveness of the Bulgarian economy operational programme for the EU's structural funds, etc. These have been financed though Phare pre-accession programme and have been assigned top priority. The development of the National Innovation Strategy has been financed through the Dutch MATRA programme for bilateral assistance.

As a result the administrative capacity of MEE has been considerably improved, which resulted in the development and the launch of the National Innovation Strategy and the Preparation of the operational programme "Competitiveness of the Bulgarian Economy" 2007 – 2013. Additionally, MEE has launched a number of further Phare and bilateral assistance projects such as the 2004 – 2006 "Improving the Competitiveness of Bulgarian Enterprises" and has been among the ministries, which prepared a programming budget for the year 2004 with a NIS implementation component in it. All these programmes aim at establishing the basic infrastructure for innovation policy at national level. Their aim and specific actions should prepare enterprises for the challenges of managing Structural Funds projects.

Innovation Friendly Environment

The creation of an innovation friendly environment is an objective of the Strategy for Encouraging the Development of SMEs 2004 – 2006 and the National Innovation Strategy.

Developing adequate financing mechanisms has long been set as a priority in Bulgarian policymaking. For quite long outside the activity of the state-owned Encouragement Bank there was no progress in developing venture capital or other public financial schemes both at national and regional level. In 2005 MEE established the National Innovation Fund with a budget of 2.5 MEUR, which has already implemented three rounds of financing innovation projects of Bulgarian companies. It co-funds innovative projects by SMEs or a consortium of SMEs and research organisations up to a threshold of 50%. The average size of financed projects for the first session of the fund in 2005 was on average 75,000 euro, which is somewhat low for innovation projects. The National Science Fund at MES, which operates since 1990, also set aside in its 2005 programme financing for innovative science – industry projects but these are somewhat more limited in scope and size. Its budget in 2004 was above 6 MEUR. Approved projects for financing in 2004 ranged from 17,000 euro to 50,000 euro.

There have been numerous projects on reducing the administrative burden to SMEs and improving their administrative services, including through the development of e-government but these have been rather fragmented and politicised. Still, some progress has been reported in the adoption of one-stop shop administrative services and some e-government solutions, e.g. paying taxes. The fragmentary character of business environment improvements has been partly reflected in the host of donors active in this area, including Phare, bilateral agencies and other international bodies.

Although human capital has been set as a priority in the National Plan for Economic Development 2000 – 2006 only few measures were knowledge-economy oriented. These were implemented by the Ministry of Labour and Social Policy under the annual Employment Guidelines. The National Innovation Strategy foresees the development of entrepreneurship education through bilateral Dutch assistance and national budget funds but specific allocations are rather limited in size.

Knowledge Transfer and Technology Diffusion to Enterprises

Both the National Innovation Strategy and the National R&D Strategy set technology transfer and industry – science relations as priorities. Hence, NIF and NSF fund projects that support the flow of knowledge between industry and science. In accordance with NIS the Phare 2005 National programme envisages the creation of technology transfer offices at Bulgarian universities. These, however, so far fail to make use of established intermediary organisations, including the Bulgarian Innovation Relay Centre, which has been active in the technology transfer field in Europe for the past 10 years. Thus the risk remains that the science- industry divide is further exacerbated along lines of financing rather than bridged.

Innovation Poles and Clusters

MEE has developed two Phare projects for development of the cluster approach. The first phase, which aims to set the cluster model and select pilot clusters for financing is currently under implementation. It will be continued by the Phare 2005 National Programme. The projects also envisage direct support to the identified pilot clusters.

Support to Creation and Growth of Innovative Enterprises

Bulgaria has developed two main policy instruments in this direction: (i) grant schemes for advisory services for enterprises and (ii) development of business incubators and regional development agencies. Projects have been financed through Phare funding schemes and with national budget support. The funding of the high-technology business incubators envisaged under the Phare 2002 National programme had to be reduced, as the Ministry of Regional Development and Public Works failed to ensure the proper running of the scheme under Phare rules. Further, Phare projects plan the conversion of former military bases into business incubators. **There are no measures for financing spin-offs and innovative enterprises so far.**

Boosting Applied Research and Product Development

The National Innovation Fund, also supports industrial research and pre-commercial phase development projects of companies. Some lines of the National Science Fund can also be used to prepare applied research projects. These, however, have been relatively obscure in adopted and active national planning documents.

Increased Investment in Basic Research

The National R&D Strategy is the primary document setting priorities in the field of basic research. The National Science Fund has been active in this field since 1990 but has recently somewhat streamlined and prioritised national funding in the field to complement EU financing of the Framework Programmes for Science, Technological Development and Innovation.

3.3 Conclusions: the national innovation system and policy mix

Overall, the Bulgarian policy mix in the area of innovation and knowledge economy has been balanced and comprehensive. It will gain further strength if the National R&D Strategy is adopted sooner by Parliament to complement the National Innovation Strategy. The current policy mix lacks any regional component, which should be given priority in the future. All new developments, however, should be introduced with high caution. Even at the present moment it seems that the policy mix seems somewhat broader than the available financing. Thus in the future there is a definitive need for developing an independent peer review and a more in-depth assessment of RTDI system performance and the effectiveness of policy instruments with the aim of streamlining and focusing national RTDI policy. It seems that currently Bulgaria is moving too fast beyond policy objectives 1 and 2 (see Exhibit 5) without achieving high quality. In this line of reasoning it would be wise to focus more on these two objectives and improve regional RTDI policymaking, while limiting the other objectives to more piloting and points of excellence projects.

Exhibit 6: Key opportunities and constraints for investment by the Structural Funds

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Improving governance of innovation and knowledge policies	• implementing a rigorous national mechanism for policy formulation, consultation and monitoring (innovation forum, policy monitoring reports, etc.); • introducing a national and regional foresight exercise on R&D and innovation priorities • coordinated implementation of the action plans of the five RIS initiatives in Bulgaria	• existing fragmentation of bodies and functions between MEE and MES, which makes policy ownership difficult • lack of coordinating agencies in the regions • lack of administrative capacity in the regions for innovation policy formulation and governance
Innovation friendly environment	• developing publicly supported financial engineering schemes for regional development financing and venture capital; strengthening the Bulgarian Stock Exchange Rules; • local e-governance mechanisms to help boost local democracy, incl. one-stop shops, transparency enhancing mechanisms, electronic registries, etc; • expanding successful distance learning courses on entrepreneurship developed at local universities, especially their e-service delivery	• limited possibilities for experimenting for best practice local service due to the stringent provisions of the currency board arrangement – there are not funds for experimenting; • low level of local and regional administrative capacity – financial, IT and management; • a history of untransparent procurement and service delivery practices
Knowledge transfer and technology diffusion to enterprises	• devising and delivering an aid support scheme to micro and small enterprises for IT and environmentally friendly technology transfers; • outlining and implementing a national map of technology transfer support services directed towards the European wide tech-transfer networks (e.g. technology parks, innovation centres, technology transfer offices, etc.); • funding for streamlining the existing national R&D infrastructure to focus it on market demand and retrain/redirect less efficient structures • building the national/regional RTDI infrastructure	• high dispersion of activities of the local R&D system and doubling of resources, which tends to lead to demands for multiple overlapping structures throughout the country; • lack of an underlying strategy for positioning and coordinating relevant support structures • no national R&D priorities • no clear national industrial priorities

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Innovation poles and clusters	• support to the functioning of the National Innovation Fund and expanding its activities to include clustering financing lines	• BSMEPA capacity to meet new lines of financing in the wake of increasing number of emerging cluster initiatives • Limited knowledge/experience on clustering and cluster management
Support to creation and growth of innovative enterprises	• support to both NIF and the National Science Fund to enhance innovative enterprises' performance; • enhanced support to existing incubators and special emphasis on virtual, e-services based incubators	• lack of reliable data on the existing incubator landscape in the country
Boosting applied research and product development	• support to strengthening the capacity of NIF and NSF to launch competitive schemes for support of applied research; • strengthening TTO at universities through support and coordination infrastructures (e.g. applied research awards, forums, etc.)	• the uncertain and unreformed higher-education background with a number of universities with disputed official recognition
Investment in basic research capacities	• support to the NSF and the existing national programmes; • developing national support facility to bridging the financial gap of private participation in EU research programmes (e.g. FP 7) • funding for research infrastructures	• lack of an approved underlying strategic document and national vision (the National R&D Strategy still pending in Parliament)

4 Pre-accession European funding to boost innovation and create a knowledge economy: 2000-2006

From the three pre-accession programs – Phare, ISPA and SAPARD, only the Phare program supported projects in the field of technology modernisation and innovation. The Phare program support is project-based while the SF support is more program-oriented. This is why the presentation of the Phare program contribution might differ from the presentation of the SF support. This section of the report analyses the Phare support in Bulgaria in the fields of innovation and knowledge-based economy during the period 2000-2006.

4.1 Strategic framework of Phare for supporting innovation and knowledge –

4.1.1 Strategic approach to innovation and knowledge in Phare Programme

The National Phare Programme has been designed to meet broad objectives, which represent the areas in which the Government of Bulgaria and the European Commission believe that Phare support can most helpfully assist Bulgaria to meet the accession criteria. The measures targeting innovation fall under the economic and social cohesion objective and such measures were implemented for the first time under the Phare 2000 National Programme.

BG 0102.01: SME services and technology grant scheme, completed
This scheme, which was grounded in the productive sector investment strategy of the National Development Plan, addressed the shortage of modern management skills and access to finance on suitable terms for SMEs in Bulgaria.

BG 0102.02: Hi-technology business incubators – R&D component, completed
This scheme, which was grounded in the productive sector investment strategy of the National Development Plan, was meant to strengthen the technology-based SME sector by providing infrastructure and support services for the start-up and development of innovative small businesses. **Only the R&D component was implemented.**

Participation in EC Programmes and Agencies: Phare projects BG0013, BG0105.03, BG0205.03, BG2003/004-937.12.01, BG2004/016-711.12.01, BG2005/017-353.11.03
Under these projects during the years the Phare co-financing helped Bulgaria to pay its entry ticket for participating in the following EC programmes and agencies: Leonardo da Vinci II, Socrates II, Youth, **FP5 and FP6 (including Euratom),** Altener, Culture 2000, Customs 2002, Enterprise and Entrepreneurship, Media Plus, SAVE, Combating Cancer, AIDS and other diseases, Health Monitoring, Pollution-related Diseases, and the European Environment Agency.

BG2003/004-937.02.03 Introduction of a cluster approach and the establishment of a cluster model - ongoing

The purpose of the project is to establish two pilot **clusters** in selected sectors and to strengthen institutional capacity for implementing cluster model using EU practice as groundwork for successful multiplication of the models in other sectors.

BG2004/016-711.11.04 Support for increasing the competitiveness of Bulgarian enterprises - ongoing
The overall objective of this project is to foster the sustainable development of SMEs through improvement of their competitiveness.

BG2004/016-919.05.01 Support for participation of Republic of Bulgaria In Community initiative INTERREG IIIB and IIIC - ongoing
The purpose of the project is to encourage and support participation of the Bulgarian partners in INTERREG III strand B and strand C and prepare potential beneficiaries to develop and implement trans-national and interregional projects.

BG2005/017-353.10.06 Support to the implementation of the National Innovation Strategy - forthcoming
The overall objective of the project is to improve the competitiveness of Bulgarian enterprises and to promote higher growth innovation environment, through improvement of the innovation infrastructure and know-how at national level.

BG2005/017-586.04.02 Cluster development initiatives - forthcoming
The overall objective is to increase the level of competitiveness and innovation in the SME sector as a basis for sustainable and balanced development of the economy. The project purpose is to support growth of existing or embryonic clusters of Bulgarian enterprises in order to improve their competitiveness. The grant scheme will provide support to about 8-14 clusters. The individual grant will amount up to 250,000 euro.

For the period 2000 – 2006 the Phare support to innovation and knowledge-economy projects has been indirect through paying the entry tickets for participation of Bulgarian entities in the Community programs. Most of the capacity building projects in the field of innovation have been implemented as “specific support actions” under FP5 and FP6: participation of the Agency for SMEs (currently The Bulgarian Small and Medium Enterprises Promotion Agency) in the IRC – Bulgaria consortium, one completed RIS initiative for the South Central region of Bulgaria, which commenced the process of regionalising the innovation policy in the country (with the participation of the Ministry of Regional Development and Public Works in the consortium) and 4 RIS initiatives ongoing, all of them collaborating with the district authorities and the regional development councils (innovation governance), projects focused on the provision of support to SMEs to get involved in international research projects, and innovation projects. Most of these projects are small-scale with a limited number of SMEs involved as beneficiaries.

4.1.2 Specific measures in favour of innovation and knowledge.

The exact weight of the individual Phare projects directed towards innovation and knowledge cannot be measured because (i) there is no information publicly available on the exact amounts disbursed under individual projects, and (ii) some of the projects are still ongoing. Therefore the data in the table below should be viewed as a preliminary assessment of ongoing measures and actions.

Exhibit 7: Key innovation & knowledge measures

Policy area	Number of identified measures (all programmes)	Approximate share of total funding for innovation & knowledge measures	Types of measures funded (possibly indicating importance)
Improving governance of innovation and knowledge policies	1	N/A	Support to the implementation of the national innovation strategy
Innovation friendly environment	2	N/A	Support for increasing the competitiveness of the Bulgarian enterprises
Knowledge transfer and technology diffusion to enterprises	7	N/A	Support for the participation of Bulgaria in the EU programmes
Innovation poles and clusters	2	N/A	National strategy and action plan for setting up and developing clusters in Bulgaria, growth of existing or embryonic clusters in Bulgaria
Support to creation and growth of innovative enterprises	1	N/A	Hi-tech business incubators
Boosting applied research and product development	1	N/A	R&D grant scheme for SMEs
Investment in basic research capacities	0	N/A	

4.2 Learning from experience: pre-accession funding and innovation since 2000

4.2.1 Management and coordination of innovation & knowledge measures

This section reviews the overall management of Phare schemes in favour of innovation and knowledge during the current period. It examines the coherence, the role of key organisations or partnerships in implementing Phare measures for innovation and knowledge, and the financial absorption and additionality of the funds allocated to innovation and knowledge.

Through implementing Phare projects the Executive Agency for the Promotion of SMEs, the Ministry of Economy and Energy, and the Ministry of Regional Development and Public Works have strengthened their administrative capacity for managing pre-accession funding. As a result of this a longer-term competitiveness operational programme and an operational programme for regional development were developed, which would benefit as well the innovation and R&D activities in the country. However, their impact cannot be evaluated yet as these projects will be launched in 2006. Only one project is focused on developing the administrative capacity in the field of innovation policy, namely Phare BG2005/017-353.10.06 Support to the implementation of the National Innovation Strategy. The project is meant to provide iinstitutional support for the Bulgarian Small and Medium-sized Enterprises Promotion Agency (BSMEPA). The scope of activities will encompass screening of Bulgarian SMEs and identification of technology and development barriers. The support for BSMEPA will be focused on the development of procedures (e.g. operational manuals/ procedure manuals) for the implementation of financial schemes supporting innovative actions of SMEs, especially in the context of OP "Development of the Competitiveness of the Bulgarian economy" co-financed by the European Regional Development Fund and in line with the best EU practices.

4.2.2 Effects and added value of Phare schemes support for innovation and knowledge

The analysis is based on publicly available information on the Phare program. Accordingly, this section does not pretend to provide an exhaustive overview of the effects or added value[24] of Phare schemes but rather is based on the examination of a limited number of cases of good practice.

[24] A good definition is "The economic and non-economic benefit derived from conducting interventions at the Community level rather than at the regional and/or national level". See Evaluation of the Added Value and Costs of the European Structural Funds in the UK. December 2003. (Available at : www.dti.gov.uk/europe/structural.html)

The experience with Phare implementation in Bulgaria has shown that some measures have higher impact and value added on innovation and knowledge economy development, for example:

- The payment of the annual instalments for the participation of Bulgaria in the various EU-supported programmes on research and innovation (listed above) allowed for the formation of a critical mass of organisations and experts with skills for project development and management.
- Umbrella projects encouraging linkages between knowledge and innovation stakeholders have proven higher impact and value-added, for instance the project "Technology grant scheme and consultancy services for SMEs" have a strong potential for multiplication.
- The Phare support to the implementation of the National Innovation Strategy is expected to result in institutional building and strengthening the national innovation infrastructure through the establishment of university-based technology transfer offices.

Exhibit 8: Overview of good practice cases

Brief description of case and main reason behind choice	Policy area	Main Instrument	Main Beneficiaries
SME services and technology grant scheme It aimed to improve business performance through a range of consultancy services focusing on technological transfer and innovations, management and organisational development, financial management, marketing and advertising, and human resource development. The scheme included a complementary grant scheme (co-financed by both public and private sector contributions) for upgrading production technology in the enterprises receiving consultancy services. Both components were implemented in 2004.	Knowledge transfer and technology diffusion to enterprises	Phare BG0102.01	Private sector – industrial companies

- Degree of novelty – the project was focused on the following sectors: engineering and equipment, food and beverages, textiles and leather, furniture and wood products, IT, electrical and electronics equipment, other (not falling under the above sectors). Six part-time sectoral know-how groups were set up with profound commercial, technical and consulting experience in the respective sector, involving both international and national experts.
- Strategic relevance with respect to national/regional gaps and needs – the implementation of the project addressed the needs of companies for specialised business consultancy and innovation services, still underdeveloped in the country
- Significant impact of the case – the consultancy services were provided in the following areas: technology transfer and innovations, management and organisational development, financial management, marketing and advertising, HR management, operational improvement
- Current and expected financial weight in relation to total SF spending, regional or national RTDI expenditure and absorption capacity – N/A
- Transferability - N/A

Most of the companies which used the consultancy services were satisfied with the inputs provided by the consultants. Emphasis was on marketing and advertising, HR development and organisational development.

4.3 Conclusions: Phare interventions in favour of innovation and knowledge

The major contribution of the National Phare programme in the period 2000 – 2006 has been the payment of annual instalments for the participation of Bulgarian organisations in the EU-supported programmes in the field of research, technology development and innovation, and vocational training. In FP5 Bulgarian organisations participated in 271 projects, and in FP6 the current figure for the Bulgarian participation is more than 240 projects. In terms of direct financial support provided by the Phare programme for RTDI funds have been very limited, and only few projects have had a focus on innovation. Since the National Innovation Strategy was approved in the fall of 2004 for the first time greater attention was paid to innovation and innovation – support projects were foreseen in the financing memorandum for the 2005 National Phare programme – *Support to the implementation of the National Innovation Strategy* and *Cluster development initiatives*. Both projects will commence in 2006, and their outcomes and impact can only be analysed at a later stage. For the period 2000 – 2004 the innovation-related projects in the Phare support were under the Economic and Social Cohesion objectives. There is no regional dimension in terms of support to innovation in the Phare projects implemented thus far in Bulgaria.

Exhibit 9: Main outcomes of innovation and knowledge measures

Scheme	Capability	Added value
BG0013 Participation in the Community programmes: FP5, Leonardo da Vinci II, Socrates II, Culture 2000	good	Capacity building and improving the participation rates in the Community programmes
BG0102.01 SME services and technology grant scheme – completed	good	Innovative approaches and solutions Direct support for modernisation of production processes
BG0102.02 Hi-technology business incubators – R&D grant scheme - completed	low	Capacity building of companies for participation in research projects
BG0105.03 Participation in EC Programmes and agencies	good	Capacity building and improving the participation rates in the Community programmes
BG0205.03 Participation in EC programmes and agencies	good	Capacity building and improving the participation rates in the Community programmes
BG2003/004-937.02.03 Introduction of a cluster approach and the establishment of a cluster model - ongoing	N/A	Institution building, innovative approaches and solutions
BG2003/004-937.12.01 Participation in EC programmes and agencies	good	Capacity building and improving the participation rates in the Community programmes
BG2004/016-711.11.04 Support for increasing the competitiveness of Bulgarian enterprises - ongoing	N/A	Reinforcement of national priorities
BG2004/016-711.12.01 Participation in EC programmes and agencies	good	Capacity building and improving the participation rates in the Community programmes
BG2004/016-919.05.01 Support for participation of Republic of Bulgaria In Community initiative INTERREG IIIB and IIIC – ongoing	N/A	Capacity building for the structural funds
BG2005/017-353.10.04 Support for increasing the competitiveness of Bulgarian Enterprises – Phase I	N/A	N/A
BG2005/017-353.10.04 Support for increasing the competitiveness of Bulgarian Enterprises – Phase II	N/A	N/A
BG2005/017-353.10.06 Support to the implementation of the National Innovation Strategy	N/A	N/A
BG2005/017-353.11.03 Participation in EC programmes and agencies	N/A	N/A
BG2005/017-586.04.02 Cluster development initiatives	N/A	N/A

5 Regional potential for innovation: a prospective analysis

This section of the report seeks to summarise and draw conclusions from the analysis of the preceding sections, available studies and interviews and focus groups carried out for this study in order to provide an analysis of the regional innovation potential. In doing so, the aim is to provide a framework for orientations in terms of future Structural Fund investments in innovation and knowledge.

5.1 Factors influencing regional innovation potential

This section summarises the conclusions elicited from the available documents and the focus group convened on March 16, 2006 in Sofia[25].

The economic restructuring of the regions continues and support for innovative actions can help them to achieve the most adequate sustainable economic structure. Innovation is needed in the service sector which dominates in the economic structure of all planning regions but is characterized by low quality. All regions need to decrease the intra-regional disparities (among the districts and the municipalities within the same planning region) and particularly to start solving the "centre-periphery" problem which is present in all regions and districts. Particularly affected are the border areas and the rural areas. These areas need assistance from the state, focused above all on creation of conditions for launching a sustainable process of economic restructuring and diminishing of the existing social problems and unemployment. Additionally, more than 93% of enterprises in the regional economies are micro and small companies, with few years of operation, which is a barrier to knowledge economy and innovation development.

The region with the highest potential for the development of a regional knowledge-based economy is the South West Planning region. The region concentrates 80% of total R&D expenditure (public and private), and more than 50% of the universities and research institutes. The latter supply the regional economy with highly qualified labour force. The region displays strong growth in both services and industry with particular strengths in ICT, pharmaceuticals, microelectronics, biotechnologies, metallurgy, machine-building, banking and financial services, administrative services. The headquarters of all financial institutions are based in the capital Sofia, which provides easy access to finance. The capital also concentrates the major EU-supported projects in the field of technology development and innovation, for instance the Innovation Relay Centre – Bulgaria, and the bulk of FP5 and FP6 research projects with Bulgarian participation.

The other five regions, although slightly different in terms of sectoral development and economic growth, still display fairly similar innovation potential. Severozapaden, Severoiztochen and Yugoiztochen regions are service dominated, tourism and agriculture heavy, whereas Severen – Tsentralen and Yuzhen – Tsentralen regions have strong inherited industrial base. In all regions from the cluster industry is still

[25] The analysis is based on the National Development Plan, the National Regional Development Strategy, the Regional Development Plans of the six planning regions for the period 2007-2013, the annual report on the implementation of the innovation strategy for 2005 of the Ministry of Economy and Energy, the analysis Innovation.BG, the outcomes of the pilot RIS project in Bulgaria for the South Central Planning Region and the pilot foresight project - ForeTech, the draft of the National Stategy for R&D, as well as the operational programmes on competitiveness, regional development and administrative capacity.

dominated by traditional sectors of low technological level - food processing, textiles, chemical and oil industry, machine building, etc. With the exception of Severozpaden region, universities and research institutes are equally distributed in the other four regions from the Rural Industries cluster. All regions face human capital constraints because of outward bound migration and brain drain.

Tourism. On one hand, Bulgaria is close to the large markets for international tourism in Western, Northern, Central and Eastern Europe and on the other hand, Bulgaria possesses rich and diverse potential for tourism development. During the last years the tourism sector manifests a steady trend of increased revenues. The beautiful nature and the rich cultural and historical heritage of Bulgaria provide opportunities for development of new and prospective types of tourism and tourism-related products, such as cultural tourism, environmental tourism, rural and adventure tourism. The challenges faced by the sector are related to the adequate skills of personnel, the inadequate infrastructure, the public-private partnership for the construction and maintenance of tourist infrastructures, the low level of use of digital technologies for new tourist products and services.

Energy. Bulgaria is a traditional exporter of energy and the development of this sector of its economy could be a major driver or deterrent to innovation performance, both nationally and in the regions. The Bulgarian economy is almost twice more energy intensive than the average EU-25 economies. This calls for stimulating innovation in the sector and in the energy intensive sectors of the economy. Bulgaria needs to diversify its national energy system as currently it is totally dependent on Russia for its energy supplies. As the country has good traditions in the sector and there is a good pool of experienced human personnel, Bulgaria should try to move into new and innovative fields such as renewable energy, bio-fuels, etc.

Certain sectors of the Bulgarian economy have higher propensity to innovate and will serve as the backbone and driving engine for future innovation growth in this country. ***ICT, pharmaceuticals, microelectronics, biotechnologies, metallurgy, machine-building, banking and financial services, administrative services*** have consistently outpaced the rest of the economy in terms of innovative performance[26]. Some of these sectors are horizontal and instrumental to innovation in others, e.g. ICT, banking, administrative services. The others reflect competitive advantages of the Bulgarian economy and substantial foreign investment. They form the leading innovation industries in Bulgaria.

On the public policy side, the positive changes influencing the innovation potential of the Bulgarian regions are: the National Innovation Strategy, National R&D Strategy, all Bulgarian regions are currently involved in RIS initiatives.

[26] *Innovation.bg*: Measuring the Innovation Performance of the Bulgarian Economy, Applied Research and Communications Fund, 2006

Exhibit 10: factors influencing innovation potential by type of region

Region / type of region	Main factors influencing future innovation potential
Ageing academia: Jugozapaden region (South West Planning region)	• High level of concentration of public R&D expenditure in the region • Highly qualified labour force in the region • Concentration of universities and research institutes • Strengths in ICT, pharmaceuticals, microelectronics, biotechnologies, metallurgy, machine-building, banking and financial services, administrative services • Experience in technology brokerage (IRC – Bulgaria, coordinated by ARC Fund and the Bulgarian Academy of Sciences) but of a limited scale • Improved access to innovation financing to increase the number of high-tech companies, spin-off companies and achieve better exploitation of R&D results • Support to cluster initiatives
Rural industries: The other 5 Bulgarian regions	• Concentration of public R&D expenditure in the cities of Plovdiv, Varna, Bourgas, Veliko Turnovo, Gabrovo, Pleven and Rousse • Strengths in machine building, agriculture, strong tourist sector, energy, potential for exploitation of renewable energy resources, chemical and oil industry, food processing, textiles, river and sea transport • Raising the technological level of traditional industries • Support to cluster initiatives • Ageing population and migration of skilled personnel to the capital Sofia

5.2 A prospective SWOT appraisal of regional innovation potential

Ageing academia cluster - Development perspectives

There are a number of issues to be tackled by the region to make the best of its existing potential for knowledge economy development:

- Reinforce networks between the capital Sofia and the rest of the region on the one side and between academia and industry on the other. These should be based on enhanced ICT use including e-government.
- Improve administrative capacity for the absorption of Structural Funds and the Cohesion Fund resources for research and innovation.
- The financial institutions and the intermediary organisations should have a stronger involvement in the deployment of knowledge economy tools through SF mechanisms

Cluster 5 Ageing Academia – Yugozapaden region (South West region)

Strengths	Weaknesses
• High scientific and technological potential (19% of the population with higher education) • Concentration of public institutions in Sofia • High potential for international cooperation (regional development, research and innovation) • Specialisation and development of high value added economic activities in ICT, pharmaceuticals, electro-optics, e-government, financial services	• Obsolete research and innovation infrastructure • University curricula and scope of public research organisations not aligned with industry needs. • Low use of ICT by the businesses • Weak administrative capacity in regional innovation policy formulation and implementation • Lagging behind in technological development and continued delay in restructuring of industry
Opportunities	**Threats**
• SF support for upgrading the research and innovation infrastructure • Governmental support to mmaintain the leading position in the country as an educational and research centre • Improved access to financial resources • Increased awareness of the necessity for PPPs in RTDI • The EU membership will provide opportunity for regionalisation of research and innovation policies and accelerated capacity building process	• Concentration of RTDI activities in the capital Sofia and deepening the intra-regional disparities between regional innovation demand and supply • The low administrative capacity in the region in the innovation domain can threaten the development and implementation of regional RTDI policy and hence, the adequate use of structural funds • Inadequate level of public financing for RTDI • Delay in deploying e-government • Ageing population and academia

Rural industries cluster - Development perspectives

There are a number of issues to be tackled by the region to make the best of its existing potential for knowledge economy development:

- Upgrade the technological level of traditional industries through exploring the convergence of specific sectoral technologies and ICT, biotechnologies, automation, nano-technologies, etc.
- Encourage clustering initiatives for attracting higher R&D investment and for better leveraging SF support
- Develop technology brokerage to ensure the adoption of advanced technologies and best manufacturing and laboratory practices

Cluster 8 Rural industries (the other 5 Bulgarian planning regions)

Strengths	Weaknesses
• Specialised scientific and technological potential that can support the development of the regional economy – in the cities of Varna, Rousse, Veliko Turnovo, Gabrovo, Plovdiv, Stara Zagora, Bourgas, Pleven • Specialisation of the regions in certain technology fields, for instance marine technologies in the North-East region, biotechnologies for agriculture and food industry in the South Central region • Improvement of the capacity to develop and implement regional R&D and innovation strategies – all regions are involved in RIS initiatives	• Industry dominated by traditional sectors • Low level of process and product innovations in companies • Obsolete education, research and innovation infrastructure • Insufficient use of ICT, e-commerce, etc. • Strong dependence on the state budget for financing research and innovation activities
Opportunities	**Threats**
• SF support for upgrading the research and innovation infrastructure • Improved access to financial resources • Increased awareness of the necessity for PPPs in RTDI • The EU membership will provide opportunity for regionalisation of research and innovation policies and accelerated capacity building process • Opportunity for upgrading the traditional industries through exploring the convergence of specific sectoral technologies and ICT, biotechnologies, automation, nano-technologies, etc. • Opportunity for establishment of technology clusters	• High level of unemployment and a large number of low-income and aging population • Low interest in developing a research carrier • Low level of R&D investment • No substantial change in enterprises' innovation behaviour after joining the EU and continuing weak collaboration science – industry continues • Lagging behind in technological development and continued delay in restructuring of industry • Delay in deploying e-government • Growing competition on the RTD market due to the globalisation and no adequate policy on national/regional level • No adequate skills to master new technologies in the traditional sectors

5.3 Conclusions: regional innovation potential

Policy headline 1: Macro - level – potential for development of a coherent national innovation policy integrating the measures developed by the current RIS projects

- Relevant regions – all Bulgarian regions
- All Bulgarian regions are currently involved in RIS initiatives. This provides good potential for upgrading the National Innovation Strategy and its measures based on the measures to be developed by the RIS projects, developing the regional dimension of innovation policy formulation and implementation, laying the ground for developing the regional dimension of research policy, building regional administrative capacity in the field of innovation, and coordination of the regional and national innovation policies with the national research policy and the national policy for regional development. Potential for upgrading the research infrastructure and building the missing elements of the innovation infrastructure, developing national financial mechanisms to support innovation – seed and venture capital funds, regional development funds, and support to strengthening the national research potential - implementation of the National Foresight Programme for Identifying R&D priorities

Policy headline 2: Meso - level – potential for development and implementation of coherent sectoral and regional innovation policies

- Relevant regions – all Bulgarian regions
- Innovation culture and capacity building for innovation policy formulation and implementation in the regions
- Support to the implementation of the RIS Action Plans after January 2008 – integrating the RIS Action Plans into the Regional Development Plans and implementation of the initiatives and projects covered by the Action Plans
- Regional technology foresight initiatives/sectoral technology foresight initiatives as a basis for specialisation of the Bulgarian regions and for future investments in research and innovation, as well as for upgrading the university curricula and for restructuring the research activity to meet the demand of regional economy
- Establishing Regional Innovation Commissions – one per planning region – to support the regional actors in the implementation of innovation projects (which will be implemented with the support of the structural funds and the Cohesion Fund) on one hand and the government administration in the implementation of the operational programmes on the other

Policy headline 3: Potential for transforming metropolitan regions to research and innovation poles

- The metropolitan region of Yugozapaden region concentrates more than 80% of total R&D expenditure in Bulgaria and hosts the biggest HEIs and public research organisations. This agglomeration constitutes a critical RTDI capacity that could transform the region into research and innovation pole, capable of generating spill over effects to the other regions in Bulgaria However, low collaboration between academia and industry remains an obstacle and further efforts for developing co-operation should be supported.
- Relevant regions: Yugozapaden region.

Policy headline 4: Potential for regional/sectoral clustering initiatives

- Relevant regions: the regions from the Rural Industries cluster
- More than 93% of enterprises in the regional economies are micro and small companies, with few years of operation, which is a barrier to knowledge economy and innovation development. The regions from the cluster are dominated by traditional industries of low technological level and low value-added products. Hense, they need to integrate into international value-added production chains by pooling together the resources of the enterprises.

Policy headline 5: Micro – level – Potential to support companies to innovate through technology brokerage and consultancy services

- Relevant regions – all Bulgarian regions
- Through the EU framework programmes on research, development and demonstration (FP4, FP5, FP6) Bulgaria has become a member of the Innovation Relay Centre Network and the Network of Euro-info Centres. Due to low demand on new technologies the use to these services is still limited. With the increased competitive pressure of the European Single Market and the requirements of SF assistance companies will increasingly require specialised assistance for: capacity building for research projects; life-long learning and vocational training schemes for the businesses, specialised sectoral trainings on best manufacturing and laboratory practices; sectoral meetings on modern technology trends; introducing high technologies in traditional industries; introducing environment friendly technologies and reducing the level of energy consumption in industrial companies.

6 Future priorities for Structural Fund support for innovation and knowledge: options for intervention

The current analysis shows that all Bulgarian regions fall under the "convergence" priority of the Cohesion Policy, i.e. their per capita GDP is less than 75% of Community average. Bulgarian NUTS II regions lag behind the average performance of EU regions in all but a small number of legacy areas such as mass university education thus facing a multitude of priorities. Limited administrative capacity to handle EU funding, especially on regional and local level and narrow national resources for co-financing Structural Funds' interventions call for a very careful focusing on a small number of **priorities policy areas**, which promise to have the highest return in terms of growth and jobs:

- **Streamline the public R&D system and increase the effectiveness of public R&D expenditure** through: (i) reinforcing competitive financing mechanisms with high private sector financing leverage such as the National Innovation Fund at the Ministry of Economy and Energy and the National Science Fund at the Ministry of Education and Science.

- **Enhance the national innovation infrastructure for networking and clustering** on regional, national and European level through support for intermediary institutions such as project development consulting companies, technology transfer centres and offices, business incubators, clusters, science parks, etc.

- **Develop funding alternatives and instruments** for financing the capital, technological and innovation upgrade of micro and small enterprises and innovation projects for product differentiation, meeting environmental, energy and other efficiency targets standards of medium-sized enterprises.

- Support **entrepreneurship and human capital for innovation**. Though there is a need of a general overhaul of the secondary and higher education systems for providing adequate entrepreneur and human resources for development and innovation, there should be some specific targeted interventions in that direction. These should target life-long learning projects by micro and small enterprises, youth skills upgrade and employment in micro and small enterprises and entrepreneurship support infrastructure (e.g. annual awards, MBA education grants, etc.);

- **Cultivate and grow a regional dimension of innovation policy.** Though there are no major overall differences between Bulgarian NUTS II regions they have quite varying prospects and capacity for future development in terms of innovation and knowledge economy and in the preparedness of regional and local authorities to develop and implement regional innovation projects. Regions should use the Regional Development Strategy tool to develop regional innovation governance structures, which activities and project pipeline should in turn be supported through the structural funds.

The draft outline of the National Strategic Reference Framework (NSRF) and the related Operational programmes (OP) identifying areas and actions for Structural Funds and Cohesion Fund interventions have been presented online[27]. Currently there are 6 OPs drafted as of December 2005: Competitiveness, Human Resources, Environment, Transport, Regional Development, and Administrative Capacity. These are complemented by the National Rural Development Plan and National Fisheries Plan. The RTDI element is incorporated in the OP on Competitiveness where concrete support measures are envisaged.

6.1. Strategic orientations for Structural Fund investments in innovation and knowledge

Key conclusion 1: Very low level of gross expenditures on R&D. Public R&D spending does not leverage private sector resources.

Bulgaria's gross expenditures on R&D have remained flat at a very low level of about 0.5% of GDP for the past five years. A particular weakness is the low level of participation in both R&D performance and financing of the private sector, which share in GERD is roughly 20%. Thus the public R&D sector spends and performs a disproportionately high share of R&D without leveraging private sector resources.

Recommendation 1: Increase the overall level of public R&D financing through competitive funding schemes and alternative financial instruments.

More public financial resources should be directed towards the existing competitive public mechanisms of the National Innovation Fund and the National Science Fund, which require private financial leverage. These should calibrate their support for projects according to companies' size: micro and small enterprises would benefit most from direct support for technological upgrade, capital deepening, clustering projects, etc. Medium-sized enterprises require R&D project support, clustering and national and international networking projects, etc.

Additionally, there should be appropriate instruments for start-ups and seed capital financing, as well as guarantee funds for project financing, including under the Structural Funds. Financial instruments should focus primarily on manufacturing but could also encompass business support and innovation services (engineering, technology brokerage, etc.) and IT. The recommendation is relevant for all Bulgarian regions. Bulgaria could use the best practice example of Sweden where a nation-wide programme for better access to financing innovative sectors was launched in 2005.

Key conclusion 2: Weak collaboration among National Innovation System actors and broken science – business and education – business link

Bulgarian regions and the country as a whole have a fairly well developed science and education systems but these have failed to materialize into higher innovation activity and revenues in the economy and in turn have suffered from lack of private funding. A very important part of the causes for this status quo has been the lack of a vibrant and multifaceted publicly supported and privately managed, competitive intermediary, brokerage and business support environment. The Government of Bulgaria has viewed such structures as private and essentially competitive to their public service delivery whereas in a fledgling market economy these should be viewed as important public service delivery mechanisms.

[27] The drafts as well as other information concerning the work of structural funds in Bulgaria are available in the Internet at: http://www.funds.minfin.bg/?cat=2.

Recommendation 2: Enhance the development of a vibrant business, technology brokerage and innovation support system clustering and networking initiatives

- Structural Funds interventions should target the development of innovation poles around existing consulting companies, technology transfer centres and offices, business incubators, clusters, science parks, career development and planning centres, life-long-learning, distance learning centres etc.
- Special emphasis should be put on linkages to EU's FP 6 and FP 7 programmes and the Competitiveness and Innovation Programme through e.g. targeted upgrading support for centres of excellence, Euro-Info Centres, IRC and other existing nods that can be used to develop competitive innovation poles.
- Special emphasis should be directed towards e-delivery of services by the intermediaries thus underpinning IT development.
- The recommendation is valid for all Bulgarian regions. Bulgaria could make use of many best practice examples from the EU such as "Building an enterprise culture project" (EFI) of the East of England; Strategic Intelligence and Innovative Clusters project in Canarias and Murcia (Spain), Nordhrein-Westfalen (Germany) and Kentriki Makedonia (Greece).

Key conclusion 3: No regional dimension of the national innovation policy

Though Bulgaria has only recently developed a coherent national innovation policy and policy-making mechanisms these do not relate to regional and local levels. As innovation happens primarily on the ground, i.e. in regions and local communities there is a need for Bulgaria to develop a regional dimension to its innovation policy through building governance and financial infrastructure at its regions. The needs and specifics of Bulgarian NUTS II regions in terms of innovation and knowledge-based economy are similar but because of diverging economic dynamics in recent years differences already appear, especially with regard to their prospective innovation performance. Yugozapaden (South-West) region as the only Bulgarian representative of the Aging Academia cluster is clearly ahead in its development compared to the rest of the regions.

Recommendation 3: Developing regional innovation strategies and project pipelines for innovation and knowledge-based economy

All Bulgarian regions are currently developing their regional innovation strategies with the exception of the Yuzhen Tsentralen (South-Central) region, which already developed its RIS implementation capacity. Thus there is a need for encouraging the mutual exchange of knowledge and innovative practices among the regions through the institutionalisation of a National RIS network, which comprises the governance teams of the separate RIS initiatives and ministry representatives. A pilot Regional Development Fund should be established based on public-private partnership and with the participation of RIS management teams to support regional specific pilot projects developed under the RIS initiatives. Its measures might be structured in three strands: financing of project preparation, financing of pilot RIS projects, and thematic financing distinguishing between the two types of regions in Bulgaria.

6.2. Operational guidelines to maximising effectiveness of Structural Fund interventions for innovation and knowledge

Key conclusion 4: Low project preparation capacity at beneficiary level: municipalities, regions and the private sector

Both the Regional Development and the Administrative Capacity OPs note this deficiency but fail to stipulate more specific measures.

Recommendation 4: Develop project preparation facilities

Specific attention should be given to developing, funding and implementing instruments for increasing the project preparation capacity at regional, local and final beneficiaries' level, especially with a view to innovation and knowledge-based economy. This could best be done through specific targeted financial voucher and public-private schemes, in which beneficiaries can use allocated funds specifically for project development and management through private consulting companies. The recommendation is valid for all Bulgarian regions. The experience of the 10 New Member States will be studied and adapted.

Key conclusion 5: Limited innovation governance and coordination capacity at regional level

Projects supported under the Phare programme during the period 2000 – 2006 do not encompass specific measures for building administrative capacity in the field of innovation policy formulation and implementation at regional level. The sector of non-governmental organizations was the most active one in introducing new policy tools like RIS and foresight.

Recommendation 5: Support RIS governance structures

Enhance the innovation governance and coordination capacity in the regions through building the administrative capacity of the Regional Development Councils – setting up Regional Innovation Commissions for each Planning Region of Bulgaria, provision of support to the National Network of RIS regions. The recommendation is valid for all Bulgarian regions.

Key conclusion 6: Need for better coordination between policy priorities and OPs and specific measures

Though the NSRF presents a well balanced view of OPs and measures with a clear cut priority on innovation measures this view fails to materialize in the specific actions of the OPs. This is partly a consequence of political transition between two governments in Bulgaria in 2005 but also and primarily because of a lack of clearly defined priorities at NSRF and OPs level.

Recommendation 6: Improve policy decision – policy implementation coherence in planning and monitoring

The mechanism of checking policy implementation through the OPs should be streamlined through a more detailed guidance on policy level following EU guidelines and regular overview of progress and of meeting the targets set at the outset. Thus the waste of financial and administrative resources as well as duplication in the preparation of the OPs will be considerably limited.

Exhibit 11: Summary of recommendations on investment priorities

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
All Bulgarian regions	Increase the overall level of public R&D financing through competitive funding schemes and alternative financial instruments.	▪ More public financial resources should be directed towards the existing competitive public mechanisms of the National Innovation Fund and the National Science Fund, which require private financial leverage. These should calibrate their support for projects according to companies' size: micro and small enterprises would benefit most from direct support for technological upgrade, capital deepening, clustering projects, etc. ▪ Medium-sized enterprises require R&D project support, clustering and national and international networking projects, etc. ▪ Development of appropriate instruments for start-ups and seed capital financing, as well as guarantee funds for project financing, including under the Structural Funds. Financial instruments should focus primarily on manufacturing but could also encompass business support and innovation services (engineering, technology brokerage, etc.) and IT.	210 MEUR
All Bulgarian regions	Enhance the development of a vibrant business, technology brokerage and innovation support system clustering and networking initiatives	▪ Development of innovation poles around existing and support the emergence of new project development consulting companies, technology transfer centres and offices, business incubators, clusters, science parks, career development and planning centres, life-long-learning, distance learning centres etc. ▪ Targeted upgrading support for centres of excellence, Euro-Info Centres, IRC and other existing nods that can be used to develop competitive innovation poles. ▪ e-delivery of services by the intermediaries thus underpinning IT development. ▪	150 MEUR
All Bulgarian regions	Implementing regional innovation strategies and project pipelines for innovation and knowledge-based economy	▪ Establishing a pilot Regional Development Fund based on public-private partnership and with the participation of RIS management teams to support regional specific pilot projects developed under the RIS initiatives. Its measures might be structured in three strands: financing of project preparation, financing of pilot RIS projects, and thematic financing distinguishing between the two types of regions in Bulgaria. ▪ Encourage the mutual exchange of knowledge and innovative practices among the regions through the institutionalisation of a National RIS network, which comprises the governance teams of the separate RIS initiatives and ministry representatives. ▪ Enhance the competitiveness of the traditional industries through exploring the convergence of specific sectoral technologies and ICT, biotechnologies, automation, nanotechnologies	200 MEUR

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources
All Bulgarian regions	Support RIS governance structures	▪ Enhance the innovation governance and coordination capacity in the regions through building the administrative capacity of the Regional Development Councils – setting up Regional Innovation Commissions for each Planning Region of Bulgaria, provision of support to the National Network of RIS regions. ▪	120 MEUR
All Bulgarian regions	Improve policy decision – policy implementation coherence in planning and monitoring	▪ The mechanism of checking policy implementation through the OPs should be streamlined through a more detailed guidance on policy level following EU guidelines and regular overview of progress and of meeting the targets set at the outset. Thus the waste of financial and administrative resources as well as duplication in the preparation of the OPs will be considerably limited ▪ Innovation policy watch to measure the effectiveness of the measures for the implementation of the national innovation policy ▪ Annual survey and report on the innovativeness of the Bulgarian economy ▪ Regional foresight initiatives to set up priorities in terms of technologies and innovation and build up a common vision for the long-term sustainable development of the regions ▪ Elaboration of sectoral policies based on the regional foresight initiatives	80 MEUR
Yugozapaden Yujen centralen Severen centralen Severoiztochen	Strengthening the national research potential	▪ Implementation of the priorities to be identified under the National Foresight Programme for R&D priorities ▪ Upgrading the research infrastructure	180 MEUR
All Bulgarian regions	Development of the human potential in regard to innovation	▪ Innovation culture and capacity building for the implementation of innovation projects (under the structural funds and the Cohesion Fund) ▪ Capacity building for research projects ▪ Life-long learning and vocational training schemes for the businesses, specialised sectoral trainings on best manufacturing and laboratory practices ▪ Sectoral meetings on modern technology trends ▪ Development of the adequate skills to successfully introduce high technologies in traditional industries	210 MEUR

Appendix A Methodological annex

A.1 Quantitative analysis of key knowledge economy indicators

A 1.1 Factor analysis

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables (Table 1) into a small number of factors by means of factor analysis.

Table 1. Reduction of the dataset (215 EU-25 regions) into four factors by means of factor analysis

	The 4 factors			
	F1 'Public Knowledge'	F2 'Urban Services'	F3 'Private Technology'	F4 'Learning Families'
Higher education (HRSTE), 2003	**.839**	.151	.190	.184
Knowledge workers (HRSTC, core), 2003	**.831**	.164	.267	.327
High-tech services employment, 2003	**.575**	.367	.428	.323
Public R&D expenditures (HERD+GOVERD), 2002	**.543**	.431	.275	-.195
Value-added share services, 2002	.323	**.869**	.002	.121
Value-added share industry, 2002	-.265	**-.814**	.386	-.061
Employment government administration, 2003	-.217	**.745**	.124	-.175
Population density, 2002	.380	**.402**	.043	.038
High and Medium/high-tech manufacturing employment, 2003	-.073	-.331	**.873**	-.089
Value-added share agriculture, 2002	-.222	-.350	**-.672**	-.198
Business R&D expenditures, 2002	.335	-.050	**.664**	.267
S&T workers (HRSTO, occupation), 2003	.560	.178	**.589**	.382
Population share under 10 years of age, 2001	-.237	.060	-.015	**.868**
Life-long learning, 2003	.472	-.009	.165	**.703**
Activity rate females, 2003	.418	-.227	.281	**.620**

Note: Principal Component Analysis. Rotation Method: Equamax with Kaiser Normalization, a Rotation converged in 9 iterations. Main factor loadings are highlighted in bold. Source: MERIT, based on Eurostat data, mostly referring to 2002 or 2003

Based on the variable with the highest factor loadings we can characterise and interpret the four factors and give them a short symbolic name:

Public Knowledge (F1)
Human resources in Science and Technology (education as well as core) combined with public R&D expenditures and employment in knowledge intensive services is the most important or common factor hidden in the dataset. The most important variables in Public Knowledge are the education and human resource variables (HR S&T education and core). Cities with large universities will rank high on this factor.

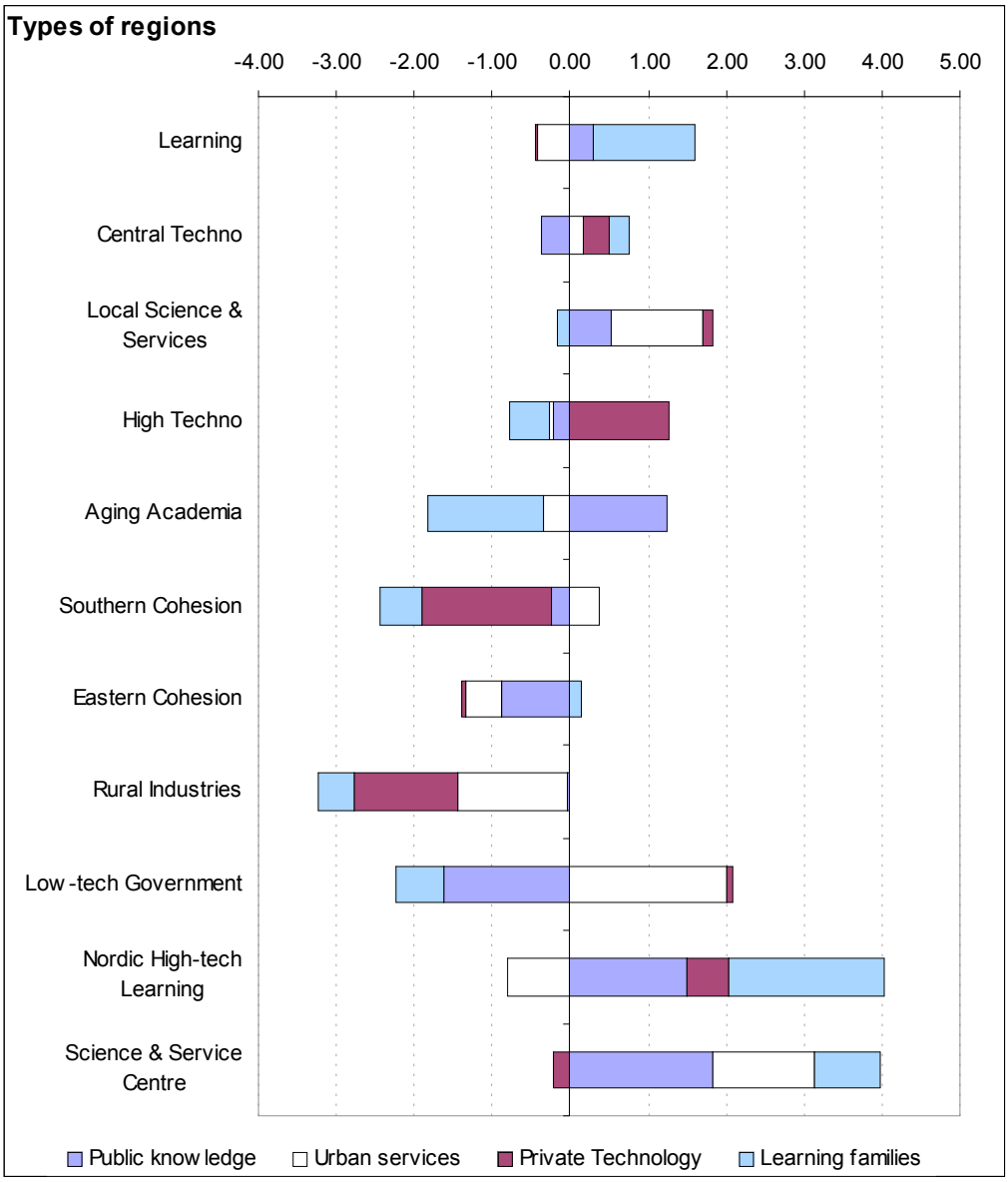
One interesting conclusion is that public and private knowledge are two different factors (F1 and F3 respectively), which for instance has implications for policy issues regarding Science-Industry linkages. Public R&D and higher education seems especially related to high-tech services, whereas Business R&D especially serves high- and medium-high-tech manufacturing.

Urban Services (F2)
This second factor contains information on the structure of the economy. It is well known that industrial economies are quite different from services based economies. It is not a matter of development per se, because in the European regions the variety of economic structure is very large and for a large part based on endowments and path dependent developments like the extent to which government administration is located in a region or not. This factor takes into account the differences between an industrial area and a service based area including the public administration services of the government. Another observation is that there are two different 'urban' factors, indicating that academic centres not necessary co-locate with administration centres. What may not be surprising is that the Urban Services factor is not associated with R&D, since R&D is more relevant for innovation in manufacturing than for service industries.

Private Technology (F3)
This factor contains business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries. A countervailing power is the existence of agriculture in the region. One interpretation could be that agricultural land-use goes at the cost of possibilities of production sites. Another interpretation is that agriculture is not an R&D intensive sector.

Learning Families (F4)
The most important variable in this factor is the share of the population below the age of 10. Locations with relatively larges shares of children are places that are attractive to start a family. Possibilities for Life Long Learning in a region seems associated with the lively labour participation of the mothers of these youngsters. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

A 1.2 Description of the 11 types of EU regions



1 Learning

The Learning regions are first of all characterised by the high score on the factor 'Learning Families', and the three main components of this factor: life-long-learning, youth and female activity rate. On the other factors the regions are close to the regional average. Unemployment is on average the lowest compared to the other EU regions. Employment in the government sector is limited. GDP per capita is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities with the Nordic High-tech Learning regions, but the business sector in the Nordic version invest more in R&D.

2 Central Techno
This is a rather large group of regions located mostly in Germany and France with close to average characteristic, but the share of High-tech manufacturing is rather high. The factor-scores as well as GDP-per head is slightly above the regional average, except for the Public Knowledge factor which is slightly lower.

3 Local Science & Services
This group of regions with diverse nationality consist mainly of capital cities, such as Madrid, Warsaw, Lisbon, Budapest and Athens. These urban area's serve as national centres for business services, government administration, public research institutes and universities. Urban Services and Public knowledge are therefore the strongest factors for this type of region. GDP per capita is on average slightly below the EU25 average, but growing. The low score on life-long-learning is a weakness in most Local Science & Services regions, especially compared to the more wealthy and advanced Science & Service Centres.

4 High Techno
The High Techno regions host many high-tech manufacturing industries. They are mostly located in Germany (e.g. Bayern and Baden-Wurtemberg), some in Italy (e.g. Lombardia and Veneto) and two French regions. This type is very strong in Private Technology and has a high level of GDP per capita. The factors Public Knowledge and especially the Learning Family factor shows a relative weakness, e.g. in life-long-learning. Growth in terms of GDP per capita has been low and unemployment didn't improve much in the previous years.

5 Aging Academia
This group of regions is mostly located in east-Germany and Spain and also includes the capital regions of Bulgaria and Romania. The strength in the Public Knowledge factor is mostly based on the high share of people with tertiary education. The low score on the Learning Family factor is due to little life-long-learning and hosting relatively few children. The unemployment situation has improved, but is still very high.

6 Services Cohesion
Services cohesion regions are located in Southern Europe, consisting of many Greek, some Spanish and two Portuguese regions. The low score on the Private Technology factor is striking. There is hardly any high-tech manufacturing nor business R&D. Services is the most important sector, but also agriculture is still a rather large sector. The share of manufacturing industry in value added is very limited. Population density is low, but on average it has been increasing.

7 Manufacturing Cohesion
Manufacturing industries is the dominant sector, whereas services and agriculture are rather small sectors. This type of region is mostly located in Poland, Czech Republic, Hungary and Slovak Republic. Two Portuguese regions are also included. The Public Knowledge factor is the main weakness of this type of regions. However, the score on the Private Technology factor is close to average, which means that it is much stronger in this respect than the Services Cohesion regions. Unemployment is high, even compared to Rural Industries and Services Cohesion regions.

8 Rural Industries
Besides a low per capita GDP, Rural Industries regions have in common a low score on both the factors Urban Services and Private Technology. Population density is very low. The service sector is often very small. Especially agriculture but also manufacturing industries are relatively large sectors. Besides regions in Bulgaria and Romania

9 Low-tech Government
This type of region, mostly located in southern Italy is characterised by a very low score on Public Knowledge combined with a high share of employment in the Government sector. Unemployment is severe, on average comparable to Manufacturing cohesion regions. GDP per capita is however close to the regional average.

10 Nordic High-tech Learning
The Nordic version of the learning regions are typically strong in the Learning Family factor, but this type also has by far the highest business R&D intensity. In contrast with the popular characterisation of Nordic societies, the size of the government administration is the lowest of all the types. The low score on Urban Services is also due to the low population density. A rather unique feature of this type of regional knowledge economy is the combined strength in both the Public Knowledge and the Private Technology factor.

11 Science & Service Centre
The main characteristics of this urban group of regions are the high scores on the Public Knowledge and Urban Services factors. Population density is very high. This type also has the highest GDP per capita and productivity. The variables that are captured by the factor Learning Families also show a score above the regional average, but disappointing is the relatively low presence of high and medium-high-tech manufacturing and the business R&D intensity.

A.2 Qualitative analysis and preparation of country reports

In summary, the country reports were prepared in the following stages:

A first country document was prepared by the core study team in the form of a **template country report**. It contained overall guidance to the country experts and included a number of pre-filled tables, graphs and analysis sections based on information available at EU level.

Next, the core team members and the national experts who were involved in the pilot phase of the project commented completed elements of the templates. Drafted elements and templates were completed and compiled into **first country briefings (draft pilot reports)** by the national experts involved in the pilot phase of the project. These pilot country reports were prepared by experts for Belgium, Greece, Italy, France, and Poland.

Once the five first country briefings were completed, a **final set of guidelines** was prepared by the core team. These guidelines were agreed with the Commission services responsible for this evaluation. Prior to this, all first country briefings were reviewed during the January 2006 and presented to a first meeting of the scientific committee.

The work during the **country analysis phase** included:
Undertaking a series of key interviews (KI) with policy decision makers;
Organising a focus group (FG) with key national or regional RDTI stakeholders;
Collecting additional information and finalising short case studies; and
Preparing the synthesis notes of these various activities.

The above-mentioned work served as qualitative data and allowed the national experts to compile the draft **country reports**. All reports were subsequently reviewed, checked and finalised by the core team and the consortium members. Once this first check was completed, the core team organised a final peer reading of the document to verify its overall consistency and to ensure a final English language editing of the document. The core team then completed the final editing and layout of the document with a view to publication.

An overall synthesis report of all has been prepared and will be published by the European Commission providing an overview of the issues addressed in each of the 27 country reports produced by the evaluation team.

Appendix B Statistical tables and regional scorecards

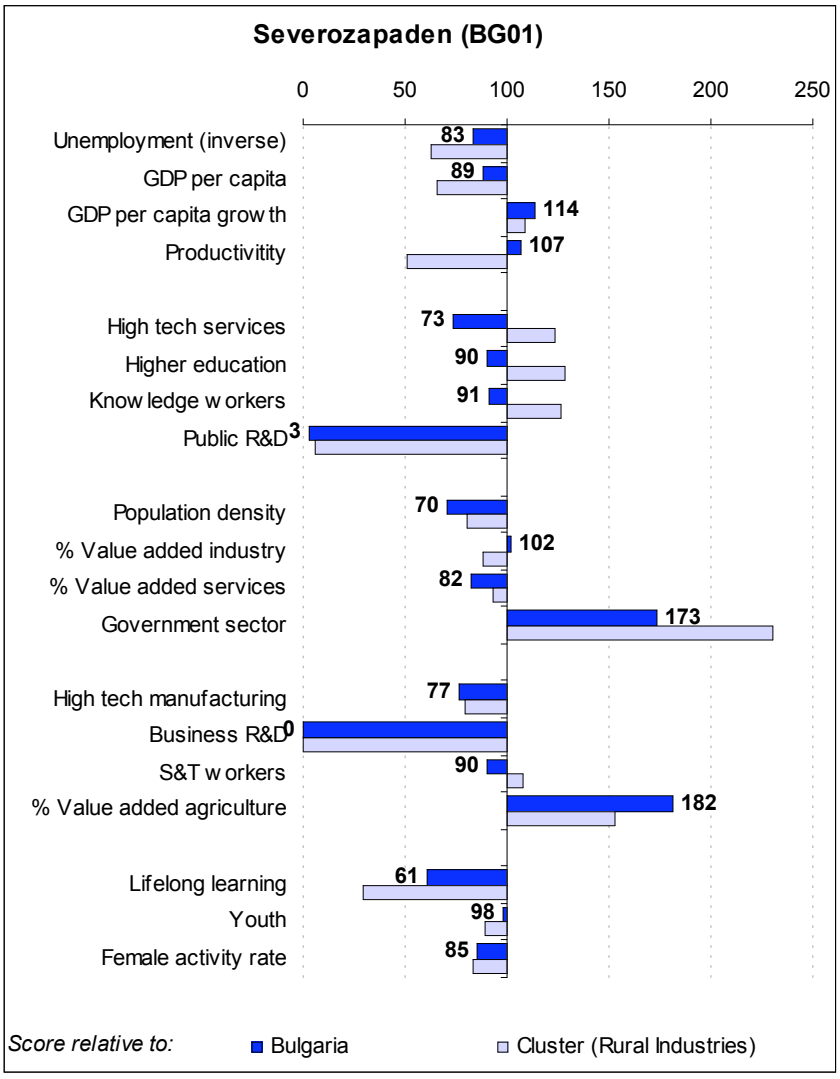
B.1 Overall quantitative analysis per region

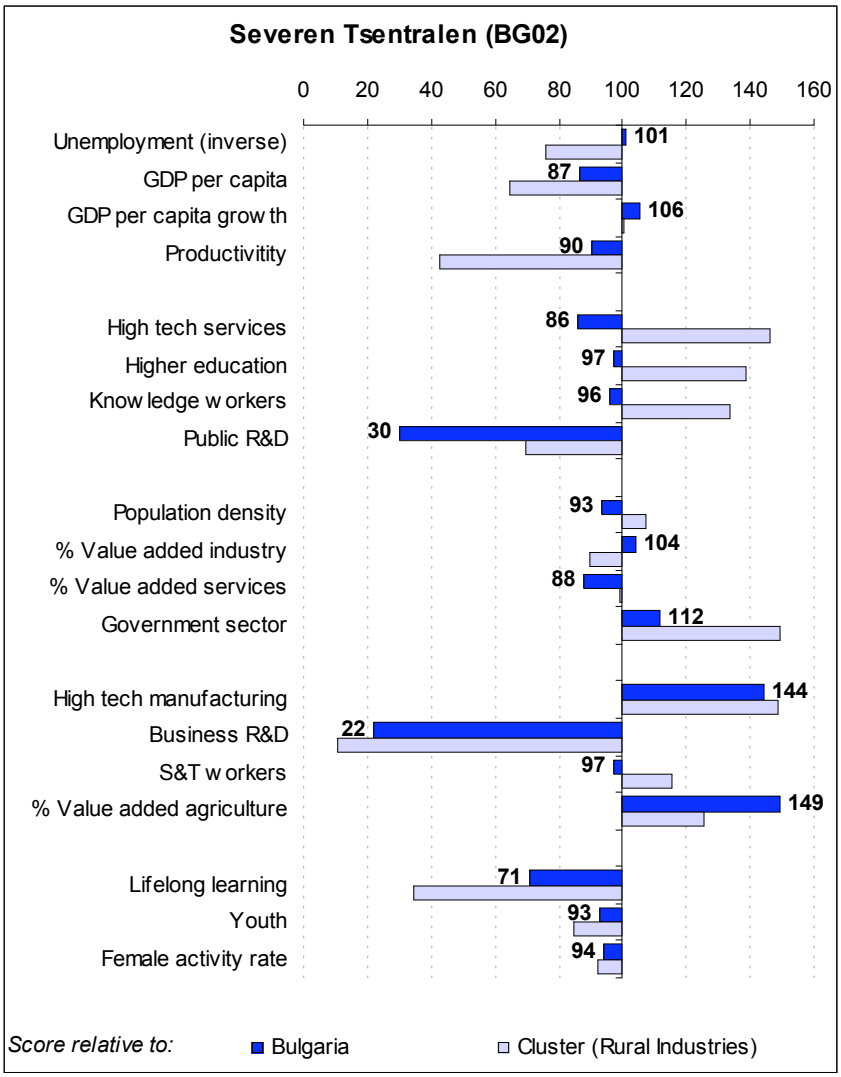
			Economic performance				Public knowledge				Urban services				Private technology				Learning families			Cluster factor scores				
Cluster Scores		Cluster	Unemployment	GDP per capita	GDP per capita growth	Productivity	High tech services	Higher education	Knowledge workers	Public R&D	Population density	% Value added industry	% Value added services	Government sector	High tech manufacturing	Business R&D	S&T workers	% Value added agriculture	Lifelong learning	Youth	Female activity rate	Public knowledge	Urban services	Private Technology	Learning families	Per capita GDP
			2003	2002	1996-2002	2002	2003	2003	2003	2002	2002	2002	2002	2003	2003	2002	2003	2002	2003	2001	2003					
EU25			9,2	21170	4,8	4556	3,2	20,7	11,6	0,69	117	27,0	70,9	7,5	6,6	1,24	20,7	2,1	8,7	10,8	48,3					
Regional average			9,4	18882	4,8	3914	2,8	18,9	10,7	0,49	294	28,9	66,6	7,6	6,5	0,80	19,5	4,3	7,1	10,5	47,2					
Bulgaria	BG		13,7	6099	5,3	534	2,7	21,1	10,9	0,40	71	29,1	58,8	8,0	4,7	0,09	15,4	12,1	1,3	9,2	44,3					
Relative to EU25			67	29	112	12	84	102	93	58	61	107	83	106	71	7	74	577	15	85	92					
Severozapaden	BG01	8	16,5	5399	6,1	573	2,0	19,1	9,9	0,01	50	29,5	48,4	13,8	3,6	0,00	13,9	22,1	0,8	9,0	37,7	-0,21	-0,42	-1,51	-1,20	-1,78
Severen Tsentralen	BG02	8	13,6	5282	5,6	481	2,3	20,5	10,5	0,12	66	30,2	51,7	8,9	6,7	0,02	14,9	18,1	0,9	8,5	41,7	-0,47	-1,12	-1,20	-1,31	-1,80
Severoiztochen	BG03	8	19,4	5140	4,6	465	1,6	17,2	8,5	0,14	65	21,8	59,0	6,8	4,8	0,12	12,4	19,2	1,1	10,0	43,3	-0,21	-0,81	-1,95	-0,61	-1,82
Yugozapaden	BG04	5	11,3	8833	6,5	685	4,2	29,8	16,0	0,87	104	30,1	66,3	7,9	3,6	0,15	21,6	3,6	2,0	8,6	49,0	-1,70	-0,16	-0,38	-1,11	-1,33
Yuzhen Tsentralen	BG05	8	11,1	4921	3,1	439	2,0	16,6	8,5	0,12	71	32,4	52,4	6,6	6,0	0,03	12,3	15,2	0,9	9,3	43,4	-0,12	-1,33	-1,23	-0,91	-1,84
Yugoiztochen	BG06	8	16,2	5017	4,8	470	2,3	17,8	8,1	0,05	54	26,0	57,9	8,8	2,8	0,08	12,7	16,1	1,3	10,3	43,3	-0,17	-0,45	-1,65	-0,37	-1,83
Learning		1	4,3	23139	4,7	4900	3,2	22,1	12,5	0,40	216	30,5	66,0	6,0	6,2	1,12	22,0	2,4	15,1	12,2	53,8	-0,29	-0,41	-0,04	1,30	0,56

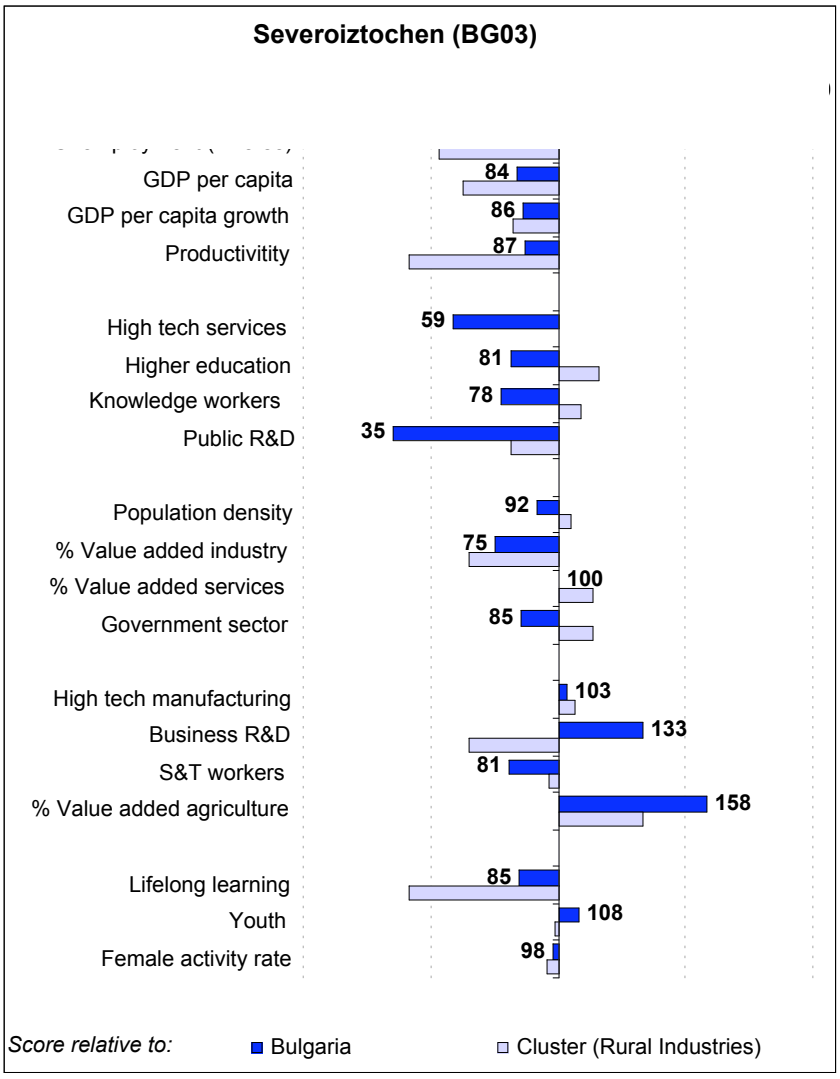
Cluster Scores	Cluster	Economic performance				Public knowledge				Urban services				Private technology				Learning families			Cluster factor scores				
		Unemployment	GDP per capita	GDP per capita growth	Productivity	High tech services	Higher education	Knowledge workers	Public R&D	Population density	% Value added industry	% Value added services	Government sector	High tech manufacturing	Business R&D	S&T workers	% Value added agriculture	Lifelong learning	Youth	Female activity rate	Public knowledge	Urban services	Private Technology	Learning families	Per capita GDP
		2003	2002	1996-2002	2002	2003	2003	2003	2002	2002	2002	2002	2003	2003	2002	2003	2002	2003	2001	2003					
Central Techno	2	7,5	20700	4,0	4884	2,9	18,7	10,6	0,42	182	30,0	66,8	8,2	7,5	0,84	20,7	3,1	6,7	11,2	47,6	-0,38	0,16	0,36	0,25	0,24
Local Science & Services	3	9,2	19852	6,0	3780	4,3	23,6	13,7	0,88	389	22,0	76,2	9,8	4,6	0,79	22,4	1,8	5,9	10,4	46,9	0,52	-1,19	0,12	-0,17	0,13
High Techno	4	6,1	25202	3,6	5591	3,1	17,5	10,3	0,58	288	31,7	66,7	7,3	11,9	1,31	22,8	1,6	5,6	9,7	46,4	-0,21	-0,05	-1,27	-0,52	-0,84
Aging Academia	5	13,3	17508	5,3	3649	2,5	27,4	13,2	0,67	185	30,1	66,9	7,6	6,7	0,57	18,8	3,0	4,8	7,4	46,0	-1,24	-0,33	-0,02	-1,48	-0,18
Southern Cohesion	6	10,7	16213	6,3	3082	1,2	14,7	8,2	0,37	66	19,9	70,0	7,5	1,5	0,11	11,2	10,2	3,1	10,0	38,2	-0,25	-0,36	-1,66	-0,54	-0,35
Eastern Cohesion	7	14,2	9776	5,3	1230	1,9	12,0	7,2	0,26	113	34,2	61,3	6,6	6,6	0,33	15,9	4,5	4,1	11,0	48,4	-0,88	-0,46	-0,06	-0,15	-1,20
Rural Industries	8	10,3	8204	5,6	1120	1,6	14,8	7,8	0,17	62	33,6	52,0	6,0	4,5	0,18	12,9	14,5	2,6	10,1	45,3	-0,03	-1,40	-1,33	-0,46	-1,41
Low-tech Government	9	14,1	18553	4,1	4848	2,3	10,0	6,2	0,55	161	21,2	75,1	12,9	4,2	0,28	16,2	3,7	4,6	10,1	32,4	-1,62	-2,00	-0,08	-0,61	-0,04
Nordic High-tech Learning	10	6,4	23323	4,7	5202	4,5	28,5	18,7	0,41	67	29,9	67,9	5,4	7,6	3,05	30,2	2,3	25,0	11,9	58,2	1,49	-0,82	0,54	-1,98	0,59
Science & Service Centre	11	6,1	34489	5,3	6663	5,6	28,5	16,8	0,98	2118	16,8	81,2	7,4	3,8	1,00	30,5	0,8	12,8	11,4	55,5	1,82	1,31	-0,22	0,85	2,06

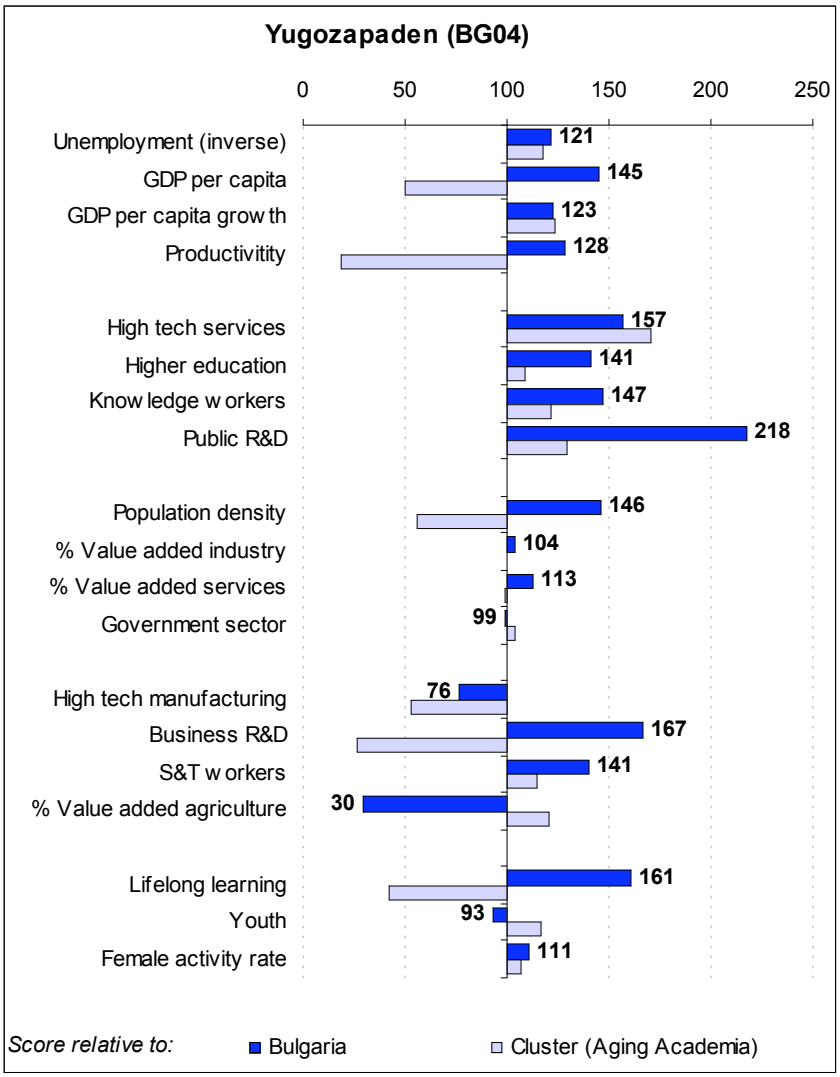
B.2 Regional Scorecards

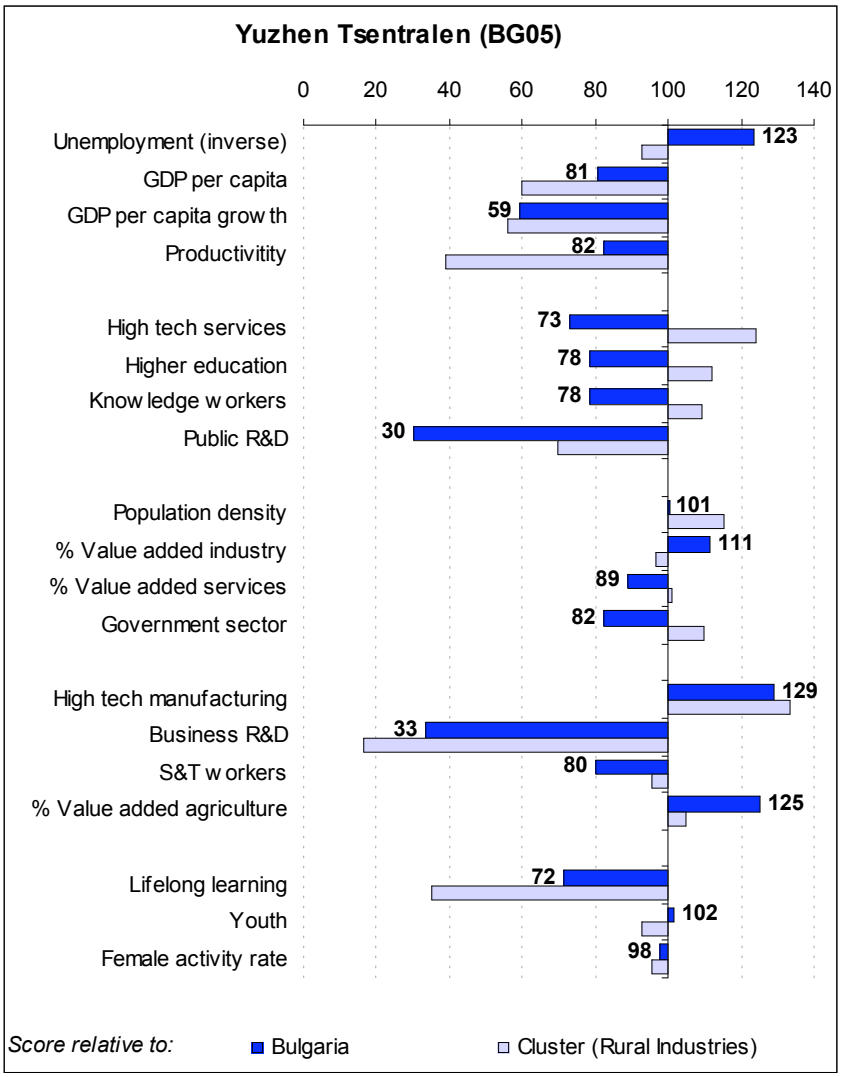
Yugozapaden region (South West Planning Region) stands out from the other Bulgarian regions as a member of the cluster 5"Ageing Academia". The other five Bulgarian regions **Severozapaden (**North West Planning Region**), Severen Tsentralen (**North Central Planning Region**), Severoiztochen (**North East Planning Region**), Yugoiztochen (**South East Planning Region**) and Yuzhen Tsentralen (**South Central Planning Region**)** regions belong to the cluster 8 "Rural Industries".




Severen Tsentralen (BG02)
0
20
40
60
80
100
120
140
160
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
101
87
106
90
86
97
96
30
93
104
88
112
144
22
97
149
71
93
94
Score relative to:
Bulgaria
Cluster (Rural Industries)


Severoiztochen (BG03)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
84
86
87
59
81
78
35
92
75
100
85
103
133
81
158
85
108
98
Score relative to:
Bulgaria
Cluster (Rural Industries)


Yugozapaden (BG04)
0
50
100
150
200
250
Unemployment (inverse)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
121
145
123
128
157
141
147
218
146
104
113
99
76
167
141
30
161
93
111
Score relative to:
Bulgaria
Cluster (Aging Academia)


Yuzhen Tsentralen (BG05)
0
20
40
60
80
100
120
140
Unemployment (inverse)
GDP per capita
GDP per capita grow th
Productivitity
High tech services
Higher education
Know ledge w orkers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T w orkers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
123
81
59
82
73
78
78
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101
111
89
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129
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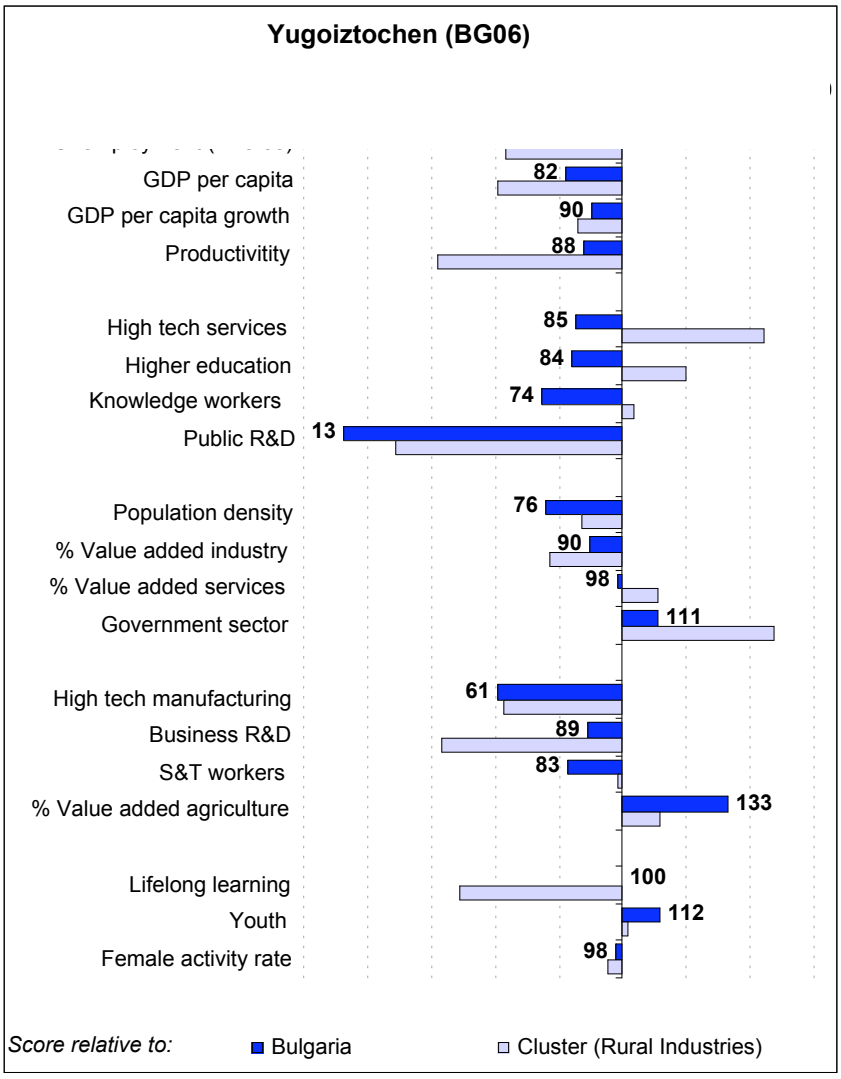
80
125
72
102
98
Score relative to:
Bulgaria
Cluster (Rural Industries)


Yugoiztochen (BG06)
GDP per capita
GDP per capita growth
Productivitity
High tech services
Higher education
Knowledge workers
Public R&D
Population density
% Value added industry
% Value added services
Government sector
High tech manufacturing
Business R&D
S&T workers
% Value added agriculture
Lifelong learning
Youth
Female activity rate
82
90
88
85
84
74
13
76
90
98
111
61
89
83
133
100
112
98
Score relative to:
Bulgaria
Cluster (Rural Industries)

Appendix C Categories used for policy-mix analysis

C.1 Classification of policy areas

Policy area	Short description
Improving governance capacities for innovation and knowledge policies	Technical assistance type funding used by public authorities, regional agencies and public-private partnerships in developing and improving policies and strategies in support of innovation and knowledge. This could include past ERDF innovative action programmes as well as support for instance for regional foresight, etc.
Innovation friendly environment;	This category covers a range of actions which seek to improve the overall environment in which enterprises innovate, and notably three sub groups: innovation financing (in terms of establishing financial engineering schemes, etc.); regulatory improvements and innovative approaches to public services and procurement (this category could notably capture certain e-government investments related to provision of services to enterprises) ; Developing human capital for the knowledge economy. This category will be limited to projects in higher education aimed at developing industry orientated courses and post-graduate courses; training of researchers in enterprises or research centres[28];
Knowledge transfer and technology diffusion to enterprises	Direct or indirect support for knowledge and technology transfer: direct support: aid scheme for utilising technology-related services or for implementing technology transfer projects, notably environmentally friendly technologies and ITC; indirect support: delivered through funding of infrastructure and services of technology parks, innovation centres, university liaison and transfer offices, etc.
Innovation poles and clusters	Direct or indirect support for creation of poles (involving public and non-profit organisations as well as enterprises) and clusters of companies direct support: funding for enterprise level cluster activities, etc. indirect support through funding for regrouping R&D infrastructure in poles, infrastructure for clusters, etc.
Support to creation and growth of innovative enterprises	Direct or indirect support for creation and growth of innovative firms: direct support: specific financial schemes for spin-offs and innovative start-ups, grants to SMEs related to improving innovation management, marketing, industrial design, etc.; indirect support through funding of incubators, training related to entrepreneurship, etc.
Boosting applied research and product development	Funding of "Pre-competitive development" and "Industrial research" projects and related infrastructure. Policy instruments include: aid schemes for single beneficiary or groups of beneficiaries (including IPR protection and exploitation); research infrastructures for non-profit/public organisations and higher education sector directly related to universities.

[28] This is part of the wider area of in-house training, but in the present study only the interventions targeted to researchers or research functions will be analysed.

C.2 Classification of Beneficiaries:

Beneficiaries	Short description
Public sectors	Universities National research institutions and other national and local public bodies (innovation agencies, BIC, Chambers of Commerce, etc..) Public companies
Private sectors	Enterprises Private research centres
Networks	cooperation between research, universities and businesses cooperation between businesses (*clusters of SMEs)* other forms of cooperation among different actors

C.3 Classification of instruments:

Instruments	Short description
Infrastructures and facilities	Building and equipment for laboratories or facilities for university or research centres, Telecommunication infrastructures, Building and equipment for incubators and parks for innovative enterprises
Aid schemes	Grants and loans for RTDI projects Innovative finance (venture capital, equity finance, special bonds, etc.) for innovative enterprises
Education and training	Graduate and post-graduate University courses Training of researchers

Appendix D Policy measure tables

D.1 Summary of relevant Phare projects

BG 0102.01: SME services and technology grant scheme, completed
This scheme, which was grounded in the productive sector investment strategy of the National Development Plan, addressed the shortage of modern management skills and access to finance on suitable terms for SMEs in Bulgaria. It aimed to improve business performance through a range of consultancy services focusing on technological transfer and innovations, management and organisational development, financial management, marketing and advertising, and human resource development. The scheme included a complementary grant scheme (co-financed by both public and private sector contributions) for upgrading production technology in the enterprises receiving consultancy services. Both components were implemented in 2004.

BG 0102.02: Hi-technology business incubators – R&D component, completed

This scheme, which was grounded in the productive sector investment strategy of the National Development Plan, was meant to strengthen the technology-based SME sector by providing infrastructure and support services for the start-up and development of innovative small businesses. Building on earlier projects supported by Phare and other donors, the scheme was envisaged to support the creation of up to six high-tech business incubators located at academic centres of technological excellence. The scheme incorporated as well a R&D grant scheme (co-financed by both public and private sector contributions) to help the selected enterprises bring to the market products based on their innovative technologies. **Only the R&D component was implemented whereas the creation of hi-tech business incubators was cancelled by the Delegation of the European Commission in Bulgaria due to lack of administrative capacity in the implementing agency – the Ministry of Regional Development and Public Works.** The latter component was later on partially implemented through national budget resources. It was a pilot scheme for Bulgaria. 49 companies were approved to participate in it.

Participation in EC Programmes and Agencies: Phare projects BG0013, BG0105.03, BG0205.03, BG2003/004-937.12.01, BG2004/016-711.12.01, BG2005/017-353.11.03
Under these projects during the years the Phare co-financing helped Bulgaria pay its contribution for participating in the following EC programmes and agencies: Leonardo da Vinci II, Socrates II, Youth, FP5 and FP6 (including Euratom), Altener, Culture 2000, Customs 2002, Enterprise and Entrepreneurship, Media Plus, SAVE, Combating Cancer, AIDS and other diseases, Health Monitoring, Pollution-related Diseases, and the European Environment Agency.

BG2003/004-937.02.03 Introduction of a cluster approach and the establishment of a cluster model - ongoing
The purpose of the project is to establish two pilot **clusters** in selected sectors and to strengthen institutional capacity for implementing cluster model using EU practice as groundwork for successful multiplication of the models in other sectors. This project

will be implemented in 2006, within its framework a National Strategy and an Action Plan for setting up and development of clusters will be drafted. The proceeds of the project will support the analysis of the needs and the potential of the two sectors, consultancy to the approved applicants for institutional building of the clusters' management bodies as well as the supply of basic office equipment for the operation of the newly established organisations. The second phase – Cluster development initiatives, will be implemented in 2007.

BG2004/016-711.11.04 Support for increasing the competitiveness of Bulgarian enterprises - ongoing

The overall objective of this project is to foster the sustainable development of SMEs through improvement of their competitiveness. The support under this project will be focused upon achieving compliance of manufacturing processes with EU environmental standards and occupational health requirements, introducing quality management systems, good laboratory practices and good manufacturing practices, increasing energy efficiency, **enhancing the capacity for innovation and R&D**, and promoting the sustainable development of SMEs with growth potential, creating attractive business environment through promoting the development of public-private partnerships.

BG2004/016-919.05.01 Support for participation of Republic of Bulgaria In Community initiative INTERREG IIIB and IIIC - ongoing

The purpose of the project is to encourage and increase participation of the Bulgarian partners in INTERREG III strand B and strand C and prepare potential beneficiaries to develop and implement trans-national and interregional projects. The project is meant to support the Bulgarian organisations involved in projects in Interreg IIIB and IIIC that have been approved. The Phare support is 75% of the budget of the Bulgarian partners in these projects. The call was announced in the summer of 2005, the signing of the contracts with the Bulgarian partners is still pending.

BG2005/017-353.10.06 Support to the implementation of the National Innovation Strategy - forthcoming

The overall objective of the project is to improve the competitiveness of Bulgarian enterprises and to promote higher growth innovation environment, through improvement of the innovation infrastructure and know-how at national level.
Project purposes: Establishment of Technology Transfer Offices at Bulgarian universities and Public research organisations; Development of the administrative and technical capacity of the Bulgarian Small and Medium-sized Enterprises Promotion Agency to support the network of institutions in the public and private sector in Bulgaria whose activities initiate, import and disseminate new technologies.

BG2005/017-586.04.02 Cluster development initiatives - forthcoming

The overall objective is to increase the level of competitiveness and innovation in the SME sector as a basis for sustainable and balanced development of the economy. The project purpose is to support growth of existing or embryonic clusters of Bulgarian enterprises in order to improve their competitiveness. The grant scheme will provide support to about 8-14 clusters. The individual grant will amount up to 250,000 euro.

Appendix E Case studies

Name of Case (related policy measure or action)
Title of measure/project: SME services and technology grant scheme Description: The scheme addressed the shortage of modern management skills and access to finance on suitable terms for SMEs in Bulgaria. It aimed to improve business performance through a range of consultancy services focusing on technological transfer and innovations, management and organisational development, financial management, marketing and advertising, and human resource development. The scheme included a complementary grant scheme (co-financed by both public and private sector contributions) for upgrading production technology in the enterprises receiving consultancy services. Both components were implemented in 2004. Policy framework: Phare BG0102.01; Knowledge transfer and technology diffusion to enterprises
Brief history and main features
Policy area: Knowledge transfer and technology diffusion to enterprises Main instruments: Phare project, components: consultancy and direct grant The initiative targeted industrial private companies. Organisations involved: the initiative was managed by Ramboll Management. Time-frame: 12 months, 3925 Bulgarian consultant days deployed, 649 companies covered initially What is the degree of novelty of the initiative? Sectoral approach, consultancy based on preliminary surveying the companies' needs – tailor-made approach
Main results
6 know-how groups established, managed by 6 Bulgarian experts 130 short-term Bulgarian experts provided the consultancies to the companies Consultancy services delivered to 279 companies as follows: Marketing and advertising – 35.3% Management and organisational development – 33.5% Technology transfer and innovations – 10.2% HR management – 7.1% Operational improvements – 7.1% Financial management – 6.7% 17 companies involved in a 10-day training/consultancy on ISO 9001
Reasons of success and conditions for repeatability
Tailor-made consultancy rendered upon studying the companies' needs The companies received a consultancy package which was a mixture of several fields, for instance HR development and re-engineering of some of the production processes Good organisation of the work of the long-term and the short-term experts – know-how groups The overall approach can be applied in other sectors – the overall approach proved to be successful and the companies were satisfied with the consultancy they received

Appendix F Further reading

Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013, COM(2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm

e-Bulgaria Report 2004 (in English) and 2005 (in Bulgarian), Applied Research and Communications Fund

European Innovation Scoreboard 2005, Comparative Analysis of Innovation Performance, European Trend Chart on Innovation, 2006

Innovation Potential of the Bulgarian Economy, Vesti Bulletin No. 4/2004, Bulgarian Innovation Relay Centre

Innovation.bg: Measuring the Innovation Performance of the Bulgarian Economy, Applied Research and Communications Fund, 2006

National Regional Development Strategy of the Republic of Bulgaria 2005-2015, Ministry of Regional Development and Public Works of the Republic of Bulgaria, 2005

Regional Innovation Strategy for the South-Central Planning Region, Applied Research and Communications Fund, 2005

Regional Plan for the Development of Jugozapaden (South West) Planning Region for the Period 2007-2013, Ministry of Regional Development and Public Works of the Republic of Bulgaria, December, 2005

Trends in International Mathematics and Science Study (TIMSS), International Association for the Evaluation of Educational Achievement, 2004

Working together for growth and jobs: A new start for the Lisbon Strategy, COM(2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm

List of useful websites at national or regional level

Applied Research and Communications Fund: www.arcfund.net

Bulgarian National Strategic Reference Framework and Operation Programmes Site: http://www.funds.minfin.bg/?cat=2.

Bulgarian Phare financing memoranda per years
http://europa.eu.int/comm/enlargement/fiche_projet/index.cfm?page=410708&c=BULGARIA

Financial data of Phare National Programme in Bulgaria
http://www.minfin.government.bg/inpage.php?id=338&language=english

Bulgarian Ministry of Economy and Energy: www.mee.government.bg

Bulgarian Ministry of Education and Science: www.mes.government.bg

Bulgarian ministry of Regional Development and Public Works: www.mrrb.government.bg

Knowledge Economy and Innovation Portal: www.bgrazvitie.net

Appendix G: Stakeholders consulted

List of all individuals interviewed

Name	Position	Organisation
Boyko Denchev	Director	Bulgarian Small and Medium Enterprises Promotion Agency
Emilia Radeva	Senior State Expert	Ministry of Economy and Energy
Lora Pavlova	Senior Expert	Ministry of Education and Science
Lyubomir Datsov	Deputy Minister	Ministry of Finance

Participants to focus group

Name	Position	Organisation
Angel Milev	Programme Manager	ARC Fund
Ass. Prof. Milanka Slavova	Lecturer	University of National and World Economy
Boriana Ivanova		Agency for Economic Analysis and Forecasting
Borislav Petkov		Ministry of Finance
Boyko Dentchev	Director	National Innovation Fund, Executive Agency for SME Promotion
Christo Chorbadjiev		Twinning Project, MoEE
Daniela Tchonkova	Coordinator	ARC Fund
Desislava Hristova		Ministry of Regional Development and Public Works
Emil Komatichev	Senior State Expert	MoEE
Emilia Radeva	Senior State Expert	MoEE
Enzo Reali		Delegation of the European Commission to Bulgaria
Ivan Popov		Ministry of Regional Development and Public Works
Joachim Frede	Resident Twinning Advisor/MoEE and Ministry of Labor and Social Policy (MLSP)	
Milena Dacheva		Bulgarian Association of Regional Development Agenices

Nicholas Petropoulos	SF Expert for the Ministry of Finance and Ministry of Economy and Energy (MoEE)	Logotech
Philip Kroumov	State Expert	MoEE
Prof. Kostadinka Simeonova	Director	Centre of Science and Science Histoy
Prof. Marin Petrov	Senior Consultant	ARC Fund
Ralitsa Borisova		University of National and World Economy
Ruslan Stefanov	Coordinator	Center for the Study of Democracy
Zoya Damianova	Programme Director	ARC Fund