

# Science, Innovation and Information Society

Throughout 2011, ARC Fund continued its efforts to provide the most up-to-date information and analysis to Bulgarian policy-makers in innovation, science and technology policy.

## Innovation.bg



The annual Innovation.bg 2011 report provides a reliable assessment of the innovation potential of the Bulgarian economy and the state and development capacity of the Bulgarian innovation system. It puts forward recommendations for an improved public policy on innovation in Bulgaria and EU drawing on the latest international theoretical and empirical research while taking into account the specific economic, political, cultural, and institutional framework in which the country's innovation system is operating. For a seventh consecutive year the report raises the awareness of the importance of innovation as a factor for setting national priorities in the implementation of the new EU 2020 Strategy.

The report is intended for decision-makers in the public and private sectors. Following the methodology established by the four preceding editions, Innovation.bg 2011 analyzes the state and development capacity of the national innovation system based on five groups of indicators:

- overall innovation product;
- entrepreneurship;
- investment and financing of innovation;
- human capital for innovation;
- information and communication technologies.

In addition, the *Innovation.bg 2011* report for the first time analyzes the innovation potential of two economic sectors (construction and energy), taking into account the characteristics of the value added

chains and the interaction within the sectoral innovation systems. To achieve an impact on the speed and effect of innovation through national and sector policies (by means of well-considered regulation, educational and scientific technological priorities, fiscal and tax framework, and rules of public-private partnership) it is necessary to understand the mechanism of innovations at company and sectoral level.

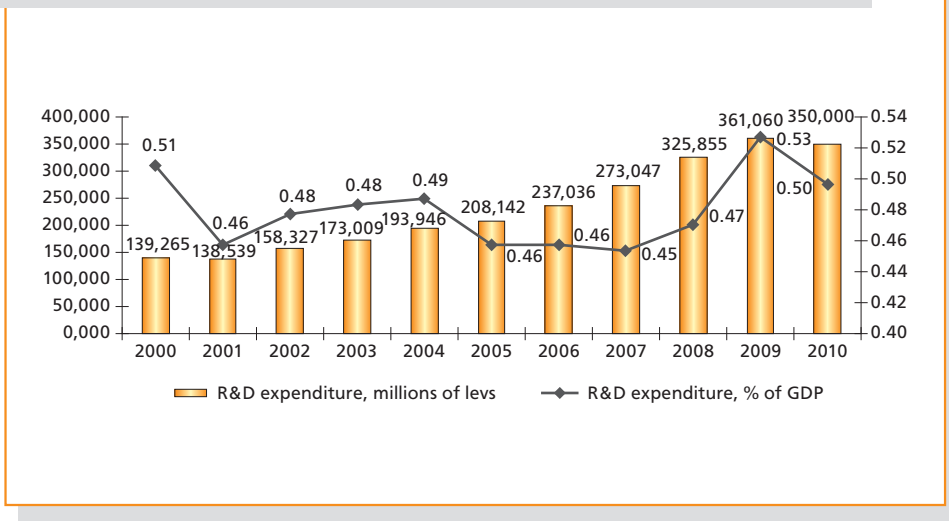
The analysis of sectoral innovation systems provides evidence of the essence and significance of innovation activity at the companies, thereby supporting the establishment of sector-based innovation-oriented policies and measures. Devising mechanisms of impact – ones that have not been imposed from with-

out but are instead the result of and have been indicated by the transformation processes in the relevant sectors –

ensures a healthier environment for the functioning of the innovation ecosystem as a whole.

### Innovation Potential of the Bulgarian Economy

**Figure 1. R&D EXPENDITURE IN BULGARIA**



There are some positive trends in the R&D indicators, although these are not particularly dynamic and are the result of market forces not of a scientific, technological and innovation policy. These could be cancelled by the economic crisis if measures for improving public innovation policy are not undertaken. Along with the constant increase of funds for R&D in all institutional sectors, the following structural changes can also be noted:

- Increasing share of the business and higher education in R&D expenditure at the expense of the state sector;
- R&D expenditure distribution is spread out more evenly by planning regions in the country.

The main challenges are related to the chaotic nature of the changes in public policy, inconsistency in the funding of individual scientific fields, as well as the weak institutionalization of the measures. Since funding reflects the location of human resources, the indicators of staff engaged in R&D demonstrate the same structural changes in respect to the institutional sectors and the regions in the country.

Funding for science and innovation remains below the level required to improve the innovation potential of the national economy which could result in lower growth in the future.

*Innovations in support of sectoral competitiveness*

This year's *Innovation.bg* report provides two analyses of sectoral innovation systems and the results of the innovation activity of companies there - construction and energy.

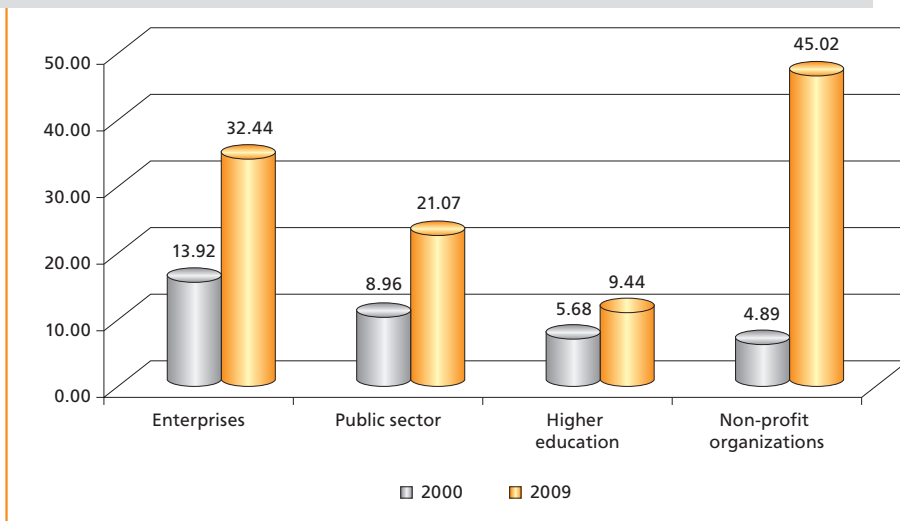
- The two sectors and the activities related to them along the global value added chain provide considerable employment, attract a lot of foreign direct investment and contribute to the formation of an essential portion of the country's GDP.
- Both sectors are key for the long-term competitiveness of the national economy – by means of developing the living and working environment; transport and energy infrastructure, as well as environmental impact (in the case of construction) and through energy efficiency, energy balance and the country's energy security in the case of the energy sector.

Construction and energy are developed on the basis of a diversified set of technologies which are at different stages of development. Although not formally conducting research, the business in the two sectors has a considerable potential to absorb technological knowledge generated in other fields and to introduce it in practice.

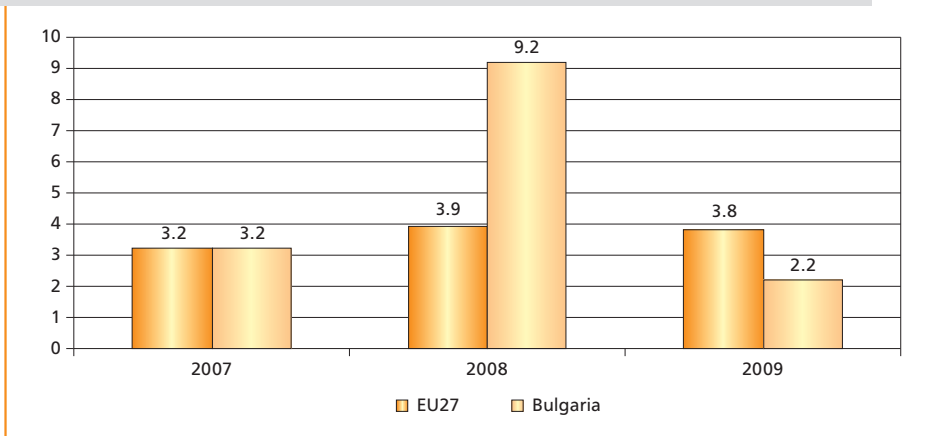
The results of the sectoral analyses suggest recommendations for the national innovation policy along several main lines:

- Innovation policy and the financial instruments which make its implementation possible (the National Innovation Fund, the National Science Fund, the operational programs, venture and guarantee funds through the JEREMIE initiative, among others) should be tailored to the characteristics of innovation at the sector level and the specific

**Figure 2. EXPENDITURE PER R&D-ENGAGED STAFF, THOUSANDS OF BGN**



**Figure 3. GOVERNMENT BUDGET EXPENSES FOR R&D IN ENERGY, % OF ALL BUDGET EXPENSES FOR R&D**



favorable factors. Sector development policies should be based on in-depth knowledge of sectoral innovation systems, the capacity, needs and specific expertise of agents in the sector.

- Prioritizing high-tech services while disregarding traditional low-tech sectors leads to ignoring factors critical for economic growth and competitiveness of national and regional economies, as well as to missing opportunities for spreading know-how and new technologies created in the country on a broader basis. Encouraging innovation in the traditional sectors creates higher demand for innovation solutions generated by the rest of the economic activities related to them.

This intensifies the interaction in support of open innovations within the innovation system as a whole.

- The business environment is of key importance for the development of the innovation potential of traditional industries which are a smaller source of new knowledge and which absorb the latter more. Basic (transport and communications) and advanced infrastructure (universities and research units) act as a medium for disseminating existing and new technologies, in conjunction with other factors such as patent law, protection of competition, tax relief and established business practices.

### *National innovation policy*

Bulgaria entered the second decade of the 21st century at one of the lowest levels of its innovation potential and competitiveness in Europe. In 2011, there

are conditions which, provided they are used efficiently, can transform the weaknesses into opportunity. Europe is developing its new 2020 strategy and requires

member states to adopt at national level ideas, priorities and instruments to achieve the objective of a competitive, sustainable, green and social European economy. The main principles which will guide the next 2014 - 2020 programming period in the management of Community funds are in the process of development.

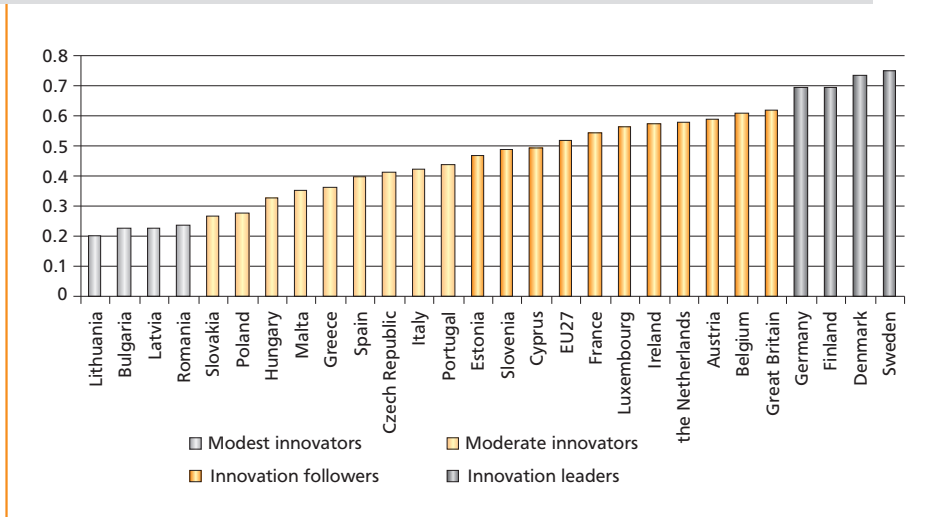
The missed opportunities and, above all, Bulgaria's low relative positions in the field of research and innovation compared to the rest of the EU member states, necessitate a well-reasoned and integrated policy for the development of science, technology, education and innovation. To implement such a policy it is equally important to have ensured funding, as well as political will, aimed at implementing the following measures:

- Establishment of an Integrated National Strategy for Innovation and Technological Development of the Bulgarian economy. The new innovation strat-

egy should reflect the scienceeducation-innovation interaction and should provide incentives for research units, universities and businesses to work together in the generation and transfer of new knowledge, technologies and innovations.

- Bulgarian representatives in the various EU institutions should participate more actively in the forging of European policy and in the making of decisions and recommendations. Numerous guidelines and decisions in the field of innovation have been published in the EU in recent years. Some of them restate ideas and recommendations from previous years without making any analysis, report or evaluation of their implementation and impact. There should be essential improvement in the programming of European funds for 2014 - 2020, with a stress on setting aside more means to fund R&D, technology and innovation. In this respect, the set of themes

**Figure 4. INNOVATION UNION 2010: THE INNOVATION PERFORMANCE OF EU MEMBER STATES**



should be restructured and new rules should be adopted for more effective procedures of application, reporting and control.

- Establishment of a strong and capable administrative body overseeing the application of Bulgaria's innovation development strategy which would reflect the political will for implementing the research and innovation policy.
- Increasing public and private funding of research and innovation by:
  - Providing instruments for national cofunding of projects approved for funding by EU programs. The state should support its best scientists, research units, business and NGOs that have succeeded in attracting external funding for the development of their research potential not only from FP7 but also from the other programs which have a direct impact on the innovation potential (e.g. CIP).
  - Coordinated public funding – through the National Innovation Fund, the National Science Fund, the operational programs, the venture capital funds – with the objective of prioritized channeling of

funds to the implementation of innovation projects.

- Utilization of public-private partnerships as a tool for the implementation of projects with a significant public outcome. The central government and the municipalities should apply new technological knowledge in public procurement as a main consideration instead of simply the lowest cost bid.

The national innovation system needs new models and mechanisms of management which would provide not only faster reform of its individual elements – scientific organizations, universities, intermediary units, innovative firms, administrative and financial institutions – but would also boost creative interaction and integration between them. The successful implementation of such measures requires a developed innovation culture. Awareness of the potential of innovations and understanding their significance at individual and community level takes time but gives results – a good reason to place it at the foundation of contemporary policy for the development of Bulgarian education and life-long learning.

### Seventh National Innovation Forum: Innovation and Competitiveness



*Mr. Ruslan Stefanov, Coordinator of Innovation.bg Group, Applied Research and Communications Fund*



*From left to right: Dr. Ognian Shentov, Chairman, Applied Research and Communications Fund; Mr. Boyko Borissov, Prime Minister of the Republic of Bulgaria and Mrs. Zinaida Zlatanova, Head of EC Representation in Bulgaria*

The Applied Research and Communications Fund, the Representation of the European Commission in Bulgaria and the Ministry of Economy, Energy and Tourism organized the Seventh National Innovation Forum entitled ‘Innovation and competitiveness’ on May 17, 2011 under the auspices of the Prime Minister of the Republic of Bulgaria, Mr. Boyko Borisov.

During the forum, the findings of the annual report on the innovation development in Bulgaria – Innovation.bg 2011, were presented and discussed. The winners in the national contest for “Innovative Enterprise of the Year” were awarded.

The National Innovation Forum is a unique annual event for Bulgaria, aimed at uniting the efforts and bringing together all stakeholders and interested parties to discuss the innovation environment in the country and to propose optimization measures.

The Prime Minister of the Republic of Bulgaria welcomed what Bulgaria has already achieved in stimulating innovations and explained that the Ministry of Economy, Energy and Tourism (MEET) has made an in-depth analysis of the Bulgarian economy, indicating the strengths, weaknesses and opportunities for development. He said that investments of EUR 200 million from the Operational Program “Competitiveness” shall be made and three technology parks shall be constructed, which will contribute to innovation-based economic growth in Bulgaria.

The Innovation.bg 2011 report presented at the forum, outlined: (a) why innovations are key factors for Bulgaria, (b) why the Bulgarian state suffers from innovation deficit despite the fact that it has one of the highest growth rates on the aggregate innovation index, (c) why patents indicate the potential for innovations not only now, but also in the future, (d)



the increase in the business contribution for research and development (R&D) expenditures in Bulgaria.

In summary, the forum participants indicated the steps necessary for the realization of Bulgaria's full innovation potential. These included the need to:

- Strengthen the knowledge base and further develop the European Research Area;
- Develop second-generation policies to be directed towards economic growth through innovation and technological development;
- Have a well-functioning administration and commitment at highest policy level;
- Draft a law for innovation to regulate the policy for stimulating innovation;
- Provide government co-financing for EU funded projects of national importance (similar to FP7 cofinancing)

### Annual Innovation Award

The award in the “Innovative Enterprise of the Year” contest is given annually to Bulgarian enterprises which have successfully developed and/or introduced innovations or to Research and Technological Development (RTD) organizations for their research that has increased the efficiency of business performance and/or has led to a sustainable economic

impact. The innovation performance of companies is evaluated by an independent jury on the grounds of data provided by the companies, on-site visits and in-depth technology audits of the applicants. Applicants are evaluated against a special methodology by an expert panel and a jury in two categories. The first category includes innovative small com-



*The winners of the Innovative Bulgarian Enterprise of the Year awards 2011*



panies which have up to 50 employees, and the second includes innovative medium and large companies which have over 50 employees.

Prime Minister Boyko Borissov awarded the winners in the “Innovative Enterprise of the Year” 2011 national contest. In the Small Innovative Enterprise category first prize went to PRIMAVET Sofia Ltd. and

three other companies were recognized by award diplomas: Advanced Technology Corp., APEX 11 Ltd. and Interiorprotekt Ltd. In the Medium and Large Innovative Enterprise category the first prize award was given to OPTIX Co, followed by DATEX Ltd. and AMK Drive and Control Engineering. Special award was given to ORAK Engineering for sustainable and innovative business practices.

### *Draft Law on Innovation*

In 2011, ARC Fund continued its good collaboration with the Ministry of Economy, Energy and Tourism and developed the first Draft Law on Innovation in Bulgaria.

The Draft Law on Innovation foresees the following main groups of measures for financial and nonfinancial support of innovation in the enterprises:

- The creation of a Bulgarian Council on Innovation as an advisory body to the Minister of Economy, Energy and

Tourism;

- The setting up of a state enterprise Bulgarian Innovation Fund with a mission to support innovation in Bulgarian enterprises through grant and other types of financial and non-financial instruments;
- The introduction of tax breaks for innovative companies and start-ups;
- The definition of the main terms in the country’s innovation policy and the key stakeholders in the national innovation system.

### *EVAL-INNO*

The “Fostering Evaluation Competencies in Research, Technology and Innovation in the SEE Region” (EVAL-INNO) project began in May 2011. The overall objective of the project is to improve national and regional RTDI evaluation capacity in South East Europe in order to ameliorate the efficacy of RTDI activities and maximize their benefits for economies and societies. The project consists of six partners from six countries (Austria, Bulgaria, Greece, Hungary, Montenegro and Serbia) in South East Europe all of which have a high level of public policy

expertise with access to national policy-makers and policy-delivery systems. Additionally, through a network of six country correspondents, the project will cover the entire South East European area, both in assessing as well as improving RTDI evaluation practices and the public procurement of evaluation expertise. The EVAL-INNO project is funded under the **South East Europe Transnational Cooperation Program** and co-funded by the project partners from own funds or from national public funds. The project runs for three years and concludes in April 2014.



*EVAL-INNO Steering Board Meeting, October 13th-14th, 2011, Sofia, Bulgaria*

In order to improve the framework within which RTDI policies, programs, institutions and projects take place, project activities include:

- Mapping RTDI strategic documents, RTDI programs and funding instruments, innovation infrastructures, RTDI stakeholders and actors as well as potential and current RTDI evaluators;
- The aggregation and codification of RTDI evaluation standards based on the best practices from across Europe and from around the world;
- The aggregation and codification of the best practices in the public procurement of RTDI evaluation expertise from across Europe and from around the world;
- Organizing training sessions based on the research findings for current and potential evaluators. These training sessions will be organized around both RTDI evaluation methodologies and standards as well as for those authorities involved in public procurement in South East Europe;
- Guidelines for the evaluation of RTDI programs and a methodology for benchmarking intermediary or R&D based innovation organizations/centers;
- 3 RTDI program evaluations and one regional benchmarking exercise comprising at least 6 innovation intermediaries;
- The development and maintenance of a permanent RTDI evaluation platform containing four databases including an institutional evaluators' database, a project evaluators' database, an information on evaluation standards database, and a database of RTDI studies);
- External communication and dissemination activities to ensure a high impact of project results and improvement of the efficacy of RTDI activities in SEE, including through a large international conference and other events.

ARC Fund is leading both the mapping activities as well as the development of the four databases within the project.

At the end of 2011, ARC Fund has already made significant progress in developing the structure and functionality of the databases as well as mobilizing

the partners and country correspondents in providing the content to populate it. These activities will be completed in the first half of 2012.

### *ERAWATCH Country Report 2011: Bulgaria*

In 2011, ARC Fund elaborated the annual ERAWATCH Country Report 2011 for Bulgaria. The report reviews the performance of the national innovation system. It identifies the national policy challenges using the Innovation Union self-assessment tool. It also specifically highlights the structural challenges which, if left unaddressed, constitute bottlenecks for the improvement of the country's economic, research and innovation performance. The report underlines the impacts of the global economic crisis and its effects on subsidies for R&D. The report also notes the governmental actions to update the regulatory framework, set new rules, pro-

cedures and priorities, as well as create coherence and synergies between the numerous existing strategic documents.

For the first time, the National Strategy of Scientific Research up to 2020 (adopted in 2011) set priority areas for the development of research in Bulgaria, taking into account the national economic interests and objectives. It also notes that many necessary strategic documents and measures are still under preparation and extensive effort from all stakeholders is needed to implement the newly foreseen measures of the National Strategy of Scientific Research to 2020.

### *ERA-LAW*

In 2011 ARC Fund implemented a study in support of the ERA Framework Impact Assessment. ARC Fund prepared an inventory of the Bulgarian legislation, thus presenting an overview on the way research and research systems are regulated. The output of the study for all Member States will constitute an important element of the baseline information which the European Commission will draw on in putting together the ex ante Impact assessment for the ERA Framework. The inventory includes legislative and non-legislative measures and documents, both existing and

under development (e.g. laws, administrative procedures, rules, strategies, programs, etc.). The inventory regards the documents that set the rules for the individual researchers, the research performing organizations and the research funding.

The overview analysis in the inventory specifically comments on the relevance of each document or program to the dimensions of ERA. It also lists any specific aspects of the rules in question that may promote improvements in line with the relevant ERA objectives.

*ERAWATCH: Baseload research inventory service*

For a fifth consecutive year, ARC Fund provided information about the Bulgarian national and regional research systems to the European Commission's research inventory service ERAWATCH. ARC Fund's work focused on the main mechanisms for research policy-making in Bulgaria, the most important political documents, the research dynamics of EU membership, the regional dimension of research activities and the activities

of the main institutions involved in research.

In 2011, ARC Fund analyzed the new developments in the research policy, including the adoption of the National Strategy for Research Development 2020, the setting of national R&D goal in the framework of Europe 2020 strategy, and the adoption of a National Roadmap for Research Infrastructures.

*Trend-Chart on Innovation*

As a member of the ERAWATCH network in 2011 ARC Fund developed the Country Report for Bulgaria on the European TrendChart on Innovation. This was the piloting of the integration of research and innovation intelligence gathering at European level. The European TrendChart on innovation is the longest running policy benchmarking tool at European level. Since its launch in 1999 it has produced annual reports on national innovation policy and governance, created a comprehensive database of national innovation policy measures. The databases of INNO Policy TrendChart and ERAWATCH have been merged and a joint inventory of research and innovation policy measures has been created by the European Commission with the aim of facilitating access

to research and innovation policies information within Europe and beyond.

The 2011 Bulgaria TrendChart on Innovation Report noted that the current level of innovation and competitiveness in Bulgaria was at a low point. Nevertheless, there were plenty of opportunities for development in that area, as indicated by the national response to the Europe 2020 strategy on smart, sustainable and inclusive growth. The report further acknowledged that the innovation policy in Bulgaria was in its infancy, and the innovation structure of the country was not well developed. As of 2011 Bulgaria did not have any demandside innovation policy, which was the thematic focus of the latest TrendChart report.

*Regional Innovation Monitor*

The Regional Innovation Monitor (RIM) is an initiative of the European Commission's Directorate General for Enter-

prise and Industry, with the mission to describe and analyze innovation policy trends across EU regions. RIM analy-

sis is based on methodologies developed in the context of the INNO-Policy Trendchart, which covers innovation policies at national level as part of the PRO

INNO-Europe initiative. The overarching objective of the initiative is to enhance the competitiveness of European regions by increasing the effectiveness of their

The ERAWATCH Country Report 2011 identified the main structural challenges that Bulgaria is currently facing, which include:

- Ensuring stability of public policy and consistency between multi-annual utilized adequately for updating the institutional structure and the public scientific system;
- Institutional fragmentation, as at the present time separate research and innovation measures are implemented by various ministries, agencies and other entities. National measures and Cohesion Policy instruments are not strategy documents. The chaotic nature of the changes in public policy creates inconsistency in the funding of individual scientific fields, as well as the weak institutionalization of policy measures. Despite recent changes (2010-2011), as well as foreseen changes in legislation and the adoption of strategic documents, all stakeholders need to focus their efforts on the effective practical implementation of the suggested support measures;
- Increasing public funding and enhancing budgetary prioritization. There is a lack of adequate financial resources and effective public resource management directed towards the national research targets. The share of competitive funding in public budgets for scientific research is disproportionately small. There are also limited financial instruments for entrepreneurs such as start-up funding schemes, guarantee and venture capital funds. The participation of the private sector in R&D expenditures is very low, as is the absorption capacity of EU funds, including OP “Competitiveness” and OP “Development of Human Resources”.
- Setting an efficient evaluation and monitoring system of innovation and science policy implementation, including in individual organizations. Despite the measures envisaged in various strategic documents, a regular and comprehensive evaluation system has not been established;
- Increasing the attractiveness of research careers. The current levels of research personnel salaries, and the outdated material base and equipment do not attract young researchers, resulting in a brain-drain and an aging R&D staff;
- Ensuring the link between education, research and the business. There is lack of incentives for firms to collaborate with public research institutions, combined with prohibitive costs and minimal benefits from producing knowledge-intensive products for an unsophisticated consumer base. The National Science Fund supports measures to promote research activities among students, but they are insufficient in terms of scope and financing to achieve qualitative change.

innovation policies and strategies. The specific objective of the RIM is to enhance the scope and quality of policy assessment by providing policy-makers and other innovation stakeholders with the analytical framework and tools for evaluating the strengths and weaknesses of regional policies and regional innovation systems.

In 2011, ARC Fund updated the profiles of the six Bulgarian planning regions within the Regional Innovation Monitor platform. It focused the analysis on regional economic development, research, technological development and innovation potential. ARC Fund described the major support measures and projects, the most relevant policy documents, research-implementing organizations and local stakeholders. The analysis underlines that from a historical point of view, Bulgaria has been a highly centralized economy and it has not yet developed a regional dimension to its research and innovation policy. The country has only recently begun to consider the regional dimension in its innovation policy. The local authorities (municipalities) are strongly dependent on the national budget for the financing of innovations and have few resources of their own (for example from local taxes) to invest in this area. This is one of the factors that hinder the implementation of the Regional Innovation Strategies. The alternative source of financing of innovation is through the EU funds, which in some cases have larger importance than national sources. Bulgarian municipalities have various levels of activity in applying for EU funds. The main sources of EU financing are Seventh Framework Program, the Interreg IVC programme, and the Operational Program "Development of the Competitiveness of the Bulgarian Economy 2007-2013". Since January 15th, 2009, Bulgarian municipalities can

also apply for credits from the **Fund for Local Authorities and Governments (FLAG)**. The fund was created by the Council of Ministers to tackle the problem with the provision of financial resources for municipalities for developing project proposals and the co-funding of EU projects.

ARC Fund also elaborated a report on Bulgaria's most advanced region – the Southwest region (Yugozapaden). The authors of the report note that Yugoza-paden is the biggest and best performing region in Bulgaria in terms of GDP and innovation. R&D expenditures in the region have been on the rise in absolute terms in recent years but have stagnated as a share of GDP, in line with the overall situation in the country. The region hosts almost half of all Bulgarian universities, as well as the two biggest public R&D performers – the Bulgarian Academy of Sciences and the Agricultural Academy. However, the Yugozapaden region is characterized by high intra-regional economic disparities, with Sofia, the capital city, being disproportionately better developed than the rest of the region.

The region also lags behind the average innovation performance of EU27 regions. The lack of any administrative support, as well as policy implementation capacity for innovation at regional level in Bulgaria has prevented the realization of the Regional Innovation Strategy. Instead, most of the innovation projects implemented in the region in recent years have been supported through the European Cohesion and Structural Funds. The region has attracted almost half of the EU funds which are dedicated to competitiveness, innovation and technological development in the country. Thus it has been able to offset some of the negative effects of the global economic crisis in 2009-2011.





*In 2011 the ERAWATCH platform was transferred to its new website [www.erawatch.jrc.ec.europa.eu](http://www.erawatch.jrc.ec.europa.eu)*

## METRIS

In 2011, ARC Fund joined the Metris-Network, an intelligence group for gathering insights and for benchmarking the development of social science and humanities in Europe. METRIS is an initiative of the Directorate-General for Research (DG RTD) which aims to become an entry and reference point for the social sciences and humanities landscapes in Europe. It is overseen by the ERA Directorate of DG RTD of the European Commission.

METRIS pursues the collection, regular updating, and analysis of information on social sciences and humanities at national and European level.

The 2011 report on the Social Sciences and Humanities (SSH) in Bulgaria marks a new beginning in the independent review of Bulgarian research performance, based on comparable European data. The report outlined that SSH is one of the areas in



which the gap between Bulgaria and the EU is the widest. This is particularly worrying as SSH forms the basis for applied policy advice, which means that Bulgarian policies might lack a well-prepared background. Most SSH research in Bulgaria is carried out in state funded institutions. While there is no restriction on researcher

mobility between the public and private sector, it is a rare occurrence. Mobility exists primarily towards foreign research institutions. Within the private sector, non-governmental organizations carry out the majority of SSH research, although precise figures regarding the main performers are not available.