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Research and Innovation Observatory Country Report 2016 Bulgaria

The 2016 series of the RIO Country Report analyses and assesses the development and performance of the national research and innovation system of the EU-28 Member States and related policies.

It aims at monitoring and evaluating the EU policy implementation as well as facilitating policy learning in the Member States.

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Foreword

The report offers an analysis of the R&I system in Bulgaria for 2016, including relevant policies and funding, with particular focus on topics of critical importance for EU policies. The report identifies the main challenges of the Bulgarian research and innovation system and assesses the policy response. It was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports, websites, etc. The quantitative data are, whenever possible, comparable across all EU Member State reports. Unless specifically referenced, all data used in this report are based on Eurostat statistics available in January 2017. The report content is partly based on the RIO Country Report 2015 (Todorova and Slavcheva, 2016).

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HIGHLIGHTS

- In Bulgaria real GDP grew with 3.6% in 2015, and is expected to grow with 3.1% and 2.9% in 2016 and 2017 respectively.
- The general government deficit is set to gradually decrease from 1.7% in 2015 to 0.9% of GDP in 2016, to 0.8% and 0.7% in 2017 and 2018 respectively.
- Bulgaria exhibits low to medium level of structural integration in global value chains (GVCs), which is slightly higher on the buying side.
- Employment growth is to increase from 0.4% in 2015 to 0.8% in 2016 and to slightly slow down to 0.7% in 2018. Together with the expected decrease in the labour force due to population ageing and emigration, this is likely to further reduce the unemployment rate to 8.1% in 2016, 7.1% in 2017 and 6.3% in 2018.
- The Bulgarian research and innovation system has been characterized by significant underfunding, varying around 0.5-0.6% of GDP, reaching 0.79% in 2014, and provisionally 0.96% in 2015. Although the overall trend is positive, the public component remains pressingly low.
- As a result mainly of the implemented EU operational programmes and instruments, the R&D performed by the business sector (as percentage of GERD) increased from 30% in 2009, to 50% in 2010, followed by 61% in 2013 (close to the EU28 average of 64%).

MAIN R&I POLICY CHALLENGES

- **Ensuring the R&I system sustainability by increasing funding and quality differentiation.** The low level of public funding for research and innovation is the most striking feature of the Bulgarian R&I system, which puts at risk its sustainability. However, simply increasing investment in size cannot be expected to lead to competitive results, unless more emphasis is placed on supply of human resources and incentives for excellence and internationalization.
- **Focusing on consolidation and capacity building on the road to an innovation eco-system.** The R&I system is fragmented due to overly extensive thematic coverage, gaps in institutional coordination and the overall funding system so far, which stimulates whole institutions to compete against each other for institutional budgets, instead of collaborating on thematic priorities. The RIS3 approach and the establishment of the Council for Smart Growth (CSG) offer a new opportunity for the Bulgarian authorities to revitalize research and innovation policies as well as to reorganize the fragmented landscape of R&I and related sectoral policies.
- **Establishing conducive environment for public-private partnership and science-business cooperation.** The Bulgarian research and innovation system is characterized by a separation of the publically funded "research and development pillar" and the private sector "innovation pillar". RIS3 2014-2020 and RIO CR2015 discuss the necessity to stimulate both the supply and demand sides in the innovation system, to enhance linkages and to create financial stimuli and professional support services to encourage their interaction.

MAIN R&I POLICY DEVELOPMENTS IN 2016

- Elaboration of [New Vision for Development of Scientific Research in Support of Society and Economy "Better Science for Better Bulgaria" 2016-2025](#)
- Entry into force of [Amendments to the Law on Higher Education](#)
- Increased introduction of performance-based financing (PBF) model
- Further implementation of the [RIS3 Action Plan](#)

1. Main R&I policy developments in 2016

[New Vision for Development of Scientific Research in Support of Society and Economy "Better Science for Better Bulgaria" 2016-2025](#)

The debate around the new vision has been launched. The vision seeks to demonstrate new commitment (also in financial terms) to science and innovation and to establish trust among R&I stakeholders, as well as between the national and international scientific communities.

[Amendments to the Law on Higher Education](#)

(03/2016)

The HEIs are divided into four categories (formally non-existent before): university, research-performing university, specialized HEI, and independent college. The differentiation between research-oriented HEIs and HEIs focused on tuition is fundamental for establishing the proper basis for performance-based funding.

Performance-based financing model

State funding will still be based primarily on the number of students enrolled, but there is growing share of specific criteria on quality of training and research and also compliance with labour market needs. In the 2016/2017 academic year 30% of the state funding to public institutions will be allocated based on criteria measuring tuition quality, research results and labour market relevance.

[RIS3 Action Plan](#)

The Action Plan has been completed in 2016 with the exception of finalization of the update of the National Roadmap for Scientific Infrastructure, which awaits national financial commitment. The Council for Smart Growth is functioning, allowing for policy coordination and high-level involvement in policy implementation.

1.1 Focus on National and Regional Smart Specialization Strategies

Description and timing: The Bulgarian RIS3¹ has a vision for Bulgaria by 2020 to make a qualitative leap in its innovation performance at EU level to tackle public challenges in the field of demography (reverse brain drain and youth entrepreneurship), sustainable development, intellectual capital and the nation's health.

This vision is expressed in practical terms in the strategic goal: by 2020, Bulgaria to move from the group of "modest innovators" into the group of "moderate innovators", which is implemented by achieving two operational targets:

Target 1: Focus the investment for the development of innovation potential in the 'smart' thematic areas (for creation and development of new technologies leading to competitive advantages and increase in the added value of domestic products and services);

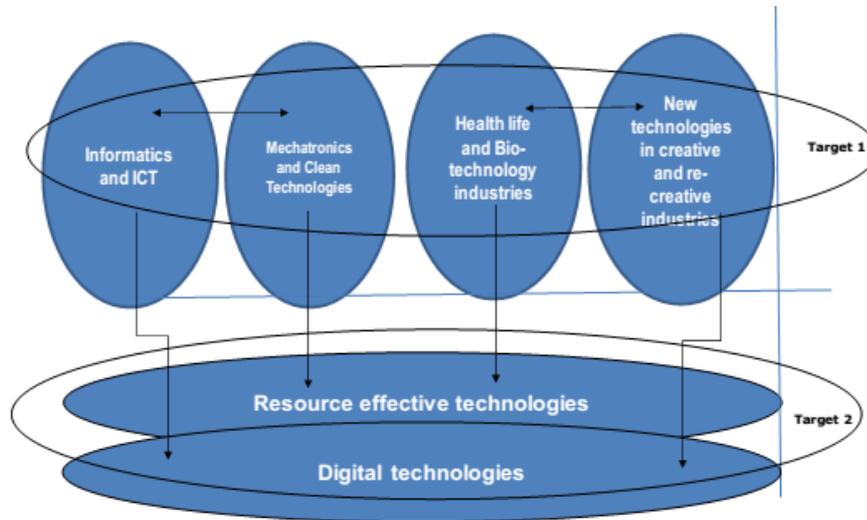
Target 2: Support for accelerated implementation of technologies, methods, etc., improving resource efficiency and application of ICT in industry.

The targets chosen have demonstrated the commitment of policy-makers to concentrate policy efforts and funding upon a limited number of RIS3 vertical ('smart') thematic

¹ Directly concerning two Operational Programmes, OP "Innovation and Competitiveness" and OP "Science and Education for Smart Growth" 2014-2020, Priority Axis 1

areas and two horizontal priorities (addressing the Bulgarian resource efficiency gaps and EU Digital Agenda):

Smart Thematic Priority Areas and Horizontal Policies



Source: RIS3, Bulgaria

The 'smart' areas allow multiple linkages and mutually reinforce each other, given the applicable skills set in an environment of scarcity of highly-qualified human capital, leaving room for 'emerging' knowledge-based industries. The Entrepreneurial Discovery Process (EDP) has allowed for deepening of the 'smart' areas and identifying specific niches (33 in number), where Bulgaria possesses potential for break-through achievements: in Informatics and ICT – 8 sub-thematic areas (STAs); in Mechatronics and CleanTech – 11 STAs; in the Industry for a Healthy lifestyle and BioTech – 10 STAs; and in the Creative and Recreative industries – 4 STAs. The areas capture the research capacities in the country and match them to the economic strengths of the country (in terms of comparative and competitive advantages, higher added value sectors, export potential and expected market demand growth niches). The traditions of Bulgarian agriculture and medicine are combined with achievements in ICT and automation, recognizing that 'the industries of the twenty-first century will depend increasingly on the generation of knowledge through creativity and innovation'².

Given the high centralization of governance and administration in Bulgaria, the country has chosen a national approach to smart specialization for the 2007-2013 programming period. However, pilot initiatives exist at regional level in the North Central Region, thanks to the JRC RIS3 Support to Lagging Regions project³, and at the level of the Capital City of Sofia - Innovation Strategy for Smart Specialization of Sofia (ISSSS)⁴ with the support of the S3 Platform⁵.

New developments: The RIS3 Action Plan has been gradually implemented in 2016, also with EC technical support with respect to monitoring and evaluation. Technology roadmaps per each RIS3 thematic area have been elaborated.⁶ The Council for Smart Growth is functioning, allowing for policy coordination and high-level oversight. The extensive entrepreneurial discovery process continued with twelve regional events (two in each of the six NUTS II regions in different cities and towns) that have taken place to discuss and promote the smart specialization process and calibrate the thematic areas

² Landry, Charles; Bianchini, Franco (1995), *The Creative City*; see also Florida, Richard, *The Creative Class*.

³ <http://s3platform.jrc.ec.europa.eu/ris3-in-lagging-regions>

⁴ <http://www.sofia-da.eu/en/strategic-documents/innovation-strategy-for-smart-specialization-of-sofia.html>

⁵ <http://s3platform.jrc.ec.europa.eu/>

⁶ http://www.mi.government.bg/files/useruploads/files/innovations/trms_3rev_final_bg.pdf

and sub-areas. The funding schemes under OPIC in the sphere of technological development and innovation are approaching contract phase (innovation in established enterprises - €50m and innovation in start-ups - €10m). The scheme for centres of excellence and competence centres under OPSESG with an indicative budget of €179m is ongoing with a parallel tender for international evaluators.⁷

Outstanding issues: The RIS3 Action Plan is completed with the exception of finalization of the update of the National Roadmap for Scientific Infrastructure, which awaits national financial commitment of €55m as estimated on project basis. In practice, the ESFRI Roadmap has been updated in 2016 by the Ministry of Education and Science (MES) with external expertise and confirmed priority on the set of 14 projects defined earlier in the process (in 2010 and 2014), which were assessed individually in economic and financial terms. However, ESFRI is expected to undergo additional alignment with RIS3 and scope extension in 2017-2018, also in view of the mid-term review of 2014-2020 programming period. Additionally, Bulgaria has undertaken to complete its overall landscape analysis. In the 2015-2016 period an inventory of the research infrastructure, equipment and apparatuses is performed within the 2025 Strategy analysis. The work done needs to be translated in 2017-2018 into a comprehensive diagnosis of the R&D&I infrastructure in terms of thematic and spatial repartition, obsolescence and/or overlaps, review of research outputs, and especially potential for cooperation with the industry.

The RIS3 process is expected to continue to benefit from EDP (next round of regional and thematic events being planned for 2017), from OP implementation (e.g. OPIC innovation schemes demonstrating the relevance of the RIS3 areas and sub-areas) and even the start of multi-fund financing (with the approval of the 16 strategies for Community-Led Local Development⁸). The RIS3 update needs to include also a meaningful diagnostic of the overall research infrastructure landscape in Bulgaria.

2. Economic Context

According to the 2016 Autumn Economic Forecast⁹, a substantial revision of national accounts data lifted real GDP growth figures from 3.0% to 3.6% in 2015. Private consumption growth, driven by rising consumer confidence, was particularly buoyant in 2015 at 4.5%. Thus, GDP growth projections are revised from 2.0% to 3.1% in 2016 and from 2.4% to 2.9% for 2017. Inflation is expected to be negative in 2016 (-0.9%), positive (1%) in 2017, but remaining low given the expected negative output gap. Employment growth is to increase from 0.4% in 2015 to 0.8% in 2016 and to slightly slow down to 0.7% in 2018. Together with the expected decrease in the labour force due to population ageing and emigration, this is likely to further reduce the unemployment rate to 8.1% in 2016, 7.1% in 2017 and 6.3% in 2018. The general government deficit is set to gradually decrease from 1.7% in 2015 to 0.9% of GDP in 2016, to 0.8% and 0.7% in 2017 and 2018 respectively. Regarding fiscal risks, a positive surprise could come from further improvements in tax compliance.

Bulgaria's labour productivity and labour costs remain the lowest in the EU despite recent increases. Real wages increased significantly faster than productivity in 2012 and 2013 and somewhat faster than productivity in 2014, in part due to negative inflation. Real productivity per person was on a steady but slow increase during the period. As a result of these trends, the gap between wages and productivity in 2014 is at its widest, pointing to the prevailing labour market tightness and hampering income convergence prospects. The high levels of skills shortages and mismatches hinder the adjustment of the labour market. Bulgaria has taken some steps towards reforming the education and

⁷ <http://www.mon.bg/?go=news&p=detail&newsId=2315>

⁸ <http://opcompetitiveness.bg/news.php?id=1105>

⁹ http://ec.europa.eu/economy_finance/eu/forecasts/2016_autumn_forecast_en.htm

training systems¹⁰, but the gaps in quality and the lack of synchrony with regard to labour market needs continue to hamper the supply of specifically skilled workers to the economy, weighing against investment in higher value added sectors. (EC 2016)¹¹

2.1 Structure of the economy

Services present the highest and growing share of employment, 55.56% in 2014, as well as of value added, which amounts to 67.57%. Although in 2014 manufacturing recovered from the crisis as the SMEs value added returned to its pre-crisis level, the number of jobs in the sector was still 8% lower than in 2009. The increase in value added among large companies was far bigger at 29%. The improvement was partly driven by the manufacture of motor vehicles and transportation equipment sub-sector¹². The country's economic performance is highly dependent on the development of the SMEs. The share of enterprises in the category "250 persons employed or more" is low and stable at 0.22% in the period 2011-2013, while the share of enterprises in the category "from 0 to 9 persons employed" is large: 90.91%, 91.28% and 91.36% respectively in the years 2011, 2012 and 2013.

The Bulgarian economy has traditionally been specialized in low-tech production and the exports are still biased towards primary products, instead of knowledge-intensive services and high value-added products. The country's list of main exports includes fuels, clothing, plastics, basic metals and fabricated metal products¹³. In 2015 there is a slight upward tendency related to higher value-added exports such as machinery and equipment; car parts and components; computer and electronic equipment; pharmaceuticals¹⁴. Bulgaria is ranked 64th among global exporters. Nonetheless, the export data for 2015 demonstrates the continued skewed export structure, whereby the raw materials outweigh finished products.

2.2 Business environment

The business environment has not improved significantly in recent years. According to the World Bank's 'Doing Business' report 2016, Bulgaria ranks 38th in ease-of-doing business (out of 189 economies)¹⁵. Frequent changes of the legal framework create uncertainty for the companies and hamper the business planning. The implementation of important reform measures is behind schedule. Significant barriers to doing business in Bulgaria persist in the regulatory and administrative burden, the judicial system and the insolvency framework. Procedures are complex, lengthy and relatively costly, in particular for enforcing contracts, trading across borders, connecting to the electricity grid, and processing insolvency cases. The low recovery rate and the tendency for procedures to end in the liquidation of companies rather than their restructuring are additional weaknesses of the insolvency framework that limit the business activities. Effective access to finance is still a problem for SMEs. Difficulties with public procurement hamper the effective use of European Structural and Investment Funds. (EC 2016)

2.3 Supply of human resources

The data shows that Bulgaria needs to double the new doctorate graduates (0.42 vs. 1.07 EU-average per thousand population aged 25-34 in 2013), the new graduates in science, maths, computing, engineering, manufacturing and construction (1.75 vs. 2.3

¹⁰ see Education and Training Monitor 2016, Bulgaria

¹¹ http://ec.europa.eu/europe2020/pdf/csr2016/cr2016_bulgaria_en.pdf

¹² Small Business Act Fact Sheet 2015: Bulgaria, <http://ec.europa.eu/DocsRoom/documents/16344/>

¹³ e.g. <http://www.worldsrichestcountries.com/top-bulgaria-exports.html>

¹⁴ Analysis of the Bulgarian Industrial Association (<http://www.bia-bg.com/analyses/view/22322/>), July 2016

¹⁵ <http://www.doingbusiness.org/data/exploreconomies/bulgaria/>, adjusted 37th for 2016 and 39th for 2017

EU-average per thousand population in 2014), as well as the overall number of researchers (2.21 vs. 5.34 EU-average per thousand population in 2013) in order to approach the average levels in the EU-28. Bulgaria has taken some steps towards reforming the education and training systems, but the quality of education and training systems and their inadequacy with regard to labour market needs continue to hamper the supply of skilled workers to the economy, weighing against investment in some sectors. (EC 2016)

Bulgaria needs to address its severe digital skills gap. With a Human Capital score of 0.33 Bulgaria ranks last among the EU countries¹⁶. Only 31% of Bulgarians possess basic levels of digital skills, which can be an important barrier to the country's economic development. The demand for software specialists is three times higher than the supply by educational institutions (2000 as against 6000 needed per year)¹⁷, with a trend to increase in the medium and long term. However, the share of ICT specialists in the workforce is the second lowest in the EU countries. The high levels of skills shortages and mismatches hinder the adjustment of the labour market.

3. Main R&I actors

The Ministry of Education and Science (MES) primarily functions as a regulator of the national education system. MES also designs and carries out national science and scientific research policy and oversees the functioning of the main public research funding instrument – the Scientific Research Fund (SRF). MES also hosts the Managing Authority of Operational Programme “Science and Education for Intelligent Growth 2014-2020” (General Directorate “Structural Funds and International Educational Programmes”) and the National Contact Point (NCP) for the EU framework programmes and Horizon 2020 (within the Directorate “Science”).

The Ministry of Economy (ME) defines the national innovation policy and provides (national) funding predominantly to private enterprises for applied research through the National Innovation Fund (NIF), implemented by the Bulgarian SME agency (BSMEPA). The General Directorate “European Funds for Competitiveness” of the Ministry of the Economy is the Managing Authority of Operational Programme “Development of the Competitiveness of the Bulgarian Economy”, co-financed by ERDF during programming period 2007-2013 and of Operational Programme “Innovation and Competitiveness” for 2014-2020 programming period.

The largest public research performing institutions in Bulgaria are the Bulgarian Academy of Sciences (BAS), the Agricultural Academy (AA) and key Bulgarian universities (i.e. HEIs such as Sofia University, Plovdiv University and the Technical University in Sofia). The private performers are private universities, private research organisations (including registered as non-profit NGOs), and enterprises involved in R&D&I.

Although a relatively new phenomenon (mainly due to Operational Programme “Development of the Competitiveness of the Bulgarian Economy”, co-financed by ERDF during programming period 2007-2013), clusters, Technology Transfer Offices (TTOs), Sofia Tech Park, networks and platforms in Bulgaria disseminate information and research results as well as facilitate the search for partners in Bulgaria and EU for joint innovative projects, promote cooperation and the development of scientific, technological and business collaborations.

¹⁶ DESI 2016 – Country Profile, Bulgaria

¹⁷ e-Skills for Jobs in Europe – Measuring Progress and Moving Ahead (2014), Bulgaria Country Report

4. R&I trends

The total gross domestic expenditure on R&D (GERD) in Bulgaria was €337.76m in 2014 and €430.43m in 2015. There are three main sources of R&D funding (the data are for 2014): the business sector (€76.53m), the government (€89.23m), and foreign funding (€171.85m of which the EC funding is €26.34m). The total GERD follows an upward trend from 2005 onwards, with possibly one year of stagnation in 2011. On the other hand, starting in 2010, the direct support from the government declines. Support from EC, for which only a few data points are available, remains almost stable in size (there is a small increase in 2014 compared to 2013) and is very low in comparison to the other sources of R&D financing.

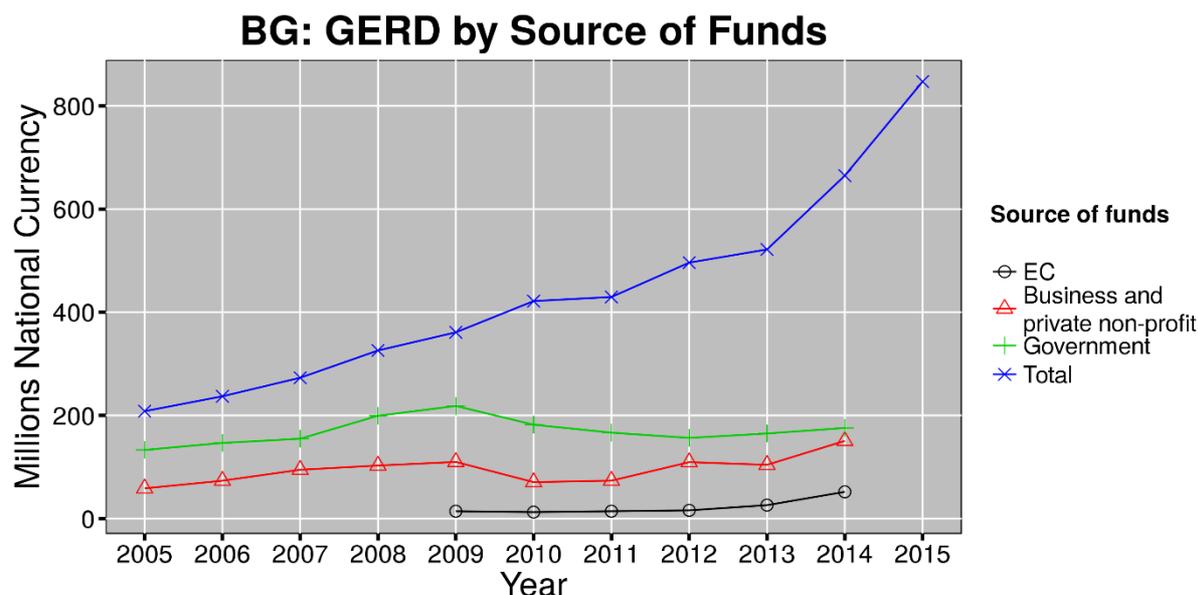


Figure 1. Government funding of the total GERD

Data source: Eurostat, November 2016

4.1 Public allocation of R&D and R&D expenditure

The public sector is almost exclusively the recipient of government funded GERD. The share of direct public funding going into the business sector is negligible until 2007, then increases in 2008, before decreasing again in 2009. In 2013 there is a slightly positive trend.

Bulgaria offers very basic R&D tax incentives, and their scope is limited¹⁸. In most cases the publicly performed R&D is eligible for tax incentives. The local stakeholders are hardly aware of systematic targeting by sector (outside the scope of the smart specialization process currently ongoing as ex ante conditionality for ESIF 2014-2020), although individual ministries introduce specific sectoral policy measures, e.g. the Ministry of Tourism, Ministry of Energy.

Although the results from impact evaluations are not yet available, preliminary assessment of project implementation shows insufficient uses of EU best practices. The focus is on publicly performed R&D or company support, with relatively weak monitoring

¹⁸ A study on R&D tax incentives. Annex: Country fiches. Draft final report, TAXUD/2013/DE/315

and evaluation system and partnership instruments. The R&D incentive system needs to be adjusted to serve the needs of the private sector and to promote collaborative efforts.

4.2 Private R&D expenditure

In Bulgaria, the intensity of the business enterprise expenditure on R&D (BERD) is modest (0.7% of the GDP in 2015), but it has been on the rise since 2009 (Figure 2). The rise is most probably related to the increased role of financing inflows from abroad. However, restricted data availability due to confidentiality limits any detailed analysis of the degree of internationalisation or inward R&D penetration. Services and manufacture together account for more than 95% of the BERD expenditure in the period under scrutiny. It is worth mentioning that the services clearly take the lion's share of the BERD (whereas the intensity of the manufacture stagnates in the period 2006-2014) and are strongly correlated to the total BERD intensity.

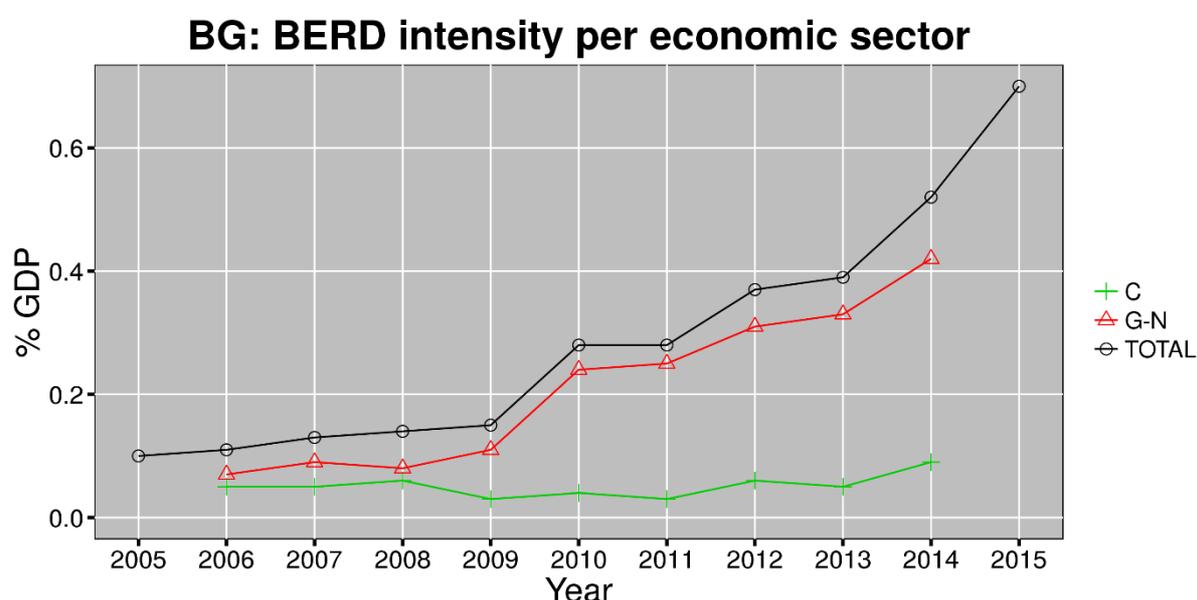


Figure 2. BERD Intensity Broken Down by Most Important Macro Sectors (C= manufacture, G_N=services)

The business sector is the main funder of the Bulgarian BERD in the period 2005-2009, but the intensity of its funding in 2012-2013 is similar to the pre-crisis level. Despite the lack of data for several years, it is clear that the funding from abroad (which increased from 0.01% of the GDP in 2009 to 0.27% in 2013 and 0.35% in 2014) is the main driver of the growth of the Bulgarian BERD intensity, predominantly due to EU funding sources.

The business expenditure on R&D in the top manufacture sectors in Bulgaria experienced strong fluctuations in the period 2006-2013. Despite the fluctuations, there is a growing trend in 2009-2013 in the manufacture of machinery and equipment. The pharmaceutical industry is another leading manufacture sector in Bulgaria, and so is (although at lower levels of BERD expenditure) the manufacture in electronics. As for the services sector, the driving force behind the growth of the BERD intensity in the services is the professional, technical and scientific services. As already noted above, funding from abroad, and specifically EU funding, has played a key role.

4.3 Public sector innovation and civil society engagement

The UN E-Government Development Index (EGDI) provides relative (not absolute) performance rating of national governments. It presents a composite measure of three important dimensions of e-government by country, namely: provision of online services, telecommunication connectivity and human capacity. In 2016 Bulgaria's EGDI score is 0.6376 (increasing in comparison with 2014, 0.5421), with highest performance in human capacity (0.7875). The UN e-participation index (EPART) is derived as a supplementary index. It focuses on the use of online services to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation"), and engagement in decision-making processes ("e-decision making"). In 2016 Bulgaria's EPART score is 0.6949 having substantially improved from 2014 (0.2549).

Having in mind (1) the ever-growing number of the various kinds of non-profits as well as the increase in their diversity, (2) the noticeable expansion in the number of Bulgarian citizens with various socio-economic statuses involved in the organizations' lives, and (3) the development of a legislative and institutional framework that protects and encourages both the existence and activities of the NGOs and their viability, it can be concluded that there has been significant progress in the rise of civil society in Bulgaria. However, the R&I expenditure by the (local) non-profit sector amounts to 0.004% of the total in 2014 (NSI, March 2016). The Bulgarian R&I associations and foundations in principle grant support for applied research, but their activity is predominantly, or even exclusively, oriented towards auxiliary areas concerned with the facilitation of R&I and the dissemination of results¹⁹, such as scientific conferences, symposia, seminars, round tables; publishing and information activities, publications in scientific editions and dissemination of research results; and scientific communication, including travel expenses. Key project initiatives, such as the FP7 project "Public Participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation" (CASI)²⁰, represent EU-wide cross-sectoral partnerships on innovation-related challenges. It considers not only the impacts of social and technological innovation, but also the types of actors involved and their inherent interests. It thus effectively integrates the perspectives of civil society, SMEs, industry, policy stakeholders, and leading academics.

5. Innovation challenges

5.1 Challenge 1: Ensuring the R&I system sustainability by increasing funding and quality differentiation

Description

The low level of public funding for research and innovation is the most striking feature of the Bulgarian R&I system, which puts at risk its sustainability²¹. The Horizon 2020 Policy Support Facility (PSF) panel²² (hereafter the PSF panel) discusses in its "Peer review of the Bulgarian research and innovation system 2015"²³ the required dramatic increase of

¹⁹ Bulgaria Country Report, EUFORI Study, 2015

²⁰ <http://www.casi2020.eu/>

²¹ On 1st and 16th November 2016 two mass protests were organized in Sofia by scientists, researchers, innovators and other representatives of the academic community to express disagreement with the budget 2017 proposals, which fail to increase public financing for R&D&I in Bulgaria.

²² Directorate-General for Research & Innovation of the European Commission set up a 'Policy Support Facility' (PSF) under the European Framework Programme for Research & Innovation 'Horizon 2020' to support Member States in reforming their national science, technology and innovation systems. The first activity requested from the PSF is a Peer Review to support wide-ranging reforms in Bulgaria.

²³ <https://rio.jrc.ec.europa.eu/en/library/horizon-2020-policy-support-facility-peer-review-bulgarian-research-and-innovation-system> or <http://horizon2020.mon.bg>

the R&D expenditure to achieve the national R&D investment target of 1.5% of GDP by 2020, still half of the Europe 2020 goal (3%). In 2016 Joint Working Group for Implementing H2020 Peer Review Recommendations has been set up to provide follow-up to the PSF and to coordinate policies inter-institutionally. Policy Support Service is also ongoing.

The underfunding issue stems from both insufficient national public resources allocated to R&I and inadequate participation of national actors in EU framework programmes. The general view is that Bulgaria has been pulling out of co-operations (e.g. ERIC infrastructures) rather than engaging in new European scale co-operations, due to a lack of national funding priority²⁴. According to the Stairway to Excellence (S2E) Facts & Figures for Bulgaria²⁵, levels of R&D expenditure by the Business Enterprise Sector and the Government Sector are close to EU-13, but the same indicator for the higher education sector is three times lower. Furthermore, the statistics for H2020 participant breakdown²⁶ in signed grant agreements shows that universities account for more than one third of the share of participations. In other words, increasing R&D expenditure potentially involves focusing on R&I activities of HEIs and cooperation.

The data concerning the total stock of researchers reinforce the above statements. Bulgaria has 4.43 per 1000 active labour force (Eurostat, 2011) compared to an EU average of 10.55. The number of new doctoral graduates per 1000 population (aged 25-34) is only 0.6 whereas the EU average is 1.7 (Eurostat, 2011). This is in the context of the number of doctoral candidates having almost doubled between 2000 and 2015. The low number of researchers most clearly demonstrates the need to stimulate human resources, especially in HEIs, as well as public and private investment in R&D&I.

However, simply increasing investment in size cannot be expected to lead to competitive results, unless more emphasis is placed on future supply of human resources and incentives for excellence and internationalisation. In particular, there could be a substantial increase in the part of public funding which is allocated competitively, transparently and based on merit. According to the World Bank 3S Report²⁷ for Bulgaria, 'the current funding environment does not encourage sufficiently researchers and research organisations to increase the quality and impact of their research'. The emphasis on excellence can also be expected to stimulate further participation in H2020 and higher success rate of Bulgarian projects²⁸.

Policy response

In Bulgaria the HEI reform started in 2015 with the amendments to the Law on Higher Education entering into force from March 2016. The HEIs are divided into four categories (formally non-existent before): university, research-performing university, specialized HEI, and independent college. The differentiation between research-oriented HEIs and HEIs focused on tuition is fundamental for the quality improvement. However, the differentiation needs to be reflected in the funding model.

The underlying principles are presented in the proposal for new Ordinance regulating the state subsidies for HEIs specific activities, published for public consultation²⁹, in line with Article 91a (2) of the Law for Higher Education. From 1 January 2017 the Ordinance is envisaged to replace Ordinance No. 3/27.11.2015 on the conditions and procedure for the planning, distribution and spending of the subsidies from the state budget allocated for the specific scientific research or artistic activities of the state higher education

²⁴ *ibid.*

²⁵ S2E Facts and Figures, Bulgaria, 2015:

http://s3platform.jrc.ec.europa.eu/documents/20182/117536/S2E_BG_national_profile.pdf/f1155ae7-1421-41dc-9a34-0805372f42e6

²⁶ [http://www.europarl.europa.eu/RegData/etudes/STUD/2016/572678/IPOL_STU\(2016\)572678_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2016/572678/IPOL_STU(2016)572678_EN.pdf)

²⁷ "Input for Bulgaria's Research and Innovation Strategies for Smart Specialization" (February 2013)

²⁸ S2E Country Report, Bulgaria, 2015

²⁹ <http://www.mon.bg/> in Section 'Draft Documents'

institutions³⁰. The financing depends on the results from the application of scientific performance indicators (e.g. publications) according to the metrics in the Regulation for monitoring and evaluation of the scientific research activity, conducted by the HEIs, research organizations, as well as the Scientific Research Fund³¹.

The new metrics-based funding model is accompanied by indicative budget of €400m until 2025 (from OP SESG, OPIC, SRF, H2020 and the state budget), calculated on the basis of the Indicative Investment Annex to the Vision for Development of Scientific Research in Support of Society and Economy "Better Science for Better Bulgaria" 2016-2025³². The model moves further towards PBF, as the previous efforts have not led to substantial improvements³³.

In 2016 the National Research Infrastructure (NRI) Roadmap in Bulgaria has also been in a process of update in line with the ESFRI Roadmap 2016 update process, launched in September 2014 in Trieste. The NRI Roadmap was created for the first time in 2010³⁴. Initially, individual infrastructure projects were linked across the European science space, but with insufficient connectivity to local stakeholders and business at national and regional level. The infrastructure projects included in the approved selection from 2012 and the amendments from 2014³⁵ ensured a stronger co-alignment with European infrastructure consortiums and national partners.

Given that it is an element of the ex-ante conditionality under Thematic Objective 1 "Strengthening research, technological development and innovation" of ESIF 2014-2020, and presented as a central pillar of the new Vision for Science 2025, the ESFRI Roadmap is expected to undergo additional alignment with RIS3 and scope extension in 2017-2018, also in view of the mid-term review of the 2014-2020 programming period. Currently, the Roadmap awaits overall financial allocation and confirms the priority given on the set of 14 projects defined earlier in the process (in 2010 and 2014) and assesses them individually (also in light of RIS3). Between 2014 and 2016, the Ministry of Education and Science has provided national research infrastructures in the Roadmap amounting to about BGN 8.6 million, namely:

- 4 million BGN for construction and renovation of the National Centre for High-Performance and Distributed Computing;
- 4 million BGN to build the National Cyclotron Centre;
- 740,000 BGN for partial equipment of the Regional Centre for Astronomical Research and Education – Rozhen;
- 95,000 BGN have been paid and 79,000 BGN are allocated for payment (in the period between 2014-2016) as membership fees for participation in European consortia of the Roadmap of the European Strategy Forum on associated national sites: National Centre for High-performance and Distributed Computing for participation in CLARIN and EGI; Centre for Modern Microscopy for basic and applied research in biology, medicine and biotechnology, for participation in EuroBioImaging. In parallel two calls for proposals are already running funded by OP SESG (for setting-up of centres of excellence and of competence) on a competitive basis with respect to the main share of the ERDF allocation (EUR 179 million), with extended deadline until 28 February 2017.

In 2017 Bulgaria has also undertaken to complete its overall landscape analysis. In the 2015-2016 period an inventory of the research infrastructure, equipment and

³⁰ State Gazette, Issue 94 from 04.12.2015 (www.dv.parliament.bg)

³¹ State Gazette, Issue 72 from 18.09.2015 (www.dv.parliament.bg)

³² <http://www.strategy.bg/>

³³ <https://rio.jrc.ec.europa.eu/en/library/research-performance-based-funding-systems-comparative-assessment>

³⁴ http://www.nrrri-bg.com/sites/default/files/docs/National_Roadmap_EN.pdf

³⁵ www.mon.bg/?h=downloadFile&fileId=6476

apparatuses is performed within the 2025 Strategy analysis. The work done needs to be translated in 2017-2018 into a comprehensive diagnosis of the R&D&I infrastructure in terms of thematic and spatial repartition, obsolescence and/or overlaps, review of research outputs, and especially potential for cooperation with the industry.

Horizon 2020 support service also continues from 2016 into 2017 focusing on improvement of the model for performance review and assessment of the research and innovation activities. The expected results are higher quality process of performance review and assessment and increased PBF, in order to focus on quality and attractiveness to scientists, especially young researchers.

Policy Assessment

Unless public funding for R&I in Bulgaria becomes more in line with that of countries with comparable level of development, the R&I functioning could be disrupted. The current low level of financing is sustainable neither for meaningful research initiatives, nor for the necessary economic 'catch-up' growth rate based on science and technology. The supply of human resources is also at stake. The deficiencies in human capital and national funds also create a vicious circle with respect to attracting external resources and proper participation and benefit from international research programmes and projects. For instance, Bulgaria's project success rate under H2020 is currently the lowest in the EU (10.8% in 2014 and 5.6 in 2015).³⁶

The human resources and funding issues are even further aggravated by the political discontinuities, which serve as additional disturbing factors³⁷. Unless policy continuity is ensured, at least based on RIS3 themes and infrastructures, increased overall and competitive funding as well as focus on human capital, the sustainability of the system is put at risk. Fostering competitive funding through focus on RIS3 areas³⁸ (market-orientation) and impact metrics (quality-orientation) could guarantee the proper functioning of the R&I system and could provide the missing set of incentives for researchers' careers and for research excellence. The new metrics-based funding model can be paving the way to a full-scale performance-based funding, which could allow for human capital development, quality differentiation and at least moderate innovation status in IUS.

5.2 Challenge 2: Focusing on consolidation and capacity building on the road to an innovation eco-system

Description

The R&I system is not only underfunded, but also internally fragmented. Six important obstacles have been identified³⁹ to transforming it into an attractive innovation eco-system⁴⁰, the most significant among which are the unfavourable expenditure structure in the public sector and lack of resource concentration. The wide-spread institutional support to numerous scientific organizations prevails at the expense of performance-

³⁶ http://ec.europa.eu/research/evaluations/pdf/h2020_2-years-on_brochure.pdf

³⁷ In the period 2009-2014 six ministers of education and science changed. There were (early) general parliamentary elections in 2014 in Bulgaria. In March 2016 Bulgaria's National Assembly elected Deputy Premier for European Policies Coordination and Institutional Affairs Meglena Kuneva to replace Prof. Todor Tanev as Minister of Education and Science. Deputy Ministers Prof. Nikolay Denkov and Prof. Kostadin Kostadinov were replaced subsequently. In November 2016 the Cabinet resigned.

³⁸ S2E Country Report, Bulgaria, 2015

³⁹ National Research Development Strategy 2014-2020, approved by Parliament in 2011 and updated in 2014, and Action Plan 2015-2020, Council of Ministers Decision No 737/30.10.2014

⁴⁰ Since then, private sector investments have grown steadily to reach 0.40% in 2013, while public expenditure has decreased down to 0.25% in 2013. The ratio is currently comparable with developed systems, but the levels for both sources of funding are extremely low.

based and project financing. There is no effective competitive environment, involving e.g. independent and external (international) expertise of scientific ideas, developments and results. Concerns have even been raised related to the operation of the National Science Fund (NSF), including the lack of competent and independent reviewers, adequate conflict of interest regulations and enforcement of rules and procedures. In addition, national instruments contain limited budget and rarely support research infrastructures. The various external sources of knowledge and funding are inefficiently used in terms of both cooperation and absorptive capacity.

In other words, the R&I system is fragmented mainly due to overly extensive thematic coverage, gaps in institutional capacity and coordination⁴¹ and the overall funding system so far, which stimulates whole institutions to compete against each other for institutional budgets, instead of collaborating within themes (internally and externally) to support excellence and quality research results on programme and project basis. Bulgarian funding schemes neither complement nor prepare for the effective participation of Bulgarian scientists and innovation entrepreneurs in EU research and innovation programmes or in activities funded through the ESIF. "The mechanism for interaction and coordination among all the participants engaged with Horizon 2020 functions at the national level, aiming to stimulate Horizon 2020 participation is insufficiently effective"⁴². The latter is reflected in the H2020 statistics⁴³, where Bulgaria's share of applicants is 0.77% of the total for EU-28 (compared to e.g. population share of 1.4% of EU-28).

Policy response

RIS3⁴⁴ outlines the novel institutional set-up. The most up-to-date policy instruments focus on the regulatory framework (including the model for financing higher education institutions), promotion of activities related to improvement of the quality of education, learning outcomes in priority economic areas and the successful realisation of graduates in the labour market (National Reform Programme of Bulgaria, 2016 update).

The Law on the Promotion of Scientific Research will be amended. The aim is to improve the functionality of the register of scientific activities, to implement a policy of open access to scientific results, to improve the organization, management and financing of the exploitation of research results, to establish an agency for promotion of scientific research and to apply financial engineering and ethical rules (National Reform Programme of Bulgaria, 2016 update). Proposals for amendments to the Law on the Academic Staff have been also been approved by government and await parliament vote.

The new Vision for Development of Scientific Research in Support of Society and Economy "Better Science for Better Bulgaria" 2016-2025⁴⁵ has been published for public consultation. As presented on 13 June 2016 by the Vice Prime Minister in the main hall of the John Atanasov Innovation Forum in Sofia Tech Park, the vision is based upon four main pillars:

- Pillar 1: Renewed commitment to raising public investment in research;
- Pillar 2: Reforms in the R&D system;
- Pillar 3: Strategic priorities, alignment with smart specialization and beyond;
- Pillar 4: Human resources.

⁴¹ Audit Report No 0700010614 (Implementation of the National Research Development Strategy in the period 01.08.2011 until 31.12.2014), Bulgarian National Audit Office, <http://www.bulnao.government.bg/>

⁴² Audit Report No 0300202315 (Contribution of Horizon 2020 to the implementation of the goals of National Development Programme: Bulgaria 2020 and the national strategic documents in the period 01.01.2013 until 31.12.2015), Bulgarian National Audit Office, <http://www.bulnao.government.bg/>

⁴³ eCORDA DATA update as of September 2016

⁴⁴ <https://www.mi.government.bg/bg/themes/inovacionna-strategiya-za-inteligentna-specializaciya-na-republika-balgariya-2014-2020-q-i-proces-na-i-1470-287.html>

⁴⁵ <http://www.strategy.bg/>

In this context, the synergies between funding instruments have become crucial, as demonstrated by the national event within the Stairway to Excellence (S2E) project, held on 14 July 2016 in Sofia⁴⁶. Subsequently, the procedure for Centres of Excellence (CoE)⁴⁷ and Centres of Competence (CoC)⁴⁸ under the Operational Programme Science and Education for Smart Growth 2014-2020 started in August 2016, accompanied subsequently by a tender procedure for international evaluators. These centres aim to create the best possible conditions for attracting highly qualified researchers to conduct top level research at European scale in the priority areas of Bulgarian RIS3 (Informatics and ICT; Mechatronics and CleanTech; Industry for a Healthy Lifestyle and BioTech; New Technologies in the Creative and Recreative Industries) and improve significantly the potential for applied research, experimental development and innovations. CoE and CoC could turn into leading research organisations in Bulgaria, supporting the development of the other participants in the innovation ecosystem, through their unique research expertise and by training top specialists in the RIS3 areas.

Policy Assessment

The H2020 PSF panel definitively recommends that Bulgaria strengthens its national and EU funding capacities: "At present, the national research community in Bulgaria suffers from a lack of confidence in the fairness of funding allocations and in the established peer review system for the evaluation of projects. Solid processes to peer review project proposals are critical to restore confidence and trust among researchers. This may mean outsourcing part or all of the process to an external agency such as the EC or ESF while simultaneously building internal capacity and national trust. Independent international ex post evaluations of programmes are also recommended alongside the use of Policy and Programme Evaluation groups to help build trust and impact of existing or new Agencies". In this respect, the 2016 procedure for the centres of excellence and competence with international expertise fulfils the expectations, although results cannot ensue until 2017.

The R&I system coordination, capacity improvements and the benefits of shared infrastructure are the current main topics in the national policy agenda. The establishment of the Council for Smart Growth (CSG)⁴⁹ offers a new opportunity for the Bulgarian authorities to revitalize research and innovation policies as well as to reorganize the fragmented landscape of R&I and related sectoral policies – such as higher education and industrial policies, including ICT. The Council however has conducted only two sessions (in December 2015 and November 2016), which is highly insufficient for a modest EU innovation performer. The Vision for Science 2025 seeks to demonstrate new commitment (also in financial terms) to science and innovation and to establish trust among R&I stakeholders, as well as between the national and international scientific communities. Unfortunately, beyond the declaration of principles, the document falls short of description as to how Bulgaria's science policies eco-system is prepared for the reforms that the vision advocates. No commitments can be found in the strategy as to the H2020 PSF strategic suggestions such as the creation of Promotion Agency for Research and Innovation (PARI), establishment of a full-time professional National Contact Point (NCP) network and EU Funding Liaison Office in Brussels.

The national event within the S2E project shows the participants readiness for consolidation and synergies. However, policy and project implementation has been delayed and needs to be accelerated resolutely. For example, the flagship project Sofia Tech Park is still not fully operational, let alone beneficial to the eco-system⁵⁰. While conceived as an answer to the problematic issues of the national R&I system, it is now

⁴⁶ <http://s3platform.jrc.ec.europa.eu/-/s2e-national-event-bulgaria>

⁴⁷ <http://sf.mon.bg/?qo=news&p=detail&newsId=386>

⁴⁸ <http://sf.mon.bg/?qo=news&p=detail&newsId=387>

⁴⁹ Council of Ministers Decree No 116/12.05.2015

⁵⁰ according to the Executive Director, Elitsa Karadjova, the results will be visible in 5-7 years:
<http://sofiatech.bg/news/изпълнителният-директор-на-софия-тех/>

questionable whether Sofia Tech Park itself is not becoming a victim of those. One of the reasons for large-scale investments not being common practice is that the realization of shared facilities, like any other infrastructure, requires more than just the technical means (investment phase with construction and supply of equipment). The term 'infrastructure' in the R&I sphere refers also to the consortium-building incentives, active sectoral policies, business logic and funding mechanisms that make the infrastructure sustainable and attractive to scientists and researchers.

4.3 Challenge 3: Establishing conducive environment for public-private partnership and science-business cooperation

Description

The R&I system (apart from insufficient funds and internal fragmentation) is insufficiently connected with the needs of the industry, labour market and society. According to the Innovation Union Scoreboard 2016 (IUS 2016) Bulgaria belongs to the group of modest innovators, whose level of innovation performance is less than 50% of the EU average. 'Linkages and entrepreneurship' and 'Finance and support' are the main weaknesses⁵¹. The indicator for public-private scientific co-publications is particularly unsatisfactory, but improving. The Global Competitiveness Report 2014-2015 of the World Economic Forum⁵² ranks Bulgaria 113th out of 144 countries after assessing the university-industry collaboration in R&D. The respective figures from the Global Competitiveness Report are 112th out of 140 (university-industry collaboration in R&D) in 2015-2016⁵³ and 74th out of 139 in 2016-2017.⁵⁴

According to "R&D and innovation systems in Romania and Bulgaria in the EU context"⁵⁵, in both countries companies are drastically less involved in collaboration in comparison with the EU average, mainly due to the capacity of the potential receptors to acknowledge, assess, assimilate and exploit research results. However, the relationship between research and industry is itself a creator of absorptive capacity.

Internal and external linkages contribute to increasing the innovation potential. The Bulgarian National Innovation System (NIS) however is characterized by a clear separation of the publically funded "research and development pillar" on the one hand, and the private sector "innovation pillar" on the other. The lack of complementarity between the activities of the beneficiaries and stakeholders of the two pillars is one of the main challenges. According to the World Bank Report⁵⁶ "[s]cience policy and funding instruments in Bulgaria have been designed with the idea of the "supply-push" model, in which scientists are at the origin of the project, the main barrier is selling the new idea on the market and the technological sophistication and risks tend to be high to medium". The effective priority is rather to promote market-oriented research, through RIS3, as it is also the logic foreseen with the creation of centres of excellence/competence with EU support as mentioned above. The idea is to avoid the barrier created by waiting for private partner to be (potentially) attracted at a later stage⁵⁷, when demand could also support and be integrated into early-stage project development and innovation. Simultaneously, failure to set-up institutional level legislation to protect and transfer research results has a negative effect on the commercialisation of research in Bulgaria⁵⁸.

⁵¹ <http://ec.europa.eu/DocsRoom/documents/17829>

⁵² <https://www.weforum.org/reports/global-competitiveness-report-2014-2015/>

⁵³ <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

⁵⁴ <http://reports.weforum.org/global-competitiveness-index/competitiveness-rankings/>

⁵⁵ Authors: Steliana Sandua, Zizi Goschina, Irina Anghela, Gloria Goschina

⁵⁶ "Input for Bulgaria's Research and Innovation Strategies for Smart Specialization" (February 2013)

⁵⁷ national funding for basic research excluded

⁵⁸ *ibid.*

Policy response

Policies have been introduced, which promote innovation in the enterprises and support the cooperation between enterprises and academia, the renovation and upgrading of technologies in the enterprises, the introduction of new ICT-based services, the creation and the development of clusters. 228 contracts worth BGN 118.7m (approx. €60m) were signed under the procedure "Improving production capacity in SMEs" under OPIC for the period 01.01-25.03.2016. "Supporting the development of innovations by start-ups" procedure has been launched with a budget of €10m. The planned procedures under OPIC 2014-2020 are: "Developing product and manufacturing innovations" with a budget of €35m; "Development of clusters in Bulgaria" (with a budget of €20m); "Development of managerial capacity of SMEs" (€30m). (National Reform Programme of Bulgaria, 2016 update)

The government is making efforts to improve the legal framework of the insolvency proceedings with the aim to eliminate the existing shortcomings. Amending and supplementing of the Commerce Law is under preparation, which will provide more opportunities to take effective measures to prevent bankruptcy by rescuing the enterprise, including when there is a real danger of insolvency. The goal is to negotiate obligations restructuring, to create conditions for the recovery and stabilization of the enterprise and continuation of its activity by establishing effective procedures, including the possibility of an agreement reached before the opening of insolvency proceedings. To increase the efficiency of the insolvency procedures, a report concerning insolvency and creditor rights is under preparation in cooperation with the World Bank.

The predominant share of public-private partnerships will soon fall within the scope of the Concessions Bill⁵⁹, as proposed by the government in May 2016 to replace the current Concessions Act and the Public-Private Partnership Act⁶⁰, and amend a number of other acts containing concession-related provisions. The new Concessions Act is expected to increase opportunities for use of a concession as a form of public-private partnership that creates public resources, high level benefits and services for the public and private sector, and for society as a whole. The new draft is further meant to contribute to the development of infrastructure and services, without financial exposure for, or with minimum financial participation by the state and municipalities, whereas the experience of the private sector is expected to be used for innovation and increased efficiency. However, the public-private partnership (PPP) in the sphere of R&D&I may still need a separate regulatory package.

Policy Assessment

RIS3 discusses the necessity to stimulate both the supply and demand sides in the innovation system, to enhance linkages and to create financial stimuli and professional support services to encourage their interaction. The role of intermediaries in this process (networks, clusters, platforms, TTOs, Sofia Tech Park) is indispensable. Where local absorption capacity is insufficient (either for financing or for R&I results and knowledge), partners across borders also present an option, especially given EU integration.

Setting-up global PPP framework in R&I or institutional level legislation and support services⁶¹ to protect and transfer research results could have a positive effect on the commercialisation of research in Bulgaria. Alternatively, the entrepreneurial researchers would continue to keep commercialisation activity artificially low or to commercialise research privately. The most obvious step is to implement the "Commission

⁵⁹ <http://parliament.bg/bg/bills/ID/42205>

⁶⁰ In fact in 2014 the parliament voted on the PPP law cancellation with motives that in its current form it seems inoperative, unnecessary and restrictive, in addition to being a mere compilation of the Obligations and Contracts Act, the Concessions Act, and the Public Procurement Act, as well as the Municipal Property Act.

⁶¹ e.g. BAS Patent Department

Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations"⁶². This recommendation is designed to help the identification, protection and efficient transfer of intellectual property of all types, created in PROs, to the private sector.

6. Focus on creating and stimulating markets

This section aims at describing and assessing national level efforts to introduce demand-side innovation policies to stimulate the uptake of innovation or act on their diffusion, including public procurement and regulations supporting innovation. It also analyses policy measures aimed at internationalisation of companies with the aim of increasing the innovativeness of the economy.

Bulgaria has adopted a strategic framework (with Strategy for Public Administration Reform) towards reform and modernisation of public administration although implementation of important measures is behind schedule. Similarly, and despite the Strategy for the Continuation of the Judicial Reform deficiencies regarding the functioning of the judicial system raise concerns for the economic and business development.

National policy efforts thus aim at improving the overall economic environment in Bulgaria. The Third Action Plan (TAP) for reducing the administrative burden on businesses for the period 2015-2017 is in the process of implementation (National Reform Programme of Bulgaria, 2016 update), building upon previous work, including EU-funded projects in this sphere⁶³. The report (towards 31.12.2015⁶⁴), approved in April 2016, on the measures implemented in accordance with TAP, shows that the reduction of the administrative burden on businesses has led to cost-saving of more than €53m a year. The administrative burden on businesses has decreased by 21.7% of the 30% reduction envisaged in the plan, which covers selected legislation over the period 2015-2017. 18 measures had been adopted by various state and government bodies, including the Finance Ministry, Customs Agency, the Ministry of Transport, Information Technology and Communications, the Ministry of Labour and Social Policy and the Employment Agency. Three measures to be carried out by the Ministry of Agriculture and Food and by the National Statistical Institute have been implemented ahead of schedule.

Bulgaria participates in the SPP Regions project⁶⁵. SPP Regions is promoting the creation and expansion of seven European regional networks of municipalities working together on sustainable public procurement (SPP) and public procurement of innovation (PPI). The regional networks are collaborating directly on tendering for eco-innovative solutions, whilst building capacities and transferring skills and knowledge through their SPP and PPI activities. The tenders within the project will achieve 54.3 GWh/year primary energy savings and trigger 45 GWh/year of renewable energy. The focus of these tenders will be on: 1) energy use in public buildings; 2) vehicles and transport; 3) food and catering services. The project also pursues to strengthen networking and exchange at the European level by redeveloping the PROCURA+ European Sustainable Procurement Network⁶⁶.

In Bulgaria public procurement, especially within the overall framework of EU funding programmes, acts as irreplaceable market stimulus. Bulgaria has launched an ambitious public procurement reform process through the National Strategy on Public Procurement. An entirely new Law on Public procurement has been adopted in the beginning of 2016. The scope of the preliminary control performed by the Public

⁶² http://ec.europa.eu/invest-in-research/pdf/download_en/ip_recommendation.pdf/

⁶³ e.g. <http://abrio.mee.government.bg/>

⁶⁴ <http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bq-BG&Id=960>

⁶⁵ <http://sppregions.eu/about-spp-regions/>

⁶⁶ <http://www.procuraplus.org/>

Procurement Agency is extended. The important changes are increasing the transparency and predictability of the process of contracts awarding, as well as simplifications of the administrative procedures. The phased introduction of a national centralised single platform for e-procurement starts in 2016. (National Reform Programme of Bulgaria, 2016 update) These can be beneficial only if implemented together with other decisive changes ranging from the adoption of accurate implementing regulatory measures, the streamlining of consistent ex-ante and ex-post controls, improved efficiency of the appeal system, standardisation of procedures, increasing the administrative capacity of relevant public bodies (CSR 2016).

The proposal for a new Law on Innovation from 2012, not adopted in Parliament, planned to introduce direct tax incentives for research and innovation. The proposal from 2016 as currently elaborated leaves room for such measures through the Budget Law⁶⁷. In fact, the existing system in Bulgaria already incorporates indirect support for R&I, although the format is rarely known and used by the private sector. BAS, AA and HEIs are exempted from corporate tax and tax on income. Accelerated depreciation tax (100% annually) applies, also for private actors, for assets acquired by means of R&D. Tax deductible expenditure is considered donations (individual and corporate), which may include R&D&I, encompassing donations for HEIs and academies, cultural, educational and scientific exchange under international treaty whereby Bulgaria is a signee, scholarships and stipends, as well as donations to not-for-profit organizations in the central registry, supported by the Ministry of Justice, for entities for public benefit. The study on R&D tax incentives, performed by DG TAXUD, compares the models implemented in different EU countries and identifies the existence of tax credits and accelerated depreciation in Bulgaria, which are less common compared to other member states, where enhanced allowance and patent box apply⁶⁸.

Bulgaria is in a process of implementing its National Strategy for SME Development 2014-2020⁶⁹ in line with the Small Business Act⁷⁰, where internationalisation plays a key role. The BSMEPA is the main government institution with functions focused on the implementation of the Bulgarian government's policy for small and medium enterprises (SMEs), especially internationalisation. In this respect, the agency in Sofia and the 26 regional offices provide Bulgarian SMEs with the following groups of services: 1) information services; 2) basic consulting for start-ups in marketing, finance, law, planning & management, human resources, innovations, quality improvement and environment protection; 3) more advanced consultancy in the following areas: taxation, current legislative changes, currency regimes, credit policies of the banks, participation in privatization, announced concessions, public procurement, etc.; 4) development of projects, directed towards SMEs promotion, and participation in EU programmes; 5) financial assistance and facilitation of access to external sources of financing (banks, capital market, venture capital funds, leasing); 6) training for SMEs to enter new markets; and 7) export promotion and strengthening the international positions of SMEs.

The following activities fall within the scope of the OPIC procedure, opened in July 2016, whereas the agency receives €5m for creating conditions for sustainable development and successful integration of Bulgarian enterprises in the European and international markets:

- Support for the participation of Bulgarian SMEs in promotional activities at home and abroad to promote Bulgarian production;

⁶⁷ The draft has not entered the Council of Ministers. The merger of the two agencies (for investments and for SMEs) is currently envisaged to happen through amendments in the Law on the Promotion of Investments.

⁶⁸ A Study on R&D Tax Incentives. FINAL REPORT. TAXUD/2013/DE/315. FWC No. TAXUD/2010/CC/104

⁶⁹ www.mi.government.bg

⁷⁰ Small Business Act (SBA): http://ec.europa.eu/growth/smes/business-friendly-environment/small-business-act/index_en.htm

- Pilot development and implementation of tools for digital marketing and online marketing for Bulgarian companies to acquire skills exit, expansion and strengthening of positions on foreign markets;
- Upgrade and maintenance of a web-based platform to provide information on foreign markets and connecting the Bulgarian enterprises with foreign partners to improve their export potential;
- Access to specialized databases and specialized publications in connection with the implementation of activities to support SMEs.

Bulgaria also joined the European Space Agency, thus becoming the 10th ESA European Cooperating State, by signing of the Plan for European Cooperating State (PECS) Agreement in April 2015⁷¹, which provides local researchers and companies with the opportunity to participate in international high-tech activities and tenders. In 2015 ESA published the first tender for Bulgaria (AO/1-8268/15/NL/NDe)⁷² through EMITS and projects amounting to €787,000 are under implementation⁷³.

In terms of financial stimuli to markets, Bulgaria has announced in June 2015 that it plans to contribute €100m to projects benefiting from finance by the European Fund for Strategic Investments (EFSI)⁷⁴, at the heart of the €315b Investment Plan for Europe⁷⁵. The contribution will be made through co-financing of projects approved by the Bulgarian Development Bank. Bulgaria was the 8th Member State after Germany, Spain, France, Italy, Luxembourg, Poland and Slovakia to announce a contribution, even before the EFSI becomes operational. Currently, Bulgaria participates in EFSI with 7 projects, listed in the European Investment Project Portal (EIPP)⁷⁶. Besides, the programmes COSME⁷⁷ and "InnovFin – EU Finance for Innovators"⁷⁸ complement the available market opportunities for financing.

⁷¹ http://www.esa.int/About_Us/Welcome_to_ESA/Bulgaria_becomes_tenth_ESA_European_Cooperating_State

⁷² <http://emits.sso.esa.int>

⁷³ <http://www.mi.government.bg/files/useruploads/files/innovations/results.pdf>

⁷⁴ <http://www.eib.org/efsi/>

⁷⁵ http://ec.europa.eu/priorities/jobs-growth-and-investment/investment-plan_en

⁷⁶ <http://www.ec.europa.eu/eipp/>

⁷⁷ http://www.eif.org/what_we_do/guarantees/news/2015/Cosme-efsi-cibank.htm

⁷⁸ http://www.eif.org/what_we_do/guarantees/news/2016/efsi_innovfin_raiffeisen.htm

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Abbreviations

ABBREVIATION	FULL NAME IN ENGLISH	FULL NAME IN BULGARIAN
BSMEPA	Bulgarian SME Promotion Agency	Изпълнителна агенция за насърчаване на МСП
CSR	Country Specific Recommendations	Специфични препоръки за страната
DG	Directorate General	Генерална дирекция
EC	European Commission	Европейска комисия
EFSI	European Fund for Strategic Investments	Европейски фонд за стратегически инвестиции
EIF	European Investment Fund	Европейски инвестиционен фонд
ERA	European Research Area	Европейско изследователско пространство
ERC	Support for Frontier Research	Подкрепа за върхови изследвания
ESF	European Social Fund	Европейски социален фонд
ESFRI	European Strategy Forum on Research Infrastructures	European Strategy Forum on Research Infrastructures
ESIF	European Structural and Investment Funds	Европейски структурни и инвестиционни фондове
EU	European Union	Европейски съюз
FDI	Foreign Direct Investments	Преки чуждестранни инвестиции
FP	Framework Programme	Рамкова програма
GBAORD	<i>Government Budget Appropriations or Outlays for Research and Development</i>	Публичните бюджетни средства или разходи за научноизследователска и развойна дейност
GDP	Gross Domestic Product	Брутен вътрешен продукт
GVC	Global Value Chain	Глобална верига на стойността
ICT	Information and Communication Technologies	Информационни и комуникационни технологии
IPRs	Intellectual Property Rights	Информационни и комуникационни технологии
JEREMIE	Joint European Resources for Micro to Medium Enterprises	Съвместни европейски ресурси за микро-, малки и средни предприятия
KET	Key Enabling Technologies	Ключови (базови) технологии

MC	Marie Curie Actions	Действия Мария Кюри
ME	Ministry of Economy	Министерство на икономиката
MES	Ministry of Education and Science	Министерство на образованието и науката
MF	Ministry of Finance	Министерство на финансите
MIP	Macroeconomic Imbalance Procedure	Процедура за макроикономически дисбаланси
NCP	National Contact Point	Национална контактна точка
NCSI	National Council for Science and Innovations	Национален съвет за наука и иновации
NEC	National Economic Council	Национален икономически съвет
NIC	National Innovation Council	Национален съвет по иновации
NIF	National Innovation Fund	Национален иновационен фонд
NIS	National Innovation System	Национална иновационна система
NSI	National Statistical Institute	Национален статистически институт
OP	Operational Programme	Оперативна програма
R&D	Research and Development	Научни изследвания и развитие
R&I	Research and Innovation	Научни изследвания и иновации
R&TD	Research and Technology Development	Научни изследвания и технологично развитие
RI	Research Infrastructures	Инфраструктура за научни изследвания
RIS3	Research and Innovation Strategy for Smart Specialisation	Иновационна стратегия за интелигентна специализация
S3	Smart Specialisation	Интелигентна специализация
SMEs	Small and Medium-sized Enterprises	Малки и средни предприятия
SOE	State-Owned Enterprise	Държавно предприятие
SRF	Scientific Research Fund	Фонд Научни изследвания
TTOs	Technology Transfer Offices	Офиси за технологичен трансфер
UMIS	Information System for Management and Monitoring of the Structural Instruments of the EU in Bulgaria	Информационна система за управление и мониторинг на структурните инструменти на ЕС в България

Factsheet

	2009	2010	2011	2012	2013	2014	2015	2016
GDP per capita (euro per capita)	5000	5100	5600	5700	5800	5900	6100	
Value added of services as share of the total value added (% of total)	64.72	67.84	65.46	65.84	67.08	67.6	67.34	
Value added of manufacturing as share of the total value added (%)	14.69	13.47	15.68	15.79	14.68	15.19	15.76	
Employment in manufacturing as share of total employment (%)	17.65	17.33	17.47	17.57	17.08	17.1	17.44	
Employment in services as share of total employment (%)	52.48	54.06	54.58	55.34	55.69	55.56	55.71	
Share of Foreign controlled enterprises in the total nb of enterprises (%)	4.4	4.26	4.13	3.91	3.84			
Labour productivity (Index, 2010=100)	94.8	100	104.3	106.9	108.3	109.4	112.9	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	0.29	0.26	0.26	0.34	0.42	0.45	0.55	
Summary Innovation Index (rank)	34	33	32	34	34	32	34	
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				27.4		26.1		
Innovation output indicator (Rank, Intra-EU Comparison)			27	27	26	26		
Turnover from innovation as % of total turnover (Eurostat)		7.6		4.2				
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						36	38	39
Ease of getting credit (WB GII) (Rank)						22	27	
Venture capital investment as % of GDP (seed, start-up and later stage)	0.017	0.009	0	0	0.004	0.003	0.002	
EC Digital Economy & Society Index (DESI) (Rank)						27	27	27
E-Government Development Index Rank		44				73		52
Online availability of public services - Percentage of individuals having interactions with public authorities via Internet (last 12 months)	11	24	25	27	23	21	18	19
GERD (as % of GDP)	0.49	0.56	0.53	0.6	0.63	0.79	0.96	
GBAORD (as % of GDP)	0.32	0.26	0.24	0.24	0.24	0.25	0.25	
R&D funded by GOV (% of GDP)	0.3	0.24	0.21	0.19	0.2	0.21		
BERD (% of GDP)	0.15	0.28	0.28	0.37	0.39	0.52	0.7	
Research excellence composite indicator (Rank)				21				
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		4.29	4.63	3.6	3.49			
Public-private co-publications per million population	3.88	3.1	4.34	2.87	1.65	2.07		
World Share of PCT applications	0.02	0.02	0.02	0.02	0.03	0.02		

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Figure 1. Government funding of the total GERD

Figure 2. BERD Intensity Broken Down by Most Important Macro Sectors (C= manufacture, G_N=services)

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