BULGARIAN INNOVATION MODEL

KEY ISSUES AND CHALLENGES

By
Dr. Evgeni Evgeniev

VUZF University of Finance, Business and Entrepreneurship

/20 March 2018/
Sofia, Bulgaria
Strategic framework

- National Strategy for Development of Scientific Research
- Innovation Strategy for Smart Specialization
- OPESG
- National Science Fund/Executive Agency to the Ministry of Education and Science
- Map of the Research Infrastructures and Equipment in Bulgaria-2017
- European Strategy Forum of Research Infrastructures

National Roadmap of RIs
Bulgaria’s Innovation Strategy for Smart Specialization

Smart specialization is a strategic approach to economic development through targeted support to research and innovation (R&I). It will be the basis for Structural Fund investments in R&I as part of the Cohesion Policy’s contribution to the Europe 2020 jobs and growth agenda. More generally, smart specialization involves a process of developing a vision, identifying competitive advantage, setting strategic priorities, and making use of smart policies to maximize the knowledge-based development potential of any region, strong or weak, high-tech or low-tech.

Source: EC Smart Specialization Platform. [http://s3platform.jrc.ec.europa.eu](http://s3platform.jrc.ec.europa.eu)

**Priorities**
- Informatics and ICT
- Mechatronics and Clean Technologies

**Priorities**
- Industries of Life sciences and biotech
- Creational and Recreational Industries

**Council for Smart Growth**
Number of Researchers in FTE

Sweden, Luxembourg, and Croatia Go Beyond National R&D Targets. Yet, Bulgaria falls behind!
Share of EU Structural Funds, initially allocated under Research & Technical Development Infrastructure

Source: DG Regional and Urban Policy, EC (2014)
Publications and Patents

• BAS published 60% of overall papers in 2000-2015

• Intensity of patenting has decreased substantially after 1990.

• In 2000-2014 period, 903 patents have been issued in USPTO and 303 in EPO.

• ICT sector continues to be strongly performing in patenting.
Opportunities

• State-of-the-art scientific facilities to conduct competitive research at international level

• The access to modern infrastructure is an important factor in attracting and retaining the best students, PhDs, and researchers.

• Improving the research infrastructure should lead to a significant increase of the capacity of Bulgarian scientists for conducting high quality scientific research which will impact the development of high tech industry in Bulgaria.

• Budget allocation – ca. 300 M. EUR for Centers of Excellence, Centers of Competence, Regional Research Centers and Unique Infrastructure for 2018-2023

• National Roadmap of Ris – ca.200 M. EUR for 2018-2023
National Roadmap of Bulgaria (2010-2016)

• The first National Roadmap for RI of Bulgaria was adopted in 2010 by CoM Decision No.692. It was linked to the ESFRI priorities.

• With Council of Ministers’ Decision No.569 on 31 July 2014 the NRRI was updated by reviewing and evaluating existing and new RIs, as well as identifying those (14 consortia) that are in line with the European priorities and outlining priorities for modernization and/or construction of new scientific facilities.

• Final update (2016-2017)
<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2010</th>
<th>2016 Landmarks</th>
<th>2016 Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLARIN</td>
<td>CLARIN</td>
<td>CLARIN (ERIC)</td>
<td></td>
<td>Actris</td>
</tr>
<tr>
<td>EURO ARGO</td>
<td>EURO ARGO</td>
<td>EURO ARGO (ERIC)</td>
<td></td>
<td>Danubius</td>
</tr>
<tr>
<td>ESS</td>
<td>ESS</td>
<td></td>
<td></td>
<td>CTA</td>
</tr>
<tr>
<td>PRACE</td>
<td>PRACE</td>
<td></td>
<td>PRACE</td>
<td>E-RIHS</td>
</tr>
<tr>
<td>EPOS</td>
<td>EPOS</td>
<td></td>
<td>HL-LHC</td>
<td>EPOS</td>
</tr>
<tr>
<td>DARIAH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Current challenges

- Sustainable development of local RIs, given the strategic national and EU financing
- Their access to Pan-European infrastructures
- Their more efficient use and promotion of benefits to society
National Roadmap 2017-2023

In accordance with...

- National Strategy for Development of Research
- Innovation Strategy for Smart Specialiation
- ESFRI Agenda
Diagnostic Review of Research Equipment and Apparatus
Number of research complexes in Bulgaria as per level of significance

- European: 12
- National: 84
- Regional: 65

Source: Diagnostic Review of Ris in Bulgaria (May 2017).
Physics, Material Science and Engineering

Exploitation of RIs

Attracted competitive funding, 2012-2016

Source: Diagnostic Review of Ris in Bulgaria (May 2017).
Medical and Agro-Bio Sciences

Exploitation of RIs

Source: Diagnostic Review of Ris in Bulgaria (May 2017).

Attracted competitive funding, 2012-2016
Attracted competitive funding, 2012-2016

Social Sciences and Humanities

Exploitation of RIs

Source: Diagnostic Review of Ris in Bulgaria (May 2017).
E-infrastructures for multidisciplinary research

Exploitation of RIs

14 % (up to 3 years)
86 % (4-5 or more) - obsolete

Attracted competitive funding, 2012-2016

Source: Diagnostic Review of Ris in Bulgaria (May 2017).
# Main findings for the North

<table>
<thead>
<tr>
<th>North-West</th>
<th>North-Central</th>
<th>North-Eastern</th>
</tr>
</thead>
<tbody>
<tr>
<td>has a huge gap compared to all other regions as research infrastructure is available only in the healthy life industries and biotechnologies. It is crucial that this region is supported through European and national funding in the areas that have already demonstrated research and business potential. Yet, government policies need to incentivize businesses and researchers to cooperate in areas which are new to the region.</td>
<td>does have a potential to specialize more in ICT, but the potential of using and further strengthening the research infrastructure in healthy life industries and biotechnologies is there. Therefore, there is a need to channel funding for new equipment in all three priority areas.</td>
<td>does have a high specialization in the mechatronics and clean technologies areas but it could strengthen its potential also in the healthy life industries and biotech, as well as in the creative and recreational industries, where there is a priority under Bulgaria’s IS 3.</td>
</tr>
</tbody>
</table>

*Source: Diagnostic Review of Ris in Bulgaria (May 2017).*
<table>
<thead>
<tr>
<th>Region</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>South-Western</td>
<td>stands far ahead of the other regions in terms of presence of research infrastructure in all four IS 3 priority areas. Moreover, Bulgarian research infrastructures which are integrated in Pan-European partnerships are exclusively coordinated by research institutes and universities, which are located in the capital of Bulgaria.</td>
</tr>
<tr>
<td>South-Central</td>
<td>faces the highest gap in terms of available research infrastructure and priorities under Bulgaria’s IS 3. There is a strong research infrastructure in the field of social sciences and humanities. Moreover, there is no research capacity in e-infrastructures, whereas the ICT industry is a priority area for IS3. Finally, there is a limited research infrastructure in mechatronics and clean technologies area, although it will be supported by OP Innovation and Competitiveness</td>
</tr>
<tr>
<td>South-Eastern</td>
<td>does have available strong research infrastructure in the mechatronics and clean technologies, as well as in the healthy life industries and biotech areas, which are also priorities in the IS 3. Limited research infrastructure in the creative and recreational industries would need to be improved.</td>
</tr>
</tbody>
</table>

**Source:** Diagnostic Review of Ris in Bulgaria (May 2017).
## Regional Specialization per Research Area

<table>
<thead>
<tr>
<th>Region/research area</th>
<th>PME</th>
<th>Medicine &amp; Agro-Bio Science</th>
<th>Social Science and Humanities</th>
<th>E-Infrastructures for multidisciplinary research</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-Western</td>
<td>n/a</td>
<td>*</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>North-Central</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>North-Eastern</td>
<td>***</td>
<td>**</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>South-Western</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>South-Central</td>
<td>*</td>
<td>***</td>
<td>***</td>
<td>n/a</td>
</tr>
<tr>
<td>South-Eastern</td>
<td>***</td>
<td>***</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Note: *** (high level of presence of research infrastructure); ** (mid-level); *(low-level); n/a – not available.

**Source:** Diagnostic Review of Ris in Bulgaria (May 2017).
Overall findings

• Insufficient modern infrastructures, which must meet the current requirements for RI;

• Inadequate management of existing research facilities, inefficient workload and maintenance;

• Irregular territorial and thematic distribution of the RI;

• Inadequately qualified staff to support research equipment;

• Financial instability and inadequate engagement of the private sector.

• Some potential, but also regional gaps, to support Bulgaria's smart specialisation strategy.
## Business Regional Specialization

<table>
<thead>
<tr>
<th>Region</th>
<th>Mechatronics and Clean Technologies</th>
<th>Industries for healthy life and biotech</th>
<th>New technologies in creational and recreational industries</th>
<th>Informatics and ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwestern</td>
<td>n/a</td>
<td>**</td>
<td>**</td>
<td>*</td>
</tr>
<tr>
<td>North-Central</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>North-Eastern</td>
<td>n/a</td>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>South-Western</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>South-Central</td>
<td>***</td>
<td>n/a</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>South-Eastern</td>
<td>n/a</td>
<td>n/a</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

**Source:** Diagnostic Review of Ris in Bulgaria (May 2017); Establishment of Regional Research Centers in Bulgaria (May 2017).
Key principles for financing new RIs

• Avoid duplication of unique and expensive research equipment;

• Ensure high workload of the research infrastructure and access of interested users;

• Maintain the available infrastructure in a good working condition;

• Provide balanced allocation of RI by institutions and regions;

• Ensure Pan-European RI integration.
Grouping of RIs as per ESFRI classification in 2016

GROUP I – Landmarks – in stage of use

1. National Interdisciplinary Research E-Infrastructure for Resources and Technologies for the Bulgarian Language and Cultural Heritage, Integrated within the European Infrastructures CLARIN and DARIAH (CLADA-BG)

2. European Social Survey for Bulgaria

3. Distributed infrastructure from centers for the production and research of new materials and their applications, as well as for the preservation, access and e-storage of artefacts (archaeological and folklore) – INFRAMAT

4. Regional Astronomical Center for Research and Education

5. National Center for High Performance and Distributed Computing

6. National Programme to the European Center for Nuclear Research - CERN

7. Laboratory complex to the Science and technology park „Sofia Tech Park“

8. National Programme to the Joint Institute for Nuclear Research in Dubna

9. Bulgarian Antarctic Base "St. Kliment Ohridski"

10. National University Complex for Biomedical and Applied Research
Grouping of Ris as per ESFRI classification in 2016

GROUP II – Projects – in stage of development

1. National Cyclotron Center
2. Infrastructure for Sustainable Development in the Field of Marine Research, also linked to the participation of Bulgaria in the European infrastructure Euro-Argo
3. Scientific Cell Technology Infrastructure in Biomedicine
4. Energy storage and hydrogen energy
5. Center for Contemporary Microscopy for Fundamental and Applied Biology, Medicine and Biotechnology
6. Research in the field of controlled thermonuclear fusion /ITER/
7. CTA-MAGIC
8. National Research Infrastructure for Observing Atmospheric Aerosols, Clouds and Gas Pollutants Integrated within the Pan-European Infrastructure ACTRIS
Grouping of Ris as per ESFRI classification in 2016

GROUP III – Emerging projects
1. National Geoinformation Center
2. Eco and Energy Efficient Technologies
3. National infrastructure for research and innovations in agriculture and foods (RINA)
4. Center for Plant Systems Biology and Biotechnology (PlantaSyst)
Government commitment between 2014 and 2017

Over 30 m. BGN in financing, spread through:

• EUR 2 M for the construction and renovation of the National Centre for High Performance and Distributed Computations
• EUR 2 M for the construction of the National Cyclotron Centre
• EUR 0.5 M. for repairing the “Academic” research ship, which is part of the Infrastructure for Sustainable Development in the Field of Maritime Research, which is also linked to the participation of Bulgaria in the European infrastructure (Euro-Argo).
• EUR 0.370 M for partial equipment for the Regional Astronomical Center for Research and Education – Rozhen
• EUR 87,000 (for 2014-2016) membership fee for participation in European consortia from the ESFRI Roadmap of the associated national sites: National centre for high performance and distributed calculations for participation in CLARIN and EGI; Centre for Contemporary Microscopy for Fundamental and Applied Biology, Medicine and Biotechnology Research - to participate in EuroBioImaging.
• EUR 3,670 M per year for CERN
• EUR 20,000 BGN annual membership for ITER
• EUR 250,000 annually for the Bulgarian Antarctic base under the National program for Polar research
Stages of Development for the National Roadmap of RIs

First stage: Synchronization (2017-2018) Emphasizes on the maintenance of existing complexes. During this stage, the project proposal calls for establishing Centres of Excellence (CoE), Centres of Competence (CoC), and Regional Research Centres (RRC) under the OP SESG are to be successfully completed.

Second stage: Building (2019-2020) Based on the 2018 update, the construction will be supported and financial support will be provided for all significant RIs, included in the updated NRRI.

Third stage: Development (2021-2023) Existing infrastructures are further developed and a regular assessment of their efficiency and effectiveness is conducted from the viewpoint of exploitation of their research results and potential for commercialization.
Developing a New Agency for Promotion of Research & Innovation in Bulgaria (PARI)

**Mission:** Implement policy, conduct effective monitoring and coordination.

**Vision:** Promote the development of science and new technologies in congruence with national priorities under Bulgaria’s Smart Specialization Strategy (S3).

**Tasks:**
- Finance programs and projects in compliance with priorities, as defined by S3 and the CoM;
- Create procedures for application, initial evaluation, monitoring and final assessment of the implementation of programs and projects;
- Monitor and evaluate the activities of national scientific research organizations and bodies;
- Provide technical assistance in support of all institutions in the space of investment in science, technologies and innovations;
- Provide technical support of institutions as the executive power, legislative power and other authorities for the improvement of the legislative framework in the research scientific area;
- Manage EU structural funds, related to measures in the space of innovation and science.
Proposed Structure of new PARI Agency

Demo Fund
Long-term policy

• Lessons from Korea, Germany, Finland, Czech Rep.

• Matching funds (EU and national financing)

• Significant Increase of Public Funding for R&D

• Establishment of new Agency for Research and Innovation in Bulgaria
Contacts:
Assoc. Prof. Evgeni Evgeniev, PhD
eevgeniev@vuzf.bg