REPORT FROM NATIONAL CASE STUDY

Bulgaria

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Abstract

This report presents the findings from the Bulgarian case study, including the reviews and outlooks for ARC Fund (research performing organisation) and the Ministry of Education and Science and the National Science Fund (research funding organisations).
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List of abbreviations

BAS – Bulgarian Academy of Sciences
BulCRIS – Bulgarian Current Research Information System
COSME – EU Programme for Competitiveness of Enterprises and Small and Medium-sized enterprises
ERAC – European Research Area and Innovation Committee
GDP – Gross Domestic Product
IBSP – Innovation and Business Support Programme
ICT – Information and Communication Technology
IMI-BAS – Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences
IS3 – Innovation Strategy for Smart Specialisation
MES – Ministry of Education and Science
MSCA – Marie Skłodowska Curie actions
NIF – National Innovation Fund
NSF – National Science Fund
NSI – National Statistical Institute
OP – Operational Programme
PSF – Policy Support Facility
R&D – Research and Development
R&I – Research and Innovation
RISE – Research, Innovation, and Science Policy Experts
RRI – Responsible Research and Innovation
SGC – Smart Growth Council
SIC – Safer Internet Centre
STEM – Science, Technology, Engineering, and Mathematics
STI – Science, Technology and Innovation
STIPP - Science, Technology and Innovation Policy Programme
SWG – Standing Working Group
TTO – Technology Transfer Office
1. Executive summary

Responsible research and innovation (RRI) has emerged in recent years, especially in Europe, as a science policy framework that aims for a) engaged publics and responsible actors in the science and innovation field, and b) ethically acceptable, sustainable and socially desirable research and innovation outcomes that are aligned with societal needs and challenges.

The European Commission views RRI as a framework that can be used to address grand societal challenges through the engagement of societal actors (researchers, citizens, policy makers, business, third sector organisations and others) in the co-construction of research and innovation, and to better align this process and its outcomes with the values, needs and expectations of the European society.

The European Commission has defined five policy keys, which comprise the RRI concept. These are Ethics, Gender Equality, Open Access, Public Engagement and Science Education. Sometimes a sixth key is added – Governance, but this key was not considered for the purposes of the current report. Instead, the undertaken study and the report approached RRI also through the related AIRR dimensions: Anticipation and Reflexivity, Inclusion and Diversity, Openness and Transparency, and Responsiveness and Adaptation.

RRI is a relatively new concept for Bulgaria. Although the Bulgarian research and innovation system is by no means a stranger to individual RRI keys, some of which have been incorporated into the research practice in the country long ago, the overall RRI terminology is largely unknown outside the group of policy-makers and researchers with deeper familiarity and experience with the EU funding programmes and mechanisms.

Nevertheless, debates related to the RRI principles have grown in prominence among the scientific and innovation community in Bulgaria in recent years. This is especially valid for deliberations on the social impact of scientific research, debates on ethics and institutionalisation of ethical norms (ethics commissions, codes of conduct for research integrity), initiatives to promote open science and open access policies, and increased attention to different methods for societal engagement.

Given the insufficiently developed legal framework on RRI in Bulgaria, it is often up to public research organisations and universities to develop their own internal structural and normative regulation related to RRI principles.

Policy and decision-makers view responsibility largely as an opening for lending extra legitimacy to institutional policies and governing research and innovation. Researchers and civil society actors emphasise the need to expand professional responsibilities and engage society more actively as an integral part of research and institutional cultures.

ARC Fund, as an example of a research performing organisation, frames responsibility as a broader socially responsible behaviour, conscious of the implications of research and its usefulness, and fully adhering to principles of transparency and accountability to societal actors and stakeholders, good governance, high ethical and professional standards, and proactive stakeholder engagement. RRI framework is perceived as highly relevant for adding to current organisational legitimacy of ARC Fund vis-à-vis key stakeholders in society.

***

By examining how individual RRI keys and dimensions are perceived in the Bulgarian R&I context, the following conclusions can be made:

**Ethics** has been related to the opportunity to institutionalise ethical standards via a centralised body tasked with advising the national government on issues of STI policy. The strengthening of research integrity and ‘proper’ scientific conduct (honesty, reliability, respect, non-biased public communication of science, full transparency and accountability of research activities and research outcomes) in universities and research organisations is also prioritised. Although there is no national Code of Conduct for research organisations yet, some universities and institutes of the Bulgarian Academy of Sciences (BAS) have adopted their own Codes and established Ethics Commissions.

**Societal engagement** is framed mainly in terms of intensification of practices for public/stakeholder dialogue and consultation on matters of science and innovation policy; opening up alternative spaces for the effective co-
construction of specific instruments and measures that would ensure successful policy implementation; achieving social acceptability through an increased legitimacy of R&I policy decisions. Societal engagement is thus understood mainly as a tool for increasing the public trust in science and for legitimising public R&I spending, rather as a way to actively engage society in the process of defining research priorities.

**Gender equality** in research and innovation is frequently dismissed as a non-issue for the Bulgarian context. This is explained by the statistical prevalence (53%) of female researchers in the public research sector. In addition, numerous women occupy top managerial positions in public research and innovation organisations. However, women are underrepresented in the programme committees of the main public funding research organisation – the National Science Fund. Perceiving the existing situation as good, measures to further promote gender equality in science and research are rarely foreseen or implemented. The relevant strategic documents instead see the preservation of the current balanced gender representation as a sufficient objective and fail to envisage more progressive steps.

The policy framework on **open access and open science** within the Bulgarian science system calls for lifting of barriers for researchers to provide full account of their research work as broadly as possible to the wider community. Specific steps have been undertaken by MES and BAS in the past five years which strive to place Bulgaria among the top performers on open access/open science policies in Europe. For example, the Scientific Research Promotion Act provides for MES to maintain subscription to large databases of e-journals and e-data for scientific purposes and provide it for free to public research organisations and universities. BAS has established a network of scientific Open Access Centres to promote open access and open science policies among researchers.

**Science education** is occasionally promoted by public institutions like the Ministry of Education and Science and Sofia Tech Park, but overall Bulgaria needs to do more to promote science education in schools. Universities and research institutes recognise the importance of science education, but concrete implementation is hindered by insufficient financial resources and the fact that science education is still not considered a priority in the policy-making process.

**Diversity** is not recognised as crucial for innovative organisations and for promotion of creativity. However, some researchers and policy-makers are aware that innovation and research processes will have to become more inclusive and open to participation of underrepresented social groups to reverse the current trends of aging scientific community.

Policy-makers interpret **reflexivity** and **anticipation** as a way to ensure intensification of links between science and education, businesses, governments, and society as a whole, and as a tool for identifying important social challenges. Reflexivity and anticipation are associated with foresight, which is needed for regular updates of funding priorities.

**Openness** and **transparency** are associated with declaring potential conflicts of interest, publicity of research findings, measurement of risks and impacts, among other. **Transparency** also means accountability to society.

**Adaptation** is conceived by the Ministry of Education and Science as the way to introduce international good practices and adapting them to the national context through integration.

The overall conclusion is that the concept of RRI remains largely unknown in Bulgaria, although in numerous aspects of their work, the essential research funding and policy implementing institutions like the National Science Fund and the Science Directorate at the Ministry of Education and Science adhere to the principles of RRI. The national discourse often puts together terms like ‘open access’ and ‘open science,’ ‘ethics,’ ‘public engagement’ and ‘responsibility,’ but anticipation, reflexivity, and inclusiveness are rarely used, especially as elements of a larger RRI concept.

To date, there have been no discussions on the decision-taking level on integrating RRI in the national science policy, and hence none of the key institutions (the Science Directorate at MES and NSF) has a specific mandate and staff with RRI-related responsibilities.
### Policy recommendations to Bulgarian policy makers

| Ethics | • Continuous development of ethics standards at the national level  
|        | • Adoption of National Code of Conduct |
| Societal Engagement | • Expansion of channels for communication with the public (social media, TV programmes for science)  
|        | • Launch of a coherent communication strategy for societal engagement  
|        | • Build capacity for science communication among scientists and researchers through training programmes |
| Gender and diversity | • Promotion of awareness about the need to uphold principles of gender equality and non-discrimination  
|        | • Address barriers to academic career progress of women  
|        | • Enhance international exchanges on gender equality and diversification |
| Open Access | • Organise round tables to spread knowledge and get support from researchers for open science/open access policy measures  
|        | • Set up surveys to study perceptions of researchers  
|        | • Engage media and other communications channels to promote open science and open access |
| Science Education | • Promote importance of science and its application to society through encouraging appointment of science education specialist in research projects  
|        | • Promote the appointment of RRI specialists in universities and research institutes, and inclusion of modules in research projects that relate to RRI |
| Anticipation and reflexivity | • Regularly update national research priorities supported by public funds to ensure they correspond to important societal challenges  
|        | • Development and promotion of research programmes of national and societal importance |
| Openness and transparency | • Intensify partnerships with media (journals, TV) in reporting on science and innovation achievements and promotion of results  
|        | • Organise a larger number of round tables, seminars and other events to increase positive attitude of the society towards science  
|        | • Increase trust of the Bulgarian society in government interventions regarding R&I through established communication channels with wider stakeholders, and introduce new such channels through media outreach |
| Responsiveness and adaptation | • Regular meetings of the Council for Smart Growth  
|        | • Active engagement with relevant societal actors, including researchers, business actors, and civil society |

### Policy recommendations to European policy makers

- **Integrate RRI into evaluation criteria for funding science (supporting project proposals).** RRI principles should be better integrated into criteria measuring scientific excellence and the economic valorisation of R&I (i.e. publications/patents’ count, commercialisation of scientific results, etc.), so that broader socio-ethical benefits and goals are not ignored.

- **Enhance awareness about RRI matters:** Better awareness can be achieved through additional training opportunities for policy makers, scientists and public representatives (NGOs), which would enable the process of implementing RRI principles more broadly.

- **Focus on governance as a key pillar:** The whole R&I ecosystem should be aligned with the goals for socially acceptable, desirable and sustainable R&I processes and outcomes. This requires a focus on the governance mechanism of the national research and innovation system.

- **Gender and Diversity:** The RRI key gender equality is too narrow and could be extended to include other socio-demographic characteristics relevant to promoting and improving diversity in science, research and innovation (age, ethnicity, disability, race, etc.).
2. Introduction: about the report

Responsible research and innovation (RRI) has emerged in recent years, especially in Europe, as a science policy framework that aims for a) engaged publics and responsible actors in the science and innovation field, and b) ethically acceptable, sustainable and socially desirable research and innovation outcomes that are aligned with societal needs and challenges.

The European Commission views RRI as a framework that can be used to address grand societal challenges through the engagement of societal actors (researchers, citizens, policy makers, business, third sector organisations and others) in the co-construction of research and innovation, and to better align this process and its outcomes with the values, needs and expectations of the European society.

The European Commission has defined five policy keys, which comprise the RRI concept. These are Ethics (research integrity and ethical acceptability of scientific and technological developments), Gender Equality (promoting gender balance in research teams and decision-making bodies, considering the gender dimension in R&I), Public Engagement (participation of all societal actors in R&I processes to align their outcomes to the values, needs and expectations of society), Open Access (accessibility to and ownership of scientific information) and Science Education (increasing the number of researchers and enhancing the education process to better equip citizens for participation in R&I debates). Sometimes a sixth key is added – Governance, but this key was not considered for the purposes of the current report.

Instead, the undertaken study and the report approached RRI also through the related AIRR dimensions: Anticipation and Reflexivity, Inclusion and Diversity, Openness and Transparency, and Responsiveness and Adaptation. This report analyses and presents the Bulgarian Responsible Research and Innovation (RRI) discourse from three main perspectives: overview of the national level policy and practice, and case studies: (i) the Ministry of Education and Science (MES) as the policy maker in education and research, (ii) the National Science Fund (NSF) as the national research funding body, and (iii) the Applied Research and Communications Fund (ARC Fund) as a research performing organisation. The concept of RRI is still novel for Bulgaria and as such is relatively unknown beyond the circle of policy-makers and researchers with experience of the EU funding programmes and mechanisms. However, as the subsequent chapters will demonstrate, most of the RRI keys have been incorporated into the Bulgarian research and innovation system long ago, although the implementation sometimes leaves space for improvement of practices.

The analytical work on which this report is based combined documentary analysis, semi-structured interviews, a participatory workshop with stakeholders, and focus groups in organisations involved as case studies (MES, NSF and ARC Fund). All these analytical tools were employed to perform the context analysis of institutional structures, legal frameworks, policy environments, established practices, and drivers and barriers with respect to promotion and uptake of RRI dimensions.

This report also serves as a review of the current status of the work on RRI dimensions in the case study organisations, and development of outlooks outlining RRI objectives, targets and indicators for each organisation. Outlooks are short and practical action plans on how RRI can be improved in the organisation, developed in consultations with important stakeholders in the organisation. The outlook lists actions the organisation is willing to implement in order to strengthen responsibility in its work. The outlook also addresses barriers and drivers for RRI and identifies important goals and indicators.

Following the introduction, the report describes the methodology and the overall process of the national study, which went through three stages: (i) national mapping, (ii) organisational studies of the Ministry of Education and Science (policy maker), the National Science Fund (research funder), and ARC Fund (research performer), and (iii) analyses, findings, conclusions and recommendations.

The central part of the report contains an overview of the Bulgarian science policy environment and the context it provides for emergence, establishment and evolution of RRI practices. Chapter 4 offers a brief overview of Bulgaria and its legal and normative framework (related to RRI principles), and examines the political and cultural values framing public discussions on science, technology, research and innovation. Chapter 5 looks at the aspects of responsibility in Bulgarian science policy and practice and examines which national policy documents are
conducive to further uptake of RRI in the country, and reflects on the position of RRI in the Bulgarian research and innovation context.

Chapter 6 consists of a review and outlook of the research conducting organisation – ARC Fund. It starts by presenting the organisation and then moves on to analysing how responsibility is conceptualised in its work and activities. The five RRI keys and the AIRR dimensions are examined and described, taking note of barriers that possibly interfere with or drivers that advance performance on individual RRI aspects, highlighting some examples of good (and sometimes bad) practices, and listing the potential points for improvement, along with the needed indicators for measuring success. Chapter 7 has an identical structure, but focuses on research funding organisations – in the Bulgarian case the Ministry of Education and Science and the National Science Fund.

Chapter 8 summarises the general findings of the national discourse analysis and the case studies, putting forth some conclusions and sketching some differences and similarities between case study organisations.

Finally, Chapter 9 presents policy recommendations for national and European policy makers, and for research funding and research conduction organisations. The chapter also has a section presenting some good practices that might be scalable to European or national level.
3. Methodology

3.1 Analytic approach

The analytical approach to the national case studies in RRI-Practice project has been inspired by institutional theory. Scott (1987) describes the following three perspectives for studying organisations: as a rational, as a natural and as an open system. We have adopted this approach, but have as well used other concepts that we believe are more intuitively understandable. The following table presents the basic approach to the organisational studies, adopted by the RRI-Practice consortium partners.

Table 1: Analytical approach to the organisational studies

<table>
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<tr>
<th>Aspects of organisations</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange dynamics</th>
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<tr>
<td></td>
<td>Mandates, legislative frameworks, formal hierarchies</td>
<td>Culture, informal routines, informal reward systems, focus on management</td>
<td>Policy learning, pressures from key stakeholders (owners, the public, etc.)</td>
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<tr>
<td>Potential drivers for RRI</td>
<td>Active ownership (e.g. the state), legislation that includes social responsibility as a core element of the mandate, formal evaluation criteria adapted to RRI goals</td>
<td>RRI dimensions become mainstreamed, managers start seeing RRI dimensions as an obvious part of their responsibilities, no social acceptance for neglect of the RRI dimensions</td>
<td>Pressure from the media, success stories from organisations considered to set ‘gold standards’ in the field</td>
</tr>
<tr>
<td>Potential barriers to RRI</td>
<td>No formalised pressures to conform to RRI dimensions</td>
<td>Informal incentive systems reward economic output/excellence/etc., effectively marginalising the RRI dimensions</td>
<td>Important stakeholders reward, for instance, excellence and economic performance to a greater extent than RRI related matters</td>
</tr>
<tr>
<td>Methods</td>
<td>Analysis of formal documents</td>
<td>Interviews with employees at different levels in the organisations, focus groups</td>
<td>Media analysis, interviews with top management</td>
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In order to study the Bulgarian research funding organisations (MES and NSF) and a research performing organisation (ARC Fund) as open systems (their ‘interchange dynamics’), we needed to analyse them in their context. We have therefore placed the focus on the national science and innovation system, in which these organisations are embedded and operate. Although the national science and innovation system cannot be regarded as an organisation, we still find it useful to structure the study of the national context in a way similar to the organisational study. We believe this approach will make it easier for the reader to relate our findings from the organisational studies to findings from the national context.

In addition, we feel it is useful in our analyses to put a specific focus on barriers, drivers and good practices, which may be either of a structural or cultural nature, or may be related to the dynamics, expectations and pressures arising from key stakeholders.

Throughout the course of the national-level and organisational studies in Bulgaria we employed diversified data collection methods which included documentary reviews, semi-structured interviews, focus groups, an online survey, and a national workshop. The overall process of the national study went through three stages: (i) national mapping, (ii) organisational studies of MES (policy maker) and NSF (research funder), and ARC Fund (research performer), and (iii) synthesis of overall analyses, and findings to provide some overall conclusions and recommendations.
3.2 National mapping

The mapping of the national discourses and practices of RRI in Bulgaria had two distinct objectives:

- To perform context analysis of institutional structures, the legal system, and the policy environment in order to determine accelerating and impeding factors in the decision-making structures with respect to the RRI keys.
- To understand the main societal and political discourses surrounding RRI and the ways in which these are framed and have been implemented, or not, in the national context.

The national mapping encompassed: (i) analysis of national strategies and the legal framework relevant to RRI; (ii) interviews with national stakeholders; and (iii) a national workshop with a diverse group of stakeholders.

3.2.1 Document analysis

The following national documents were reviewed and analysed from the perspective of RRI:

1. Higher Education Act
2. Scientific Research Promotion Act
3. Law for Academic Staff Development
4. Pre-School and School Education Act
5. Law on Equality between Women and Men
6. Protection against Discrimination Law
10. Innovation Strategy for Smart Specialisation
11. Innovation Promotion Act

3.2.2 Interviews

A total of 9 national stakeholders were interviewed, among them researchers from the Bulgarian Academy of Sciences and universities, high-level representatives of the Ministry of Economy and the Ministry of Education and Science, and NGO representatives.

Interviewed stakeholders (affiliations and type of organisation):

- Sofia University ‘St. Kliment Ohridski,’ https://www.uni-sofia.bg/en (Research institute / academia)
- Bulgarian Centre for Bioethics, http://www.bio-ethics.net/en (NGO)

Document summaries are presented in Annex 1.

4. https://www.lex.bg/laws/lidoc/213680028
5. https://www.lex.bg/laws/lidoc/2136803101
3.2.3 National workshop

The national workshop was held on 23 February 2017 and hosted by ARC Fund in its building in Sofia. The workshop was attended by 18 stakeholders representing 11 different organisations: research institutes of the Bulgarian Academy of Sciences and the Agricultural Academy, universities, NGOs, the Ministry of Education and Science and the National Science Fund, and high-tech companies. It was divided into two parts: ‘Concept of responsibility in research and innovation,’ and ‘Drivers and barriers to the successful implementation of RRI in Bulgaria.’

Participants at the national workshop (affiliations and type of organisation):
- Bulgarian Science Fund, https://www.fni.bg (Policy-makers)
- Agrobioinstitute – Centre of excellence in plant biotechnology, http://www.abi.bg (Research institute / academia) – 2 participants
- University of National and World Economy, http://www.unwe.bg/en (Research institute / academia)
- Bulgarian Centre of Women in Technology, http://www.bgwomeninict.org (NGO)
- Bulgarian Centre for Bioethics, http://www.bioethics.net/en (NGO)
- ARC Fund, http://www.arcfund.net (NGO) – 5 participants
- TechnoLogica, http://www.technologica.com (Industries / businesses) – 2 participants

3.3 The organisational studies

When the work on the RRI-Practice project commenced in Bulgaria, it was jointly decided (by ARC Fund’s team and the team of the Science Directorate of the Ministry of Education and Science) that the National Science Fund (NSF) should be involved in the study as well, as this is the main national financial instrument for scientific research. Thus, the national study of research funders encompassed both MES and NSF, while ARC Fund was studied as an example of a research performing organisation.

The study of the Ministry of Education and Science and the National Science Fund went through two stages: data gathering and analysis, and outlook development.

- Data gathering and analysis: documentary analysis, interviews with four representatives of the National Science Fund and four representatives of MES, and two focus groups – the first to discuss the findings from the documentary analysis and the analysis of the semi-structured interviews (hosted by MES on 26 March 2018, with 10 participants from MES, NSF, the Bulgarian Academy of Sciences, Sofia University, the Ministry of Economy and ARC Fund).
- Outlook development: based on the analysis a first draft of the outlook was elaborated which was discussed in a second focus group (hosted by MES on 5 June 2018 with six participants from MES, the Ministry of Economy and Sofia University).

The following documents have been reviewed and analysed from the perspective of RRI:
- Rules of the National Science Fund 2016
- National requirements and eligibility criteria for participation in calls for proposals under internationally funded programmes
- The documentation of calls for proposals of the National Science Fund

13 Detailed report on the national workshop in Bulgaria is accessible at: https://www.rri-practice.eu/knowledge-repository/national-workshop-reports/
- Guidance and methodology (of the National Science Fund) for evaluation of research proposals 2016 submitted under the programmes: (i) young scientists, (ii) bilateral cooperation, and (iii) fundamental research
- Annual operational programme of the National Science Fund for 2017
- Evaluation reports on the activities of the National Science Fund (Mar 2017 and Dec 2017)

The study of the Applied Research and Communications Fund also consisted of two parts:

- Data gathering and analysis: documentary analysis, interviews with 10 members of staff from senior management, middle-level management and researchers, a focus group to discuss the findings from the documentary analysis and the interviews, and an internal online survey among staff members to complement the findings in the RRI review.

- Outlook development: Based on the input from the study, the outlook was drafted and presented to respondents who participated in the study. Written feedback was collected and used for revision of the outlook. The process of outlook development was completed after final consultations with the senior management.

The following organisational documents have been reviewed and analysed from the perspective of RRI:

- Statute
- Rules and Order for Performing Publicly Beneficial Activities (which encompass the guiding principles of all organisational activities in the public benefit)
- Child Protection Policy
4. The context for RRI: the national science policy system

4.1 General country information

The Republic of Bulgaria is situated in Southeast Europe with a territory of 110,994 square kilometres. The socialist regime was dismantled in fall 1989, when Bulgaria had a population of 9 million. Since then, emigration and a demographic crisis, related to the difficulties of the transition to a market economy, have led to a substantial decrease in the population (7 million in 2018). According to the National Statistical Institute (NSI), close to 20% of the population live in the capital Sofia. Overall, 73% of the population live in urbanised areas. About 65% of the population is between 15-64 years of age.

Bulgaria is culturally and linguistically diverse. Ten percent of the population is of ethnic Turkish origin, while 5% are Roma. There are several smaller communities as well, including Russians, Jews, Armenians, Vlachs and others. In the past years, Bulgaria has been indirectly impacted by the European migration crisis, as immigrants and refugees use Bulgaria as a transit country. However, the number of immigrants in the country remains insignificant.

Bulgaria had the lowest unemployment rate at the beginning of the transition period (April 1991), whereas it reached a peak in February 2001 (19.3%). In March 2018, unemployment rate stood at 6.8%. The average monthly wage in Bulgaria is EUR 566 (the NSI data) – among the lowest in the EU.

There are 54 universities and equivalent higher schools (of which 17 are private), and 22 colleges (4 are private). No Bulgarian university is ranked among the Reuters Top 100 innovative universities in the world.

In 2016, according to NSI data, 27.7% of the population had tertiary education, 54.6% had upper secondary education, while 17.7% had primary or lower education. In the 2016/17 academic year, there were 232,800 students in universities, which is 12% less compared to the 2012/13 academic year. This downward trend is also observed with the general education. As a direct consequence of these developments, the national STI system is already experiencing a lack of human resource capacity (see Annex 2a).

In 2016, 6,738 Ph.D. students were enrolled in Bulgaria, of which 51.9% were women. In 2016, a ‘Doctoral’ degree was acquired by 1,464 persons of whom 773, or 52.8%, were women. According to NSI data for 2016, 53% of all researchers in Bulgaria were women, while 47% were men.

In the early 1990s, Bulgaria’s R&D financing stood at 2.16% of GDP. Since then, it has declined substantially. In recent years, the public funding contribution for R&D was only 0.2% of GDP or less and there is no prospect to achieve the target of 1.5% of GDP in R&D funding by 2020 set by the Bulgarian government. The majority (over 70%) of the R&D funding is directed towards Sofia-based research organisations and universities. National funding instruments have contributed EUR 7.6 million per year since 2005, whereas EU Structural Funds are expected to channel around EUR 60 million per year between 2014 and 2023. This funding is likely to be insufficient for the restructuring of the national science system. Furthermore, Bulgarian research institutions are among the least competitive in the EU calls for research and innovation funding. Therefore, it comes at no surprise that in terms of performance of the innovation system, Bulgaria takes 27th position in the EU according to the most recent European Innovation Scoreboard 2018.

Accelerators, incubators, co-working spaces, business clusters, Technology Transfer Offices (TTOs), Sofia Tech Park, networks and platforms have emerged as part of the national innovation eco-system. However, they are mostly limited to Sofia and very few are spreading to other regions of Bulgaria. Overall, business-science partnerships are weak and there are only a few examples of successful technological commercialisation projects, involving research institutes and universities.

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15 NSI data report 0.24% of GDP in public R&D funding as of 2016, which is second lowest in the EU-28 after Romania (0.22%). The top performers in the EU are the Scandinavian economies (Sweden, Finland, and Denmark), which registered over 1% of public R&D funding.

16 See Annex 1 for more information.

Executive power in Bulgaria is exercised by the government, while legislative power is vested in both government and the National Assembly. The judiciary is independent of the executive and the legislature.

The Ministry of Education and Science (MES) is the key institution responsible for science and education policies and regulation. Scientific Research Promotion Act, Art.7, reads that “the national policy in the sphere of scientific research is undertaken by the Council of Ministers through the Minister of Education and Science in accordance with the National Strategy for Development of Scientific Research, adopted by the National Assembly.” The day-to-day implementation of science policy is undertaken by the Science Directorate at MES with a small staff of 15 people.

While MES is responsible for the development of the science system, the Ministry of Economy has responsibility over the innovation system.

The National Innovation Fund (NIF) and the National Science Fund (NSF) are independent funding mechanisms, administered by their own regulations. Project proposals they fund are selected on a competitive basis. The key beneficiaries of projects funded under the National Innovation Fund are businesses, which are required to cooperate with research institutes and universities. The key beneficiaries of projects funded under the National Science Fund are research institutes and universities.

There are two key councils that act as consultative bodies for innovation and science policies. The National Innovation Council includes government officials, academics and businesses as representatives of the innovation eco-system, who meet to discuss innovation policy matters. The National Science Council brings together academics and government officials, who discuss matters of relevance to science policies. Unfortunately, none of the councils meets regularly, and numerous pending issues remain unaddressed.

### 4.2 Legal and other binding normative frameworks

In relation to RRI principles, the following legal or other binding normative frameworks are applicable in Bulgaria: Higher Education Act, Bulgarian Academy of Sciences Act, Scientific Research Promotion Act, Law for Academic Staff Development, Pre-School and School Education Act, Agricultural Academy Act, Law on Equality between Women and Men, and Protection against Discrimination Law.

The Higher Education Act governs the role and functions of Universities in Bulgaria, whereas the Bulgarian Academy of Sciences Act covers the research institutes under the Bulgarian Academy of Sciences – the largest public research organisation. The Agricultural Academy Act covers the research institutes under the Agricultural academy – the second largest public research organisation. All other research institutes in the country are subject to the Scientific Research Promotion Act.

Roles, functions and policies of universities and research institutes are further defined by different regulations and other secondary acts. Overall, the structure of the public universities and research institutes is decentralised, thus allowing the organisations to act autonomously.

Specific regulations govern the work of the two national funding mechanisms for science and innovation, namely NSF (Regulation of the National Science Fund\(^\text{18}\)) and NIF (Rules for Management of the Resources of the National Innovation Fund\(^\text{19}\)).

The Innovation Promotion Act has been prepared in 2011, but has yet to be passed by the Parliament.

The most relevant national strategies concerning the Bulgarian science and innovation system are:

- National Strategy for Development of Scientific Research in Bulgaria 2017-2030, which analyses the existing research and science environment and makes recommendations on how to improve policies;
- National Roadmap for Research Infrastructure (2017-2023), which presents the policy, state of the national research infrastructures and provides a mid-term strategy for integrating Bulgarian research infrastructure with the Pan-European research infrastructure;
- Strategy for Development of Higher Education and Action Plan (2014-2020), which provides analysis of the higher education system and action plan on how to move forward with policy implementation;


• Innovation Strategy for Smart Specialisation (IS3), which analyses the research and innovation potential in Bulgaria and identifies priority areas for enhancement of the competitiveness of the Bulgarian RDI system. The IS3 is based on the concept of building competitiveness through design and creative industries, innovation in the social sector and services, new business models and innovation based on practice.

Figure 1: Governance Mechanism of the National STI System in Bulgaria

Source: Bulgaria’s Innovation Strategy for Smart Specialisation

The work on the Innovation Strategy for Smart Specialisation (IS3)\(^20\) was launched in late 2012. Following a series of consultations with key stakeholders (businesses, academics and researchers, government, local/regional authorities, NGOs and experts) it was finally adopted by the Council of Ministers and the National Parliament in fall 2017. The Strategy is a result of ex-ante conditionality of the European Commission for absorption of EU funds under two Operational Programmes, namely Operational Programme ‘Innovation and Competitiveness’ and Operational Programme ‘Education and Science for Smart Growth’, which have a total budget of EUR 2.5 billion (including national co-financing) for the 2014-2023 framework period.

IS3 envisions Bulgaria to leapfrog its innovation performance by 2020 in order to deal with the sustainable development, public challenges in the demographic space (limit the brain-drain, attract prominent Bulgarians who have made a career abroad, stimulate entrepreneurship among the younger generation), and intellectual capital. The strategic goal is for Bulgaria to move up from the group of modest innovators to the group of

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moderate innovators in the EU. Yet, this will remain a very challenging task without urgent targeted national interventions.

The adoption of the IS3 contributed towards enhancing the efficiency of the utilisation of innovation and science policies and funding mechanisms. The IS3 streamlined the governance mechanism of the innovation and science system through the establishment of the Smart Growth Council (SGC) by Regulation No. 116 from 12 May 2015. SGC is chaired by the Prime Minister and composed of key ministers (Minister of Education and Science, Minister of Agriculture and Food, Minister of Transport and ICT, and the Minister of Economy), three representatives of the business sector and five representatives from the academia. The main function of the SGC is to coordinate policy implementation in the national innovation system (education, science, innovations, ICT) and more particularly the implementation of IS3. The Council is also in charge of coordination of policies for management of NIF and NSF (see Annex 2b for information regarding the governance mechanism).

4.3 Political and cultural values and discussions related to STI

There are no recent surveys that specifically evaluate the attitude of Bulgarians towards RRI. One of the few exceptions is the special RRI Eurobarometer survey conducted in May 2013, which studied the attitude of society on science and technology in EU27 + Croatia. The survey results demonstrate that Bulgarians, similar to all Europeans, are positive about the influence of science and technology on society. However, when asked how informed they felt about developments in science and technology, only 25% of Bulgarians responded that they felt informed, compared to 65% in Denmark, 61% in Sweden, 58% in Luxembourg. The majority of Europeans said that they were interested in the development of science and technology, but in Bulgaria only 35% felt that way. In fact, the majority of Bulgarians (59%) reported they were not interested and not informed. However, it is interesting to note that overall 47% of Europeans said they have studied science or technology at school, university, college or another location, while in Bulgaria this share is higher – 52%.

Figure 2: Where do you get information about science and technology (Bulgaria)?

Most Bulgarians reported receiving information about science and technology from TV (75%), newspapers (24%) and websites (22%). Very few sought information on science and technology from social media and blogs (9%), and books (7%). Forty-five percent of Bulgarians firmly believed that scientists in universities and state laboratories behave responsibly towards society, which was among the highest levels of trust in the EU. Further 37% of Bulgarians perceived the behaviour of scientists as somewhat responsible towards society, whereas 7% thought that socially responsible conduct was not characteristic for scientists. In 2013 survey, 77% of Bulgarians responded that science and technology made their lives easier, more comfortable and healthier, which is among top results in the EU (only after Malta – 78%, and similar to Sweden). Similar to many other EU countries, Bulgarians believed that science created more opportunities for future generations.

http://saveti.government.bg/web/cc_1501/1

Below are survey results that relate to all RRI principles.

**Societal engagement**

Half of the Bulgarian survey participants responded that public dialogue was required in decision-making process on science and technology. Thirty-three percent said that citizens should be consulted and their opinion should be considered, but only 14% expressed opinion that citizens should participate in the policy dialogue on science and innovation and have an active role.

When asked who was best qualified to explain the impact of scientific and technological developments to society, the respondents gave the following answers: scientists working in universities and government laboratories (79%), scientists working in private laboratories (41%), TV journalists (20%), and politicians (only 2%).

**Science Education**

Sixty-five percent of Bulgarian respondents think that the central government should do more to stimulate young people’s interest in science. A prevailing view was that interest in science improves young people’s job prospects (75%), general culture (92%), and their ability to act as well-informed citizens. Bulgaria ranked second after Ireland in terms of people’s opinion that scientific education helps young people’s creative thinking.

**Ethics**

The majority of Bulgarian respondents (81%) agreed that the EU should promote European ethical principles for conducting scientific research. Eighty-three percent said that researchers should receive mandatory training on scientific research ethics (a result similar to other EU countries). The opinion that scientific experts should declare possible conflicts of interest when advising public authorities was also almost universal (80%).

**Gender equality**

Only 45% of Bulgarian respondents said that it is important to respect gender equality in scientific research. This is a very low share compared to 77% in Luxembourg and 73% in Germany (EU average is 58%). Furthermore, Bulgaria had the second smallest (after Romania) share of people who thought it was important that scientific research takes equal account of the needs of men and women.

**Open access**

While the majority of Europeans think that publicly funded research should be made available online and free of charge, Bulgarians are less open to this issue, as shown in Figure 3 below.

**Figure 3: Do you think that the results of publicly funded research should be made available online free of charge?**

![Figure 3](image)

*Source: Special Eurobarometer 401, 2013.*

Given that innovation and research cut across many dimensions, scientists, policy makers and businesses in Bulgaria have engaged in progressive debates over the past decade. These debates have focused on restructuring the R&D system in the country in order to improve the research infrastructure, optimise the research capacity and increase salaries of researchers. In spite of the open dialogue, little has been achieved to improve the national research coordination mechanism, raise the level of trust in society towards the research system, and improve business-science partnerships. As a result of chronic underfunding of the national research
system, opportunities to upgrade the research infrastructure in the country remain limited, and over half of the research facilities (research equipment and apparatus) is obsolete (see Annex 2b).

The debate on increasing public R&D funding has intensified since 2017. A team composed of MES and NSF experts launched work with the World Bank, the OECD and the EC in January 2018 for developing a report, entitled *Socio-Economic Impact of Universities and Research Institutes*. The report studies the national innovation and research system, elaborates on national and international practice, describes the socio-economic profile of all six planning regions of the country and considers the contribution to regional innovation. It recommends: (i) increase of performance-based R&D funding with a regional balance; (ii) development of national research universities, which foster partnership with business; (iii) establishment and capacity building of a National Research and Innovation Agency. The report, expected to be publicly disseminated in the second half of 2018, has also instigated one of the most debated issues in the country related to business-science partnership, which is seen to be affecting national competitiveness.

Overall, the RRI framework is to a large extent unfamiliar to the scientific and innovation community in Bulgaria, although the social impact of scientific research, which relates to the RRI principles, has recently become the subject of debate. The debate on ethics has also intensified over the past decade. Universities and research institutes have institutionalised Ethics Commissions, whereas the Bulgarian Academy of Sciences has adopted the European Code of Conduct for Research Integrity. MES has strengthened the ethics aspects of RRI by introducing changes in the Bulgarian Law for Academic Staff Development in May 2018, which gives power to the Minister of Education and Science to act as a control mechanism for opened or not-completed procedures for acquiring science degree. There have also been many initiatives on open science and open access policies, initiated by the Bulgarian Academy of Sciences, which has established a network of scientific Open Access centres over the past few years. Finally, gender equality is mentioned in the National Strategy for Development of Scientific Research 2017-2030. Any form of discrimination based on gender, ethnicity, and religion (among other grounds) is forbidden.23

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23 This is stipulated in Art.4 of the Law for Protection against Discrimination, as well as by Art. 3 of the Law for Promotion of Employment.
5. Aspects of responsibility in national science policy

5.1 The conceptualisations of responsibility in national science policy

Responsibility in the Bulgarian science policy context can be viewed as a platform for guiding system-level conditions for the emergence, optimisation and development of effective, robust and high-performing R&I ecosystems. It can be thought of as a forward-looking approach (rather than a comprehensive concept) in the formulation of higher education, science and innovation policies, as well as good governance of such policies, in a way that contributes to:

- adopting effective decision-making and legislative processes in STI;
- ensuring better governance of higher education, and research and development activities;
- establishing a constructive dialogue among various stakeholders;
- improving management structures in higher education, S&T and innovation;
- defining new synergies to efficiently combine international, regional and national R&D strategies and strengthen their implementation through cooperation.

The National Strategy for Development of Scientific Research in Bulgaria 2017-2030, which was adopted in mid-2017, has the ambitious goal:

"... to transform Bulgaria into an attractive centre for avant-garde scientific research and development of new technologies, to motivate young talents to stay in the country, to increase responsibility of Bulgarian science towards the society and vice versa, to raise the international authority of the country in the space of science and as a final result to reach economic growth and substantial increase of the quality of life."

Yet, as key interviewees underlined, there is no uniform vision at the highest policy-making level about how to implement these goals. The Bulgarian Government provides general oversight in setting and implementing the science and innovation policy, whereas research institutions and researchers are expected to ensure that their research conduct and practices reflect the principles, responsibilities and expectations outlined and demanded by funding bodies and the society.

The Bulgarian legislation has yet to undergo major changes to integrate the principles of RRI, although some recent developments in this regard can be reported – for instance, the Scientific Research Promotion Act contains a reference to RRI principles, like Art.3, which reads:

"Research activity is based on principles of ethics, transparency, publicity, accessibility and applicability."

A draft Innovation Promotion Act has been initiated by the Ministry of Economy, but the procedure for adopting it has seen little progress since the draft was made publically available for discussion in May 2016. Art.3 mentions some of the RRI related principles:

"During implementation of this Act on all levels, including planning, programing, funding, monitoring and evaluation of measures for helping and promoting innovation, compliance with the following principles is required: predictability, transparency, equality, partnership, accountability, effectiveness."

Given the insufficiently developed legal framework on RRI, in practice responsible science and research conduct are in the hands of public research institutes, especially the Bulgarian Academy of Science (BAS) and its 42 research institutes, the Agricultural Academy with its 26 institutes, and the 35 public universities. A good illustration of this situation is the fact that there is no unified code of conduct for the Bulgarian research system, but various universities, research institutes, and research networks (e.g. Agricultural Academy, Medical University-Pleven, Burgas Free University, Alliance of Scientists, etc.) have their own internal codes of conduct.

During the national workshop discussion, policy and decision-makers viewed responsibility largely as an opening for lending extra legitimacy to institutional policies and overcoming issues of mistrust when it comes to governing research and innovation. Researchers and civil society actors placed emphasis on the need to expand professional responsibilities and engage society more actively as an integral part of research and

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24 Findings from the National Workshop, held in Sofia on 23 February 2017.
in institutional cultures. Three main clusters of interpretation concerning the rationales embedded by the ‘responsibility’ concept surfaced during the workshop discussions, which are labelled **actor responsibilities**, **impact/socio-economic relevance of R&I**, and **industry collaboration/corporate social responsibility** (see Annex 2d).

### 5.2 The notion of ‘RRI’ in national science policy discussions

The term RRI is still unfamiliar for most of the scientific and innovation community in Bulgaria, except for those that interact with European institutions on a regular basis. This is also valid for the staff of MES and NSF. One important aspect that is currently debated is the **social impact of scientific research**. It relates closely to the RRI principles. Performance-based funding for scientific research has been raised as a key pillar of public funding by a recent international report that evaluated the national innovation and research system. The report suggests that scientific research needs to be directed towards creating benefits for the society as opposed to only generating a database of citations and driving impact-factor increase for the purpose of achieving a higher standing in the international rankings. In this line of thought, this principle is one of the core elements of the new Bulgarian Strategy for Development of Scientific Research 2017-2030. For example, there are specific measures, identified in the strategy document, which aim at science education for society, and the application of the open science and open innovation principles. Furthermore, open science is likely to be integrated in the forthcoming call for Establishment of Regional Research Centres under the Operational Programme Innovation and Competitiveness of the Ministry of Economy.

Very often during the workshop and focus group discussions, **RRI was seen as a re-labelling or extension of existing approaches for governing and dealing with both R&I outcomes and processes.** Overall, participants in the national workshop drew on their knowledge of existing mechanisms, methods and principles as an entry-point for considering the social dimensions of science and innovation, recognising the importance of aspects such as public accountability, stakeholder engagement, research ethics, integrity, science education, openness, transparency, dialogue, partnerships, science communication, public outreach and gender equality. In addition, a smaller number of participants were involved in discussions of how RRI relates to broader issues of social and economic development, underscoring its prominent place as a governance issue. The term RRI was easily linked, as per interviewees’ statements, to the IS3.

### 5.3 Ethics in the national science system

**A. Description of the practice and its development and an assessment of how well it currently works**

**Ethics** in the Bulgarian R&I context has been **related to the opportunity to institutionalise ethical standards** via a centralised body tasked with advising the national government on issues of STI policy. The need to **strengthen the research integrity and ethical scientific conduct** in universities and research organisations has been highlighted in the recent public debates, due to a few cases of misconduct at the university level, which received considerable media attention in the fall of 2017.

The Scientific Research Promotion Act (Art.3) requires ethical principles like honesty, reliability, respect and accountability to be at the core of the ethical system of the national science policy. A desirable ethical practice is thus expected to frame issues in a fair or non-biased way as part of the public communication of science, and to ensure full transparency and accountability of research activities and research outcomes.

Another relevant legislative document is the Bulgarian Higher Education Act (promulgated in 1995, Art.55, par.3), which reads:

> “Members of the academic staff in higher education institutions have the right to freely conduct, according to their interest, scientific research and to publish the results from their work.”

The Higher Education Act puts forth certain boundaries to this research freedom through Art.56, par.1, item 2 which says that the academic staff should “observe scientific and professional ethics.”

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Sofia University “St. Kliment Ohridski,” the top performer in terms of international university ranking for Bulgaria, has an Ethics Commission, which is a regular consultative authority, set up by the Ethics Code of the University\(^27\) (see Annex 2e for more information). The Bulgarian Academy of Sciences (BAS) has adopted the European Code of Conduct for Research Integrity as a member of the European Federation of Academies of Sciences and Humanities.\(^28\) There are only two institutions in Bulgaria, which have received the HR Excellence in Research Award by EURAXESS\(^29\) – the Institute for Population and Human Studies and Varna Free University.

B. Main barriers (structural, cultural or related to interchange dynamics)

Certain structural barriers hinder promotion of ethics in the national science system. For instance, an interviewee from MES mentioned that in 2016 there was a possibility to set up an Ethics Commission at the Ministry to observe the European Code of Conduct in the European Research Area. Yet, this idea met with high resistance from policy makers. The main argument against it was that ethics is an autonomous matter of universities and research institutes and the executive power cannot interfere with their decisions and policies.

C. Main drivers (structural, cultural or related to interchange dynamics)

The main drivers of change are the legal instruments and the strong support of university rectors and directors of research institutes in developing organisational research ethics policy. The Bulgarian Law for Academic Staff Development, (promulgated in 2010, Art. 30) covers procedural infringements, conflict of interest, plagiarism, unreliability of scientific results. Especially important is the most recent amendment of the law from 4 May 2018, namely Art. 30a, which stipulates that the Minister of Education and Science shall set up an Academic Ethics Commission that will examine signals involving potential infringement of procedures for awarding academic degrees, recruitment procedures, cases of plagiarism and academic dishonesty, and conflict of interests (see Annex 2f for detailed information). Since this is a new legal amendment, the implementation still cannot be evaluated.

D. Good practices (or bad practices)

National and EU calls have now established a good practice for providing requirements for the applicants to adopt Ethics Codes. However, the Bulgarian practice shows that researchers often only tick the box when asked about adopted ethics code, although in some cases their institutions (research institutes, universities) do not yet have the necessary internal normative acts.

5.4 Societal engagement strategies in research

A. Description of the practice and its development and an assessment of how well it currently works

During the national workshop, participants framed societal engagement mainly in terms of procedural objectives, concerning future and existing governance/institutional design, such as an expressed willingness for the intensification of practices for public/stakeholder dialogue and consultation on matters of science and innovation policy; opening up alternative spaces for the effective co-construction of specific instruments and measures that would ensure successful policy implementation; bolstering efforts for promoting genuinely collaborative processes of agenda/priority-setting for R&I, and so on. In this context, the topic of ‘engagement’ surfaced as being associated more with achieving social acceptability through an increased legitimacy of R&I policy decisions, and less with strengthening research and innovation outputs or processes per se. The interviewees provided specific cases in which they discussed how the society is entrusted with the opportunity to understand better science. They all confirmed that societal engagement is very much needed in order to secure public trust in science.

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\(^{27}\) In fact, it was in March 2005 when the European Commission adopted Recommendations related to the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers. Both documents require more transparent and just behaviour towards hiring of researchers. Universities and research institutes in Bulgaria followed these recommendations.

\(^{28}\) In spring 2017, the European Code was welcomed by the European Commission. http://ec.europa.eu/research/index.cfm?&na=na-240317-1&pg=newsalert&year=2017

\(^{29}\) The HR Excellence in Research Logo is awarded by the European Commission to universities, research and funding organisations abiding by the principles provided for in the European Charter for Researchers and the Code of Conduct of Recruitment of Researchers.
B. Main barriers (structural, cultural or related to interchange dynamics)

Societal engagement in building strategies in the science field is still a rarity in Bulgarian practice, and agenda setting with the larger involvement of society is not yet a priority. Even the very idea of consulting society at large during the process of design of research policy meets considerable opposition in some policy-making and scientific circles. The widespread opinion is that society is not knowledgeable enough on issues related to science and research to participate in a meaningful dialogue.

C. Main drivers (structural, cultural or related to interchange dynamics)

The process of elaborating the IS3 was a breakthrough in terms of stakeholder engagement in research policy design as opinions of all key stakeholders (government, academics, businesses, local/regional authorities, NGOs, experts, as well as the civil society) were taken into account. Building upon this positive experience, a variety of stakeholders were involved in deep and broad consultations during the preparation of the National Strategy for Development of Scientific Research 2017-2030, as well as in the new approach of the Executive Agency for OP Education and Science for Smart Growth in setting up a programme for establishment of Regional Research Centres.

D. Good practices (or bad practices)

Teams at the Ministry of Economy and MES organised a series of round table discussions and working meetings in Sofia and in all six economic planning regions of the country between 2015 and 2017 to discuss the analytical findings and policy areas within the framework of the IS3. Lead researchers were in the front line of elaborating the Bulgarian Strategy for Development of Scientific Research 2017-2030, which was consulted broadly with key stakeholders in January-April 2017 and finally adopted in June 2017. Furthermore, the new procedure under OP Education and Science for Smart Specialisation for “Establishment of Regional Research Centres” has proven effective in using the stakeholder engagement approach.

5.5 Gender equality and diversity strategies in the science system

A. Description of the practice and its development and an assessment of how well it currently works

Gender equality is mentioned in the National Strategy for Development of Scientific Research 2017-2030. The Strategy acknowledges a good distribution of scientists, in terms of gender, age and subjects, among the strengths of the scientific research system in Bulgaria, but seems content with the existing situation, as no measures are foreseen for further promotion and safeguarding of gender equality and equal opportunities. Instead, retention of the existing non-discrimination policy and balanced distribution of the scientific potential according to age and gender are listed as objectives. Hence, no substantial impact regarding gender equality has been registered so far (the strategy was adopted in June 2017).

Any form of discrimination based on gender, among other grounds, is forbidden, as stipulated in Art.4 of the Law for Protection against Discrimination (promulgated in 2005), as well as by Art.3 of the Law for Promotion of Employment. Law on Equal Opportunities for Women and Men defines the national policy on gender equality as based on the principles of equal opportunities in all spheres of public, economic and political life, and balanced representation of both genders on all levels.

B. Main barriers (structural, cultural or related to interchange dynamics)

Gender equality in research and innovation was initially dismissed as a non-issue for the Bulgarian context, and explained by the statistical prevalence of female researchers in the public research sector.30 This was also the dominant opinion on the national workshop, the first focus group meeting at MES, and in individual interviews. Nonetheless, some participants highlighted the issue of under-representation of women in top positions in both research and innovation. Several interviewees referred to the need to overcome structural factors inducing women to drop out of science by providing more career support to female scientists during periods of pregnancy, maternity leave, etc. Discussions also entailed considerations about the need to support the inclusion of young scientists in R&D and provide the ‘right’ institutional incentives for reversing the currently

30 Out of 12,732 scientists working in Bulgarian public research sector and Higher education sector, 53% are women and 47% are men. See National Strategy for Development of Scientific Research in the Republic of Bulgaria 2017 – 2030, p.17.
unfavourable age structure in the Bulgarian research environment, thus expanding the issue of gender equality towards a broader objective of social justice and diversity.

C. Main drivers (structural, cultural or related to interchange dynamics)
The main driver for preserving gender equality is the strong legal regulation, which prohibits gender (or any other form of) discrimination – as stipulated by the Anti-Discrimination Law and the Law on Equal Opportunities for Women and Men.

D. Good practices (or bad practices)
Many research institutes in BAS and some universities (Burgas Free University, Varna Free University, etc.) in Bulgaria are headed by women.

5.6 Open access and open science strategies in the national science system

A. Description of the practice and its development and an assessment of how well it currently works
The policy framework on open access and open science within the Bulgarian science system calls for lifting of barriers for researchers to provide full account of their research work as broadly as possible to the wider community. A draft concept on open access and open science was circulated in 2013, and published in 2014 on the website of the Ministry of Education and Science (see Annex 2g for details). It justifies the need for open access and open science policy; presents the EU and the global best practice and gives an overview of the measures undertaken in Bulgaria (e.g. green corridor, golden corridor).

Bulgaria has recently joined the European Research Area Committee’s Standing Working Group (SWG) on Open Science and Innovation. BAS has established a network of scientific Open Access centres, and universities in Bulgaria are becoming part of the Open Access/Open Science initiative of BAS. There are 35 Bulgarian Open Access journals from 10 publishers listed in the Directory of Open Access Journals.

The Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences (IMI-BAS) became the coordinator of the Bulgarian network and it provides support for academic institutions and researchers. As a result, many initiatives have been undertaken since then (see Annex 2g for details).

The focus group, held at MES in March 2018, discussed at length the open access and open science strategies of the national science system and how important this policy is. More recently, the Minister of Education and Science has appointed his advisor on Science to head a Working Group on Open Science/Open Access. The aim is to improve Bulgarian ranking of open access in the global world and turn it into one of the open access leaders.

B. Main barriers (structural, cultural or related to interchange dynamics)
No substantial barriers have been identified.

C. Main drivers (structural, cultural or related to interchange dynamics)
BAS and MES are the key drivers of the open access/open science policy. Specific measures have been undertaken in the past five years which strive to place Bulgaria among the top performers on open access/open science policies in Europe.

D. Good practices (or bad practices)
In January 2018, the RISE expert group was invited to Bulgaria to discuss open science and open innovation policies at the European level. The RISE group of experts presented their report Europe’s future: Open Innovation, Open Science, Open to the World, while the Bulgarian hosts put forward the main economic and policy perspectives of their country.31

There is an annual National Information Day, called “Open access to scientific information,” which is organised by the Institute of Mathematics and Informatics. It invites representatives of national institutions responsible for the development of open access policies (Ministry of Education and Science, Ministry of Transport, Information Technologies and Communication, Ministry of Culture), and representatives of Bulgarian research institutes and universities that are active in the implementation of open access policy and programmes. The

31 https://ec.europa.eu/research/openvision/index.cfm?pg=home
national information days cover activities such as: Open Science, Evaluation in an Open Science context, Copyright retention, Acknowledge, improve and value the existing European Open Science infrastructure, Open Innovation, Cross-cutting issues.

5.7 Science education as integrated in research

A. Description of the practice and its development and an assessment of how well it currently works

Science education has been promoted occasionally by public institutions like MES and Sofia Tech Park, but **Bulgaria needs to do more to promote science education** in schools. Development of decentralised science education centres across the country would provide opportunity for community-science education programmes to take place. Universities and research institutes in general recognise the importance of science education promotion in the society, but concrete **implementation is hindered by different barriers**, like insufficient financial resources and the fact that **science education is still not considered a priority** in the policy-making process.

B. Main barriers (structural, cultural or related to interchange dynamics)

Universities and research institutes find it difficult to organise science education activities due to lack of financial resources. In interviews, it was often mentioned that the Bulgarian society pays little attention to scientific results and the science in general. Media attention towards science is also very limited. For that reason, it is even more important to focus resources in promoting scientific research to the general audience.

C. Main drivers (structural, cultural or related to interchange dynamics)

MES has been the main driver of the science education policy. It has established several initiatives which help promote science education in the society. One of the best examples is Sofia Tech Park JSC (the first tech park in Bulgaria, established as a public company under the Ministry of Economy), which has become a central authority for science education initiatives in the country.

D. Good practices (or bad practices)

MES has a number of initiatives that relate to science education. There are projects like “Researcher’s Night,” “Beautiful Science,” “Laboratory for Glory” and “Festival of Science.” In addition, there is an annual competition for school children called “Young Talents.” The annual awards Pythagoras also promote scientific results. One of the award categories is called “Young scientists.” MES cooperates well with the media to promote scientific achievements. Sofia Tech Park JSC also has programmes to support science education. They regularly invite children and students to visit their laboratory complex and the start-up incubator. The Tech Park supported the development of Science Museum for children, which was launched in June 2018. Few years earlier, the first science museum for children opened doors in Sofia – Muzeiko. It welcomes hundreds of children every month to help promote science among them.

5.8 Incorporation of AIRR dimensions into science policy discussions

5.8.1. Diversity and inclusion

A. Description of the practice and its development and an assessment of how well it currently works

Inclusion and diversity are concepts that are **still not fully recognised in Bulgaria as critical** for the successful implementation of innovation and research processes.

32 [https://www.britishcouncil.bg/programmes/education/researchers-night](https://www.britishcouncil.bg/programmes/education/researchers-night)
33 [https://eu2018bg.bg/bg/events/2119](https://eu2018bg.bg/bg/events/2119)
35 [http://sofiatech.bg](http://sofiatech.bg)
36 For three consecutive years, VUZF University students visited Sofia Tech Park to get acknowledged with the work of the laboratory complex and the start-ups in the business incubator. See info: [http://www.vuzf.bg/?Template=VUZFActualNewsView&RecordId=903&LanguageId=2](http://www.vuzf.bg/?Template=VUZFActualNewsView&RecordId=903&LanguageId=2)
The National Strategy for Development of Scientific Research in Bulgaria 2017-2030 puts forth the goal of increasing the number of researchers to typical EU levels and achieving a balanced distribution by age, gender, scientific fields and regions. A focus is clearly placed on gender balance and measures for attracting/incentivising young scientists, while other diversity aspects, such as programmes and actions for increasing the participation of underrepresented groups (ethnic and religious minorities, people with disabilities, immigrants) are overlooked.

In terms of inclusion of different societal actors, the Strategy stimulates dialogue among academic circles, society and business for maintaining high quality of research, applicability of results (in terms of fuelling economic growth), development of new directions, and improving quality of life. This is to be achieved through integration of the components of the knowledge triangle (education-science-business) as a basis for development of the knowledge-based economy and attaining sustainable, intelligent growth.

Another relevant document is the Scientific Research Promotion Act. Its provisions create conditions for effective collaboration between science and industry via instruments for joint and integrated action. The document also stipulates financial support for research activities encouraging the opening-up of the labour market and the setting-up of structures that bridge the cooperation of universities, scientific organisations, and business.

The Innovation Strategy for Smart Specialisation also tries to open up the innovation policy development process to diverse voices and combine the power of ideas and knowledge from different actors to co-create new products and find solutions to societal needs.

B. Main barriers (structural, cultural or related to interchange dynamics)

Low social status of scientists and lack of incentives for a career in science/academia are powerful barriers for motivating people, especially the young graduates, to join the ranks of scientists and researchers in Bulgaria. The successful cooperation within the knowledge triangle (education-science-business) is hindered by the fact that the three 'elements' often speak different languages and pursue own priorities and interests.

C. Main drivers (structural, cultural or related to interchange dynamics)

The legislative documents mentioned above provide incentives for promoting diversity and inclusion.

D. Good practices (or bad practices)

No specific good practices were identified.

5.8.2. Anticipation and reflexivity

A. Description of the practice and its development and an assessment of how well it currently works

Policy-makers interpret reflexivity and anticipation as tools for increasing the quantity and improving the quality of research related to issues of societal importance. Reflexive policy-making is seen as a way to ensure intensification of links between science and education, businesses, governments, and society as a whole, and achieve a balance in science-industry collaboration.

Reflexivity and anticipation can also help identify the important social challenges, thus leading to the development and implementation of appropriate research programmes of national and social importance. Being anticipatory of advances and emerging key research areas can help the relevant bodies (MES and NSF) to regularly update their priorities for funding and support.

B. Main barriers (structural, cultural or related to interchange dynamics)

The key barrier is the short-term horizon of political mandates in Bulgaria. Over the past two decades, the duration of term in the office of Ministers of Education and Science has been on average less than two years. Therefore, there is usually no time to think strategically and to maintain a mid-long term policy as the politicians seek quick solutions. Moreover, accountability of mandates and policies does not have a high standard in Bulgaria.
C. Main drivers (structural, cultural or related to interchange dynamics)

The main driver should be the Ministry of Education and Science but frequent changes at the head of the Ministry are a significant drawback. Therefore, the science community remains the main driver for reforms.

D. Good practices (or bad practices)

The annual report on the work of the Ministry of Education and Science is a way to reflect upon what has been achieved in line with strategic goals. However, the last annual report produced by the Ministry of Education and Science was published in fall 2016. No annual report, which should publicly avail information about the key achievements and missed opportunities in the national science policy was published in 2017.

5.8.3 Openness and transparency

A. Description of the practice and its development and an assessment of how well it currently works

**Openness and transparency** are associated with **declaring potential conflicts of interest, publicity of research findings and accountability to society**. The National Strategy for Development of Scientific Research 2017-2030 is based on the key principle of restoring confidence in the research system through openness and transparency in all actions and procedures in accordance with common European standards and best practices.

Public debates related to openness and transparency are organised in working groups, which develop strategies and proposals that underpin changes in the legislation and policies as per strategic priorities of the country’s national research system. The participation of business associations is very much welcomed. Think tank and NGO experts also take part in the discussions of these expert groups. Unfortunately, these issues typically fail to capture the attention of the media and wider society.

B. Main barriers (structural, cultural or related to interchange dynamics)

The National Strategy for Development of Scientific Research 2017-2030 underlines an important problem of significant distrust among the scientific community and the public regarding the way funding for research and innovation is distributed. Selection procedures for proposal evaluators and the quality of evaluations, along with the insufficient administrative personnel are also important problems, which hinder the goals of openness and transparency.

C. Main drivers (structural, cultural or related to interchange dynamics)

The NGO sector is the main driver for promotion of **transparency and openness**. Very often reports prepared by think tanks have helped government authorities to recognise the importance for the policy-making process to be more open and transparent. Policy recommendations, set up by notable think tanks in Bulgaria (e.g. ARC Fund, Center for the Study of Democracy, Economic Policy Institute, Institute for Market Economics and others) have been regularly discussed in conferences and seminars with participation of key stakeholders. Digitalisation and new technologies have forced management of universities, research institutes and government structures to be more accountable to the public but also between themselves.

D. Good practices (or bad practices)

The Bulgarian research system is only occasionally evaluated by impartial external reviewers. The Bulgarian Academy of Sciences undertook a major evaluation of its research structure in 2009, which resulted in a reform to consolidate research institutes through optimisation and merging. In 2014, the research infrastructure from the National Roadmap of Research Infrastructure was evaluated by international peer reviewers. These examples can help Bulgaria improve in terms of institutionalisation of mechanisms to disclose information on a regular basis, as well as appoint independent bodies to conduct major evaluation as a common practice towards achieving more openness and transparency.

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5.8.4 Responsiveness and adaptation

A. Description of the practice and its development and an assessment of how well it currently works

Responsive governance has a major impact on the development of the national STI system. The coordination of the STI policy has been identified by analytical reports, produced by the World Bank (2012-2013) and more recently by European Commission’s PSF studies (2015-16 and 2017-18) as a major pillar of the system. Yet, the main coordination body of the system – Council for Smart Growth – is very inefficient, failing to meet on a regular basis. Adaptation is conceived by the Ministry of Education and Science as the way to introduce international good practices but taking into account the national context.

B. Main barriers (structural, cultural or related to interchange dynamics)

The Bulgarian mentality can be seen as a barrier, as it is not conducive to responsive governance and proper adaptation mechanisms for STI policy.

C. Main drivers (structural, cultural or related to interchange dynamics)

The Government and the key sectoral ministries – Ministry of Education and Science and Ministry of Economy – need to stand as key drivers for responsiveness and adaptation.

D. Good practices (or bad practices)

The Bulgarian Law for Academic Staff Development was amended to introduce a new Ethics Commission, set up by the Minister of Education and Science. This was an example of responsive and adaptive action of MES, which reacted to a high profile case of academic dishonesty and took necessary measures in order to intervene appropriately in possible future cases.

5.9 The integrated or fragmented nature of different responsibility related aspects

The terms ‘open access’, ‘open science’, ‘ethics’, ‘public engagement’, ‘responsibility’ often go together in the national discourse (documents and public talks). In contrast, one rarely sees together anticipation, reflexivity, and inclusiveness. The RRI terminology gained prominence among government officials in recent years, especially among those that participate in the European discourse and take part in European projects, funded by Horizon 2020, COST, COSME, etc. This is not yet reflected in legal or policy frameworks, which still do not integrate in full the notions under the RRI framework. Societal engagement, ethics, science education, open access and open science are integrated in MES, including NSF, although are not yet formalised in written documents.
6. Organisational reviews and outlooks: Research conducting organisation

6.1 Mapping of the organisation

Established in 1991, the Applied Research and Communications Fund (ARC Fund) is a European innovation policy and research institute. It is committed to maintaining an independent and non-partisan position while developing knowledge in support of policy, industry and society. In line with its status as a public-benefit organisation, ARC Fund follows strict legal provisions, which stipulate full transparency and accountability of its activities that subject it to a number of financial and activity reporting rules.

The mission of ARC Fund is to drive the development of a knowledge-based economy and society through targeted promotion of innovation, knowledge transfer, cross-border networking and capacity-building. In pursuit of this mission, ARC Fund’s activities aim to (1) create a favourable environment for the development of the European innovation system, as well as to (2) contribute to and stimulate the free exchange of ideas, information, scientific knowledge and RTD results.

The means ARC Fund employs to realise its strategic goals are not limited to core functions of applied policy research and analysis, such as the design of innovative solutions to development problems or the elaboration of new policy concepts and innovative policy-making tools. The organisation is also involved in education, training, and various forms of liaison with governmental and non-governmental agencies. Accordingly, organisational output is diverse and ranges from publications – books, reports, policy briefs and newsletters – to organising conferences and seminars, but also includes more intangible services such as expert commentary, targeted community education, contribution to public debate, assisting in civil society capacity building and aiding network development.

ARC Fund is registered as a research organisation in the Bulgarian Current Research Information System (BulCRIS) of the Ministry of Education and Science. BulCRIS maintains detailed information about scientific organisations, higher education institutions and scientific researchers.

Mandate, governance and organisational structure

According to its Statute, ARC Fund is managed by a Board of Trustees which decides upon the general research and operations strategy of the organisation. The Board is supported by an Executive Director, who is responsible for ensuring and coordinating the implementation of its decisions, as well as fundraising for specific projects and overall activities. ARC Fund undergoes an obligatory external audit procedure on an annual basis to assess its compliance with financial and operational goals.

ARC Consulting, established in 2006, is a commercial subsidiary of ARC Fund. It helps ARC Fund to better achieve its mission, mainly in the domain of innovation, ICT, and business support, by delivering high-quality consulting services to its partners and customers. ARC Fund and ARC Consulting together make up the ARC Fund Group, which in 2017 employed a total staff of 26, including part-time experts and consultants.

Currently, ARC Fund specialises in three main thematic areas: (i) science, technology and innovation policy research, (ii) safer Internet, and (iii) innovation and business support.

The Science, Technology and Innovation Policy Programme (STIPP) is the programme most aware and committed to the principles of RRI. All strategic activities are undertaken in support of strengthening the link between research, society, and policy, and aimed at mobilising different actors and societal stakeholders in the exchange of knowledge, experience and ideas so as to derive sustainable solutions to societal challenges. The programme is a pioneer in the use of technology foresight and technology assessment in the development of public policies in Bulgaria and across the region. More recently, in seeking alignment with the principles of responsible research, the programme has been placing citizen engagement at the heart of its work as one way to deliver value for society from its activities.

39 https://cris.nacid.bg/
Since 2005, ARC Fund has served as the coordinator of the Bulgarian *Safer Internet Centre (SIC)*\(^40\), which aims to enhance the digital literacy of children and adults through various training, engagement and other initiatives. SIC maintains an online hotline for reports of illegal and harmful content on the web, develops and disseminates materials on the issue of the protection of minors online, and conducts training for teachers and children in the field of safe Internet use. In this activity, SIC cooperates closely with the relevant state institutions such as the Ministry of the Interior and the Ministry of Education and Science, IT companies and a number of NGOs for joint activities in raising awareness about threats to children on the Internet and possible ways to prevent them. The work of SIC is monitored and facilitated by the Public Council on Safer Internet Use (Fig. 5 below), which includes representatives from the key national, private and non-governmental institutions and organisations, which are working towards building a safer and more positive Internet environment for children and adolescents.

The *Innovation and Business Support Programme’s (IBSP)* principal aim is to stimulate a culture of innovation and entrepreneurship at the national level. IBSP has been acting as the national coordinator of Enterprise Europe Network (EEN) node in Bulgaria\(^41\) since 2008, as well as its predecessor, the Innovation Relay Centre – Bulgaria (1997-2007). Programme experts assist SMEs to establish themselves on the global market. The programme also advises businesses, research and industry organisations on Horizon 2020 applications, focusing on the SME Instrument.\(^42\) The work of IBSP is supported by an Expert Council on Innovation, made up of representatives of academia, universities, business incubators and innovative companies (Fig. 6 below). The Council’s role is to give opinions and recommendations to the relevant institutions in Bulgaria on issues related to innovation and research, to participate with its experts in conducting technological audits of companies, and to support the technological development of enterprises. The Expert Council on Innovation contributes to enhancing the quality of services offered by EEN Bulgaria.

\(^{40}\) [https://www.safenet.bg/en/]
\(^{41}\) [http://www.een.bg/bg/]
\(^{42}\) [https://ec.europa.eu/easme/en/sme-instrument]
Figure 5: Public Council on Safer Internet Use

Chairperson:
Representative of the Parliamentary Committee for Children, Youth and Sports

Deputy Chairperson:
Chairperson of the State Agency for Child Protection

Deputy Chairperson:
Executive Director of the Society for Electronic Communications

Members of the Public Council are representatives of following institutions and organisations:
- Ministry of Education and Science
- Ministry of Interior
- Ministry of Culture
- Ministry of Transport, Information Technology and Communications
- Sofia Municipality
- Internet Society - Bulgaria
- Bulgarian Association of Information Technologies (BAIT)
- Cisco Systems
- Law and Internet Foundation
- Association Parents
- Kabina
- Partners Bulgaria Foundation
- Bulgarian Federation for Electronic Sport
- Gender Education, Research and Technologies
- Vivacom
- Mtel
- Telenor Bulgaria
- Microsoft Bulgaria
- Center for the Study of Democracy
- National Network for Children
- Digital National Coalition
- Digital Kids Foundation
- UNICEF Bulgaria
- Balkema EOOD

Figure 6: Expert Council on Innovation

Chairman;
Professor Marin Petrov, Applied Research and Communications Fund

Members of the Expert Council on Innovation:
- Professor Bibra Boeva, Department of International Economics and Politics, University of National and World Economy
- Professor Benislav Vanev, Deputy Chairman, Automatics and Informatics Union
- Professor Ivan Georgiev, Department of Business, University of National and World Economy
- Professor Teodora Georgieva, Senior Research Fellow, Applied Research and Communications Fund
- Professor Evgeni Eugeniev, VUZF University
- Professor Tsvetan Manchev, Adviser to the Executive Director, International Monetary Fund
- Petar Petrov, Manager, Point-L Ltd
- Professor Georgi Popov, Department of Machine Technology, Technical University of Sofia
- Professor Kostadin Kostadinov, Institute for the Study of Society and Knowledge, Bulgarian Academy of Sciences
- Dr. Ventsislav Slavkov, Cluster Board Chairman, Mechatronics and Automation Cluster
- Professor Milanka Slavova, Deputy Dean on Research, Department of International Economics and Politics, University of National and World Economy
- Hristo Tzakov, Laboratory of Telematics, Bulgarian Academy of Sciences
- Mario Hristov, Secretary General, Union of Inventors in Bulgaria
- Ognian Trajanov, President, Technologica Ltd.
6.2 Aspects of responsibility in organisational policy and practice

Responsibility in terms of a broader socially responsible behaviour, transparency and accountability to societal actors and stakeholders is the underpinning philosophy driving ARC Fund’s organisational strategy. This becomes not only apparent in the organisation’s mission statement, but is also inherent in the organisation’s values and principles that are called upon to inform internal policy, processes and conduct. In the case of the former, such norms are explicitly aligned with those promoted by the Treaty of Lisbon, which have been democratically legitimised and which defend sustainable development, the enhancement of quality of life and a “highly competitive social market economy, aiming at full employment and social progress.” That said, the RRI concept, as such, is not formally defined in official written documents, however its thematic keys and some of its attributable dimensions are incorporated into stated organisational visions, practices and goals.

The relevant documents of ARC Fund that can be attributed to RRI are the organisation’s founding documents, namely (i) Statute and (ii) Rules and Order for Performing Publicly Beneficial Activities (which encompass as well the guiding principles of all organisational activities in the public benefit), as well as its (iii) Child Protection Policy.

In the organisation’s founding documents, the notion of responsibility is aligned with norms and principles of good governance, financial accountability, openness, and moral and ethical integrity. Explicit reference is made to ‘fundamental’ values that underscore the organisation’s public-benefit orientation, while also drawing on ‘good practice’ codes of governance and standards of responsibility applicable specifically to the third sector. Evident in this regard are principles that render legitimacy to ARC Fund’s complex operational approach, such as:

- commitment to public accountability (incl. commitment to internal and external evaluation of work and activities);
- culture of openness and collaboration;
- fair, equitable and transparent stakeholder engagement (incl. engagement with the values and interests of partners, donors, institutions, and society at large);
- adherence to high professional and ethical behaviour standards (incl. responsive employee practices, atmosphere of non-discrimination, and formal recognition of gender and diversity principles at the workplace);
- compliance with requirements for prudent and efficient management of resources;
- full operational and financial autonomy.

ARC Fund’s Child Protection Policy delineates the organisation’s commitment to high professional integrity, openness and transparency in decision-making processes and activities. The document addresses issues of child safety, wellbeing, and empowerment as essential elements of responsible and ethical design and implementation of all projects and programmes, which directly or indirectly focus on children. The Policy defines standards of behaviour that are binding not only for employees, but also for contractors, partners, and volunteers.

6.2.1 The conceptualisations of responsibility in the organisation

Based on the analysis of the organisational interviews, we can distinguish outcome-related responsibility and process-related responsibility of ARC Fund’s (research) activities.

Outcome-related responsibility

Ideas around responsibility were stemming from a perceived need to align the goals and directions of research endeavours with broader societal needs or public preferences. In this regard, two lines of reflection that relate to the envisaged outcomes of research were particularly noticeable. The first invoked a sense of responsiveness.

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43 http://www.arcfund.net/index.php?id=391
44 Article 2 of the Treaty of Lisbon (2007).
45 ARC Fund’s Child Protection Policy was developed first for the needs of the ‘Safer Internet Centre’ Programme and then endorsed by the organisation’s Board of Trustees. The document lists the ethical values and principles the employees must uphold in and outside the office, and describes in detail all procedures and obligations that need to be met when working with children and minors. The Policy is binding not only for organisation’s staff, but also for partners in concerned projects.
to some of the most pressing issues on the social and economic agenda as an important precondition for ensuring valuable contribution to society and addressing societal challenges:

‘[…] Seeking applicability in terms of delivering broader social value, to do with solving important issues that people can relate to, is what I tend to think of when trying to justify a responsible approach to research.’

As discussed by participants, this entails not only responsibility in terms of foregrounding socially-relevant research questions in the pursuit of a ‘virtuous’ agenda by different actors, researchers or institutions, but also attentiveness to individual and collective R&I practices and, to some extent at least, responsibility for the impacts of R&I on wider groups in society.

‘We are all members of society regardless of our professional roles. So we always need to think about the impact of [our] scientific and innovation work on ordinary people.’

This perspective thus relates to an expanded notion of responsibility that accentuates on the need to develop ‘systemic’ capacities to act and promote responsible R&I governance.

Another perspective coupled responsibility in research with imperatives for public and stakeholder engagement as a basis to ensure an ethical and socially robust management of science. Inherent in such remarks was a preoccupation with the need to carve out a more decisive role for the public to shape research visions and goals and thus strengthen the applicability and usefulness of research results. Within this perspective, responsibility also seemed to be tied to demands for an enhanced collaborative process whereby actors meet and engage in a form of mutual learning whose role is not limited to ‘sanctioning’ research frameworks, but also becomes an integrative part of the knowledge production process itself.

‘[…] My personal understanding is that the most important aspect of responsibility in science and innovation is ethical responsibility. When conducting scientific research or piloting certain innovation, the primary concern should be society [at large] – there should be no negative effects on society. And in order to avoid such effects, in the very beginning a close cooperation should be established – scientists conducting the scientific research, for example in the area of nanotechnologies or neurobiology, should communicate not only with the stakeholders, but with ordinary citizens as well, because ordinary people are the best experts when it comes to their daily lives.’

What seemed to unite these accounts as a single discourse was an underlying commitment to improved reflexivity on the part of R&I actors, seen as the principal interlocutors that can broker the relationship between science and society. Implicit in such discussions was therefore an assumed responsibility for the implications of research, its usefulness, as well as openness to external actors’ inputs. The following statement of one interviewee is largely illustrative of this perspective:

‘Instituting science as an integral part of society is what the notion of ‘responsibility’ [in science or research] constitutes in my opinion. Actors in the field of science should actively seek to be part of societal advancement, informed by societal needs, expectations and ethical concerns when deciding on research focus and designing their research methodologies. On the other hand, they also should seek to promote wider public’s interest in scientific issues as this is how science and society can be brought closer together in solving societal challenges.’

**Process-related responsibility**

Closely related visions of social responsibility in research evoked framings of ‘good’ scientific practice – construed as avoiding misconduct, truthful and honest reporting, as well as normative/ethical compliance.

‘[…] Just from common sense I assume responsibility is staying as close as possible to the objective results and findings of research, not playing with the data, and observing ethical principles.’

In such articulations, sustaining a professional moral culture that can enforce the highest standards of integrity among researchers was perceived to have the potential to act as a necessary backbone of responsible behaviour.

Embedded in the discussion of enhancing the ethical disposition of contemporary research was a strong commitment to the use of rigorous scientific methods and techniques, which in turn would lead to an improved
public trust in the capability of research to contribute positively to society. This, as one participant put it, takes on additional significance in the context of using research results in evidence-based policy:

‘[...] So we often discuss a responsible approach to science and fact-making in general terms [...], principally from the perspective of how you tend to use data and how you treat secondary sources that inform your policy research work.’

6.2.2 Ethics in the organisation

A. Description of the practice and its development and an assessment of how well it currently works

A number of recurrent themes emerged, giving shape to ‘ethics’ in organisational practice, mainly in terms of the application of fundamental ethical principles and legislation to social scientific research, which targets and involves children, citizens and other societal, institutional and industry stakeholders. Ethics was also framed in terms of broader ethical preoccupations with the motivations, processes and outcomes of performed research and outreach activities.

Different layers of interpretation and operationalisation of ‘ethics’ emerged across data from interviews and focus group discussions, which can be synthesised as follows:

- **Engaging with societal issues from a value neutral perspective.** A critical point put forth by participants had to do with the very nature of policy research conducted at ARC Fund which is about intellectual honesty, non-partisanship and value neutrality. Working in the public interest was expressed as the key starting point when talking about ‘ethics’. This was also said to go to the heart of scientific integrity as practiced within the organisation, which is also implicitly present in the mission, vision, principles, and guidelines for research activities at ARC Fund.

- **Trust-building in relations with external stakeholders, clients, and partners.** Given that a great deal of ARC Fund’s research involves cooperation and coordination with different people or groups in different institutions or positions, much of what research ethics implied to participants had to do with promoting the values that are essential to collaborative work – such as trust, accountability, mutual respect, and fairness among diverse actors.

- **Ethics as legality, transparency and fairness** in research and organisational practice, meaning a firm focus on compliance with the relevant national and European legal frameworks. Particular attention was paid to privacy and data protection issues in research. The function of ethics in research management was seen as a genuine tool for fostering self-reflection and sensitivity towards social needs and values that inform research practice.

- **Competitive-based funding of ARC Fund’s research work.** As ARC Fund’s main source of financing is participation in projects funded by various European programmes, the organisation’s successful performance in this competitive environment is conditioned not only by a high quality of research performance, but also by meticulous observance of ethical norms.

- **A final layer of understanding regarding the role of ‘ethics’ is about the wider preoccupations with the norms and orientations of socially-embedded research.**

B. Main barriers (structural, cultural or related to interchange dynamics)

- No formalised organisational structures / managerial responsibilities for incentivising ethical reflection, beyond normative procedures.

- Lack of mechanisms that could help strengthen ethical reflection and coordination among the different programmes.

- In future collaborative research activities and projects, other partners might follow different policies on research ethics.

- Challenge for uniform and effective implementation of Ethical Code on the level of entire organisation due to internal differences – different thematic focus, modus operandi and target audiences of the three programmes.

- Need for mobilising additional human resources for the implementation of research ethics in practice.
C. Main drivers (structural, cultural or related to interchange dynamics)

- Core elements of ARC Fund’s mandate related to ethics: public accountability, trust building, collaboration, value neutrality, transparency and integrity.
- Established reputation of ARC Fund, enhanced visibility and attractiveness as a (research) partner in future (research) projects, and increased opportunities for research collaboration provided by the EU framework programmes on research.
- Shared perception of ethics as a pillar of research excellence and research quality; internalised moral / professional responsibilities toward dealing with socially sensitive topics among management and research staff, especially paramount when working with children.
- ARC Fund’s sustainable innovative behaviour since its establishment: a pioneering endeavour to elaborate internal RRI Policy for a non-governmental organisation (engaged in research in social sciences and humanities), which is likely to motivate other NGOs and research organisations to develop their own organisational RRI policy.
- The EU RRI Policy Framework: EC-facilitated reflection on RRI (tied with research funding) and exchange of information and knowledge with partners in EU-funded projects.
- Research ethics – requirements of EU funding programmes, EU and national legislation.
- Public/interest groups’ pressure to remain loyal to social agenda.
- Additional incentive for continuous upholding of the highest ethical standards is the generally unfavourable media and public disposition towards the NGO sector in Bulgaria – including towards research performing organisations. This prompts organisation’s personnel to refrain from any practices that might tarnish ARC Fund’s reputation, as even minor ethically questionable actions would be caught in the spotlight of media scrutiny.

D. Good practices (or bad practices)

ARC Fund’s Child Protection Policy, developed first for the needs of the ‘Safer Internet Centre’ Programme and then endorsed by the organisation’s Board of Trustees, is the best example of a formal document outlining the ethical requirements for the work implemented in and by the organisation. The document lists the ethical values and principles the employees must uphold in and outside the office, and describes in detail all procedures and obligations that need to be met when working with children and minors. The Policy is binding not only for organisation’s staff, but also for partners in concerned projects.

The Child Protection Policy document provides a good starting point for developing a more comprehensive internal document on ethical principles for working with citizens, diverse societal groups and various stakeholders.

E. Current indicators (if any)

- Definitions and requirements concerning ethics in organisation’s core documents.
- Research projects raising ethical issues.
- Interactions and deliberations on ethical issues within the organisation and with external stakeholders.

F. All points of improvement

ARC Fund’s efforts will be focused on the elaboration of a unified organisational policy on ethics in research and research integrity, which will build upon careful consideration of the underlying social dimensions of conducted research (and especially targeting it toward socially desirable ends), and expand other important moral and social values visible through ARC Fund’s work, such as long-term sustainability, environmental and economic responsibility, and human rights. The policy on research ethics will be worked out in a participatory manner, involving all members of staff. The organisational policy on ethics will be endorsed by the Board of Trustees of ARC Fund. The implementation of the policy on ethics will build upon concrete measures (and related indicators), among which for instance competence-building on ‘research ethics’ for ARC Fund’s staff members, establishing a Research Ethics Board, which will involve some of senior management of ARC Fund, as well as external researchers and stakeholders. Performance on research ethics will be reported on yearly basis in ARC Fund’s Annual Reports.
G. Agreed points of improvement, with action plans and indicators for success

<table>
<thead>
<tr>
<th>Points of improvement</th>
<th>Action plan</th>
<th>Indicators for success (qualitative)</th>
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<tbody>
<tr>
<td>Development of organisational policy on ethics in research and research integrity, incl. Code of Conduct</td>
<td>Mar 2019</td>
<td>Institutionalising research ethics</td>
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<tr>
<td>New responsibilities for ARC Fund’s Programme Director and Programme Managers (of the three thematic programmes)</td>
<td>Mar 2019</td>
<td>Implementation of the organisational policy on research ethics</td>
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<tr>
<td>Establishment of a Research Ethics Board</td>
<td>May 2019</td>
<td>Improved management focus on ethics</td>
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<tr>
<td>Training on research ethics for all members of staff (research and administration)</td>
<td>Jun 2019</td>
<td>Improved understanding of research ethics as a method, process and perspective among staff members</td>
</tr>
<tr>
<td>Annual reporting on research ethics performance as part of ARC Fund’s annual reports (in Bulgarian and English)</td>
<td>As of Dec 2019 onwards</td>
<td>Transparency and accountability</td>
</tr>
</tbody>
</table>

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: ETHICS</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of the organisation</td>
<td>ARC Fund’s founding documents and Child Protection Policy. Sustainable innovative behaviour since its establishment. Ethics as legality, transparency and fairness – firm compliance with the legal frameworks.</td>
<td>Engaging with societal issues from a value neutral perspective. Avoidance of conflict, dishonesty or fraud; commitment to organisational development.</td>
<td>Relations with external stakeholders, clients, and partners in Europe and beyond: trust-building, exchange of information and knowledge, policy learning, input from key stakeholders (public councils, civil society organisations, industry boards, etc.).</td>
</tr>
<tr>
<td>Potential drivers for ethics</td>
<td>Core elements of ARC Fund’s mandate related to ethics. Organisational policy for high responsibility when working with children / minors. Established reputation of ARC Fund, enhanced visibility and attractiveness as a (research) partner.</td>
<td>Shared perception of ethics as a pillar of excellence and research quality. Internalised moral / professional responsibilities toward dealing with socially sensitive topics.</td>
<td>RRI Policy framework. EU-funding programmes and the related research ethics requirements. External knowledge and capacity building. Exchange of information and knowledge with partners, and increased opportunities for research collaboration. Permanent media and social scrutiny of NGO sector.</td>
</tr>
<tr>
<td>Potential barriers to ethics</td>
<td>No formalised organisational structures for incentivising ethical reflection. Challenge for uniform and effective implementation of Ethical Code on the level of entire organisation due to internal differences among the programmes. Need for mobilising additional human resources for the implementation of research ethics in practice.</td>
<td>n.a.</td>
<td>Different views and interpretations of ethical standards among partners in collaborative projects.</td>
</tr>
<tr>
<td>Actions on ethics</td>
<td>Development of organisational policy on ethics in research and research integrity. Establishment of a Research Ethics Board. New responsibilities for ARC Fund’s Programme Director and for the Programme Managers. Annual reporting on research ethics performance.</td>
<td>Training of all members of staff on research ethics. ‘Ethics’ dialogues with relevant industry and societal stakeholders</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Indicators for success of the actions on ethics</td>
<td>Comprehensive organisational policy on research ethics, approved by the Board of Trustees. Research Ethics Board established. Improved management focus on ethics. Evaluation of ethics compliance and reporting on a yearly basis in ARC Fund’s annual report, in Chapter 2 Management</td>
<td>Staff members made aware of the organisational policy on ethics. Improved awareness of ethics as a method, process and perspective among staff (perception indicators) outside project boundaries. Increase in number of interactions and engagement with external to the organisation stakeholders on ethics and ethical issues in STI</td>
<td></td>
</tr>
</tbody>
</table>
| Indicators for improved performance on ethics | Indicators:  
- Research projects raising ethical issues - % of all research projects, on annual basis  
- Research projects referred to the Ethical Board  
- Percentage of external members in the Research Ethics Board  
Perception indicators:  
- Whether ethical/unethical behaviour is rewarded/punished  
- Whether staff knows where to turn for ethical advice  
- Whether staff is aware of recommendations made by a Research Ethics Board in ARC Fund  
- Whether staff is well acquainted with organisational policy on ethics |

6.2.3 Societal engagement strategies in organisation

A. Description of the practice and its development and an assessment of how well it currently works

Researchers and management staff often portrayed societal engagement as a core function of a non-governmental organisation like ARC Fund and as a duty they ought to fulfil. Some participants in the focus group framed their interpretation of this RRI key as ‘public service’ which, whether incentivised by donors or not, reflected a conscious orientation and strategy across the organisation. This, in their words, fitted with the public mission of ARC Fund, which highlights the importance of positive outcomes for society and the national economy, rather than benefits for the organisation as such. In many respects, the organisation can be regarded as a pioneer of public engagement on national level. Respondents recalled the success of current and past engagement strategies with a shared sense of pride, as they discussed various inputs to STI policy development they brought about.

The societal engagement practices are discussed below from the perspective of each thematic programme.

- ‘Science, Technology and Innovation Policy’ Programme (STIPP)

STIPP representatives talked about their commitment to public engagement both as a key ingredient of science policy, and as a method for soliciting broader societal opinion upon which research practice and the science community can draw. For instance, participants recalled various initiatives to apply public engagement to the identification and elaboration of research priorities, often relying on collaborative efforts between citizens and experts, among other societal stakeholders. Results were often presented to EC’s DG RTD or informed concrete policy actions on national and regional levels. Others talked about the implementation of foresight and
participatory technology assessment activities as an entirely new policymaking tool in S&T policy, which ARC Fund introduced in Bulgaria through EU-funded projects after 2001.

More recent discussions within the STIP Programme focus on the very means and process of effective public engagement, alongside some of its outputs (and in particular its impact on EU and national-level governance), as a way for demonstrating public engagement’s wider legitimacy in society but also among researchers and policymakers:

‘Societal engagement is still rather underestimated, and is actually perceived as a responsibility of society itself — that it is up to the citizens to demand to participate. In my opinion, this is a faulty logic, and it is up to the researchers to tend to societal needs. We are in fact pioneers in Bulgaria in pushing for that kind of logic and we demonstrate the potential of public engagement methods in providing input for further analysis and integration into policy.’

The deep embeddedness of public engagement in STIPP’s work, also as an area of key research interest in and of itself, and as a component informing a great deal of ongoing project-based activities, has allowed for ideas about its more effective application to emerge.

‘We have been strengthening our internal capacity in regards to the elaboration and application of public engagement as part of research paradigms for more than 10 years. But we also explored engagement as a theme in much of our own work — analysing existing methods, or discovering further opportunities for producing credible results out of citizen engagement forms.’

Such long-term preoccupation with prescribing, elaborating and delivering public engagement practice in national and European contexts has naturally allowed for new lines of argument and analysis to be developed. Internal reflection and analytical scrutiny within the STIP Programme have been contributing to a mode of refined and more deliberate understanding regarding the idea of public engagement, which goes beyond narrow interpretations about its procedural nature in policy or science communication.

- ‘Safer Internet Centre’ Programme (SIC)

Interviewees and focus group participants seemed to assign somewhat different goals to societal engagement and outreach activities performed by SIC. It was pointed out that public benefits here are mainly twofold. On the one hand, societal engagement was equated with effective communication and dissemination of information or research findings not only among relevant target groups (children, parents, teaching professionals), but also among society at large through diverse channels. An explicit rationale for engaging with such outreach work on the part of SIC has been to sensitise different publics about pressing societal problems (e.g. sexual abuse of children, gender-based violence, etc.) and needs, and in so doing provoke interest and active participation in ongoing debates. This is achieved mainly through informal engagement activities and events such as family hackathons, festivals and discussions, focusing on closing the divide between publics, policy and specialised information. These examples of engagement/outreach practices have aimed to improve scientific and policy culture and served to encourage wider participation of publics in informed debate.

On the other hand, noted were strategies of reflexive, ends-based societal engagement focused on working closely with and involving different stakeholder groups in the co-design of SIC’s various initiatives and activities. Such strategies of stakeholder engagement were aimed at identifying broader societal needs and priorities, and in turn at formulating ‘demand-driven’ responses or campaigns on relevant to the programme topics, just as much as they were about extracting different opinions or eliciting feedback on existing guidelines, projects or methodologies. As argued, this made up an essential part of SIC’s engagement approach which often seeks the active involvement of different publics in the process of deliberating possible programme ‘content’, as a form of voluntary ‘built-in’, in a quest to further socially relevant outcomes.

- Innovation and Business Support Programme (IBSP)

Lastly, to IBSP discussants public engagement seemed to operate on two, albeit closely related, levels. On one side, engagement was perceived in terms of delivering services to the business community, which took the form of working with SMEs, business clusters and industry associations; consulting with them on company-relevant development, business strategies and other details on the path to enhanced business performance; organising information days, contests and other informal events; as well as seeking feedback directly related to
those events. On the other hand, it meant engagement in terms of a broader expert-stakeholder dialogue and consultations which underpins annual assessments of the innovation performance of national economy and of the current conditions and development opportunities of the Bulgarian innovation system.

B. Main barriers (structural, cultural or related to interchange dynamics)

All barriers mentioned by respondents were external to the organisation.

- Finding and recruiting suitable people for engagement activities on a given topic.
- Insufficient level of interest among the wider society in science and research, resulting in low responsiveness to opportunities to engage in debates on research and innovation.
- Corresponding opinion among scientists, researchers and innovators that societal engagement is unnecessary, as society is disinterested and unable to understand the language of science. The resistance towards societal engagement is especially pronounced among elder / senior generation of scientists, who prevail in the Bulgarian science and research sector.

C. Main drivers (structural, cultural or related to interchange dynamics)

- ARC Fund’s mission and focus is on the public benefit. Public engagement (engagement with stakeholders and engagement with lay people) is key for ARC Fund’s activities. ARC Fund is a pioneer in working with lay people on R&I policy-related issues in Bulgaria.
- Strong capacity and experience on societal engagement in all three thematic programmes.
- Two councils of external experts support the work of ARC Fund: Expert Council on Innovation and Public Council on Safer Internet Use.
- Strong emphasis on societal engagement at European level, raising the profile of societal engagement in S&T among policymakers and other stakeholders.

D. Good practices (or bad practices)

- Science, Technology and Innovation Policy Programme – since 2007 STIPP has been building the in-house capacity for engaging citizens as an effective tool for elaborating research priorities and informing policy-making.

**GOOD-PRACTICE: CITIZENS-BASED FUTURE-ORIENTED RESEARCH AGENDA SETTING**

ARC Fund was a partner in the H2020 project CIMULACT (“Citizen and Multi-Actor Consultation on Horizon 2020”). The project aimed at improving the engagement of citizens in the process of formulating the research agenda in Europe by providing inputs to the Work Programmes of Horizon 2020 for the period 2018-2020 and contributing to the preparatory work on Framework Programme 9. CIMULACT partners mobilised more than 1000 citizens in 30 European countries, who developed 179 visions of desirable and sustainable futures for the EU as a means to derive an R&I agenda by which the EU governing bodies can better align research and innovation policy and funding to the aspirations of the citizens.

“The R&I agenda proposed by the CIMULACT project contrasts significantly with expert-based foresight reports, particularly in the promotion of inclusive social experimentation to find scalable solutions to the perceived challenges”

Source: CIMULACT Policy Brief Issue 4, May 2018

The novelty of CIMULACT’s process – a multi-phase, inclusive future visioning and agenda-setting – and the impact of its results were recognised in the General Introduction of H2020 work programme for 2018-2020, in the interim evaluation of H2020, as well as by OECD in its report “Open Research Agenda Setting” published in December 201746.

Web-site: www.cimulact.eu

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46 https://www.oecd-ilibrary.org/science-and-technology/open-research-agenda-setting_74edb6a8-en
Safer Internet Centre uses a variety of innovative and highly interactive engagement methods that effectively capture the attention and input from diverse segments of society, including children, teenagers, parents, and educational professionals (Field Clinic for Mobile Devices, Familathlon, Cyberscouts, Youth Panels, and others).

GOOD PRACTICE: CYBERSCOUT TRAINING PROGRAMME

The Cyberscout Training Programme uses peer-to-peer training methods for raising awareness about the most common online risks and the ways for combating them among 9-15-year-old Bulgarian children. The mission of the Cyberscout Training Programme is to create a community of children and young people across Bulgaria, who demonstrate self-developing, responsible, and safe online behaviour and popularise it among their peer groups. The certified Cyberscout is a trained student, who is an example for responsible and safe online behaviour for their peer group, gives advice to their peers regarding online-related problems, and organises and conducts public events on online safety targeted at their peers. The national Cyberscouts’ network already includes more than 500 children in 32 Bulgarian cities and towns. The programme was ranked 9th in Europe by the European Crime Prevention Network (EUCPN).

Web-site: https://www.safenet.bg/

Innovation and Business Support Programme has developed efficient methods for engaging SMEs, business clusters and industrial associations in broad stakeholder consultations. One of the most successful initiatives of the programme is the annual National Contest “Innovative Enterprise of the Year.” In the 13 editions between 2004 and 2017, over 100 companies have been awarded for their innovative work. The initiative was recognised by the European Commission as a good national practice to support innovation development.

GOOD PRACTICE: NATIONAL CONTEST “INNOVATIVE ENTERPRISE OF THE YEAR”

Since 2004, the awards in the ‘Innovative Enterprise of the Year’ national contest have been given annually to Bulgarian enterprises and start-ups which have successfully have developed and introduced innovations to national and global markets. The contest aims to demonstrate successful Bulgarian business models based on innovation and new technologies and to attract public attention to the achievements of Bulgarian enterprises in the area. The innovation performance of companies is evaluated by a 17-member independent jury (in which public authorities, funding organisations, businesses and academia are represented) on the grounds of data provided by the companies and in-depth technology audits of the applicants.

Applicants in 2018 will be evaluated against a special methodology by an expert panel and a jury in the following categories:

- Market leadership
- Quality of life
- Green Innovation
- Innovation Management
- Social Innovation
- Innovation for talents’ development / in support of talents
- Innovative start-up enterprise (up to three years from establishment)
- Innovation in creative industries

Web-site: http://www.arcfund.net/

E. Current indicators (if any)

- Number of societal engagement events organised by all three programmes.
- Number of engaged people per year.
- Target groups involved in ARC Fund’s engagement activities.
- Policy messages and research priorities developed through SE events.

F. All points of improvement

As an application-oriented research organisation (whose mission statement points to its wider societal responsibility), ARC Fund is already explicitly focused on engagement with different stakeholders and society
(lay citizens) as a way to gauge broader needs and make research results more socially effective. In line with the diverse meanings attributed to the process and outcomes of societal engagement, the organisation commits itself to forging an active dialogue with various interested parties, citizens, businesses and actors of the science (policy) system in the country and beyond. Given ARC Fund’s long-standing experience and diverse professional culture of participation, the organisation will consider strengthening the capacity of its staff members to engage with stakeholders and the general public, and elaborating an internal how-to methodological guide on societal engagement.

G. Agreed points of improvement, with action plans and indicators for success

<table>
<thead>
<tr>
<th>Points of improvement</th>
<th>Action plan</th>
<th>Indicators for success (qualitative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New responsibilities for ARC Fund’s Programme Director and Programme Managers (of the three thematic programmes)</td>
<td>Mar 2019</td>
<td>Coherent organisational approach to societal engagement</td>
</tr>
<tr>
<td>Development of internal how-to guide on societal engagement (stakeholders and lay people)</td>
<td>Jun 2019</td>
<td>Coherent organisational approach to societal engagement</td>
</tr>
<tr>
<td>Training of research staff on societal engagement methods</td>
<td>Jul 2019</td>
<td>Capacity building of staff members</td>
</tr>
<tr>
<td>Organising cross-programme info days to allow for sharing of experience and mutual learning</td>
<td>Sept – Oct 2019</td>
<td>Capacity building of staff members</td>
</tr>
<tr>
<td>Annual reporting on societal engagement activities as part of ARC Fund’s Annual Reports on activities (in Bulgarian and English)</td>
<td>As of Dec 2019 onwards</td>
<td>Transparency and accountability</td>
</tr>
</tbody>
</table>

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: SOCIETAL ENGAGEMENT</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
</table>

**Aspects of the organisation**
- Collaboration and public/stakeholder engagement as core elements of organisational policy.
- Societal engagement as a conscious orientation and strategy across the organisation.
- Pioneer of public engagement on national level.
- Senior management focus on furthering in-house capacity and sensitivity toward societal engagement as a method and research tool.
- Society-science-policy interface: R&I projects responding better to the needs and concerns of society.

**Potential drivers for societal engagement**
- ARC Fund’s mission and focus on public benefit.
- Two councils of external experts and stakeholders supporting the work of ARC Fund.
- Public engagement is key for ARC Fund’s mission and activities.
- Relevant experience in all three programmes.
- RRI Policy framework.

**Potential barriers to societal engagement**
- No internal organisational barriers identified.
- Lack of interest among general public for science and research.
- Inability/reluctance of scientists to communicate with the lay people.
- Finding and recruiting the right people.
### Actions on Societal Engagement

| Actions on Societal Engagement | Assigning new roles and responsibilities to managerial staff. Improved management focus on societal engagement activities and their benefits. Reporting on SE activities on an annual basis. | Strengthening the in-house capacity – training on societal engagement and knowledge sharing. Sharing of experience and mutual learning. | Active dialogue with various interested parties. |

### Indicators for Success of the Actions on Societal Engagement

| Indicators for Success of the Actions on Societal Engagement | New responsibilities assigned to programme managers. Section on societal engagement activities in ARC Fund’s Annual Report. | Improved in-house capacity in societal engagement as a method and a process. | SE activities as part of research methodologies in future projects and activities. Policy messages and research priorities derived from societal engagement. |

### Indicators for Improved Performance on Societal Engagement

| Indicators: | | | |
|---|---|---|
| • Research projects with SE activities - % of all projects, on an annual basis | | |
| • Increase of SE activities based on comparison of reported activities over 2 consecutive years | | |
| • Meetings of the two councils supporting the work of ARC Fund – No of meetings on an annual basis | | |
| • Number of trainings | | |
| • Number of info-days | | |
| • Number of staff involved in engagement trainings and info-days | | |
| • Number and type of stakeholders / citizens involved in SE events | | |
| Perception Indicators: | | | |
| • Whether staff knows where to turn for advice on SE activities | | |

### 6.2.4 Gender equality and diversity strategies in the organisation

#### A. Description of the practice and its development and an assessment of how well it currently works

ARC Fund’s *Rules and Order for Performing Publicly Beneficial Activities* make explicit reference to the principle of non-discrimination toward staff and externally engaged actors. Art. 2 defines that in all its activities, ARC Fund must ‘encourage to the fullest extent the inclusion of men, women and young people in the development, realisation and evaluation of all its research activities and projects.’ In the spirit of promoting tolerance and welcoming diversity, the document continues, ‘[t]he Foundation acknowledges the dignity and right to self-determination of all individuals in terms of their religion, culture, and values.’ This policy of fairness is applied by the organisation in all personnel-related decisions, including but not limited to, recruitment, hiring, training, professional development and advancement.

The interviews and focus group revealed two dominant perceptions of ‘gender equality’ in the organisation. In the first view, gender equality is interpreted through the lens of the composition of research teams and the representation of women in senior management. Active and purposeful advancement of gender balance in all activities within the organisation was stressed, although some interviewees pondered whether ARC Fund’s gender parity came about as a result of intentional actions or represents a natural reflexion of the labour market, particularly in the field of science and research, where women outnumber men.

“Particularly, on mid- and project management level things are very balanced, which is good. I don’t think this was done deliberately and that’s why I think it’s good because it was natural, because simply women that have the necessary skills and knowledge took up these positions and started doing things.”

The second prominent position was very critical of the RRI gender key as such. Interviewees explained that in their opinion, gender was only one among several equally important diversity dimensions, and that the key should be expanded, integrating gender sensitisation into wider non-discriminatory working practices and relationships. As pointed out, ARC Fund in a way goes an extra mile, exceeding the gender balance by promoting diversity in its practice in two main ways: (1) efforts to recruit research professionals (fellows, interns)
culturally and ethnically diverse backgrounds and (2) targeted outreach and selection of diverse participants in various activities involving external stakeholders (conferences, seminars, trainings, consultations, etc.).

B. Main barriers (structural, cultural or related to interchange dynamics)
   - No one in the organisation has specific functions or responsibilities for handling gender-related issues.
   - Some employees question the validity of ‘gender equality’ as a top-down and narrow category and say that gender dimension should be included into a wider concept of non-discrimination.

C. Main drivers (structural, cultural or related to interchange dynamics)
   - Formal recruitment/selection policy regarding research professionals (fellows, interns) with culturally and ethnically diverse backgrounds.
   - Shared interest/commitment to inclusiveness and ‘gender equality’ as per the composition of research teams or the representation of women in senior management.
   - Formal considerations, and/or corresponding incentive provisions regarding the selection and make-up of target groups in different research activities.
   - EC-mediated integration/consideration of gender issues in mainstream research activities (mainly via H2020 gender quality provisions).

D. Good practices (or bad practices)
ARC Fund’s *Rules and Order for Performing Publicly Beneficial Activities* are very clear on the issue of non-discrimination and provision of equal opportunities for both genders. This is mirrored in organisation’s practice – gender parity in research teams and on different management levels, and (as far as possible) composition of target groups that are in the focus of various ARC Fund’s activities. When hiring new employees, existing gender composition of the given thematic programme, or gender-related specifics of a particular project are always considered as one of the selection criteria.

E. Current indicators (if any)
   - Non-discrimination references in the core organisation documents.
   - Gender composition of staff, including research teams and senior management.

F. All points of improvement
In the area of gender equality and diversity, it was recurrently discussed that the organisation takes on a relatively active role (at least in terms of career participation) and that no major points of improvement could be conceived beyond the current practice. Nevertheless, ARC Fund will consider some long-term goals related to aspects of both equality and diversity, mainly in terms of updating its organisational policy on gender and diversity.

G. Agreed points of improvement, with action plans and indicators for success

<table>
<thead>
<tr>
<th>Points of improvement: Gender equality and diversity</th>
<th>Action plan</th>
<th>Indicators for success (qualitative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New responsibilities for ARC Fund’s Executive Director</td>
<td>May 2019</td>
<td>Coherent organisational approach to gender equality and diversity</td>
</tr>
<tr>
<td>Updating ARC Fund’s policy on non-discrimination, gender equality and diversity</td>
<td>Jul 2019</td>
<td>Coherent organisational approach to gender equality and diversity in line with RRI policy framework</td>
</tr>
<tr>
<td>Training of research staff on gender equality and diversity issues in research</td>
<td>Sept 2019</td>
<td>Strengthening research capacity of staff members</td>
</tr>
<tr>
<td>Annual reporting on gender equality and diversity activities in ARC Fund’s Annual Reports on activities</td>
<td>As of Dec 2019 onwards</td>
<td>Transparency and accountability</td>
</tr>
</tbody>
</table>
## H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: GENDER EQUALITY AND DIVERSITY (GED)</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of the organisation</td>
<td>Organisational policy addressing principles of non-discrimination and equal treatment as core elements. Gender equality in recruitment, training and professional development practices.</td>
<td>Senior management focus on sensitising gender and non-discrimination in HR development.</td>
<td>Inherited favourable local labour market conditions that see a general balance of male and female researchers.</td>
</tr>
<tr>
<td>Potential drivers for GED</td>
<td>Formal recruitment policy welcoming diversity. Equality and diversity considerations for selection and make-up of target groups in different activities.</td>
<td>Commitment to inclusiveness and ‘gender equality’ in research teams and in senior management.</td>
<td>EC-mediated integration/ consideration of gender issues in mainstream research activities (via H2020 gender quality provisions).</td>
</tr>
<tr>
<td>Potential barriers to GED</td>
<td>No specific organisational functions dealing with gender-related issues.</td>
<td>Scepticism regarding the validity of ‘gender equality’ as a top-down and narrow category.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Actions on GED</td>
<td>Updating ARC Fund’s policy on non-discrimination. Including reporting on gender equality and diversity activities in Annual Reports.</td>
<td>Training of research staff on gender equality and diversity issues in research.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Indicators for success of the actions on GED</td>
<td>Updated organisational policy on non-discrimination with new responsibilities for ARC Fund’s Executive Director. Annual reporting on gender issues.</td>
<td>Improved awareness among staff on gender issues in general and gender issues in research.</td>
<td>Increase in number of interactions and collaboration with stakeholders on gender and diversity issues in STI.</td>
</tr>
</tbody>
</table>
| Indicators for improved performance GED     | Indicators:  
  * Number of internal trainings on gender and diversity issues  
  * Number of staff involved in the trainings  
  * Number of research projects with focus on gender and diversity issues  
 Perception indicators:  
  * Whether staff knows where to turn for advice on gender issues |  |

### 6.2.5 Open access and open science strategies in the organisation

#### A. Description of the practice and its development and an assessment of how well it currently works

To the majority of participants, open access to publications and research results (alongside public engagement) seemed to be a defining element of an organisation working in the public benefit, such as ARC Fund. For many ‘open access’ offered a counter-trajectory to science commercialisation and the protection/monopolisation of knowledge. Others acknowledged the fact that ‘open access’ represents a ‘natural extension’ of debates surrounding publicly-funded research and the translation of actionable findings into ‘impact’ on challenges that face the world today. Shared were also arguments about some of the inherent moral dimensions of open access, whereby access to knowledge or information was identified as a fundamental feature of social equality.

Consensus during interviews and discussions emerged around the fact that open access had the potential to truly become a pillar of democratic and socially inclusive science policy and thus contribute to bridging the science-society gap. When transposed to the level of the organisation, many saw in those arguments also benefits for bolstering the credibility, accountability and public legitimacy of ARC Fund as an important actor already heavily involved in publishing research, brokering information, and disseminating different insights. In this sense, there was the idea that providing increased access to not simply research outputs, but also to
research data, might help foster a culture of greater scientific literacy, education or engagement with particular topics and so have a more direct impact on public policy.

B. Main barriers (structural, cultural or related to interchange dynamics)
   - Limited organisational resources.
   - Strongly held views on autonomy and copyright among country’s more traditional research players.

C. Main drivers (structural, cultural or related to interchange dynamics)
   - Institutional archive of published versions of project deliverables and research publications, incl. underlying or other curated/unpublished research data (for internal use).
   - Organisational website, incl. web-sites of the Enterprise Europe Network in Bulgaria (http://enterprise-europe-network.bg/en) and the Safer Internet Centre (https://www.safenet.bg/en/).
   - Projects’ web-sites (as they require a constant input of information and reports in order to remain interesting and relevant).
   - Embeddedness of ‘sharing’ into research practice and organisational culture.
   - Research integrity as relating to reliable, reproducible and trustworthy research findings.
   - Contractual obligations and provisions for open access under H2020 and other funding programmes.

D. Good practices (or bad practices)

At ARC Fund, open access is implicitly present in the mission, principles and guidelines but not explicitly treated as a ‘round’ organisational policy concept. In this context, participants primarily talked about other, less formalised, project-carved pathways for its institutionalisation in working practice.

The following quote is illustrative of the way in which open access was said to be implemented throughout the organisation:

‘While we lack strict formal rules, we uphold certain principles upon which our organisation was founded. For example, open and free access to all the knowledge we produce. We publish everything and make it publicly available, usually in Bulgarian and English. Apart from top management, all project coordinators must also subscribe to these ideas, since virtually all our work is project-based.’

Participants frequently referred to the supporting conditions under Horizon 2020 and other EU funding programmes as the main driver of activities in that area. Project-related activities have considerably helped the organisation routinise a number of interdependent operational paths for promoting wider public access to its research publications such as: the use of the organisational webpages, self-archiving in digital repositories, and distribution/communication of findings, insights and recommendations through partner networks and mailing lists, as well as broader media outreach.

Regarding ‘open science’, it was discussed how outside of purely project-driven efforts that served to encourage broader stakeholder dialogue and consultations for the formulation of research needs or priorities (at least concerning some organisational activities), seeking synergies with ‘grassroots’ initiatives has more recently created the space for embodying the principles of open research collaboration.

E. Current indicators (if any)
   - Number of websites providing open access to information and reports on diverse themes.
   - Number of open repositories used.
   - Networks where research findings are shared.

F. All points of improvement

Driven by the conviction that open access is fundamental for transparency, openness and accessibility, ARC Fund will work towards a clear organisational policy on OA. Such approach is expected to advance strategic organisational goals by enabling third parties to access, mine, reuse and disseminate any research findings generated at the level of the institution, while increasing their overall utility and citeability. Open access policy shall ideally be designed to help researchers comply with funding bodies’ evolving requirements on open access to research papers and on research data management. Interactions with the broader research community on issues and initiatives for OA could also help build the necessary momentum for a sector change in culture relating to open access, on which ARC Fund could take the lead on a national level.
G. Agreed points of improvement, with action plans and indicators for success

<table>
<thead>
<tr>
<th>Points of improvement:</th>
<th>Action plan</th>
<th>Indicators for success (qualitative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New responsibilities for ARC Fund’s Programme Managers and the Programme Director</td>
<td>May 2019</td>
<td>Coherent organisational approach to open access</td>
</tr>
<tr>
<td>Elaborating ARC Fund’s policy on open access</td>
<td>Aug 2019</td>
<td>Coherent organisational approach to open access</td>
</tr>
<tr>
<td>New website of the organisation with considerably enhanced options to provide open access to research results and data</td>
<td>Sept 2019</td>
<td>Website launched and regularly updated</td>
</tr>
<tr>
<td>Training of research staff on open access issues</td>
<td>Sept - Oct 2019</td>
<td>Capacity building of staff members</td>
</tr>
<tr>
<td>Annual reporting on open access in ARC Fund’s Annual Reports on activities (in English and in Bulgarian)</td>
<td>As of Dec 2019 onwards</td>
<td>Transparency and accountability</td>
</tr>
</tbody>
</table>

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: OPEN ACCESS</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of the organisation</td>
<td>Implicit consideration of open sharing of knowledge and information in organisational mission, principles and guidelines.</td>
<td>Access to research results regarded as pillar of ‘public benefit’.</td>
<td>Relations with external stakeholders, clients, and partners in Europe and beyond: exchange of information and knowledge.</td>
</tr>
<tr>
<td>Potential drivers for OPEN ACCESS</td>
<td>Institutional archive of project deliverables and research publications. Organisational website and project web-sites.</td>
<td>Organisational culture of ‘sharing’ of research results. Reliable, reproducible and trustworthy research findings.</td>
<td>Contractual obligations and provisions under H2020 and other funding programmes for open access.</td>
</tr>
<tr>
<td>Potential barriers to OPEN ACCESS</td>
<td>No separate organisational functions dealing with open access. Limited resources.</td>
<td>n.a.</td>
<td>Strongly held views on autonomy and copyright among country’s more traditional research players.</td>
</tr>
<tr>
<td>Actions on OPEN ACCESS</td>
<td>Develop organisational policy on Open Access. Capacity building among research staff.</td>
<td>n.a.</td>
<td>Interactions with broader research community about OA / helping to instigate a sector cultural shift on a national level.</td>
</tr>
<tr>
<td>Indicators for the success of the actions on OPEN ACCESS</td>
<td>OA policy in place. New responsibilities of Programme Managers. In-house capacity on OA.</td>
<td>Awareness among staff on available resources, guidelines and requirements on open access.</td>
<td>Increased recognition and use of ARC Fund outputs/leadership on OA by external actors and stakeholders.</td>
</tr>
</tbody>
</table>

**Indicators for improved performance on OPEN ACCESS**

**Indicators:**
- Number of internal trainings on open access
- Number of staff involved in the trainings
- Number of publications with OA on an annual basis
- Number of OA repositories used

**Perception indicators:**
- Whether staff knows where to turn for advice on open access
6.2.6 Science education as integrated in research

A. Description of the practice and its development and an assessment of how well it currently works

During the interviews and the focus group discussions it was often stressed that ARC Fund does not represent a traditional research or educational organisation, and on this basis (and as well taking into account its mission), science education should be considered in broader terms and not confined to ‘professional research competence’ only, which is further justified by the different thematic focus and the different target groups of ARC Fund’s three programmes. **Science education** was thus discussed from two perspectives: the *internal* perspective, which was said to remain focused on **building the research competence of the staff** (for instance, bringing young people to research through dedicated internship activities), and the *external* perspective of activities focused on **awareness-raising, information provision and capacity building, addressing different stakeholder and target groups**.

The external perspective encompasses activities such as:

- Improving formal education through the integration of specific modules on digital and media literacy into university curricula;
- Targeted training courses for schoolchildren / teachers / professionals working with children, among other stakeholders, aimed at empowering target groups / society at large to understand different issues and participate in public debates addressing them;
- Tailored business courses and capacity-building trainings (on evaluation of research programmes, management of research infrastructures, conceptualising and writing up research proposals, IPR issues, and innovation management, to mention a few);
- Ad-hoc project activities on building science literacy and popularising research results among interested publics.

B. Main barriers (structural, cultural or related to interchange dynamics)

- Limited organisational resources for upscaling of educational practices for different target groups.
- Traditionally, science education has featured less prominently in the national context.
- Limited interest in research internship programmes.

C. Main drivers (structural, cultural or related to interchange dynamics)

- Interest in science education activities across the organisation.
- EU-level project activities.
- In-house capacity in organising and delivering trainings for diverse target groups: children, teachers, PhD students, companies, experts.

D. Good practices (or bad practices)

**Practice 1: Education in the Age of Digital Technologies**

A good example of how an NGO can support the formal science education is the collaboration between ARC Fund and the Faculty of Pre-school and Primary Education of the Sofia University “St. Kliment Ohridski.” As a result of this cooperation, a postgraduate course “Education in the Age of Digital Technologies” was developed and added to the Faculty’s curriculum. Under the guidance of the Faculty lecturers and ARC Fund experts, university students taking the course developed a methodology for primary school students that focuses on building digital and media literacy of school children. The methodology develops five core competencies based on the European Digital Competence Framework (DigiComp) and the European Association of Viewers Interests (EAVI): 1) Information literacy; 2) Communication and cooperation; 3) Creating digital content; 4) Safety and 5) Solving Problems.

**Practice 2: ResInfra@DR trainings**

The most recent example of ARC Fund’s science education activities is the training to build capacity for evaluation, planning, monitoring and management of research infrastructures (RIs) in the countries of the Danube region (delivered in Feb – May 2018 and mobilising more than 100 trainees from the countries of the...
Danube region). The training was intended for policy-makers from RIs programme owning and funding authorities, active RI operators and coordinators, and potential or active RI reviewers. The training was divided into four main modules: RI planning and establishment; RI operation and management; results and impacts of RIs in practice; and the long-term sustainability of research infrastructures.

E. Current indicators (if any)
   • Number of projects including elements or aspects of science education.
   • Number and type of trainings and other educational activities.
   • Number and type (target groups) of participants in these events.

F. All points of improvement

In the following 2 years the focus will be put on establishing a long-term internship programme that would encourage young people to choose research/scientific careers through specific guidance. Such programme would seek to inspire young individuals’ interest in research and innovation by offering topic-specific mentorship and advice, building young people’s expertise, and allowing a first-hand experience of social scientific research through participation in interdisciplinary STI projects.

G. Agreed points of improvement, with action plans and indicators for success

<table>
<thead>
<tr>
<th>Points of improvement: Science education</th>
<th>Action plan</th>
<th>Indicators for success (qualitative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New responsibilities for ARC Fund’s Programme Managers</td>
<td>Mar 2019</td>
<td>Coherent organisational approach to science education</td>
</tr>
<tr>
<td>Elaborating ARC Fund’s concept on a long-term internship programme</td>
<td>July 2019</td>
<td>Coherent organisational approach to science education</td>
</tr>
<tr>
<td>Launching an internship programme</td>
<td>Sept 2019</td>
<td>Successfully commenced and completed internships</td>
</tr>
<tr>
<td>Annual reporting on science education</td>
<td>As of Dec 2019 onwards</td>
<td>Transparency and accountability</td>
</tr>
</tbody>
</table>

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: SCIENCE EDUCATION</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of the organisation</td>
<td>Elements of community/stakeholder engagement and education implicit in organisational policy.</td>
<td>Perceived need to build capacity of different stakeholders and to increase interest among young people in research and science.</td>
<td>International projects containing aspects of science education.</td>
</tr>
<tr>
<td>Potential drivers for science education</td>
<td>Rich experience in organising and delivering trainings for diverse target groups.</td>
<td>Mission to promote science and research in society.</td>
<td>EU-funded project activities.</td>
</tr>
<tr>
<td>Potential barriers to science education</td>
<td>Limited funding/resources for the upscaling of education practices.</td>
<td>n.a.</td>
<td>Science education has not been a priority in the national context over the past decades. Limited interest in research internship programmes.</td>
</tr>
<tr>
<td>Actions</td>
<td>Conceptualising and launching an internship programme.</td>
<td>Strategic management focus on engaging with science education activities.</td>
<td>Collaboration with stakeholders in education, science and innovation on strengthening learning, institutional approaches and curriculum development.</td>
</tr>
</tbody>
</table>
Indicators for success of the actions

<table>
<thead>
<tr>
<th>Indicators for success of the actions</th>
<th>Dedicated resources to project-based science education activities.</th>
<th>Increased involvement with science education among staff.</th>
<th>Number of collaborative activities on STI education.</th>
</tr>
</thead>
</table>

Indicators for improved performance

<table>
<thead>
<tr>
<th>Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Number of interns on a yearly basis</td>
</tr>
<tr>
<td>• Number of staff involved in science education activities</td>
</tr>
<tr>
<td>• Number of project-based science education activities</td>
</tr>
</tbody>
</table>

6.2.7 Incorporation of AIRR dimensions into policies

The AIRR dimensions (i.e. anticipation, inclusion, reflexivity and responsiveness) are not formally incorporated in ARC Fund’s Rules and Order for Performing Publicly Beneficial Activities. Nevertheless, during the interviews and focus group discussions the participants recognised the conceptual dimensions of the AIRR framework as largely absorbed by and overlapping with the values embedded in the RRI Keys. According to this prevalent view, such principles were seen as not adding ‘substance’ to the construct of responsibility in science and innovation, nor to the definition of the five RRI pillars. What is more, reference was made to the more ‘actionable’ underpinnings of RRI – which in the opinion of the majority of respondents, overlapped with what the organisation has historically been engaged with more directly.

- **Anticipation** in the case of ARC Fund means being proactive in terms of considering likely impacts of project-related work; articulating possible risks and uncertainties concerning engagement/research and foreseeing appropriate mitigation actions, as a result (primarily on project proposal level); as well as adapting to emerging (unintended) outcomes over the course of research projects’ implementation.

- **Inclusion** in the context of ARC Fund corresponds to stakeholder and wider public involvement in different stages of the research process. In the case of STIP Programme, this entails engaging citizens in deliberations on a variety of topics as prescribed by funded projects, with a view to enable the inclusion of broader societal perspectives into the research process. In the context of SIC and IBSP, inclusion mainly unfolds as the recurrent need to deliberate and open up reflection to an inclusive array of stakeholders, over the planning and design of undertaken research/outreach activities.

- **Reflexivity** is mostly visible in continuous reflections on the original purposes and motivations for performing research, which is expected to be socially relevant and useful (in the broader sense), as well as on the embedded assumptions of research itself. As for the former, one example put forth by participants was the attention regularly given to rethinking national, regional and European policies or visions for the development of research and innovation in line with identified stakeholder needs (mirrored in policy review initiatives undertaken by IBSP, above all). Regarding the latter, this was said to be found in ARC Fund’s approach to interdisciplinarity and open-mindedness (i.e. avoiding silo visions and creating an environment where assumptions are made explicit and probed from different perspectives, incl. the ones of key societal stakeholders), as well as elaborating on / critically scrutinising different participatory/engagement research processes and methods, by way of outlining key strengths and shortcomings. Another pertinent aspect relates to reflecting on relevant social norms and ethico-legal provisions (e.g. international agreements and national laws on child protection), with a view to strengthen the existing normative base.
6.3. Reflection on Review findings, Outlooks developed and ways forward

6.3.1 The integrated or fragmentated nature of different responsibility related dimensions

RRI emerged as a legitimate topic of conversation, whose main value proposition lies in systematising different principles for good scientific conduct, aligning research activities and outcomes with broader societal dimensions and concerns, and strengthening reflexivity on the ways in which research processes are governed. In this context, one thing that was stressed during conversations was that RRI offered a prospective canvass for social sciences and humanities – which represent the core research functions of ARC Fund – inviting tacit observations of approaches that already serve to contribute to that particular RRI ambition, such as interdisciplinarity, collaboration, and diversity in knowledge and research.

Researchers and research managers were generally able to validate common threads that currently constitute the RRI concept within policy discourse as foundational to efforts for reconfiguring the science-society relation. Some of the RRI keys – such as ‘public engagement’, ‘ethics’, and ‘open access’ – were easier for them to engage with and give concrete examples of, both in terms of conception and operationalisation in the course of daily work. Others – ‘science education’ and ‘gender equality’ – they tended to acknowledge as relevant to the work within their thematic programme.

Different nuances in practices and meaning emerged out of the general discussion of each of these keys. On ‘open access’ and ‘ethics’ keys there was significant convergence between the type of science seeking to be cultivated within and through RRI and that valued by respondents themselves. What emerged was a principal acknowledgement of the type of processes and goals those two keys were trying to put across, while on-the-ground realities and strategic orientations (that is, current direction and content of performed research and related activities) meant respecting, yet working within a narrower frame of responsibility vis-à-vis the one RRI proposed. Both the focus group and interviews revealed that ‘public engagement’ is a topic which the organisation and the STIP programme, specifically, took very seriously and continually worked with. ‘Gender equality’ was not met with an unequivocal response by participants, who remained divided with regards to assessing its appropriateness within organisational decision-making processes and strategic research orientations. In addition, they argued for a case of rethinking its present theoretical premise which seemed to leave cross-sectional diversity issues largely out of the picture. Lastly, ‘science education’ denoted a general wishfulness for deeper engagement on the level of the organisation and beyond, which called for more concretisation, mutual learning and opportunities to empower individual researchers and research institutions to connect and expand existing practices to the core values this particular key was set to promote.

6.3.2 Final reflections and plan for follow-up

The RRI concept as officially defined by the EC was perceived as not yet formally embedded in ARC Fund’s organisational policy. Hence, no roles with a specific RRI mandate have been established yet. But opportunities for fostering and enacting change within the organisation were seen as evenly spread out at all levels of management, namely the senior management, the executive management and the operational management.

**Plan for follow-up**

According to the participants in the focus group discussions the RRI framework is highly relevant for adding to current organisational legitimacy vis-à-vis key stakeholders in society. The elaboration of internal RRI policy was agreed by participants as the way to continue the work accomplished under the RRI-Practice project.
<table>
<thead>
<tr>
<th>RRI Policy development: Action plan</th>
<th>Timing</th>
<th>Staff members responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRI Vision – first draft</td>
<td>Nov 2018</td>
<td>Programme director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Programme managers</td>
</tr>
<tr>
<td>Discussion with staff members</td>
<td>Dec 2018</td>
<td>Programme director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Programme managers</td>
</tr>
<tr>
<td>Finalised RRI vision</td>
<td>Jan 2019</td>
<td>Programme director</td>
</tr>
<tr>
<td><strong>Key: ethics</strong> in research and research integrity, incl. Code of Conduct</td>
<td>Mar 2019</td>
<td>Programme director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Programme managers</td>
</tr>
<tr>
<td>Establishment of a Research Ethics Board</td>
<td>May 2019</td>
<td>Executive Director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Board of Trustees</td>
</tr>
<tr>
<td>Training on research ethics for all members of staff</td>
<td>Jun 2019</td>
<td>Programme director</td>
</tr>
<tr>
<td>(research and administration)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Key: Societal engagement</strong></td>
<td>Jun 2019</td>
<td>Programme manager – STIP Programme</td>
</tr>
<tr>
<td>Development of internal how-to guide on societal engagement (stakeholders and lay people)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training of research staff on societal engagement methods</td>
<td>Jul 2019</td>
<td>Programme managers</td>
</tr>
<tr>
<td>Organising cross-programme info days to allow for sharing of experience and mutual learning on societal engagement</td>
<td>Sept – Oct 2019</td>
<td>Programme director</td>
</tr>
<tr>
<td><strong>Key: Gender equality</strong></td>
<td>Jul 2019</td>
<td>Executive director</td>
</tr>
<tr>
<td>Updating ARC Fund’s policy on non-discrimination, gender equality and diversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training of research staff on gender equality and diversity issues in research</td>
<td>Sept 2019</td>
<td>Programme managers</td>
</tr>
<tr>
<td><strong>Key: Open access</strong></td>
<td>Aug 2019</td>
<td>Executive director</td>
</tr>
<tr>
<td>Elaborating ARC Fund’s policy on open access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training of research staff on open access issues</td>
<td>Sept - Oct 2019</td>
<td>Programme managers</td>
</tr>
<tr>
<td><strong>Key: science education</strong></td>
<td>July 2019 - Sept 2019</td>
<td>Programme director</td>
</tr>
<tr>
<td>Elaborating ARC Fund’s concept on a long-term internship programme</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Launching an internship programme</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual reporting on RRI policy implementation</td>
<td>As of Dec 2019 onwards</td>
<td>Programme director</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. Organisational reviews and outlooks: Research funder

7.1 Mapping of the organisation

The Ministry of Education and Science (MES) is the institution regulating and promoting the educational and scientific work in the country. The Minister is supported by four deputy ministers (including Deputy Minister on Science), one head of cabinet, a general secretary, and an Advisor on Science. The general administration of MES consists of three directorates: (a) Human Resources and Administrative Services Directorate; (b) Public Relations and Protocol Directorate; (c) Property Management and Accounting Services Directorate. Its specialised administration consists of 15 directorates, including the Science Directorate (staffed with 15 people) and the Higher Education Directorate. MES has regional representation as well through Regional Departments of Education. The Ministry has also Audit Committee and Internal Control Unit. MES is a principal of several secondary institutions, among which the Executive Agency for OP Education and Science for Smart Growth, which manages the EU Structural Funds.

The Minister of Education and Science conducts the national policy on scientific research in concordance with the National Strategy for Development of Scientific Research 2017-2030, adopted by the National Assembly, and the National Programme for Reforms (Scientific Research Promotion Act, Art.7).

The activities of MES are based on the principles of legality, proportionality, rationality, conscientiousness and equity, independence, impartiality, accessibility, publicity and transparency, continuity and predictability, responsibility and accountability, efficiency, subordination and co-ordination, confidentiality, and integrated administrative servicing, as declared on the website of the institution (www.mon.bg). MES abides to Customer’s Charter, which treats administrative services, performed by MES, and lists quality standards, instruments for feedback, customer rights and responsibilities, and procedures for handling signals, proposals and appeals.48

The National Science Fund (NSF) has been established through Council of Ministers regulation No.83/26 July 1990 as a legal entity funded from the state budget. Its activities are supervised by the Minister of Education and Science. The NSF’s vision is to provide complex support for the development of valuable scientific and R&D projects and promote scientific research in research institutes, universities, as well as provide support for the scientific potential, including to young scientists on the basis of European requirements and in accord with principles of ethics, transparency, publicity, accessibility and adaptability. The NSF’s mission is to develop an effective organisation for financial stimulus of scientific research, create conditions for the use and development of scientific potential in compliance with priority areas of the country, establishment of conditions for the protection of intellectual property and for the commercialisation of scientific products and the support in their distribution in all spheres of public life.

NSF promotes scientific research through:

- Financial support for research organisations and higher education institutions based on project-programme financing
- Financing projects, experiments and demonstration projects as per Fund’s research areas
- Financing projects, experiments and demonstration projects of young scientists

The Fund supports projects and activities for promotion and development of scientific research in accordance with:

- European framework for state aid for scientific research, R&D and innovations
- National Strategy for scientific research
- National reform programme
- Framework programmes with specific EU priorities, as well as other European and international initiatives

NSF is the key national financial leverage for funding competitive scientific projects with fundamental science focus, but also applied science, as well as distribution of scientific results (see Regulation of NSF, Art.4, par.3). This is specified in the National Strategy for Development of Scientific Research in Republic of Bulgaria 2017-2030. It should be noted that between 2008 and 2010, the Bulgarian Court of Auditors detected a series of

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infringements on how selected projects were evaluated. These projects were discontinued, and from 2013 to 2015 no new projects were financed through NSF. These issues generated considerable mistrust in the national science system. The NSF’s budget dropped from BGN 70 million in 2009 to around BGN 15 million in 2016 and 2017. In an attempt to improve NSF, the regulation, which governs its work has been changed and the procedures for handling the calls for proposals were streamlined and made more transparent since 2016. Attempts were made also to improve the administrative capacity of NSF. As a result, the budget for 2018 is forecast to reach BGN 24 million. The procedure for selecting a manager of NSF has also become more transparent. The present manager has been appointed in 2017 through a competition and not assigned by the Minister of Education and Science, which used to be the previous practice.

**Figure 7: The NSF Structure (as of June 2018)**

The structure of NSF is presented above. The Executive Council consists of 10 scientists and one representative of the Science Directorate of MES. There are 13 regular scientific expert committees, each having five members, a Chair and Vice-chair, as well as one secretary. There are also temporary scientific expert committees and administrative staff. NSF issues annual reports, whereas the minutes of the meetings of the executive council are published on its website ([https://www.fni.bg](https://www.fni.bg)).

The activities of the Fund are implemented based on long-term plans for development in alignment with the programming period of the European Union, as well as based on an annual operational programme, as approved by the Minister of Education and Science (NSF regulation, Art.31).

NSF presents its annual report to the Minister of Education and Science by 31 March each year. As a follow up, the science community is invited to hear the results of the activities of NSF. In 2018, the meeting was held in May at the Bulgarian Academy of Sciences.

Audits of NSF are performed by the National Audit Office. The 2012 audit report led to major changes in the institution to streamline its activities and also make it more transparent, as discussed above. In addition to reforms already undertaken, there is a public debate that NSF and the National Innovation Fund should merge into one single agency called the Promotion Agency for Research and Innovation.49

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49 Scenarios to develop Promotion Agency for Research and Innovation are discussed by Shin T. and Evgeniev, E. (2017).
7.2 Aspects of responsibility in organisational policy and practice

7.2.1 The conceptualisations of responsibility in the organisation

Although the term RRI is widely unfamiliar for the interlocutors from the Science Directorate at MES, in many of its initiatives the Directorate adheres to the principles of RRI – for example policies regarding ethics, gender equality, inclusiveness, openness, and transparency, but this is especially true in regard to open data and access to scientific results. The same is valid for the team at NSF, at least regarding some of the RRI principles.

An interviewee at MES, who is familiar with the RRI framework, put it positively:

“The RRI principles are applicable in our daily work and in all aspects of formulating and implementing science, research and innovation policies.”

Different interviewees associated the term RRI with social responsibility and accountability of decision-makers. Overall, the RRI notion is rarely used.

The RRI practice in the Science Directorate is rather a bottom-up approach. There is no programme, requirement or guideline, and there is no specific national policy regarding implementation of RRI. That is why no one in the Science Directorate has the direct responsibility to oversee RRI policy. None of the reports or other documents issued by the Ministry of Education and Science or any other institution is dealing specifically with RRI. Nevertheless, MES staff has integrated RRI principles in their daily operation and tries to promote them through participation in working groups, consultation meetings, conferences, etc., involving key stakeholders.

A senior official at MES highlighted the link between responsibility and the need that science is recognised by the society as useful in terms of providing answers to societal challenges. It was further noted that:

“[…] scientists deserve societal attention and support through public funding because they are indeed innovators and discoverers who, via their work, contribute to society’s safety, wellbeing and development by providing solutions to problems related to demographic, economic, legislative and practical/daily life domain, robotics and automation, advanced machinery, new and improved drugs delivery, etc.”

Similar to MES, nobody at NSF has a specific mandate to oversee the compliance with RRI principles and there is no specific report on this topic to the Minister or the Executive Director of NSF. There is no governing body at NSF with designated responsibility for the RRI principles, although some pillars of the RRI framework are used in competitive calls of NSF – ethics and gender equality.

A senior representative of NSF explained that NSF is not bound by any formal requirements to strive to achieve social impact as a result of its interventions. Attaining specific benefits or impacts is thus not among NSF’s requirements for financing project proposals, and the evaluators of project proposals hired by NSF do not consider this aspect during evaluation.

A senior government official said that the Policy Support Facility (PSF) for Bulgaria, launched in 2015 with the support of the European Commission as a pilot in Eastern Europe, reflected upon the responsibility of MES regarding the national science system. The purpose of the PSF was to facilitate the comprehensive analysis of the existing innovation and scientific system.

A senior MES official noted that the main challenge in the research system is:

“[…] to change the mind-set of the scientific community towards openness, inclusiveness and ethics in regard to science and all this - in the context of scientific research in service to society via scientific solutions to most pressing societal challenges.”

Moreover, another interviewee claimed that the role of science is highly underestimated among the priorities of the society. It was further explained:

“[…] You cannot have quality education without a relationship to science. This is particularly true for higher education. Yet, science is highly marginalised at the moment in the higher education system of Bulgaria.”
Another major challenge is that the scientific community is not ready to embrace the “open science” i.e. to publish intermediate results of scientific research so that they are checked for credibility and accuracy. This refers to the science integrity as a concept, including ethics in science and responsibility in science towards society.

7.2.2 Ethics in the organisation

A. Description of the practice and its development and an assessment of how well it currently works

Interviews and focus group discussions on ethics focused on the issues of research integrity and ethical standards of scientific and technological developments in their relation to the society and societal needs. As far as research integrity is concerned, MES has initiated the amendment of the Law for Academic Staff Development in May 2018 to introduce Academic Ethics Commission, which will serve as a prevention tool for misconduct, e.g. conflict of interest, plagiarism, unacceptable research practices, among other. As far as the ethical acceptability of scientific and technological developments is concerned, MES cannot regulate directly, thereby self-regulation is pursued. For instance, the Bulgarian Academy of Sciences (BAS), which is comprised of 42 research institutes, has adopted the European Code of Conduct for Research Integrity, whereas Sofia University and many others have adopted their own Ethics Code and established Ethics Commissions. Back in 2016, MES formed a working group on ethics, which organised a round table on “Ethics code for scientific research.”

The interviewees brought into the discussion the European Research Area policy which enshrined the ethics concept. The European Charter for Researchers, which is a set of general principles and requirements which specifies the roles, responsibilities and entitlements of researchers, as well as of employers and/or funders of researchers, was also mentioned several times.

One of the interviewed official at MES said that ethics is one of the concepts and topics that are discussed on a daily basis at the Ministry. It was added:

“This issue is considered fundamental in the process of changing an encapsulated scientific community into a scientific force in service to society.”

According to a senior official representing NSF, the issue of ethics is beyond the responsibility of one programme or one funding instrument. In spite of this, the NSF regulation includes observance of the ethics of scientific and technological developments, as per one interviewee. Another interviewee, who represents NSF, claimed that the selection procedure for projects, the hiring of evaluators and experts in the programme committees, is based on ethical criteria.

Overall, there is a need to increase accountability for public research funding and instigate more discussions in the public domain and social interaction on ethics in order to improve the ethical culture in the academic and research environment.

B. Main barriers (structural, cultural or related to interchange dynamics)

There is no Ethics Commission at NSF, but an Academic Ethics Commission is to be formed by end-2018 at MES, which will be responsible for research integrity. As MES has limited in-house capacity to deal with ethical issues, the members of the future Academic Ethics Commission will have to learn from practices outside the country. NSF has not yet introduced research ethics as a requirement in the calls for proposals, and thus applicants that are financed through public research funding are not required to fulfil any specific conditions for conducting ethical research. There are no specific regulations dealing with environmental, biomedical and social ethics that would affect researchers and demand from them to satisfy certain requirements.

Ethics and ethics evaluations are considered to be of less importance than the scientific assessment, claimed the interviewees. NSF does not seem to have the mandate to deal with detection of research fraud or research malpractice. There is no body dealing with ethics, as well as no information system available to query the investigation of misconduct.
C. Main drivers (structural, cultural or related to interchange dynamics)

The main driver of change could be the launch of the Academic Ethics Commission by end-2018, which should prevent malpractices at universities and research institutes, related to conflicts of interest, plagiarism, research fraud and similar unethical conduct. The public image of MES and NSF is a significant factor of the dynamics of the practice of integrity and ethics. Horizon 2020 practice can be adapted to national funding programmes/instruments (for example, Ethics Appraisal Procedure under Horizon 2020).50

D. Good practices (or bad practices)

National and EU calls have now established a good practice for providing requirements for the applicants to adopt Ethics Codes. However, Ethics Codes alone are insufficient, as there is no transparent monitoring system and indicators to track progress.

E. Current indicators (if any)

No indicators were established.

F. All points of improvement

- Establishment of Academic Ethics Commission at MES (by end of 2018 )
- Ethics evaluations need to become an integral part of the NSF methodology for selection of project proposals
- Adoption of guidelines on research ethics for research projects funded by NSF
- Establishment of Ethics Supervision Commission at NSF
- Organisation of public debates on ethics in research and launch of awareness campaigns
- Promotion of institutionalisation of Ethics Commissions by research institutes and universities
- Integrate the ethics principle in the Strategy for Development of Scientific Research 2030
- Adoption of National Code of Research Conduct

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI key: ETHICS</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of organisations</td>
<td>State mandate and legislation, supported by internal rules and guidelines. Legislative amendments enabling the setting up of an Academic Ethics Commission. A working group on ethics at MES. Ethical criteria observed in selection procedures for projects and evaluators at NSF.</td>
<td>Issues concerning ethics are discussed on a daily basis.</td>
<td>Societal demand for higher accountability of public research funding. Good practices for developing Codes of Conduct by Universities, BAS and other research institutes. European Research Area policy and the European Charter for Researchers.</td>
</tr>
<tr>
<td>Potential Drivers for ethics</td>
<td>Launch of the Academic Ethics Commission to be set up by MES. The concept of integrity and ethics of research formally embedded into the regulations and guidelines of NSF.</td>
<td>Recognition of the importance of research ethics.</td>
<td>Requirements from Horizon 2020 and other EC programmes can be adapted to national funding instruments (e.g. Ethics Appraisal Procedure).</td>
</tr>
</tbody>
</table>

50 For all activities funded by the European Union, ethics is an integral part of research from beginning to end, and ethical compliance is seen as pivotal to achieve real research excellence. There is clear need to make a thorough ethical evaluation from the conceptual stage of the proposal not only to respect the legal framework but also to enhance the quality of the research. Ethical research conduct implies the application of fundamental ethical principles and legislation to scientific research in all possible domains of research. The process to assess and address the ethical dimension of activities funded under Horizon 2020 is called the Ethics Appraisal Procedure. For more details, see http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/ethics_en.htm.
<table>
<thead>
<tr>
<th>The National Strategy for Development of Scientific Research takes into account the ethics principle.</th>
<th>Pressure from media and the public opinion intensifies the discourse on research ethics.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Potential Barriers for ethics</strong></td>
<td><strong>Research integrity and research ethics are considered less important than scientific excellence.</strong></td>
</tr>
<tr>
<td>NSF does not have a commission responsible for research ethics supervision. No monitoring mechanism and practical guidelines for ethical research at NSF. There are no specific environmental ethics, biomedical and social ethics regulations that affect researchers.</td>
<td>Resistance to change in the academic community – especially fear of excessive bureaucratisation and interference with academic autonomy.</td>
</tr>
<tr>
<td><strong>Actions on ethics</strong></td>
<td>Establishment of Academic Ethics Commission at MES and Ethics Supervision Commission at NSF. Ethics evaluations to be incorporated into the NSF methodology for selection of project proposals. Environmental ethics, biomedical and social ethics could be required in the guidelines for applicants. MES to publish sections on observance of research integrity and research ethics in the national science system in its annual reports.</td>
</tr>
<tr>
<td><strong>Indicators for the success of actions on ethics</strong></td>
<td>Academic Ethics Commission at MES and Ethics Supervision Commission with NSF are established. Revised NSF methodology for evaluation of proposals. Section that responds to research ethics and integrity added to the annual report of MES.</td>
</tr>
<tr>
<td></td>
<td>Research institutes and universities have launched the process of adoption Ethic Codes and setting up Ethics Commissions.</td>
</tr>
<tr>
<td><strong>Indicators for improved performance on ethics</strong></td>
<td><strong>Indicators:</strong></td>
</tr>
<tr>
<td></td>
<td>• % of research projects which consider areas, related to ethics</td>
</tr>
<tr>
<td></td>
<td>• % of research projects, which require checks from Ethics Commission</td>
</tr>
<tr>
<td></td>
<td>• Number of established functioning Ethics Commissions at universities/research institutes</td>
</tr>
<tr>
<td></td>
<td>• Number of universities and research institutes awarded for their good ethical practices</td>
</tr>
<tr>
<td></td>
<td>• Number of relevant strategic and legislative documents in which principle of ethical research conduct has been integrated</td>
</tr>
<tr>
<td></td>
<td>• Decrease of number of researchers, who are sanctioned as a result of malpractice</td>
</tr>
<tr>
<td><strong>Perception indicators:</strong></td>
<td>Increased number of researchers who believe that the national science system adheres to ethics rules and rules for research integrity</td>
</tr>
</tbody>
</table>
7.2.3 Societal engagement strategies in organisation

A. Description of the practice and its development and an assessment of how well it currently works

This topic is often associated with social responsibility of the research system. Societal engagement strategies in the organisation are understood as an opportunity to gain trust of the society and legitimise funding of research. In terms of cultural aspect, societal engagement is also seen as related to maintaining public respect and recognition, engaging with all stakeholders and managing risks.

Most interviewees underlined that societal engagement was very important and much needed, but for the time being no coherent strategy on how to implement it exists. The National Strategy for Development of Scientific Research 2017-2030 has foreseen certain actions, which MES needs to undertake to promote science in the society. Annual events like Pythagoras, which rewards the most outstanding researchers (including young researchers) is a way for MES to better engage the society.

MES very much depends on collaboration with the Bulgarian media, which do not always find the science topic attractive. On the other hand, an online journal BG Science (https://nauka.bg/) promotes science in Bulgaria through presentation of government work on science and innovation, interviews with scientists and promotion of public events, related to science. The journal, launched in 2005, is published once a month. Yet, the Ministry of Education and Science is not involved as an institutional partner.

The current Minister of Education and Science has encouraged the staff of the Science Directorate to engage more with universities and research institutes. In fact, the Minister has started travelling to all regions to meet with stakeholders on a regular basis as part of a broader engagement strategy.

In 2013, MES formed a Consultative Public Council, which gathers representatives of academia, research institutes, NGOs and experts. The Council was initiated in order to discuss pertinent issues that relate to the science field with the Bulgarian society. Since 2015, however, this Council has failed to meet.

High representatives from NSF confirmed that the projects financed by the Fund have budgets for dissemination of project results. In that respect, NSF puts a special focus on the possibility of promoting science in society and respectively define the public significance of the research outcomes. As an institution, however, NSF does not have a mandate or capacity to apply societal engagement strategies for the benefit of society and the research community.

B. Main barriers (structural, cultural or related to interchange dynamics)

Social engagement practices at MES and NSF are not a result of a coherent and comprehensive strategy. A variety of initiatives (consultative councils, thematic group meetings, workshops) exist, but they are not always linked and thus synergy effect can be hardly reached. Some even question the rationale of societal engagement. In the words of one of the interviewees from NSF:

“The society does not understand scientific work well, hence no need for engagement strategies.”

It is relevant to note that science communication as a discipline does not exist in the university curricula in Bulgaria. To a great extent, the lack of capacity in science communication in the country hinders the science–society dialogue. Only few journalists are specialised in science topics, which is an obstacle to attracting media attention.

C. Main drivers (structural, cultural or related to interchange dynamics)

The main driver can be the positive examples of successful societal engagement initiatives – for example the stakeholder consultations on adoption of the IS3, as confirmed by many of the interviewees and the focus group participants. Opinions of all key stakeholders, including civil society, were taken into account in this process, establishing a good practice for societal engagement in the decision-making process on innovation and research policy. Societal engagement strategies can be boosted also by international institutions (European Commission, OECD, the World Bank, etc.). The FP7 and Horizon 2020 projects focused on public engagement provide a sound basis for building a societal engagement strategy for research policy design, while the guidelines for applicants under Marie Skłodowska Curie actions (MSCA) of H2020 could be used by research institutes and

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51 Some projects on public engagement: CIVISTI, FP7; PACITA, FP7; CASI, FP7; Engage 2020, FP7; PROSO, H2020; CIMULACT, H2020.
universities in developing their own public engagement activities, as well as potentially being integrated in the guidelines for applicants of NSF.

D. Good practices (or bad practices)

The consultation process for the IS3 is considered good practice as it involved key stakeholders, including civil society organisations, in the decision-making process for identifying priority sectors of the economy and strategies how to support those through EU and national funding instruments. Another example is the engagement of stakeholders around the discussions for setting up a call for proposals for establishment of Regional Research Centres. Researchers were also involved in developing the selection procedure for the call, as well as the methodology for project selection. The third example are the EC initiatives “Science meets Parliament” and “Science meets Regions,” which bring science closer to society. Bulgarian institutions (MES and the Sofia Municipality) were also prominent partners in these initiatives.

E. Current indicators (if any)

No specific indicators have been identified.

F. All points of improvement

- The stakeholder engagement approach of the IS3 can be followed by MES and NSF during the development of new policies and regulations
- Thematic workshops and meetings of MES that engage stakeholders and society to debate societal issues where science has to play a role
- More effective engagement of media as potential channel of communication with society
- Marie Skłodowska-Curie (MSC) outreach campaigns, which can serve as good practice for NSF’s projects
- Set up regular meetings for the Consultative Council for Public Issues
- Organise capacity building courses for the academic community

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: SOCIETAL ENGAGEMENT</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of organisations</td>
<td>Legislative framework - National Strategy for Development of Scientific Research foresees activities for promoting science in the society. Institutional mandate to increase the social standing of scientists and researchers and inform society about achievements in science and innovation fields. Communication units at MES, NSF.</td>
<td>Lack of traditions in societal engagement, but staff at MES encouraged to engage more.</td>
<td>Maintaining public respect and recognition of research. Engaging with all stakeholders – research community, academia, media, NGOs, society.</td>
</tr>
</tbody>
</table>

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52 Outreach activities, as per MSC action “are meant to engage a large audience and to bring knowledge and expertise on a particular topic to the general public. Outreach activities can take several forms, such as school presentations, workshops, public talks and lab visits, etc. The objective of outreach is to explain the benefits of research to a larger public (the tax payers who fund your research). Outreach implies an interaction between the sender and the receiver of the message, there is an engagement and a two-way communication between the researcher and the public.” For more details, see [http://ec.europa.eu/assets/eac/msca/documents/documentation/publications/outreach_activities_en.pdf](http://ec.europa.eu/assets/eac/msca/documents/documentation/publications/outreach_activities_en.pdf).
### Potential drivers for societal engagement
- Previous good practices of fruitful societal engagement in decision-making on research and innovation policies.
- Strong tradition of cooperation and engagement with research institutions.
- Support of international institutions (European Commission, World Bank, OECD, etc.).
- Horizon 2020 and MSC Action guidelines for public engagement.

### Potential barriers for societal engagement
- Lack of comprehensive and clear engagement strategy.
- Undervaluing the capacity of society to engage on topics like research and innovation.
- Public pays low interest in fundamental scientific research.

### Actions on societal engagement
- Expanding channels for communication with the public (social media attention, TV programmes for science).
- Incorporating societal engagement initiatives in the communications strategy of MES and NSF.
- Introduction of separate section on the societal engagement activities in the annual reports.
- Regular meetings of the Consultative Public Council.
- Change the mind-set of the staff on importance of engaging with society through organisation of workshops.
- Increase the importance of science communication experts in the society and build capacity.
- Organise capacity building courses on science communication for the academic community.
- Organise thematic meetings with stakeholders and society to debate societal issues where science plays a role.

### Indicators for the success of actions on societal engagement
- Established channel for the public communication and engagement, including the investment of human resources.
- Clear guidelines for societal engagement for MES and NSF staff and for project applicants.
- Establishment of reward system by MES, NSF and individual research institutions and universities to motivate researchers to engage with the society.
- Increased impact (social, economic, environmental or intangible) of research, supported by NSF.
- Increased involvement of stakeholders in the decision-making process regarding innovation and research.

### Indicators for improved performance of societal engagement
- % of financing for societal engagement from the budget of MES, NSF
- Number of days for open doors for universities/research institutes to engage society
- Hiring of communication managers for research projects, offices for technological transfer, incubators and accelerators
- Number of days for awareness campaign to build capacity in the academic community
- Number of days for workshops with MES and NSF staff to improve capacity on how to engage society
- Analysis of surveys in the society, which evaluate perceptions of the science and innovation system
- Evaluation of initiatives, which engage the society (number of media releases and their impact)

### 7.2.4 Gender equality and diversity strategies in the organisation

A. Description of the practice and its development and an assessment of how well it currently works

It goes without saying that MES and NSF fully uphold the principles of gender equality given that any form of discrimination based on gender, among other grounds, is prohibited (Law for Protection against Discrimination, Art.4; the Law for Promotion of Employment, Art.3). Overall, women prevail substantially in the administrative staff of the Ministry. In addition, two out of four Deputy Ministers are women, and the Directors of Directorates are mostly women. In contrast, women are underrepresented at NSF. The Manager, Chairman and Deputy
Chairman are men, while only four out of ten members of the Executive Council are women. Despite this imbalance, a high representative from NSF did not see any issues with gender equality in the research system, in general. Moreover, one mid-level official at MES claimed:

“...gender balance is not an issue and requires much less attention not because it is being neglected but because it does not require extra resource or efforts.”

While gender equality is seen to be satisfactory, it was felt that more could be done to support ethnic, religious or other minority groups to be more active in the research domains or in the decision-making process. Inclusion of young scientists also became a hot issue during the discussions. Given the unfavourable age structure in the Bulgarian research environment, supporting young scientists was mentioned as a good way to overcome existing barriers related to ageing scientific staff.

B. Main barriers (structural, cultural or related to interchange dynamics)

Gender equality in research and innovation was dismissed as a non-issue for the Bulgarian context. Most respondents justify this position with the fact that female scientists and researchers are more numerous than male, and that many women are in top managerial positions. Although issues of delayed career prospects after maternity leave and pregnancy were mentioned during the focus groups, the dominant opinion that no measures are necessary is a strong cultural barrier to undertaking gender equality and diversity measures. In structural terms, labour market realities often force women to choose between pursuing career development or maternity. None of the strategic documents related to research and innovation envisages any special measures for the increase of the share of the female researches.

C. Main drivers (structural, cultural or related to interchange dynamics)

The main driver for preserving gender equality remains the legislation, although there is increasing awareness across the society about the need to actively uphold equal opportunities for women and men, often provoked by comparison with other EU member states.

D. Good practices (or bad practices)

A good gender balance has been achieved in the Bulgarian science and research spheres already in the socialist period and has been maintained to date. A much more pressing problem is the ageing of the scientific community, and the insufficient measures to motivate young people to study and work in the science field.

MES is the managing authority for the Bulgarian Operational Programme “Science and Education for Smart Growth” – one of the most important funding mechanisms for strengthening research and innovation in Bulgaria, and enhancing social inclusion at all educational levels. The Programme has gender equality and promotion of equal opportunities embedded in all planned operational activities and at all levels (recruitment practices that ensure adequate representation of both genders in project management teams as well as in the target groups; modelling learning content in a way that will shift the focus in the representation of traditional gender roles and promote a change of attitude).

E. Current indicators (if any)

- Developing and implementing measures to increase proportion of women in male-dominated fields of science (e.g. STEM)

F. All points of improvement

- Setting targets to promote women researchers to senior positions
- Policy on gender-sensitive language
- Equal pay
- Anti-harassment measures: introducing special regulations and disciplinary measures; policy interventions; designing and implementing procedures for improving the reporting of incidents in a safe and confidential setting (e.g. setting up an institutional hotline); raising awareness about violence, and special training courses
- Facilitating career breaks and career reintegration for women researchers
- Increase number of women researchers in some engineering fields
- Consultation with leading experts on gender in order to get a more informed sense on how gender can affect research output and performance

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI Key: GENDER EQUALITY AND DIVERSITY (GED)</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of organisations</td>
<td>MES and NSF strictly adhere to legislative framework, which upholds principles of gender equality. Women prevail in MES, but are underrepresented in NSF. Internal rules of MES (standards on the quality of administrative servicing) guarantee equal access to services of the Ministry.</td>
<td>Gender equality taken as a given and therefore dismissed as a topic that necessitates special attention.</td>
<td>Good overall gender balance in science and research (53% of researchers are female), but this is often used to mask other equality related problems (career options, pay gaps, power relations, etc.).</td>
</tr>
<tr>
<td>Potential drivers for GED</td>
<td>Legislation such as Law for Protection against Discrimination and Law on Equal Opportunities for Women and Men.</td>
<td>Increasing awareness that gender equality represents an important element of democracy.</td>
<td>Comparison with other countries in order to apply international good practice in the local context.</td>
</tr>
<tr>
<td>Potential barriers for GED</td>
<td>No specific policies for gender equality and diversity exist in the national science policy.</td>
<td>Prevailing view that gender equality is not an important issue.</td>
<td>Limitations in labour market regarding women who often have to choose between career promotion and maternity. Traditional gender misbalance in certain fields of science.</td>
</tr>
<tr>
<td>Actions on GED</td>
<td>Enhance transparency and gender balance in recruitment panels for staff. Gender equality and diversity awareness should be reflected in the methodologies for selection of research projects. Address barriers over academic career progress and work schedules. Targets for hiring of employees from underrepresented groups. Address the equal pay to man and women.</td>
<td>Ensure gender equality and diversity is rewarded. Promote dialogue on gender and diversity issues</td>
<td>Promote gender awareness. Enhance international exchanges on gender equality and diversity. Consultations with leading national and international gender experts.</td>
</tr>
<tr>
<td>Indicators for the success of actions on GED</td>
<td>Balanced composition of staff recruitment panels achieved. Gender equality included in research projects selection methodology. Measures undertaken to remove / reduce career barriers for women.</td>
<td>Gender equality awareness raised through staff surveys, workshops and working meetings.</td>
<td>Set targets to improve gender equality and introduce policy for diversity. Networks and active exchanges with national and international gender experts.</td>
</tr>
</tbody>
</table>
### Measures for increasing diversity among staff.
Reduced or eliminated payment differences.

<table>
<thead>
<tr>
<th>Indicators for Improved Performance of GED</th>
<th>Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of financing programmes, which reflect upon criteria for gender equality and diversity</td>
</tr>
<tr>
<td></td>
<td>% of research organisations which lift barriers to achieving gender equality</td>
</tr>
<tr>
<td></td>
<td>% of research organisations which promote equality and diversity</td>
</tr>
<tr>
<td></td>
<td>% of organisations which undertake education workshops for gender equality and diversity</td>
</tr>
<tr>
<td></td>
<td>% of research projects which include the principle of gender equality and diversity</td>
</tr>
<tr>
<td></td>
<td>% of budget, dedicated to gender and diversity actions to implement measures</td>
</tr>
</tbody>
</table>

**Perception indicators:**
- Whether Bulgarian scientists increase their positive attitude towards existing gender and diversity balance in the national science system

### 7.2.5 Open access and open science strategies in the organisation

A. **Description of the practice and its development and an assessment of how well it currently works**

Climbing up in the international ranking of open science and open access is a goal for MES. A Working Group, headed by the Advisor on Science at MES, has been recently appointed. Yet, open science/open access indicators are not linked to European or national programmes for financing research. For instance, OP Education and Science for Smart Growth of the EU Structural Funds does not recognise publications of researchers that are available through open access repositories.

As far as NSF is concerned, its regulation requires that the Fund takes and implements its decisions in full compliance with publicity and transparency (see Art.96, par.1). However, the information database maintained by NSF does not inform about the results of the projects (their scientific research outcomes).

In its annual report to the Minister of Education and Science, NSF provides information about the share of national research publications, which are produced as a result of the financial support of the Fund (Art.91, par.2, item 5, NSF regulation), but only according to international databases (ISI, SCOPUS, etc.) NSF does not require financed projects to publish their results in open access platforms. Its policy towards open access/open science was eloquent in the words of one of the high representatives of NSF, who said that open access and open science policy in Europe is misleading as other global regions are progressing fast in science, despite being far from open access/open science policies.

B. **Main barriers (structural, cultural or related to interchange dynamics)**

The policy on open science/open access of MES is still not uniform. On the other hand, the Ministry has undertaken measures to encourage research organisations to follow open access and open science, but in practice these measures are not yet operationalised for the projects being funded so far. Special attention is paid to the matter of retaining intellectual property rights – recognised as a potential barrier among the R&I community – in the context of publishable research results obtained through public funding (and data, when appropriate), so as to prevent third parties from infringing on these rights of the original author(s).

C. **Main drivers (structural, cultural or related to interchange dynamics)**

The Scientific Research Promotion Act provides for MES to maintain subscription to large databases of e-journals and e-data for scientific purposes. For this reason, MES pays for the subscription of 2,000 scientific journals with high quality of the ELSEVIER publishing house. The subscription is used by 64 research organisations in Bulgaria.

Finally, MES communicates with publishers to provide open access. International and national events have been supported in the past seven years to spread knowledge and get more supporters among the Bulgarian research community about open access/open science policies.
Contacts have been made with the administrators of thematic digital libraries to evaluate the need of financial resources to allow for access to international databases. This would give access to business, society, and academia to the latest and most valuable information and research results.

D. Good practices (or bad practices)

A good practice is the open access to e-journals, provided to universities and research institutes in Bulgaria through MES. Bulgaria supports the initiative of the European Commission in the open science policy direction. For instance, one of the key topics during the Bulgarian Presidency of the European Council was the open science policy and the launch of the European cloud for open science. A draft concept on open access and open science has been circulated in 2013, and published in 2014 on the website of MES.

E. Current indicators (if any)

Number of e-journals in Bulgaria which provide open access to publications.

F. All points of improvement

- Working group to finalise national open access/open science policy concept
- National open access and open science policy approved by MES
- Continuing support for the European Cloud for open science

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI key: OPEN ACCESS</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of organisations</td>
<td>Legislation and formal practices lead to adoption of open access and open science policies. Working Group on Open Access at MES.</td>
<td>Conflicting attitudes: benefits of sharing knowledge against concerns about protection of intellectual property.</td>
<td>Partnership with media to promote open access policies among researchers and the society. Rewarding system to encourage adoption of open access and open science policies by universities and research institutes.</td>
</tr>
<tr>
<td>Potential drivers for open access</td>
<td>Scientific Research Promotion Act supports open access. MES provides open access to research organisations through subscription to 2,000 journals.</td>
<td>Open access/open science is one of the targets for improving the national science system of Bulgaria.</td>
<td>MES communicates with national publishers to provide open access. Strong interconnections with other RRI pillars such as ethics and societal engagement. Open access/open science are key topics of the European Commission.</td>
</tr>
<tr>
<td>Potential barriers for open access</td>
<td>MES and NSF do not have requirements for open access for research projects that have received funding. Open Science and Open Access Concept still not approved by MES. NSF does not have a monitoring mechanism to track compliance with publicity and transparency.</td>
<td>Misbalance between IPR policy and open access/open science policy.</td>
<td>No specific engagement with media and other communication channels to promote open access/open science policies. Non-matching expectations of stakeholders. Lack of willingness of the academic community to share research data.</td>
</tr>
<tr>
<td>Actions on open access</td>
<td>MES adopts open science/open access policy. MES and NSF encourage research projects, which are financed with European and</td>
<td>Organisation of workshops and seminars, led by MES or NSF, to spread knowledge and get support from researchers for open science/open access policy measures.</td>
<td>Engage media and other communication channels to promote open science and open access.</td>
</tr>
</tbody>
</table>
public funds to follow open access/open science policy. | Set up of surveys to study perceptions of researchers.

**Indicators for the success of actions on open access**
- Number of e-journals in Bulgaria which provide open access to publications.
- Continued support for the European Cloud for Open Science
- National open science and open access policy approved.
- Researchers who are acquainted with the open science/open access policy.
- Perception of researchers for changes in the culture towards open access/open science.
- Number of professional associations which support open access/open science policy.

**Indicators for improved performance of open access**
- Number of websites which maintain scientific research publications
- Number of research publications which have open access
- Number of blogs of scientists, who work on research projects
- Number of publications or videos, which are related to research projects
- % of financed research projects, which have a concept for open access/open science

**Perception indicators:**
- Whether researchers have positive attitude towards the open access/open science policy of the government
- Whether researchers improve their interaction with Bulgarian and foreign scientists due to open access/open science policies
- Whether the Bulgarian society sees the benefits of open access/open science policies of the government

### 7.2.6 Science education as integrated in research

**A. Description of the practice and its development and an assessment of how well it currently works**

Science education can play a pivotal role in establishing a bond between science and society, and this can be facilitated by the Science Directorate of MES. The scientific community that provides working solutions to pressing societal problems and challenges will be legitimised within society, and in turn, society will become more responsible to the scientific community.

Currently, science education is not among the core priorities of MES and NSF, and they do not operate any specific science education programmes. Yet, MES has a number of initiatives that relate to science education. “Researcher’s Night” is an annual event, during which citizens can observe and participate in different science experiments and demonstrations, and learn more about the achievements of Bulgarian researchers. “beautiful Science” is implemented in collaboration between MES and the British Council. It links science, education and arts to inspire young people to pursue a professional career in science and to encourage young scientists to communicate with the broad audience. “Sofia Science Festival” is also an annual event. Its aim is to provoke interests in science among the young audience and to inform the general public about the newest endeavours of scientists in Bulgaria and around the world.

Scientific results and interest in science are promoted also through different competitions and awards. There is an annual competition “Young Talents”, which is for school children, and the annual awards Pythagoras. The Pythagoras Awards have been presented annually by MES since 2009 in recognition for outstanding scientific achievements. They are considered the most prestigious scientific awards in Bulgaria. One of the ten award categories is also the Grand Prize for Young Scientist.

OP Science and Education for Smart Growth is also encouraging inclusion of young scientists in research projects.
MES and NSF funding could set up science education programmes and initiatives in the economic planning regions outside of Sofia. Focus on STEM training at schools is very much needed. The engagement of MES in the STEM coalition since April 2018 is considered a substantial improvement.53

B. Main barriers (structural, cultural or related to interchange dynamics)

**Financial resources to promote science education are limited.** There are no designated programmes for the promotion of science in the Bulgarian society, and MES and NSF lack a specific communication strategy to promote science education. Funding constraints and frequent changes in the political leadership of MES and NSF are also important barriers.

C. Main drivers (structural, cultural or related to interchange dynamics)

MES and NSF can provide stimulus for individual universities and research institutes to engage with the society through science education and participate more actively in national competitions. It can be noted that many scientists are keen to participate, given there are available incentives, including promotion in career development.

D. Good practices (or bad practices)

The annual awards (e.g. Pythagoras and Young Talents), organised by MES, serve as good practice. In 2009-2010, ARC Fund was involved actively in activities focused on working with young people in science thanks to a project, funded under OP Development of Human Resources. ARC Fund conducted a survey of the needs of additional training and qualification of 50 doctoral students, young researchers, and post-doctoral students at the Institute of Biophysics (BAS) and the Biology and Physics faculties of Sofia University “St. Kliment Ohridski” with the objective of defining an optimum scheme for research training and raising their professional qualification, also taking into account the needs of business in the fields of environment, medicine and agriculture where biophysical methods are applied. ARC Fund organised two training courses to (i) build capacity for international project management and participation in EU programmes, encouraging R&D development and (ii) introduce the participants to the research and innovation policy of the EU, and build capacity on innovation management and IPR issues, skills they would need as well in their research careers. Thus, the Institute of Biophysics (BAS) and the Biology and Physics faculties of Sofia University “St. Kliment Ohridski” provided the research training, while ARC Fund provided the training on the complementary skills, needed for a successful career in scientific research and in business.

E. Current indicators (if any)

n.a.

F. All points of improvement

- Set up science education centres (so-called Science Shops) at universities and research institutes throughout the country
- Incentivise universities and research institutes to take part in national and international competitions that promote science
- Motivate young scientists to take part in research projects
- Cooperation with media for science education initiatives
- Set up a specific communication channel at MES and NSF related to science education
- Introduce disciplines at school/college/university which encourage RRI learning
- Introduce calls with NSF and OP-funded projects that focus on training for young scientists
- Organise Winter/Summer academies that link teachers with STEM professionals
- Engage more stakeholders and the society throughout the country in STEM platform initiatives

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53 The EU STEM Coalition is a Europe-wide network of national STEM platforms. STEM platforms are organisations (usually) established by governments to increase the number of STEM graduates and reduce skills mismatch. Key characteristics of the platform approach are the close cooperation between the ‘triple helix’ of government, education and industry, and strongly regionalised implementation. In the long term, the EU STEM Coalition aims to bridge the skills gap by having a national STEM strategy in place in all EU member states. More information is available at: [http://www.stemcoalition.eu/](http://www.stemcoalition.eu/)
G. Agreed points of improvement, with action plans and indicators for success
n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>RRI key: Science education</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspects of organisations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science education is not a core priority, but different science education related initiatives are implemented annually. Strong focus on encouraging participation of young scientists in research projects and promotion of science among the young.</td>
<td>Perception that science education is crucial for engaging society and legitimising science and research in the eyes of the society.</td>
<td>Engaging with society outside the universities and research institutes. Participation in STEM coalition since April 2018.</td>
<td></td>
</tr>
<tr>
<td>Potential Drivers for science education</td>
<td>Existing programmes and initiatives for promotion of science and popularisation of science among the young.</td>
<td>Two-way transfer of knowledge with external stakeholders. Many scientists are keen to participate and some initiatives at universities and research institutes are already in place.</td>
<td>Programmes for bilateral and multilateral cooperation and exchange visits of researchers, including young scientists. MES participation in STEM platform.</td>
</tr>
<tr>
<td>Potential Barriers for science education</td>
<td>Funding constraints. No designated programmes for science education. Frequent changes in the political leadership of MES.</td>
<td>Brain drain – state invests in education of young scientists and researchers, who then leave the country to pursue better career abroad.</td>
<td></td>
</tr>
<tr>
<td>Actions on science education</td>
<td>Promote importance of science and its application to society, including through specific communication channels. Set up science and education programmes across Bulgaria (not just in Sofia, where they are currently concentrated). Increased opportunities for the young scientists to participate in research projects.</td>
<td>Improve capacity for science communication through media.</td>
<td>Larger focus on science education at all universities and education institutions, including participation in international science-promoting events. Include RRI learning as a discipline at colleges and universities.</td>
</tr>
<tr>
<td>Indicators for the success of actions</td>
<td>Communication channel on science education is set up and operational. New science and education programmes in different regions of the country. Projects for training young scientists, funded by NSF and OP Science and Education for Smart Growth.</td>
<td>Awards for scientists that reach out to society. Science and research related articles in the media.</td>
<td>Increased science understanding and STEM uptake within society. Organised Winter/Sumer academies that link teachers with STEM professionals. Introduced disciplines at universities which encourage RRI learning.</td>
</tr>
<tr>
<td>Indicators for improved performance of</td>
<td>Indicators:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• % of research projects, which include at least one science education specialist</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Number of public events (festivals, open days, awards and competitions)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 7.2.7 Incorporation of AIRR dimensions into policies

#### Anticipation and reflexivity

**A. Description of the practice and its development and an assessment of how well it currently works**

MES currently develops the so-called national science programmes which seek to identify the potential for capacity in certain scientific areas and the demand for service. In this respect, the government will be able to channel resources to scientific areas which have the highest potential for sustainability. In early 2018, MES has also undertaken a study on *Socio-Economic Impact of Universities and Research Institutes in Bulgaria* to demonstrate the need for higher public funding to match the EU funding in the critical mid-term period 2019-2021 when the key research infrastructures will be developed. Yet, these are only limited efforts to develop a foresight programme for science (according to interviews with government officials).

The recent discussions of the 2017 Call for Establishment of Regional Research Centres in Bulgaria are a good example of reflexive decision-making at MES. MES teams have visited all six economic planning regions of the country and organised discussion, involving hundreds of key stakeholders (academia, business, local/regional authorities, NGOs, and experts) on how to improve procedure and methodology for selecting project proposals. The feedback and opinions obtained through these discussions were used to reflect upon issues, challenges and opportunities related to the establishment of the Regional Research Centres, and to finalise the text of the Call. A senior official at MES explained that the Ministry often undertakes initiatives (council meetings, thematic events) and awareness raising campaigns where the scientific community, businesses, society and the administration are invited to share their opinions, needs and concerns, providing MES with a valuable input for reflection on the implemented or planned policies.

**B. Main barriers (structural, cultural or related to interchange dynamics)**

The key barrier is the short-term horizon of political mandates in Bulgaria. Frequent changes on top of the Ministry leave little time to think strategically and to maintain mid- or long-term policies. Moreover, accountability of mandates and policies does not have a high standard in Bulgaria. Another barrier, in the opinion of one interviewee, is that the older generations of scientists are still the key drivers of science. Without anticipating measures and policies for overcoming the generation gap, the capacity to conduct research and science in Bulgaria will diminish in the coming decade as the older generations retire.

**C. Main drivers (structural, cultural or related to interchange dynamics)**

Research programmes funded through MES and NSF must be able to respond to important societal challenges and needs in diverse areas such as development of the economy, education, ecology, social development, human resources, health and security. At the same time, the limited financial resources call for a very careful and well-informed consideration of priorities and possibilities. This situation requires continuous reflections on the original purposes and motivations for funding research, which is expected to be socially relevant and beneficial. Another driver for reflexivity and anticipation is the Bulgarian role in the European policies for development of research and innovation, which demands the periodical strengthening of the existing normative base and its synchronisation with the European one.
D. Good practices (or bad practices)

The annual report for the work of MES is a way to reflect upon what has been achieved in line with strategic goals. The annual reports present information about the key achievements and missed opportunities in the national science policy during the previous year.

E. Current indicators (if any)

n.a.

F. All points of improvement

- Increase institutional capabilities for anticipatory policy-making, including the application of foresight methods, technology assessment, scenarios, and vision assessment in development of the national science programmes, planning of funding priorities and establishment of research infrastructures.
- Reflexivity should be formally incentivised, recognised and rewarded.
- MES and NSF could consider engaging directly with the society outside of research and academia in order to elaborate research and science priorities that address pressing societal challenges.

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>AIRR dimensions: Anticipation and Reflexivity</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aspect of organisation</strong></td>
<td>Overall, only limited efforts to develop a foresight programme for science, but in recent years several initiatives undertaken with enhanced anticipatory reflexive element.</td>
<td>Strategic long-term policy-making and deeper deliberation over effects and implications of current policies are not prioritised.</td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Potential Drivers for anticipation and reflexivity</strong></td>
<td>Necessity to respond to important societal challenges.</td>
<td>Public accountability. Reflexive practices within R&amp;I, formally or informally, which may be exploratory. Champions who commit to anticipatory activities.</td>
<td>Business-science partnerships. EU research and innovations priorities and strategies.</td>
</tr>
<tr>
<td><strong>Potential barriers for anticipation and reflexivity</strong></td>
<td>Lack of institutional capacity. Traditional short-term horizon of MES leadership.</td>
<td>Low accountability standards. Older generation of scientists still dominates the research and science system.</td>
<td>No evidence of anticipatory activities.</td>
</tr>
<tr>
<td><strong>Actions on anticipation and reflexivity</strong></td>
<td>Increase institutional capabilities.</td>
<td>Application of Foresight methods, Technology Assessment, Scenarios, Vision Assessment.</td>
<td>Ensuring the services are well known externally. Reflection is formally incentivised, recognised and rewarded.</td>
</tr>
<tr>
<td><strong>Indicators for the success of the actions on anticipation and reflexivity</strong></td>
<td>Recognition of trusted advisors in this domain within the organisation.</td>
<td>Survey of perceptions of staff at MES and NSF.</td>
<td>Anticipatory practices are institutionalised. Strategies and internal documents reflect upon anticipatory actions.</td>
</tr>
</tbody>
</table>
| **Indicators for improved performance** | Indicators:  
- Introduction of strategic intelligence in visioning, elaboration of strategies and action plans of MES and NSF  
- Introduction of annual surveys among staff to detect anticipatory actions |                                                                   |                      |
Openness and transparency

A. Description of the practice and its development and an assessment of how well it currently works

Public debates are organised in expert working groups, which develop strategies and proposals that underpin changes in the legislation as per strategic priorities. The participation of business associations is very much welcomed. Think-tanks and NGO experts take part in the discussions of these experts groups, which are then often continued in the public through conferences and seminars. Codes of conduct also support these activities.

B. Main barriers (structural, cultural or related to interchange dynamics)

The key barrier is that the working meetings often include the same participants, which are nominated by their respective institutions. Sometimes these representatives do not have the necessary motivation to take part in the debates.

C. Main drivers (structural, cultural or related to interchange dynamics)

Transparency and openness are well established values and practices within the public institutions given that these are publicly funded organisations.

D. Good practices (or bad practices)

The Science Directorate publishes relevant documents and initiatives at www.horizon2020.mon.bg, but information on science policies is not presented very regularly (e.g. on monthly basis) by MES. NSF publishes the reports from its Executive Council meetings, but more could be done to publicise its other activities as well.

E. Current indicators (if any)

MES and NSF provide open reporting of their activities.

F. All points of improvement

Through their current practices both MES and NSF perform well in the transparency and openness dimensions. They could consider making the information more accessible to the society by engaging the media more often. Also recommended is regular publication of Annual Reports on the work of MES.

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>AIRR Dimensions: Openness and Transparency</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aspect of Organisation</strong></td>
<td>Institutional mandate and legislative requirements.</td>
<td>Informal processes.</td>
<td>Accountability to broader society.</td>
</tr>
<tr>
<td><strong>Potential Drivers for openness and transparency</strong></td>
<td>Leadership team. Codes of conduct and other internal regulations.</td>
<td>Builds on established values. Need for open science, open access.</td>
<td>Societal trends and expectations towards government funding organisations.</td>
</tr>
<tr>
<td><strong>Actions on openness and transparency</strong></td>
<td>Partnership with online magazine BG Science and other media.</td>
<td>Staff engaged in promoting work of MES and NSF to society.</td>
<td>Engaging with the media.</td>
</tr>
<tr>
<td><strong>Indicators for the success of the actions on</strong></td>
<td>Strategic planning and implementation processes.</td>
<td></td>
<td>Number of communication channels used and media attention.</td>
</tr>
<tr>
<td>openness and transparency</td>
<td>Regular publications in print and online media. Regular updating of organisational website.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Indicators for improved performance of openness and transparency | Indicators:  
| | • Number of partnerships with magazines, TV media  
| | • Number of NSF and MES staff engaged with the society  
| | • Number of round tables, seminars, which aim at providing more transparency and openness  
| Perception indicators:  
| | • % of Bulgarians who trust researchers in government and industry  
| | • % of Bulgarians who trust policy-makers actions in the innovation and research space |

### Responsiveness and adaptation

A. Description of the practice and its development and an assessment of how well it currently works

Responsive governance has a major impact on the development of the national research system. The coordination of the science policy has been identified by analytical reports, produced by the World Bank (2012-2013) and more recently by the PSF study (2015-16) as a major pillar of the system. Adaptation to policy challenges is conceived by MES as the way to build upon international good practice but taking into account the national context.

B. Main barriers (structural, cultural or related to interchange dynamics)

Very often, MES and NSF take a top-down approach in priority setting. Therefore, it is advisable that they engage more effectively with societal actors, and not only with business partners and researchers.

C. Main drivers (structural, cultural or related to interchange dynamics)

MES and NSF management are willing to learn from global practices and relevant institutions. Therefore, this would be important when considering implementation of RRI programmes.

D. Good practices (or bad practices)

n.a.

E. Current indicators (if any)

n.a.

F. All points of improvement

MES and NSF could consider targeting through their funding programmes also areas, which are demanded by the community. NGOs and other societal actors could be supportive through consultations.

G. Agreed points of improvement, with action plans and indicators for success

n.a.

H. Resulting matrix

<table>
<thead>
<tr>
<th>AIRR Dimensions: Responsiveness and Adaptation</th>
<th>Structural issues</th>
<th>Cultural issues</th>
<th>Interchange related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect of organisation</td>
<td>Informal practices.</td>
<td>Bulgarian society does not anticipate responsive behaviour from state institutions.</td>
<td>Business engagement is limited in defining the work on research and innovation.</td>
</tr>
<tr>
<td>Potential Drivers for responsiveness and adaptation</td>
<td>Institutional recognition.</td>
<td>Historical momentum of certain disciplines.</td>
<td>Learning from global practices.</td>
</tr>
<tr>
<td>Potential Barriers for responsiveness and adaptation</td>
<td>Top-down approach in priority setting.</td>
<td>Time and project constraints.</td>
<td>Society not engaged.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Actions on responsiveness and adaptation</td>
<td>High engagement with diverse social actors. Conversational, non-hierarchical approach involving MES/NSF staff.</td>
<td>Focus on society expectations.</td>
<td>Encourage business-science partnership. Engage society through initiatives that provide knowledge about what NSF and MES are doing.</td>
</tr>
<tr>
<td>Indicators for the success of actions on responsiveness and adaptation</td>
<td>Majority of the society comprehends well the work of MES and NSF.</td>
<td>Business is actively involved in the discussions with MES/NSF and their role in the society.</td>
<td>Organised workshops/seminars.</td>
</tr>
<tr>
<td>Indicators for improved performance of responsiveness and adaptation</td>
<td>Indicators:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of business-science projects that serve society needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of organised workshops/seminars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception indicator:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of society trust MES and NSF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7.3. Reflection on Review findings, Outlooks developed and ways forward

#### 7.3.1 The integrated or fragmented nature of different responsibility related dimensions

The terms ‘open access,’ ‘open science,’ ‘ethics,’ ‘public engagement’ and ‘responsibility’ are often combined in the national discourse (documents and public talks) but one rarely sees together **anticipation, reflexivity, and inclusiveness**. The RRI terminology gained prominence among government officials in the recent years, but more strongly among those that participate in the EU discourse. However, this has yet to affect legal or policy frameworks, which have still not integrated RRI concept as a comprehensive approach.

The societal engagement, ethics, science education, open access and open science seem to have a solid presence in the practice of the Ministry of Education and Science. Some of these RRI aspects have also become important principles in the operation of the National Science Fund.

#### 7.3.2 Common barriers or drivers

MES is more successful in integrating some of the RRI keys in its practice (societal engagement, ethics and open access) and less so with others (science education). Gender equality is largely seen as a non-issue. The lack of a coherent national RRI policy leaves much space for developments in this regard. Effective coordination between innovation and science policies remains a challenge, given the fact that the Ministry of Economy is responsible for the former, and MES for the latter. According to a senior official at NSF, contacts between the National Science Fund and the National Innovation Fund – the two key national funding instruments for science and innovation – have been very sporadic since 2015.

National priorities sometimes put some of the RRI areas in focus, while others remain in the periphery. The reason is that opposition to reforms very often delays the process. Sometimes, it is the initiative of individual leaders who take the specific RRI area to a higher level.

#### 7.3.3 Final reflections and plan for follow-up

The Ministry of Education and Science will have to increase the trust of society in science. For that reason, it is necessary to increase the number of public administration staff, who engage with society on science issues. Moreover, MES and NSF need to improve their communication strategy to include principles of RRI as key milestones in the dialogue with stakeholders and the society in general. Annual surveys among staff, but also involving academic community, other stakeholders and the society in general, to detect anticipatory actions can also contribute towards improving transparency, openness and reflexivity.
The newly developed Centres of Excellence and Centres of Competence will have to be involved in the national policy-making process, as they will form the core of the national science system. It would be worthwhile to explore opportunities for NSF to set up an Ethics Commission to oversee application, implementation, monitoring and control of the project life cycle and the integration of ethics principles.

MES and NSF can publish sections of their Annual Reports that discuss progress on the implementation of RRI principles. Moreover, good practices in universities and research institutes could be rewarded to improve motivational aspects for RRI policy to be followed. It is advisable that successful members of the Bulgarian diaspora abroad are invited to public initiatives that improve the societal engagement component of the RRI policy in Bulgaria.

Actions in respect to development of STEM Platform and encouragement of initiatives within the STEM coalition throughout the country will provide more opportunities for Bulgarian policy-makers to improve public engagement. In terms of gender and diversity aspects, there is a need to enhance transparency in the recruitment panels and increase the access of vulnerable groups from the society to the public administration as well as encourage inclusion of these groups in research proposals.

MES will have to continue organising public events that promote science and technology and encourage research projects to get registration in international platforms that deal with science education. Finally, open access and open science policies will have to be formally adopted and the policy-makers have to encourage research project teams to adopt access policies, especially in cases of funding from public sources.

The plan below is a proposal for follow up which may be considered by the Ministry of Education and Science and the National Science Fund.

Table 3: Plan for follow-up

<table>
<thead>
<tr>
<th>RRI Policy development: Action plan</th>
<th>Timing</th>
<th>Responsible actors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set up inter-ministerial working group to incorporate RRI vision in strategies and action plans of MES</td>
<td>November 2018</td>
<td>MES and NSF in cooperation with other sectoral ministries</td>
</tr>
<tr>
<td>Adopt Open Access/Open Science Policy</td>
<td>January 2019</td>
<td>MES</td>
</tr>
<tr>
<td>Internal discussion and communication plans that incorporate RRI principles</td>
<td>January 2019</td>
<td>MES and NSF</td>
</tr>
<tr>
<td>Set up Ethics Commission at NSF</td>
<td>January 2019</td>
<td>NSF</td>
</tr>
<tr>
<td>RRI training for managers and staff of Centres of Excellence and Centres of Competence</td>
<td>February 2019</td>
<td>MES in partnership with external actors</td>
</tr>
<tr>
<td>Finalised RRI vision</td>
<td>February 2019</td>
<td>MES</td>
</tr>
<tr>
<td>RRI training for management of universities and research institutes throughout the country</td>
<td>March 2019</td>
<td>MES in partnership with external actors</td>
</tr>
<tr>
<td>Set up of RRI award</td>
<td>March 2019</td>
<td>MES</td>
</tr>
<tr>
<td>Development of STEM platform and launch of STEM coalition initiatives</td>
<td>March 2019</td>
<td>MES</td>
</tr>
<tr>
<td>Encourage participation of vulnerable groups in research projects, funded by national instruments</td>
<td>June 2019</td>
<td>MES and NSF</td>
</tr>
<tr>
<td>Engagement of Bulgarian diaspora in RRI-related initiatives</td>
<td>June 2019</td>
<td>MES and NSF</td>
</tr>
<tr>
<td>Continuous support for festivals, conferences, workshops, award ceremonies, related to RRI principles</td>
<td>Through the year</td>
<td>MES and NSF</td>
</tr>
</tbody>
</table>
8. Summary of findings on each responsibility dimension

8.1 The concept of responsibility

Research funding bodies: Ministry of Education and Science and National Science Fund

The staff at the Ministry perceives responsibility as a need to address societal challenges and provide solutions to pressing social needs (demographic, economic, legislative and practical/daily life domains). This would mean that the research funding institutions should strive to support the science and research, which produce results that are useful to society – for example in the fields of health and wellbeing, robotics and automation, advanced machinery, ICT, or tackling the negative effects of climate change. Responsibility is also associated with accountability of decision-makers. An important element of responsibility is also establishment of long-term partnerships between research funders, research performers, industry, professional and civic organisations, which can only be accomplished through open and engaged dialogue between these stakeholders and based on mutual trust.

Research performer: Applied Research and Communications Fund

According to the founding documents of ARC Fund, responsibility is embedded in the principles of good governance, financial accountability, adherence to high ethical and professional standards, commitment to public accountability, openness and collaboration, efficient management of resources, operational and financial autonomy, equitable and transparent stakeholder engagement, and moral integrity.

In practical terms responsibility is perceived by ARC Fund’s staff as a broader socially responsible behaviour. This entails responsibility for the implications of research and its usefulness (being responsive to some of the most pressing issues on the social and economic agenda), consideration for the impacts of research on wider groups in society, and transparency and accountability to societal actors and stakeholders.

8.2 The notion of ‘RRI’

Research funding bodies: Ministry of Education and Science and National Science Fund

The overall concept of RRI is not widely familiar within MES except among people who interact with European institutions on a regular basis. Nevertheless, in many of its initiatives the Science Directorate at MES adheres to the principles of RRI. The same is valid for the team at NSF regarding some of the RRI keys.

As the RRI concept has not been integrated in the national science policy yet, none of the staff in the Science Directorate has been tasked with specific RRI-related responsibilities. Similar to MES, there is no specific mandate for someone at NSF to oversee the compliance with RRI framework, although observance of some RRI keys is mandatory in the competitive calls of NSF.

It was identified that there is a public debate on the social impact of scientific research, which relates closely to the RRI principles. RRI was more commonly seen (during interviews, workshops and focus groups) as a re-labelling or extension of existing approaches for governing and dealing with both R&I outcomes and processes.

Research performer: Applied Research and Communications Fund

The RRI concept has not been formally incorporated into any of ARC Fund’s formal documents yet, but the RRI framework nevertheless is very significant for the organisation. The RRI principles have been always respected in the ARC Fund’s work and are implicitly present in ARC Fund’s founding documents and policy. Certain aspects of RRI, such as public engagement, open access, ethics and gender equality (included in the larger frame of non-discrimination) have always been ingrained into its practices and objectives. In recent years science education has also become more prominent for some of ARC Fund’s thematic programmes (especially Safer Internet Centre).

Overall, the RRI concept was embraced across organisation as valuable and practical guidelines for streamlining a change within the organisation, especially regarding the elaboration of the new internal policy based on RRI.
8.3 Ethics

*Research funding bodies: Ministry of Education and Science and National Science Fund*

Ethics is one of the defining concepts at MES, driven not only by internal debates, but also by public concerns over the need to strengthen research integrity (in recent years, this has been a hot topic in the Bulgarian media) and to uphold high ethical standards in science and research. A crucial development in this respect was a recent (May 2018) amendment to the Law for Academic Staff Development, which will lead to the establishment of the Academic Ethics Commission to intervene in cases of misconduct, conflicts of interest or plagiarism in universities and research institutes, with the Minister of Education and Science acting as a control mechanism.

Understandably, ethics is also important for the work of NSF, as selection procedures for evaluators of project proposals and evaluation of proposals are based on ethical criteria. However, there is no Ethics Commission at NSF and ethics evaluations are considered of lower importance compared to assessment of research excellence of the applications under NSF’s calls for proposals. Furthermore, NSF has no mandate to detect research fraud or research malpractice. Although national and EU calls for proposals have established the practice of mandatory requirements for call applicants to adopt Ethics Codes, this is often just a formality for researchers, as there is not yet a transparent monitoring system and indicators to track progress.

*Research performer: Applied Research and Communications Fund*

The common agreement is that ethics is relatively well-developed and embedded in both organisational policy and practice. Although a formal internal policy on research ethics is not in place, organisational practices encompass strict compliance with relevant national and European legal rules and frameworks; adherence to ethical requirements and obligations under EU-funded projects; engagement with societal issues from a value neutral perspective; relations with stakeholders that are based on trust, accountability, mutual respect, and fairness; and consideration of the underlying social dimensions of conducted research (longer-term sustainability, environmental and economic responsibility, and human rights).

ARC Fund will channel resources towards the elaboration of a unified organisational policy on research ethics and research integrity, incl. the establishment of a Research Ethics Board.

8.4 Societal engagement

*Research funding bodies: Ministry of Education and Science and National Science Fund*

Societal engagement is not a priority at MES in terms of setting research agendas through pronounced involvement of society. There is opposition to consulting society during the process of research policy design, as policy-makers and experts believe that society neither understands nor is interested enough in science and research to be capable in participating in a productive process. Nevertheless, the recent launch of IS3 has been a breakthrough in terms of stakeholder engagement in research and innovation, as the opinions of a variety of stakeholders, including the civil society, were considered in the process.

Societal engagement is often associated with the social responsibility of research, and societal engagement strategies are seen as an opportunity to gain public trust and legitimise spending for research.

The projects, financed by NSF, have budgets for dissemination of their results. NSF, in that respect, has put a special focus on promoting science in society and respectively define the public significance of research outcomes through asking project beneficiaries to be active in societal engagement. As an institution, however, NSF has no mandate, programme or initiative to implement societal engagement strategies that could bring together representatives of the society and the research community in a dialogue about science and research priorities and potentials.

*Research performer: Applied Research and Communications Fund*

Public engagement practices (engagement of stakeholders and average citizens) are deeply embedded in ARC Fund’s work. In many respects, ARC Fund can be regarded as the pioneer in employing public engagement in setting up new research agendas on the national level. Societal engagement is seen as a social responsibility par excellence, as it brings to the fore the importance of achieving positive outcomes for society and the economy, and helps to ensure that the process of STI policy development does not neglect the needs of the society.
At ARC Fund, societal engagement takes different forms and meanings, as practices differ across the three programmes due to differences in their thematic focus and the target groups they work with. Simple dissemination of information or research findings is usually not considered as engagement, as this is only a one-way interaction in which society is not really an active partner. Societal engagement practices at ARC Fund therefore include consultations, involvement in decision-taking and empowerment of stakeholders.

The focus of future actions on public engagement at the level of ARC Fund will be to strengthen the in-house capacity to engage with different stakeholders and lay people.

8.5 Gender equality and diversity strategies

Research funding bodies: Ministry of Education and Science and National Science Fund

The topic of gender equality in research and innovation was initially dismissed as non-relevant for the Bulgarian context, because the female researchers in the public research sector outnumber their male colleagues. However, there is an issue of under-representation of women in top positions in both research and innovation. Another problematic area is the absence of measures to support the career development of women, who interrupt their work due to pregnancy and maternity leave.

Discussions at MES and NSF shifted the attention from gender equality to a wider objective of diversity. Two issues were underlined: the need to support the inclusion of young scientists in R&D and provide the ‘right’ institutional incentives for reversing the currently unfavourable age structure in the Bulgarian research environment, and the need to create conditions for attracting graduates from ethnic, religious and other underrepresented communities into science and research.

Research performer: Applied Research and Communications Fund

At ARC Fund, gender equality is mostly perceived in terms of a balanced composition of research teams and the representation of women in senior management, on the one hand, and as only one among several dimensions of diversity, on the other. Strict observance of principles of non-discrimination and tolerance are incorporated into organisations core documents.

To a certain extent, a good gender balance in the organisation is also an outcome of external factors, such as favourable local labour market conditions that see a general balance of male and female researchers. The wider ‘diversity’ framework is therefore viewed as more relevant that the question of gender equality, and mobilised in two main ways: (1) efforts to recruit research professionals (fellows, interns) with culturally and ethnically diverse backgrounds and (2) composition of groups targeted through various initiatives and programmes.

In regard to gender equality and diversity no major points of improvement were foreseen. Nevertheless, the management team will consider updating its organisational policy on non-discrimination, gender equality and diversity and organising a training for the research staff on gender equality and diversity issue in research.

8.6 Open access and open science strategies

Research funding bodies: Ministry of Education and Science and National Science Fund

Open access and open science are still relatively new concepts, but in recent years, MES has started several initiatives for promoting and facilitating open science and open access policies. The overall aim is to improve Bulgarian performance in this area in international rankings. At MES, open access is considered to be of fundamental importance for opening up the encapsulated scientific community and putting science into service to society. However, open science/open access indicators have not yet been linked to European or national programmes for financing research.

The relationship between open science, open data, open access still needs to be clarified in the Bulgarian context. Uniform policy on open science/open access of MES is still missing, but this will be changed when the draft Concept Note on Implementing Open Access in Research is passed.

Special attention is also paid to the matter of retaining intellectual property rights – recognised as a potential barrier among the R&I community to provide access to research results obtained through public funding.
Open access is implicitly present in ARC Fund’s mission, principles and guidelines but not explicitly treated as an organisational policy concept. Open access is viewed as a very important element of responsible research, bridging the science-society gap, enabling greater scientific literacy, supporting education and in general being a pillar of democratic and socially inclusive science policy.

Although the organisation currently lacks strict formal rules, it provides free and open access to the knowledge that is produces through the organisational website (usually in Bulgarian and English).

As a measure of improvement of the current practice, a focus will be put on elaborating ARC Fund’s policy on open access and delivering a training to the research staff on open access issues.

8.7 The inclusion of science education into research

Science education is not among the core priorities of MES and NSF, and none of the two organisations has at its disposal the necessary communication strategies and channels that would help them to promote the importance of science in the Bulgarian society. Additional problems are limited financial resources to promote science education. Nevertheless, MES organises or contributes to different events, which can be at least indirectly related to science education, as they are intended to raise interest in science among the young people, or to encourage scientists and researchers to present and share the results of their work with the broader public.

Bulgaria needs to more rigorously promote science education in schools and the development of decentralised science education centres in the country as these could provide opportunities for customised science education programmes to take place in the different communities in the country.

8.8 Incorporation of AIRR dimensions

Diversity is not yet recognised in Bulgaria as being critical for innovative organisations and for promotion of creativity. Overall, inclusion and diversity are concepts that Bulgaria will have to integrate fully in the design of research and innovation policy, because they provide the fundamentals for international linkages and cooperation.

MES is engaged with development of national science programmes that will make it possible to anticipate the demand and capacity in certain scientific areas. This will help the government to channel resources towards those scientific areas, which have the highest potential for sustainability. The ability for effective anticipation of science and research needs and priorities is especially crucial in the coming period (2019-2021), when Bulgaria plans to develop some of the key research infrastructures using national and EU funding.

MES will also need to reconsider the overall role of universities and research institutes in the country, and amend the legislation regulating the rules and conditions for setting up new universities/faculties. This calls for deeper reflexivity and ability to rethink the current situation than has been observed in the past.

One of the main tools employed by MES to overcome the Bulgarian cultural mentality, which is not conducive to openness and transparency has been organisation of public debates in working groups, which develop strategies and proposals for changes in the strategic legislation. These working groups have included representatives of business, science, government and civil society.
Adaptation is conceived by the Ministry of Education and Science as the way to introduce international good practice but taking into account the national context. As the role of business is still very limited in terms of defining the work on research and innovation, research-funding organisations like MES and NSF will need to become more adaptive and find innovative ways to encourage business-science partnership.

Research performer: Applied Research and Communications Fund

The AIRR dimensions (i.e. anticipation, inclusion, reflexivity and responsiveness) are not formally incorporated in ARC Fund’s Rules and Order for Performing Publicly Beneficial Activities. The dominating view in the organisation is that the dimensions are largely absorbed by and overlapping with the values embedded by the RRI Keys. As such, AIRR dimensions do not add much substance to the overall construct of responsibility in science and innovation, but could be used to expand or modify the definition of the five RRI pillars. That being said, it can be concluded that the AIRR elements largely coincide with ARC Fund’s overall organisational approach to research process and knowledge governance.

Anticipation is interpreted as being proactive in terms of considering likely impacts of project-related work; articulating possible risks concerning engagement/research and foreseeing appropriate mitigation actions; and adapting to unintended outcomes over the course of research projects’ implementation.

Inclusion corresponds to involvement of stakeholders and general public in different stages of the research process. This entails engaging citizens in deliberations on a variety of topics, with a view to enable the inclusion of broader societal perspectives into the research process.

Responsiveness and adaptation are mostly visible in continuous reflections on the original purposes and motivations for performing research, which is expected to be socially relevant and useful, as well as on the embedded assumptions of research itself. Responsiveness also means the ability to see beyond the strict requirements (e.g. contractual obligations for implementation of a project) and sometimes change the focus of research, or a component of the project, to produce an end result that might have a more important impact under the changed circumstances.

8.9 The integrated or fragmented nature of different responsibility related dimensions

Research funding bodies: Ministry of Education and Science and National Science Fund

Interviewees and focus group participants from MES and NSF often underline connections between terms like open access and open science, ethics, public engagement and responsibility. On the other hand, terms like anticipation, reflexivity, and inclusiveness rarely appeared in the conversation, and never together. Although all RRI keys are integrated in the practice of MES (including NSF), no legal or policy framework integrates in full the notions under RRI framework.

Research performer: Applied Research and Communications Fund

RRI framework is perceived as highly relevant for adding to the current organisational legitimacy of ARC Fund vis-à-vis key stakeholders in society. Although not formally embedded in organisational policy and documents, the RRI principles have been always respected in ARC Fund’s work. At the time of the research on which the current report is based, RRI was rarely seen as an integrated and comprehensive concept – rather individual RRI keys and AIRR dimensions emerged as principles intertwine with ARC Fund’s research practices and agendas. This does not mean that no common ground was identified. Some correlations were established between societal engagement and science education, whereas the latter was sometimes described in the context of ARC Fund’s practice, as a derivative, or one of the possible formats of the former. Links and similarities were also found between societal engagement and open access, although it was highlighted that proper engagement is a two-way process and requires more that simple dissemination of information.

Gender equality was often mentioned together with diversity, with the explanation that gender key is a too narrow definition that should be expanded to cover parity on other relevant grounds as well (minorities, people with disabilities, immigrants, etc.).

Also noted was certain convergence between open access and ethics keys – here the most prominent common issue was the question of intellectual property rights and unethical use of open access materials.
Finally, ethics often emerged as an overarching element, linking all other keys, as each of them involves several ethical considerations and potential problems.

Given the fragmented nature of RRI within the organisation, and at the same time its utmost importance for the work conducted by ARC Fund, it was commonly agreed by staff members and management that the way to go forward is the elaboration of internal RRI policy capitalising on the work accomplished under the RRI-Practice project.
9. Conclusions

The present report has analysed the RRI discourse based on three levels of understanding – national policy and practice, research funding, and research performing organisation. Although the RRI concept is novel to decision-makers and research performers, it is to a certain extent integrated in policy documents and the legal framework in the shape of individual RRI elements.

The interviews, focus groups and workshops conducted during the field study for this report gave numerous practitioners an opportunity to learn more about RRI. Many of them confirmed that the RRI framework is of a large benefit for monitoring the implementation of reforms and tracking outcomes of the research and innovation system. RRI concept also provides a valuable insight on how to improve the national research system. NSF and MES, as the lead actors, should provide the framework, measures and indicators for adherence to the principles of RRI.

This report proposes an overall systematic RRI approach that should deliver better results for the Bulgarian research system. More importantly, there is a window of opportunity in 2018-2021 period, which promises to be very intensive and with considerable potential for reform for two main reasons: (i) substantial and unprecedented increase of EU and national funding for research and innovation in Bulgaria, and (ii) establishment of Centres of Excellence and Centres of Competence, as well as Regional Research Centres that should stimulate Pan-European cooperation for Bulgarian research institutes and research universities, which are currently among the underperformers in the EU ranking.

This report arrives on time to help strengthen the RRI dimensions of research funding and research performing organisations in order to improve the needed internationalisation and competitiveness of the Bulgarian research system.

9.1 Policy recommendations to national policy makers

Ethics
- Continuous development of ethics standards at the national level.
- Adoption of National Code of Conduct for Researchers.

Societal Engagement
- Expanding channels for communication with the public (social media, TV programmes for science).
- Launching a coherent communication strategy for societal engagement.
- Build capacity for science communication among scientists and researchers through training programmes.

Gender and diversity
- Promotion of awareness about the need to uphold principles of gender equality and non-discrimination.
- Address barriers to academic career progress of women.
- Enhance international exchanges on gender equality and diversification.

Open Access/Open Science
- Organise round tables to spread knowledge and get support from researchers for open science/open access policy measures.
- Set up surveys to study perceptions of researchers.
- Engage media and other communications channels to promote open science and open access.

Science Education
- Promote importance of science and its application to society through encouraging appointment of science education specialists in research projects.
- Encourage the appointment of RRI specialists in universities and research institutes, and inclusion of modules in research projects that relate to RRI.
AIRR dimensions

Anticipation and reflexivity
- Regularly update national research priorities supported by public funds to ensure they correspond to important societal challenges.
- Development and promotion of research programmes of national and societal importance.

Openness and transparency
- Increase partnerships with media (journals, TV) in reporting on science and innovation achievements and promotion of results.
- Organise a larger number of round tables, seminars and other events to increase positive attitude of the society towards science.
- Increase trust of the Bulgarian society in government interventions regarding R&I through established communication channels with wider stakeholders, and introduce new such channels through media outreach.

Responsiveness and adaptation
- Regular meetings of the Council for Smart Growth.
- Active engagement with relevant societal actors, including researchers, business actors, and civil society.

9.2 Policy recommendations to European policy makers

- Incorporating RRI in smart specialisation strategies: The Strategy for Smart Specialisation offers a clear opportunity to integrate RRI as a central pillar for growth (particularly through the development of regional centres, excellence and competence research centres). This would be a significant improvement, helping to reach development targets and objectives related to social, economic and environmental responsibility. The objective is to improve regional public policy that would support delivery of RRI to enterprises’ products, processes, service design, and distribution. Changes are expected through integration of RRI criteria and RRI as a horizontal concept.
- Improved policy instruments and better targeted funding: Working towards a medium-term impact of increased awareness and capacity on RRI delivery and a long-term impact of increased responsibility in research and innovation - with correlated benefits in growth and competitiveness - through improved policy instruments and better targeted funding for RRI implementation through the Operational Programmes and H2020. The aim is to introduce the RRI in all relevant organisations and institutions.
- Integrating RRI into evaluation criteria for rewarding science (supporting project proposals). There is a need to focus much of our attention on better integrating RRI principles with criteria measuring scientific excellence and the economic valorisation of R&I (i.e. publications'/patents’ count, marketability of results, etc.), so that broader socio-ethical benefits and goals are not ignored.
- Building better awareness about RRI matters: Better awareness through better information dissemination and access to information. There is a need of additional trainings for policy makers, scientists and public representatives (NGOs) so that the process of implementing RRI principles is better facilitated.
- Introduction of Governance as a key pillar: Introducing RRI and responsible education in all relevant organisations and institutions requires the engagement of all relevant structures, such that the whole R&I ecosystem is aligned with the goals for socially acceptable, desirable and sustainable R&I processes and outcomes.
- Gender and Diversity: The pillar “gender equality” is too narrow and could be extended to include other socio-demographic characteristics relevant to promoting and improving diversity in science, research and innovation (age, ethnicity, disability, race, etc.).
9.3 Recommendations to research conducting and funding organisations

9.3.1. Research conducting organisations

Ethics
- Elaboration of organisational policy on research ethics, including a Code of Conduct.
- Definition of responsibilities of senior management regarding promotion, competence-building and evaluation of ethical research conduct.
- Establishment of a Research Ethics Board.
- Training and information on research ethics for all employees, and new employees briefing / orientation.
- Annual reporting on research ethic performance.

Societal Engagement
- Expanding channels for communication with the public based on the easy-to-use manual with instructions.
- Capacity building for staff in the area of societal engagement.
- Definition of responsibilities of senior management regarding methods and tools for societal engagement.
- Annual reporting on societal engagement activities and their results.

Gender and diversity
- Development of organisational policy on non-discrimination and promotion of equality and diversity.
- Training of staff on issues related to equality and diversity.
- Annual reporting on gender equality and diversity in the organisation.

Open Access/Open Science
- Elaboration of organisation’s policy on open access.
- Training of research personnel on open access issues.
- Annual reporting on open access activities.
- Definition of responsibilities of senior management regarding organisation’s open access policy.

Science Education
- Increased cooperation with educational institutions.
- Internship programmes, scholarships, young researcher competitions and awards and other activities for attracting and retaining young scientists.
- Annual reporting on science education activities.
- Definition of responsibilities of senior management regarding science education in the organisation.

AIRR dimensions

Anticipation and reflexivity
- More proactive approach towards anticipating likely impacts of research work on the wider society.
- Articulation of potential risks and planning of mitigating actions.

Inclusion and diversity:
- Inclusion of as broad as possible societal perspectives in the research processes.

Openness and transparency
- Internalise the perception that scientific and research excellence can only be achieved and maintained if conducted in an open and transparent manner that allows public scrutiny.
Responsiveness and adaptation
• Perpetual questioning and reconsideration of purposes and motivations for conducting scientific research which needs to the socially relevant and beneficial to the wider society.

9.3.2. Research funding organisations

Ethics
• National Science Fund can set up an Ethics Commission following the H2020 approach.
• Environmental ethics and social ethics requirements could be included in the guidelines for applicants.
• Ministry of Education and Science can publish sections in their annual reports on observance of research integrity and research ethics in the national science system.
• Ethical considerations to be highlighted in the reviews and the evaluations of National Science Fund.
• Ministry of Education and Science can reward best practices in universities and research institutes for integration of ethics and integrity in research.

Societal Engagement
• Incorporating societal engagement initiatives in the communications strategy of the Ministry of Education and Science and National Science Fund.
• Introduction of separate section in the annual reports of Ministry of Education and Science and National Science Fund on societal engagement.
• Involving successful scientists and researchers from the Bulgarian diaspora in public initiatives.
• Develop a STEM Platform under the STEM coalition initiative.

Gender and diversity
• Enhance transparency in recruitment panels.
• Increase the diversity (especially on ethnic basis).
• Set up annual diversity award.

Open Access/Open Science
• Ministry of Education and Science adopts national open science/open access policy.
• Ministry of Education and Science and National Science Fund encourage research projects, which are financed with European and public funds to follow open access and open science policy.

Science Education
• Continue to organise public events (festivals, open days, awards and competition in science).
• Encourage research projects that are registered in international platforms, which relate to science education (e.g. SCIENTIX).
• Encourage schools, kindergartens to include science education in their programmes.

AIRR dimensions

Anticipation and reflexivity
• Introduce anticipatory strategies in the vision, action plans and strategies of MES and NSF.
• Introduce annual surveys among staff to detect anticipatory actions.

Openness and transparency
• Increase number of NSF and MES staff engaged with the society.

Responsiveness and adaptation
• Involve Centres of Excellence and Centres of Competence in the national policy-making process.
9.4 Good practices scalable to European or national level

Different stakeholders interviewed in the course of the Bulgarian case study research highlighted the important role of societal engagement for achieving social acceptability and increased legitimacy of science and innovation processes. Societal engagement can help the policy makers and scientific community to identify and elaborate research priorities, to steer policy decisions and support their implementation, and to increase the public interest in science, research and innovation work. The Bulgarian cases presented below are examples of public engagement practices that are scalable at national and European levels.

1. Bulgaria launched work on its Smart Specialisation Strategy in 2012 to analyse the strengths of the economy and identify strategic areas for intervention based on the innovation and research potential of the country. The Strategy embraced the Entrepreneurial Discovery Process, which involved wider stakeholder involvement. The work on the strategy brought the Ministry of Economy, who championed the work on the strategy, to collaborate closely with the Ministry of Education and Science. Senior government officials and staff from both ministries travelled together to all six economic planning regions to discuss findings from the analysis and policy recommendations with key stakeholders (business, academia, NGOs, local authorities, and experts), who provided substantial input and comments. The World Bank signed a partnership agreement with the Ministry of Economy to provide analytical support in 2012 and 2013, which substantiated the work on the Smart Specialisation Strategy. The European Commission provided constant guidance throughout the process and endorsed the findings. The Strategy was eventually approved by the Council of Ministers in 2017 and it set a clear vision, strategic steps, monitoring and evaluation mechanisms to track progress. The work on the Strategy helped setting up a coordination mechanism for the innovation and research policy by establishing Smart Growth Council in 2015.

2. The successful practice with IS3 was replicated during the work on Establishment of Regional Research Centres of the Operational Programme Science and Education for Smart Growth, operated by Executive Agency under the Ministry of Education and Science. A working group of government officials and external experts prepared the first draft of the call for selection of project proposals and methodology in the summer of 2017. It was published for public consultation in October 2017, inviting comments from potential beneficiaries – research organisations and businesses. The team at the Executive Agency prepared a Plan of Action for consultation with stakeholders in January 2018, and between February and April 2018, draft proposals related to the call were presented to relevant key stakeholders. Six meetings in all economic planning regions of the country and four meetings in Sofia welcomed over 500 stakeholders (Mayors, Deputy Mayors, Rectors and Vice-Rectors, chairs of business associations and others). The inputs and comments were well taken by the team at the Executive Agency, which prepared final proposals. Minute reports were prepared for the European Commission officials and presented in April 2018. The team at the Executive Agency was in contact with media to help spread news on a regular basis. The process of consultation for the call on Establishment of Regional Research Centres is considered a good practice, which could engage other Operational Programmes of the EU Structural Funds in Bulgaria to set up similar channels for consultation with stakeholders.

3. ARC Fund has accumulated considerable experience over the years which could be of use to other research conducting organisations to test, elaborate and apply societal engagement as an effective method for re-confirming research agendas, identifying new research priorities and informing policy-making. One good example of ARC Fund’s engagement with citizens in order to improve the connection and collaboration between science and society and develop a more inclusive, responsive and responsible research and innovation system, are the citizen vision workshops organised in the frame of CASI project (http://www.casi2020.eu). Citizens of different age, gender, living environment, education and profession were engaged in a three-step process. They were first asked to imagine what would sustainable future look like 30 years from now. The outcome of these workshops were different visions, which were then presented to sustainability and innovation experts, who used the ideas of citizens to formulate research priorities. In the third and final stage of the engagement process, the citizens that took part in the first vision workshop gathered again to discuss and rank the priorities developed by the experts.
4. A similar approach was undertaken in the frame of the PROSO project (Promoting Societal Engagement under the Terms of Responsible Research and Innovation; http://www.proso-project.eu). The methodology of the citizen panels was inspired by CASI project (described above) and consisted of three main stages as well. On the first Citizen Panel Meeting, citizens discussed their views on different formats of public engagement in the fields within the focus of PROSO, namely bio-economy, nanotechnology and food and health. The Joint Expert Workshop was used to review the results of the first citizen panel meeting and formulate options for fostering public engagement, taking into account citizens’ perspectives. Finally, at the second Citizen Panel Meeting, citizens discussed different challenges for public engagement, and policy and practice options to address these challenges.

Both examples from ARC Fund’s practice showed that numerous citizens are willing to take part in R&I decision-making and work very responsively towards provided opportunities to engage in the R&I processes. Initiatives that focus on one-way information flow (science communication) are overall non-attractive and detrimental to citizens’ motivations to take part in engagement initiatives. Successful societal engagement is therefore possible only if citizens believe that their participation is meaningful and socially beneficial. Also essential is transparent and open communication with the citizens, as many might be distrustful, assuming that engagement initiatives would be only used by policy makers to justify decisions which have already been made. Societal engagement is therefore a process which does not end with collection and analysis of citizens input, but requisites a continuous communication with the society and a detailed feedback on the use of the engagement results.

A good example of how the formal science education can be supported by a not-for-profit research organisation is the collaboration between ARC Fund’s Safer Internet Centre and the Faculty of Pre-school and Primary Education of the Sofia University “St. Kliment Ohridski.” As a result of this cooperation, a postgraduate course “Education in the Age of Digital Technologies” was developed and added to the Faculty’s curriculum. University students attending the course and working under the guidance of ARC Fund experts and the lecturers of the course developed a methodology for primary school students for early development of digital and media literacy. The methodology develops five core competencies based on the European Digital Competence Framework (DigiComp) and the European Association of Viewers Interests (EAVI): 1) Information literacy; 2) Communication and cooperation; 3) Creating digital content; 4) Safety and 5) Solving Problems. The methodology was approbated by teachers in 7 schools in different Bulgarian cities and presented on a conference Children’s Digital and Media Literacy, organised by ARC Fund’s Safer Internet Centre.
10. **Annex 1: Reviewed documents**

Detailed reviews of all examined documents are stored on the Trello page of the RRI-Practice project.

- Higher Education Act
- Scientific Research Promotion Act
- Law for Academic Staff Development
- Pre-School and School Education Act
- Law on Equality between Women and Men
- Protection against Discrimination Law
- National Strategy for Development of Scientific Research in Bulgaria 2017-2030
- National Roadmap for Research Infrastructure (2017-2023)
- Innovation Strategy for Smart Specialisation
- Innovation Promotion Act
- Guidance and methodology (of the National Science Fund) for evaluation of research proposals 2016 submitted under the programme for young scientists
- Guidance and methodology (of the National Science Fund) for evaluation of research proposals 2016 submitted under the programme for fundamental research
- Rules of the National Science Fund 2016
- National requirements and eligibility criteria for participation in calls for proposals under internationally funded programmes
- Annual operational programme of the National Science Fund for 2017
- Evaluation reports on the activities of the National Science Fund (Mar 2017 and Dec 2017)
- Guidance and methodology (of the National Science Fund) for evaluation of research proposals 2016 submitted under the programme for bilateral cooperation

11. **Annex 2: Additional information concerning chapters 4 and 5**

**Annex 2a) Human Resource Capacity, funding and output of the STI system**

**Table 4: Distribution of researchers by age and sex in Government sector and Higher Education sector in Bulgaria, 2016**

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Men</th>
<th>Women</th>
<th>Total</th>
<th>% of age groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 34</td>
<td>1,123</td>
<td>1,496</td>
<td>2,619</td>
<td>19%</td>
</tr>
<tr>
<td>35 – 44</td>
<td>1,485</td>
<td>2,107</td>
<td>3,592</td>
<td>26%</td>
</tr>
<tr>
<td>45 – 54</td>
<td>1,621</td>
<td>1,945</td>
<td>3,566</td>
<td>26%</td>
</tr>
<tr>
<td>55 – 64</td>
<td>1,705</td>
<td>1,691</td>
<td>3,396</td>
<td>25%</td>
</tr>
<tr>
<td>65 and over</td>
<td>374</td>
<td>246</td>
<td>620</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,308</td>
<td>7,485</td>
<td>13,793</td>
<td></td>
</tr>
</tbody>
</table>


Several reports (the 2009 ALLEA-ESF that assessed the Research Institutes of the Bulgarian Academy of Sciences, the 2012-2013 World Bank analytical and advisory work for the Ministry of Economy, Energy and Tourism and
the Peer Review of the Bulgarian Research and Innovation System conducted in 2015 under the Policy Support Facility of the EC indicated lack of human capacity in the research system of Bulgaria. In response, the National Strategy for Development of Scientific Research (2010) and its 2016 update the National Strategy of Scientific Research 2025, the Law for Academic Staff Development (2010), the Scientific Research Promotion Act (2003), as well as the IS3 for Bulgaria (2017), provided and supported the key HR-related recommendations in order to boost the Bulgarian national research system.

There are huge differences in R&D funding distribution across the six economic planning regions of Bulgaria. Southwest Bulgaria, where the capital is located—takes up over 75% of overall R&D funding.

Table 5: Regional Distribution of R&D Funding in 2015

<table>
<thead>
<tr>
<th>Planning regions</th>
<th>R&amp;D expenditures (in million BGN)</th>
<th>GDP (in million BGN)</th>
<th>% of all R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-West</td>
<td>33,265</td>
<td>6,013</td>
<td>3.9%</td>
</tr>
<tr>
<td>North-Central</td>
<td>37,218</td>
<td>7,078</td>
<td>4.4%</td>
</tr>
<tr>
<td>North-East</td>
<td>35,566</td>
<td>9,655</td>
<td>4.2%</td>
</tr>
<tr>
<td>South-West</td>
<td>639,665</td>
<td>42,430</td>
<td>75.5%</td>
</tr>
<tr>
<td>South-Central</td>
<td>65,117</td>
<td>12,569</td>
<td>7.7%</td>
</tr>
<tr>
<td>South-East</td>
<td>36,413</td>
<td>10,826</td>
<td>4.3%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>847,244</strong></td>
<td><strong>88,571</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


The total gross domestic expenditure on R&D (GERD) in Bulgaria for 2015 reached EUR 430.4 million, an increase of 20% compared to 2014. Three main sources channelled R&D funding in 2015, namely: the business sector (25%), the government (30%), and foreign funding (45%). The total GERD follows an upward trend from 2005 onwards. On the other hand, starting in 2010, the direct support from the government declined. Support from EU remained almost stable in size. Yet, it is very low in comparison to the other sources of R&D financing. Between 2018 and 2023, funding from EU Structural Funds for innovation and research shall increase dramatically. Operational Programme Innovation and Competitiveness and Operational Programme Education and Science for Smart Growth will channel about EUR 630 million for innovation and science activities, supporting businesses, research institutes and universities.

Table 6: Instruments and Funding for R&D in Bulgaria, 2005-2023

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Funding</th>
<th>Period</th>
<th>Average per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Science Fund</td>
<td>&lt;110 million EUR</td>
<td>2005-2018</td>
<td>6 million EUR</td>
</tr>
<tr>
<td>National Innovation Fund</td>
<td>&lt;30 million EUR</td>
<td>2005-2018</td>
<td>1.6 million EUR</td>
</tr>
<tr>
<td>OP Science and Education for Smart Growth</td>
<td>ca.300 million EUR</td>
<td>2014-2023</td>
<td>30 million EUR</td>
</tr>
<tr>
<td>OP Innovation and Competitiveness</td>
<td>ca.330 million EUR</td>
<td>2014-2023</td>
<td>33 million EUR</td>
</tr>
<tr>
<td>FP-7, Horizon 2020, COST, COSME, etc.</td>
<td>ca.150 million EUR</td>
<td>2007-2018</td>
<td>12.5 million EUR</td>
</tr>
</tbody>
</table>

Source: Own calculations, based on official data from the Ministry of Economy and the Ministry of Education and Science.

Bulgaria’s research system has been consistently not performing well. Between 2007-2014, according to data from DG Research and Innovation of the European Commission, Bulgaria has been continuously taking last position in the ranking among EU member states.

A total of 23,396 publications were generated between 2011 and 2016 by 15,066 authors in Bulgaria. A total of 103,272 citations are estimated, which is equivalent to 4.4 citations per publication. Based on the metrics in the SciVal analytical platform, the research output of the country is mainly in the field of Physics, Chemistry, Biological Science and Engineering. Despite the observed low share of publications in the field of Environmental
Science, Social Science and Humanities, their citation impact is quite high, compared to that of leading scientific fields.

The Bulgarian Academy of Sciences, the Agricultural Academy and key universities (Sofia University “St. Kliment Ohridski,” Sofia Medical University, Plovdiv University, and the Technical University in Sofia) represent the major public research performing institutions in Bulgaria. The private performers are private universities, private research organisations, and enterprises involved in R&D.

Although a relatively new phenomenon (mainly due to OP “Development of the Competitiveness of the Bulgarian Economy,” co-financed by ERDF during programming period 2007-2013), accelerators, incubators, co-working spaces, business clusters, Technology Transfer Offices (TTOs), Sofia Tech Park, networks and platforms, have been mainly developed in the capital of Bulgaria.

Some of the key assets are:

- **Incubators**: Start It Smart, STP Incubator (mainly hosting ICT companies).
- **Accelerators, Co-Working spaces**: Eleven, Founder Institute, Betahaus, Soho, Init Lab, Cosmos, Puzl.
- **Seed and VC hubs**: LAUNCHub Ventures, Empower Capital, Black Peak Capital Ventures, NEVEQ Capital Partners.
- **Business Angels**: CEO Angels Club, Bulgarian Angels.
- **Start-up Education**: Telerik Academy, Softuni, IT step, Entrepreneurs Library, Junior Achievement Bulgaria.
- **Start-up events and communities**: Webit, Digitalk, GEM Bulgaria, weekend Sofia, ABLE start-up community with 200 members, Startup Grind, Beta Breakfast, etc.

**Annex 2b) Description of the structures of the governance mechanism of Bulgaria’s STI system**

The **Inter-governmental Working Group for Coordination of Measures for Development of Innovations, Applied Science and R&D** was launched in March 2015 (Order No.P-70). It is chaired by the Director of Innovations, Business Environment and SMEs Directorate at the Ministry of Economy which was later re-named Economic Policies for Promotion. Members of the Working Group are also vice-ministers and senior experts at the Ministry of Economy, the Ministry of Education and Science and the Ministry of Agriculture. The main task of the Working Group is to coordinate work between the ministries in the area of policies and funding of science and innovation and find synergies. This Working Group is considered to be well-placed to coordinate work also with the **National Innovation Council**. The National Innovation Council was established with regulation No.74 from March 2015 as Consultative Council to the Council of Ministers. Its role is to: a) analyse and suggest measures in support of innovation and investment activities to increase the competitiveness of the economy; b) draft recommendations and consult the government on issues related to the overall economic development of the country; c) develop and offer economic and legal regulators for promotion of investment activities in the country; d) organise, analyse and control interaction between authorities of the executive power, other state authorities, and representatives of the business.

The **Administrative Partnership Network** was launched in April 2016. It is a network of 26 senior experts, representatives of 13 public institutions in the government. It aims to address policy issues in support of innovation and science. The Ministry of Economy is responsible for the network.

The **Regional Partnership Network** provides access to representatives of the government at the regional level. More particularly, it brings together 26 chief experts in District Administration throughout the country and regional representatives of the SME agency in the six economic regions of the country. This network has met only once in 2018.

The **Secretariat** which facilitates the work of the Smart Growth Councils is supported by the Directorate for EU Funds under the Council of Ministers Administration, and is also a supporting unit composed of experts who sit in the Ministry of Economy, Directorate Economic Policies for Promotion.
There are several **Financial Instruments** which impact substantially the national innovation and science system. These are the eight operational programmes under the EU Structural Funds, the national funding instruments (NSF, NIF), COSME and Horizon 2020, among others.

Finally, the **key beneficiaries** are the key actors in the entrepreneurship ecosystem (start-ups, accelerators, incubators); Centres of Excellence and Centres of Competence which were created in 2018 with the support of EU Structural Funds (OP Education and Science for Smart Growth 2014-2020) with a total amount of EUR 175 million. Business Clusters, Science Parks and Technology Transfer Offices are also among potential beneficiaries, as well as the Bulgarian Academy of Sciences with its 42 research institutes and other research institutes in the country.

**Annex 2c) Distribution of Research Equipment and Apparatus in Bulgaria (2016-2017)**

**Table 7: Research Equipment and Apparatus in Bulgaria**

<table>
<thead>
<tr>
<th>Research areas</th>
<th>Regional specialisation (outside the capital)</th>
<th>Exploitation of the equipment</th>
<th>Attracted funds /per year (less than EUR 25,000) – past five years</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-infrastructure</td>
<td>14%</td>
<td>86% (4-5 years)</td>
<td>7%</td>
</tr>
<tr>
<td>Social and Cultural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td>25%</td>
<td>65% (&gt;5 years)</td>
<td>14%</td>
</tr>
<tr>
<td>Health</td>
<td>54%</td>
<td>71% (&gt;5 years)</td>
<td>32%</td>
</tr>
<tr>
<td>Food and biotech</td>
<td>72%</td>
<td>68% (&gt;5 years)</td>
<td>50%</td>
</tr>
</tbody>
</table>


**Annex 2d) Outcome of national workshop discussions on responsibility**

Three main clusters of interpretation concerning the rationales embedded by the ‘responsibility’ concept were discussed during the workshops in April 2017 and March 2018. These clusters are **actor responsibilities**, **impact/socio-economic relevance of R&I**, and **industry collaboration/CSR**.

**Actor responsibilities:** Several workshop participants pointed out that R&I is essentially a shared process in which everyone has a stake, or should play a role. As some put it, R&I outcomes should be viewed as the result of institutional and collective actions, which highlight but also extend beyond professional responsibilities allocated to researchers or innovators. This broadening understanding of collectively held responsibilities with regard to R&I may be taken to imply changing roles for the various actors involved in science and technology governance/development, and their embedding in society. The notion of ‘collaboration’ was explicitly mobilised to suggest a distribution of reflexivity and moral work among a wider group of social actors (lay people, citizens, consumers, industrialists, institutional/governance actors, etc.), alongside the assumption of shared liabilities in relation to the process dimensions (knowledge production, publication strategies, etc.) and by-products (infrastructure, education curricula, etc.) of R&I.

**Impact/Socio-economic relevance of R&I:** Another major part of the discussion on ‘responsibility’ in R&I centred on notions of aligning outcomes of innovation and scientific research with broader socio-economic needs, with a key focus on achieving important positive impacts and delivering strategic results in the form of intelligent growth, employment and similar socio-economic benefits. ‘Responsibility’ was thus framed as an effective platform for advancing R&I goals, which are not only practically relevant and economically impactful but also generally applicable in society.

**Industry collaboration/Corporate social responsibility (CSR):** Discussions of ‘responsibility,’ led primarily by industry representatives, also revolved around the need to bring in commercial actors and private businesses in order to further the socio-economic potential of R&I and thus promote socially desirable R&I outcomes. Two

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54 Information about the EU Structural Funds for Bulgaria are available at: http://www.eufunds.bg/en/
such acknowledged approaches, identified by participants as commensurate with the goals of responsible R&I development, were the strengthening of collaboration between industry, science and academia, and the adoption of voluntary instruments for corporate social responsibility (CSR), such as recruiting young graduates. Part of this discussion also touched upon the expanding responsibilities of commercial actors with regard to opening up the innovation process to diverse publics, engaging society early on in co-design activities, and achieving more effective governance of the social implications of emerging technologies.

Annex 2e) Examples for ethics practices

Sofia University wrote on its website that the adoption of the Ethics Code expresses the will of the university to ensure good science practices and readiness to keep up with the standards set up by the European Science Community. The Ethics Commission of Sofia University offers consultations and advise on ethics issues, related to scientific research; supports the understanding of ethical problems, which arise in the scientific research field by organising educational and information initiatives; and investigates signals for infringement of rules of scientific and research ethics, regulated by the Ethics Code. The Ethics Commission comprises of seven lecturers from different faculties, one student and one member of the administrative staff. The Academic Council of the University adopts the rules of the Ethics Commission.

In the summer of 2014, the management of the Bulgarian Academy of Sciences conducted a series of initiatives to promote the adoption of ethics principles among its 42 institutes, which form 48% of the scientific research in Bulgaria. They have also developed HR Strategy for Researchers, which integrated the European Charter and the Code of Conduct. One of the key institutes, namely the Institute of Mechanics, adopted its own ethical committee and its own HR strategy. The Institute of Mechanics has an Academic Ethics Commission, which deals with complaints of researchers related to many academic activities. The Institute has also an Appeal Commission, which deals with decisions of the Attestation Committee, evaluating performance of researchers on an annual basis.

Annex 2f) New amendment to the Law for Academic Staff Development regarding control mechanism which covers procedural infringements, conflict of interest, plagiarism, and unreliability of scientific results

The new amendment came into force on 4 May 2018, providing legal grounds for the Minister of Education and Science to establish the Academic Ethics Commission. Upon receiving a signal about unethical conduct, the Commission has seven days to issue a motivated comment whether the signal is acceptable. If this is so, then the Minister of Education and Science assigns the case to the Commission. The Commission has 30 days for evaluation, after which it submits a report to the Minister of Education and Science about its findings. The Minister of Education and Science can extend the term for preparation of the report with no more than 30 days. Before the Academic Ethics Commission announces its results, it provides an opportunity to the person, whose work is under scrutiny, to come up with explanation. The Academic Ethics Commission is comprised of five members, one of them being qualified lawyer. The chairman and three other members of the Commission are representatives of four scientific areas, proposed by higher education institutions, scientific organisations, NGOs of scientists and social partners. They are all habilitated, have doctoral degrees and at least 10 years of academic experience. Art.35, par.1 of the Law for Academic Staff Development says that the academic staff is dismissed from work if it is confirmed that their scientific work has been plagiarised or based on unreliable scientific results.

Annex 2g) Open science and open access initiatives in Bulgaria

A total of 13 policy recommendations are included in the draft concept on open access and open science for Bulgaria, which are integrated in the National Strategy for Development of Scientific Research 2017-2030.55

- The Ministry of Education and Science needs to undertake an open access policy, based on the green corridor model. It is recommended that the open science policy covers all scientific institutions, which have full or partial government financing.
- Scientific organisations and foundations need to establish open access policy, which are in line with national science policy.
- Universities and research institutes need to impose and promote open access policy.

55 https://www.openaire.eu/oa-bulgaria
• Probe of the possibilities for coordination between the bibliometric index and the open access policies.
• Development of national database of research results, financed by the state or connected through common portal.
• Development of storage for scientific publications of small research institutions.
• Publishers of scientific publications to prepare a document for transition to open access.
• Publicity should be organised for the scientific community.
• Coordination of the national open access initiative with international initiatives.
• Transparency regarding payment of services needs to be installed (payments to the authors for golden access, green access needs to be provided for free use).
• Participation in central forums for international cooperation, regarding storage of scientific research and compatibility of the storage systems (e.g. Bulgaria’s membership to the Confederation of Open Access Repositories should be considered).
• Launch of a service for long-term storage of scientific publications.
• Planning of free access and long-term protection of raw data.

This document is of high interest and it meets to a high extent the international standards for open access and open science policies.  
As of June 2018 there are 7 Open Access Bulgarian repositories in OpenDOAR.56

a) Bulgarian OpenAIRE Repository
Bulgarian OpenAIRE Repository (http://www.bg-openaire.eu) is a centralised cross-institutional repository and provides OpenAIRE compliance and free access to all peer-reviewed publications resulting from ERC funded FP7 projects in Bulgaria.

b) New Bulgarian University
NBU Scholar Electronic Repository (http://eprints.nbu.bgis) is the first digital repository of scientific literature in Bulgaria. Faculty members can deposit their papers. Currently there are 565 publications with free online access. The New Bulgarian University encourages faculty members to deposit their research outputs into the repository.

c) Institute of Mathematics and Informatics at Bulgarian Academy of Sciences
Repository at IMI-BAS (http://sci-gems.math.bas.bg) is based on DSpace software with an active and configured OAI-PMH interface for metadata harvesting. There are more than 2100 publications from journals, conference books and reports.

d) University of Sofia "St. Kliment Ohridski"
Research at Sofia University (http://research.uni-sofia.bg). There is a digital repository for the main research outputs of the Faculty of Mathematics and Informatics. Other faculties are expected to join soon.

e) Medical University of Sofia (MUS)  
was established in 1918. Today, it is an independent institution within the structure of the Medical University of Sofia (MUS) and has its New open access repository (http://nt-cmb.medun.acad.bg:8080/jspui) at the Central Medical Library (http://www.medun.acad.bg) builds on 90-year experience in providing information resources and services for education, research, and professional practice. Repository’s content includes summaries of PhD theses, dissertations, electronic books, lectures, journal articles and CML-journal publications.

f) Burgas Free University (BFU)
Academic Research Repository at the Burgas Free University (http://www.bfu.bg) contains a collection of articles published in the Year-Books of BFU, articles from magazine “Biznes Posoki” and magazine “Contemporary Humanitaristics,” papers from international conferences of BFU, as well as articles, studies, papers and monographs of lecturers from BFU, published in other scientific editions. The interface is available in Bulgarian and English.

g) Bulgarian Information Consortium (BIC) is an open access group with 38 members - 26 universities, Bulgarian Academy of Sciences, 1 agency, 3 National and Central libraries, 4 Public libraries, and 3 NGOs.

56 http://www.opendoar.org
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