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Stairway to Excellence Country Report: ROMANIA

Author: Adrian Curaj

Editor: Mariana Chioncel

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Contact information

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: JRC-IPTS-S2E@ec.europa.eu
Tel.: +34 954488318
Fax: +34 954488300

<https://ec.europa.eu/jrc>
<https://ec.europa.eu/jrc/en/institutes/ipts>

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Abstract

In the frame of the Stairway to Excellence project, complex country analysis was performed for the EU MS that joined the EU since 2004, with the objective to assess and corroborate all the qualitative and quantitative data in drawing national/regional FP7 participation patterns, understand the push-pull factors for FP7/H2020 participation and the factors affecting the capacity to absorb cohesion policy funds. This report articulates analysis on selected aspects and country-tailored policy suggestions aiming to tackle the weaknesses identified in the analysis.

The report complements the complex qualitative/ quantitative analysis performed by the IPTS/KfG/S2E team. In order to avoid duplication and cover all the elements required for a sound analysis, the report builds on analytical framework developed by IPTS.

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EXECUTIVE SUMMARY

During 2007-2015, Romania funded 15,194 structural funds (SF) projects¹ through seven Sectoral Operational Programmes (SOPs).

- 5,882 projects have been funded through the Sectoral Operational Programme (SOP) “Increase of Economic Competitiveness” ([RO] „Cresterea Competitivitatii Economice” – POSCCE), out of which 620 projects for research cooperation or infrastructures, funded through the Priority Axis 2 of POSCCE (PA2) – “Research, Technological Development and Innovation for Competitiveness” (Ministry of European Funds, 2014).
- 3,338 projects have been implemented through the SOP “Human Resources Development” ([RO] „Dezvoltarea Resurselor Umane” – POSDRU), out of which 165 projects for human resources for R&I, funded through Priority Axis 1.5 of POSDRU (PA1.5) – “Doctoral and postdoctoral programmes supporting research”.

Romanian researchers and research organizations participated in 1,049 FP7 projects (European Commission, Directorate-General for Research and Innovation, 2015a).

The statistics on the regional participation show that there are five significant clusters of FP7, POSCCE and POSDRU projects: (1) Bucharest, (NUTS R032[1]), (2) Cluj-Napoca (R011[3]), (3) Iasi (R021[3]), (4) Timisoara (R042[4]), and (5) Brasov (R012[2]).

The most significant current concern for Romania regarding ESIF is the absorption rate. This concern is rooted in the previous funding cycles, where it was only in the final stages that the absorption rate started to grow more steadily. The reform of public investment, initiated in 2013 (consisting of prioritizing public investments and targeting the SF projects and projects funded from loans with the prospect of the multiplication of public investment funds), led to a substantial increase in the co-funding allocation for SF projects. Hence, the absorption rate went up to 40.6% at the end of March 2014 (Government of Romania, 2014b).

Despite this progress, as of June 2015, Romania continues to have the EU’s second lowest rate of SF absorption (62.2%) (European Commission, Directorate-General for Regional and Urban Policy, 2015a), and is last among the group of peer countries in the Cohesion Policy. This is despite the accelerated absorption in the last two years (SF absorption, excluding the European Agricultural Fund for Rural Development, EAFRD, according to European Commission, Inforegio Cohesion Policy Data), from 33.7 % at the end of 2013 to 52.2 % at the end of 2014.

The factors that have contributed to a low absorption rate of SF, in both the public and the private sectors, are described below.

The implementation of the SF SOPs in Romania is primarily and significantly affected by the **quality of governance** that is determined by the administrative capacity, which is still rather weak in comparison to other European countries. Other factors are poor institutional coordination and fragmentation, frequent legislative and institutional changes and insufficient policy capacity. The EC country report for Romania (European Commission, 2015a) shows that the weak administrative capacity is causing delays in structural reforms. The government has made progress in identifying the root causes of the structural weaknesses, but implementation of the solutions have been delayed. A strategy for strengthening public administration was adopted in October 2014, together with an action plan. The strategy addresses the second ex-ante conditionality agreed by the Romanian Government and the European Commission for the 2014-2020

¹ Number of funded projects as of June 2015: data available at <http://data.gov.ro/>.

programming period of ESIF (European Commission, Government of Romania, 2014). The implementation of the strategy faces substantial delay, especially because the action plan is strongly dependent on the SOP for Administrative Capacity (POCA) budget, while the POCA calls for projects are still in preparation as of June 2015.

The World Bank undertook six sectoral functional reviews on behalf of the Government of Romania, between March and October 2010. As a whole, the functional reviews painted a picture of a public administration characterized by (a) focus on compliance with detailed norms and regulations rather than performance, (b) budget resources spread thinly across policy areas without prioritization, (c) a lack of public transparency on performance, and (d) outdated control systems for managing people and budgets. With a special focus, the functional reviews have identified a poor institutional capacity in the Government's Central structure to coordinate policies and resource commitments across sectors that would better align and achieve medium-term budgets and strategies. (The World Bank, 2011a).

Collaboration between the public and private sectors and the commercialization of public research are weak. Results from the 2012 EU Community Innovation Survey have shown that only 4.9% of surveyed Romanian firms cooperated with the public sector (i.e. government or public research institutions) in the period 2010-2012 (Eurostat, 2012). Several efforts have been made starting with 2007 (with the National RDI Plan 2 for 2007-2013 – PNCDI2 and POSCCE PA2) to promote patenting and licensing, emergence of spinoff companies, and the expansion of joint or contract research. Nonetheless, the results of public research remain essentially in academic domains with little impact on economic development (The World Bank, 2012).

The **innovation and technology transfer infrastructure** has only been developed to a limited extent in Romania. It is characterized by low commercialization capacity and suffers from insufficient funding. This limits the capacity of the Technology Transfer Offices (TTO) to promote training, better monitor research and market developments and promote the cultural change needed in universities and by R&I performers toward improved collaboration with the private sector. Romania had a number of regulations on **Intellectual Property** (IP) with several contradictions on invention ownership, use and its transfer, creating negative views among domestic as well potential foreign investors. At the same time, there are few programmes aimed at IP-based start-up companies in Romania. The term 'innovative start-ups' is generally applied to all small and medium enterprises (SMEs) and generic support policies and programs for SMEs are divided between the Ministry of Economy and the Ministry of Public Finance (The World Bank, 2012). The legal framework for the protection and sharing of IP has been improved by the Law no. 8/ 2014 on service inventions, which is intended to clarify the rights of IP revenue sharing between employees and their employers. For example, in order to help both employees and employers to better manage the IPR related to service inventions, the Executive Agency for Higher Education, Research, Development and Innovation Funding – [RO] *Unitatea Executiva pentru Finantarea Invatamantului Superior, a Cercetarii, Dezvoltarii si Inovarii* – UEFISCDI has published a manual of good practices in applying the regulation on service inventions².

Despite changes and improvements in policy formulation, the **governance of the RDI system** still suffers from several weaknesses: a lack of coordination between the relevant policy actors, fragmented and under-funded institutional setting (with frequent changes in the structure of the advisory councils of the Ministry of Education and Scientific Research ([RO] *Ministerul Educatiei Nationale* – MECS)), unreliable funding, and a limited evaluation culture.

Regarding the **financing of the R&I sector**, in 2013 gross domestic expenditure on R&D (GERD) amounted to EUR 557,769 million (0.4% of GDP), the lowest in EU. The GERD financed by the Government sector (% of

² The manual is available in Romanian at:

<http://uefiscdi.gov.ro/userfiles/file/pdf%20publicatii/MANUAL%20DE%20BUNE%20PRACTIC%20INVENTII%20DE%20SERVICIU.pdf>

GERD) was 52.3%, compared to the EU average of 32.8% (European Commission, Directorate-General for Regional and Urban Policy, 2015b). The private GERD – equal to the R&D investments in the business sector (BERD) – remains low, at 0.12% of GDP in 2013, decreasing from 0.19% in 2012 (Eurostat, 2015).

As a particular aspect, the functional review of the RD&I sector carried out by the World Bank showed that several programs under the two main channels, POSCCE PA2 (for R&I) and PNCDI2, target several stages of the innovation value chain at the same time, as follows: Out of a total of EUR 1.4 billion of realized and planned expenditures between 2007 and 2011, 33.69% were devoted to basic research – stage one (EUR 972 million) through the Human Resources, Capacities, and Ideas programmes (within PNCDI2), and selected subprograms under POSCCE PA2. Almost a third of the funding (29% or EUR 408 million) was directed to either stages one or two (proof of concept), through programmes like Partnerships and Innovation under PNCDI2. POSCCE-Partnerships targeted specifically stage two with EUR 11.4 million. In total, POSCCE-Private infrastructure targets all stages of the ‘valley of death’ (stages two to four) with only EUR 19 million. Finally, all innovation stages are funded by only 1.4% of the total (EUR 20.7 million) through the subprogram POSCCE-Innovation, while stage five – production and marketing – receives less than 1%, amounting to only 5.8 million, through POSCCE-Start-ups-Spin offs (The World Bank, 2012).

Taking into consideration Romania’s drawbacks in absorbing SF, complementarities identified among ESIF and based on the lessons learned in 2007-2013 and the new challenges raised by the **ESIF architecture in Romania**, a coordination mechanism with structures on three levels (strategic committee, thematic inter-institutional, operational), has been set up in order to ensure the coherence of the interventions, complementarities and synergies in the programming and implementation stages. The coordination mechanism will function in parallel with the institutional framework designed for implementation (European Commission, Government of Romania, 2014). Even though the mechanism will be in place, they are irrelevant in the absence of human resources and the proper culture to make them functional.

There are three **ESIF funding instruments** for R&I activities: Operational Programme “Competitiveness” (POC), Operational Programme “Human Capital” (POCU), and the Regional Operational Programme (POR) – focused on support for developing technological transfer capacity.

In order to elaborate a **RIS3 strategy**, the National RDI Strategy 2014-2020 (SNCDI2020), a large foresight process³ was carried out, coordinated by a consortia of relevant public and private institutions, and supported by a wide participation of stakeholders. It provided a set of four initial proposals of smart specialisation priorities. Following a policy dialogue phase between the coordinating consortia and the MECS, the final set of four priorities was decided: (i) *Bioeconomy*; (ii) *ICT, Space and Security*; (iii) *Energy, Environment and Climate Change*; (iv) *Eco-nano Technologies and Advanced Materials*. The implementation of the SNCDI2020 is also linked to POC.

The regional smart specialisation strategies in all of the 8 regions should be elaborated by the end of 2015, but as the actual regionalisation process is still pending in Romania, the spectrum of instruments these strategies can use remains limited.

The factors that support or limit the national participation in R&I calls funded by SF / ESIF have been identified during the interviews performed by the author with relevant R&I stakeholders and based on the existing studies and reports. Besides poor strategic steering, **difficulties as regards the implementation of the SOPs during 2007-2013** programmes include: persistent weaknesses in the management systems, failure to proactively anticipate and tackle implementation shortcomings, low coordination between responsible departments, low institutional capacity to implement sectoral strategies, cumbersome national procedures for managing public investment projects, and persistent shortcomings in the public procurement system (European Commission, 2015a).

³ www.cdi2020.ro

There are also **factors that support the participation in SF / ESIF R&I calls**: (1) adequate SF / ESIF policy instruments (correctly formulated programmes and correlated with the national strategic framework) and a (2) satisfactory supply of eligible proposals.

Concerning the **participation in FP7 / H2020**, there are several issues worth mentioning. Firstly, the national R&I calls are definitely more accessible than FP7 / H2020. However, when national funding was reduced from 2008, researchers turned to FP7 – with a success rate for FP7 calls during 2007-2013 of about 14.6%, the lowest in the EU (European Commission, Directorate-General for Research and Innovation, 2015b). Moreover, researchers turned to SF, and POSCCE PA2 calls retained 271 project proposals in 2010 compared to 80 in 2009 (Ministry of European Funds, 2014).

Secondly, participation in FP7/ H2020 has been limited by the lack of qualified research project managers. On the one hand, some of the PROs have well-prepared research managers with either formal qualifications or relevant past experience in the H2020 context, while on the other hand there are PROs which are still confronted with a – sometimes very significant – lack of qualified project managers. This is due to inadequate personnel policies in some cases and, most often, to unattractive salaries (making the R&I sector an unattractive employment sector) in the context of unreliable R&I funding.

In addition, the quality of the National Contact Points (NCP) support is quite low in Romania, mainly because of the lack of personnel. The NCP capacity can be increased by improving institutional structures.

Another issue is that Romania has a lack of experience in evaluating and participating in FP schemes, at least compared to the real potential of the Romanian R&I system in terms of human resources and research infrastructures. The low networking capabilities of relevant actors and the insufficient integration in ERA are restricting the participation in FP7 / H2020.

With a potential positive impact on H2020 participation rates, the quality of the research infrastructures is high in Romania. Starting 2005, the national programmes complemented lately by the SF allowed for increased investments nationwide in R&I infrastructures. Now, the challenge for researchers and policymakers is to make them visible internationally, as well as to maintain and use them for further development. Romania will host one European research infrastructure with global impact – the ELI Extreme Light Infrastructure, with an estimated start of operation in 2016 (European Commission, European Strategy Forum on Research Infrastructures, 2012) and other 10 research infrastructures of pan European interest in engineering, energy, socio-economic sciences, physics, environmental, marine and Earth sciences, material sciences, chemistry and nanotechnologies, and life sciences (European Commission, Directorate-General for Research and Innovation, 2015c).

The following factors would affect the **synergies between ESIF and H2020**:

Coordination between ESIF (country level) and the EU (level) programmes: Despite the already existing support in common provisions on the ESIF programmes and in the Country Partnership Agreement for the coordination between ESIF, national funds and European Research Policy Horizon 2020, effective functional coordination mechanisms have to be developed. There is a need for piloting, mutual learning, and shared practices, for proactive actions both from the Managing Authority (MA), Intermediary Organism (IO) and NCPs, for covering the whole life cycle of the programmes, from deep understanding of potential synergies, design of the instruments and the call (documents development, aligning call calendars, selection procedures, funding decisions and contract signing, monitoring and evaluation – M&E), while focusing on decreasing the administrative burden on grantees. It is not about *additive manufacturing*. Achieving synergy between programmes will require both 'synergy' and a strong partnership between staff members of NCPs and MAs; each of them bringing in the value of their professional networks. Common task forces focused on problem solving would be an effective way to *walk the talk*. "Act local and share the practice at the EU level" has to be the core message, together with "no good practices left behind".

Interoperability, data sharing and open access: Access to information, data sharing and interoperability issues are critical. It is about procedures (evaluation, implementation, M&E, etc.) and resources (evaluators, applicants, beneficiaries, etc.). *Portability* of evaluations is one of the key issues in making synergy work. It is not about H2020 providing evaluations to external parties but about making evaluation information available for use at the national level by the ESIF funding authorities, while maintaining the anonymity of evaluators (*depersonalization of evaluation*).

Prospective coordinated calls, eligibility and funding rules, M&E: Achieving synergy will require coordinating the timing of the ESIF and H2020 calls for alternative and / or cumulative funding calls. This is neither easy nor obvious; mainly because programmes are not *synergy born*. The problem is complicated by the need to align the objectives of ESIFs and H2020. It is also worth looking at the ESIF-ESIF... synergies in potentially linked calls and funding projects with partners from different countries. A forward-looking consultation based process, involving key stakeholders, similar to the Entrepreneurial Discovery Process (EDP), will help to reveal new opportunities and create roadmaps for its implementation.

Based on the swot analysis and factors presented above, Chapter 9 of this report formulates proposals for specific structural changes and policy suggestions targeted to supporting the synergy between ESIF, EU programmes and national funds.

Synergy readiness – programmes level communication and coordination

- Support at the EU level, for piloting, mutual learning, and sharing good practice. Common task forces focused on problem solving would be an effective way to *walk the talk*. “Act local and share the practice at the EU level” has to be the core message, together with “no good practices left behind”;
- Develop reward schemes for the most innovative approaches, or quality labelling good practices, at the EU level;
- Drive the actions towards understanding the challenges and identify solutions related to access to information, data sharing and interoperability issues;
- Coordinated actions focused on procedures (evaluation, implementation, M&E, etc.), resources (evaluators, applicants, beneficiaries, etc.). *Portability* of evaluations is one of the key issues in making synergy work, avoiding duplications and taking time-effective, quality-based decisions. To make this effective, the MAs and IOs have to plan in advance the language used for the calls and project evaluation, and the way in which H2020 proposals could be used at the national level (decision to keep the English version or translate it into the national language);
- Coordinated actions for identifying ways of facilitating access to the information about already funded projects and their publicly available results, in line with the *open access* to the results of the publicly funded projects;
- Consolidated actions on the IPR issues related to synergy between ESIF, EU programmes;
- Consolidated actions on the use of state aid regulations, and their impact on the synergy.

Synergy readiness – country level communication and coordination

- Create common problem solving task-forces with the participation of MAs, IOs, NCPs and national RDI funding agencies;
- Support the ad-hoc task-forces, with *flexible geometry*, for fast finding solutions to the demand-driven requests;
- Support for joint staff training of NCPs, MAs, IOs and national RDI funding agencies, and development of their professional networks. This develops the *synergy* and partnership between staff members of the NCPs, MAs, IOs and national RDI funding agencies, as well as building mutual trust and stimulating proactive, joint initiatives;

- Support developing the *synergy* and partnership between staff members of the NCPs, MAs, IOs and their EU / EC peers by exchanging best practice and lessons learned as well as stimulating joint initiatives and finding solutions to common problems;
- Supporting the development of common NCPs, MAs, IOs documents explaining synergies;
- Support for providing open access to the funded projects, beneficiaries and researchers.

Synergy readiness – capacity building RDI stakeholders’ level

- Use ESIF and national funds to invest in capacity building of the research management and administration offices. This should be done with a clear focus on professional support for scanning / understanding funding opportunities and correlation between them, writing successful proposals, reducing the administrative burden on researchers in managing project implementation. Support their networks and knowledge sharing initiatives;
- Use ESIF and national funds for very practical, tailored training that targets researchers. For example, use case studies presenting lessons learned from EU, ESIF and nationally funded projects, covering the whole project life cycle, identifying needs and challenges. Focus on stakeholders inclusiveness in order to have *usual and unusual suspects* involved, to create public-public, public-private and private-private understanding of the potential synergy of funding opportunities as well as unlocking the potential in accessing collaborative, multi-fund opportunities;
- Use ESIF and national funds to cover the costs inherent in preparing quality project proposals; waived by the evaluation results;
- Targeted brokerage events that are synergy focused and oriented around case studies, for research offices and researchers;
- Support innovative projects using social networks and media for communicating funding opportunities and telling the stories of successful synergies.

Acknowledgements

Aside from expert-based analyses, parts of this report are based on a series of 27 interviews performed with key PRO and private companies' managers and researchers, policy makers, and management personnel from SF for R&I funding agencies from various NUTS2 regions of Romania. The respondents have provided policy recommendations (included in section 9) and valuable insights for capturing the nuances and qualitative aspects regarding the implementation of SF and FP7 / H2020 in Romania.

The interviewees represent three PROs, six HEIs, one governmental institution, two SF for R&I funding agencies, and two private companies:

- National R&D Institute for Food Bioresources (Bucharest);
- Institute of Biochemistry of the Romanian Academy (Bucharest);
- National R&D Institute for Biological Sciences (Bucharest);
- "Alexandru Ioan Cuza" University of Iasi;
- "Ion Ionescu De La Brad" University of Agricultural Sciences and Veterinary Medicine of Iasi;
- University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca;
- "Babes-Bolyai" University (Cluj-Napoca);
- "Transilvania" University of Brasov;
- ANCSI (Bucharest);
- Intermediary Organism (IO) POSDRU / POCU, MECS (Bucharest);
- IO POSCCE / POC, ANCSI (Bucharest);
- SC Incubus Consulting SRL (Bucharest) (General Director, Mircea POPESCU);
- SC FM Management Consultancy SRL, (FMMC) (Bucharest) (General Manager, Madalin IONITA and Researcher & Administrator, Flaviana ROTARU).

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1 INTRODUCTION

Background of Stairway to excellence project

The European Commission Framework Programme (FP) for research and technology development has been vital in the development of European knowledge generation. However, there is considerable disparity across EU countries and regions in terms of FP participation and innovation performance.

Horizon 2020 will continue to provide funding on the basis of excellence, regardless of geographical location. However, it will also introduce novel measures for “spreading excellence and widening participation” by targeting low Research & Innovation (R&I) performing countries – most of whom are eligible for innovation funding under the Cohesion Policy for the period 2014-2020.

In addition, the new regulations for ESIF aim to use funds more effectively to build regional/national excellence and capacities. By doing so, the key funding sources (ESIF and Horizon 2020) can complement one another along the entire innovation process.

Objective of S2E

The Stairway to Excellence (S2E) project is centred on the provision of support to enhance the value of the key EU funding sources for RDI: The ESIF (European Structural and Investment Funds) and Horizon 2020 but also the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME), Erasmus+, Creative Europe, EU Programme for Employment and Social Innovation (“EaSI”) and the digital services part of the Connecting Europe Facility, by actively promoting their combination. The S2E project is funded by the European Parliament and implemented by DG-REGIO through JRC- IPTS. It has two main objectives, namely:

- Providing assistance to regions and countries that joined the EU since 2004 to reduce the innovation gap, in order to promote excellence in all regions and EU countries;
- Stimulating the early and effective implementation of national and regional Smart Specialisation Strategies.

Main purpose of the document

In the context of the project, complex country analysis is performed for all 13 EU MS with the objective to assess and corroborate all the qualitative and quantitative data in drawing national / regional FP7 participation patterns, understand the push-pull factors for FP7 participation and the factors affecting the capacity to absorb cohesion policy funds. This report articulates analysis on selected aspects and country-tailored policy suggestions aiming to tackle the weaknesses identified in the analysis.

The report complements the complex qualitative/ quantitative analysis performed by the IPTS / KfG / S2E team. In order to avoid duplication and cover all the elements required for a sound analysis, the report builds on the analytical framework developed by IPTS.

2 QUALITY OF THE GOVERNANCE

RDI policy formulation and coordination

Policy formulation in the Romanian Government is marked by low demand for analyses and a focus on legal compliance of policies rather than their impact. This is evidenced by the relative absence of public policy documents, the poor quality of substantiation notes, and the limited role of the Public Policy Department (of the General Secretariat of Government) in reviewing policy issues that are on the government meeting agenda (The World Bank, 2011b). This Department has the mission to improve the policy formulation process in the central administration, mainly by implementing a coordination mechanism for policy making. The Prime Minister's Delivery Unit was established in May 2014⁴ to help strengthen and monitor progress in the Government's delivery of public service priorities through sustained focus on the performance of key services and public sector management, to oversee implementation and assess the progress of the Government transformation programme. It is planned to be complemented at the Centre of Government by a Strategic Unit and a Policy Unit.

The **RDI policy formulation** process is based, since 2007, on large participatory foresight exercises. The first National Foresight Exercise in Science and Technology (NFE1) in 2005-2006 set the strategic and implementation framework for the 2007-2013 policy cycle and was the first experience of bottom-up policy formulation in the RDI system in Romania. The second National Foresight Exercise for Research, Development and Innovation (NFE2), organized in 2013, set the framework of smart specialization priorities for Romania in 2014-2020. The NFE2 for RDI was carried out with the aim to develop the RDI Vision 2020 and identify the RDI priorities (which include smart specialisation and the complementary priorities of public interest). The fully-fledged foresight exercise for smart specialization combined a strong evidence base (an extensive database of Romanian projects, publications, patents, and SMEs that enabled the creation of "knowledge maps"), a large online exploratory phase (with almost 30,000 experts and stakeholders), a consolidation phase based on panels and an argumentative online consultation (a Delphi 2.0 survey with 4,000 respondents) for the final selection of priorities⁵.

The government's **decision-making and policy coordination** processes have been and continue to be an issue. Ad hoc committees continue to do the work envisaged for the permanent network of 11 inter-ministerial policy committees that was never operationalized (established in Law no. 750/ 2005). No formal process currently exists to ensure that policy priorities guide resource allocation decisions or that structured deliberations occur concerning the policy rationale for determining budget ceilings (The World Bank, 2011b).

The national RDI system

The institutional framework of the national RDI system consists of:

- **At macro level, regulatory institutions:** Parliament, Government (through MECS and the National Authority for Scientific Research and Innovation, ANCSI), National Council for Science and Technology Policy (not operational since its establishment in 2002), and consultative bodies of MECS (Advisory Council for Research, Development and Innovation CCCDI, National Council for Scientific Research CNCS, National Council for Ethics in Scientific Research, Technological Development and Innovation CNECSDTI);

⁴ Through a SF Technical Assistance project implemented by the World Bank.

⁵ For more information on the structure of the NFE2, please see (European Commission, Joint Research Centre, 2014)

- **At meso-level, academies:** Romanian Academy, the Academy of Agricultural and Forestry Sciences ASAS, Academy of Medical Sciences ASM, Academy of Technical Sciences AST, **and RDI funding agencies:** UEFISCDI, Romanian Space Agency ROSA, the Institute of Atomic Physics IFA;
- **At micro level, the RDI actors:** 55 public universities, 42 national R&D institutes, 69 research institutes and departments of the Romanian Academy, other research institutes, departments or clinics coordinated by branch academies (Zulean, Ioniță,, & Vișu, 2015), private RDI actors.

The Parliament has the most significant regulatory role by providing the legislative framework for the RDI activities; the regulatory activities of the Parliament concerning the RDI system are conducted by the Commissions for Education, Science, Youth and Sport of the Chamber of Senate and of the Chamber of Deputies. Also, the Parliament is setting the public expenditures for RDI.

The RDI policies are implemented by the **Government** through the **MECS**, and subsequently through the **ANCSI**. At this level, the activities should be coordinated by the **National Council for Science and Technology Policy** (which has the main role of setting the national RDI priorities as a non-legal entity under the coordination of the Prime Minister), but the council was not made operational since its establishment by Government Decision no. 57/ 2002.

In the policy formulation process, the Ministry has the support of four advisory councils: **The Advisory Council for Research, Development and Innovation** is the main consultative body pertaining to the Government on matters related to RDI. Its mission is to provide specialized scientific support in developing policies and strategies to sustain RDI at national level, in coordinating, evaluating and financing scientific research, experimental development and innovation in Romania by MECS through ANCSI.

The **National Research Council** is a national advisory body of the MECS, whose mission is to foster excellence in scientific research in Romania. The council assists MECS and ANCSI in coordinating, M&E scientific research in Romania.

The **National Council for Ethics in Scientific Research, Technological Development and Innovation** is the main body that coordinates and monitors the application of moral conduct rules and professional ethics in R&D activities in Romania.

With the taking over of the **ANCSI** by Government Decision no. 185/ 2013, **MECS** ensures institutional funding through the “Nucleu” Programme for the National Institutes for R&D operating under its coordination. In addition, MECS supervises the main competition-based **funding agencies** in the public RDI system: UEFISCDI and the IO POSCCE / POC PA2 / PA1. **UEFISCDI** has coordinated during 2007-2013 the project-based funding schemes of PNCDI2. Aside from the policy support function, UEFISCDI also plays a policy advisory role by its constant involvement in R&I and higher education (HE) policy analysis and policy formulation process (by coordinating, for instance, NFE1 and NFE2).

The **Romanian Academy** is the highest national scientific forum, with a major role in socio-economic sciences and humanities.

The **Academy of Medical Sciences** is the public institution of national interest in medical and pharmaceutical scientific research and for academic recognition in the field, with legal personality, subordinated to the Ministry of Health.

The **Academy of Agricultural and Forestry Sciences** represents the national forum for academic acknowledgement and coordination of scientific research in the fields of agriculture, forestry, aquaculture, veterinary medicine, food industry, rural development and environmental protection.

The **Academy of Technical Sciences** was established as a forum for scientific recognition at national level of prominent figures in the field of engineering, but also as a forum for debate and various initiatives, for promoting R&D, for technical creation and education in engineering. It came into existence by the reorganization of the Association The Academy for Technical Sciences in Romania.

For the national RDI system overview, please see Figure 1.

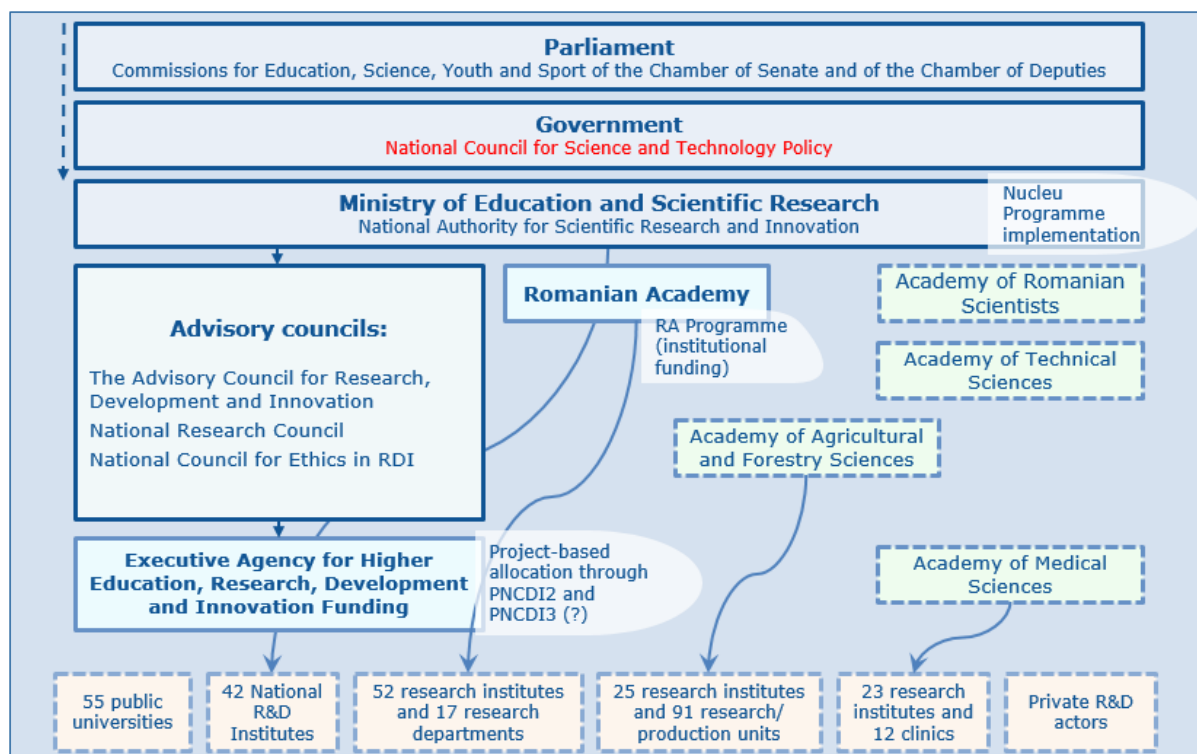


Figure 1. Organogram – institutional framework and governance of national RDI funds

There is a flawed horizontal and unclear vertical coordination of public R&I and, in recent years, inconsistency occurs in the type of institutional organization of the R&I system (in terms of coordination, with changeable structures such as agency, authority, ministry, etc.).

An institutional and organizational framework that facilitates the functioning of the R&I system is essential. The National Council for Science and Technology Policy has remained inactive since its creation in 2002. Many problems are generated by this lack of inter-ministerial coordination. Also, the policy instruments should be correlated at inter-sectoral level, at least because of the R&I potential to increase economic competitiveness. For example, the recent Health Strategy for the current policy cycle is not correlated with research, yet “health” is a research priority; clearly, in this case, a common strategy is really needed. Even in the RDI/public administration sectors where Romania has developed the necessary policy tools, they have not been applied in a timely manner, with the required speed and efficiency.

RIS3 implementation through SNCDI2020 and PNCDI3

NFE2 provided a set of four initial proposals of smart specialisation priorities. Following a policy dialogue phase between the coordinating consortia and MECS, the final set of four priorities was decided: (i) *Bioeconomy*; (ii) *ICT, Space and Security*; (iii) *Energy, Environment and Climate Change*; (iv) *Eco-nano Technologies and Advanced Materials*. In addition, the national priorities include: *Basic Research, Health, Heritage and Cultural Identity* and *New and Emerging Technologies* – the latter being more of a framework for public procurement of innovation than a pre-determined set of technologies, flexible enough to allow a fast response to the challenges of pre-competitive public procurement of innovation during the SNCDI2020 implementation.

The results of the NFE2 were integrated in the final strategic document (SNCDI2020) adopted by Government Decision no. 929/ 2014. The National RDI Plan 2014-2020 (PNCDI3)⁶ was adopted by the Government Decision no. 583/ July 2015 and has five funding programmes:

- Programme 1: “Developing the national R&D system – for improving its capacity in resources, performance and quality of RDI activities”;
- Programme 2: “Increasing the competitiveness of the Romanian economy through RDI” – for increasing the productivity of the Romanian companies through RDI within a national innovation system”;
- Programme 3: “European and international cooperation – for knowledge and ideas transfer, through participation in research programmes and international organizations, and access to research resources that are not available in Romania”;
- Programme 4: “Basic and frontier research – for supporting the niche fields in which the Romanian basic research has comparative advantage and critical mass of researchers or in which there is potential for international collaborations, which will add the ‘frontier’ dimension to the Romanian fundamental research, through obtaining leading scientific and technological results with commercialization perspectives”;
- Programme 5: “Research in strategic fields – support programmes coordinated by scientifically relevant institutions, for creating and developing the research institutions and the national competencies in the fields of strategic interest for Romania”.

Regional Development Strategies have been developed by almost all eight NUTS2 regions, with a notable exception – that of the Region West, which used World Bank consultancy for building their strategy: most of these strategies are based on an analysis of the current situation but not on prospective knowledge; do not have a sectoral focus for innovation, and, in fact, no smart specialisation; they refer to a generic form of support for innovation, but most action lines are not specific and implementation actors and funds are not clear; often referring to policies and investment in research capabilities and human resources, which are de facto of national competence (European Commission, Joint Research Centre, 2014).

Three of the eight regions have drafted their RIS3 strategies as of August 2015, but as the actual regionalisation process is still pending in Romania, the spectrum of instruments these strategies can use remains limited. The *copy-paste / 3D printed* strategies approach should be avoided and an EDP mechanism should be implemented. The regional RIS3 strategies will play an important role in improving the regions’ capacity of technology transfer through POR.

Although smart specialization is strongly related to (boosting) economic growth (European Commission, Directorate-General for Regional and Urban Policy, 2012), Romania does not have a macroeconomic model to assess R&I impact on economic growth.

An EDP enabling key entrepreneurial stakeholders to continuously identify possibilities that may propel the regions’ growth and development when implementing the strategy has been implemented. It is core-based on a meta-horizon scanning mechanism (Noselt⁷) and a deep understanding of the entrepreneurial ecosystem. However, significant improvements are necessary for implementing EDP mechanisms for the proper implementation of POC in 2014-2020.

⁶ The initial version of the PNCDI3, as it resulted from NEF2 (together with the SNCDI3, 2020 Vision and smart specialization priorities) can be found at <http://www.cdi2020.ro/pachete-de-lucru/> [RO] (Executive Agency for Higher Education, Research, Development and Innovation Funding, 2013)

⁷ <https://www.facebook.com/NOSEit?fref=ts>

RDI expenditures from national programmes

Generally speaking, Romania does not fully use the available funding for investments, mainly because access to finances is a burden – this seems to be the most problematic factor for doing business in Romania, according to the World Economic Forum's 2014-15 report on global competitiveness (World Economic Forum, 2014). More precisely, EU structural funds, but also banking loans and financial markets proved to be hard to tap into. This is due to structural shortcomings of the economy: underdeveloped financial markets as well as the deleveraging process of the banking system (European Commission, 2015a).

Regarding the financing of the R&I sector, in 2013 the Gross Domestic Expenditure on R&D (GERD) amounted to EUR 557.769 million (0.4% of GDP), the lowest in EU; the average change in rate in the period 2003-2013 is 0, and therefore an increase of 1.6% is needed to reach the EU 2020 target. The GERD financed by the Government sector was 52.3%, compared to the EU average of 32.8% (European Commission, Directorate-General for Regional and Urban Policy, 2015b).

With SNCDI2020, Romania has again reaffirmed the objective of 1% public GERD share of GDP (this time with an additional 1% from private sources) for 2020, and these figures were considered as the basis for the SNCDI2020 and its main implementation instruments (National Authority for Scientific Research and Innovation, 2015a). However, only several months after the adoption of the strategy in 2014, the budgetary allocation for 2015 is 2.17 times lower than the iterated objective for the year. In reaction to this discrepancy, civil society representatives raised the issue of ministerial responsibility (European Commission, Joint Research Centre, 2015 [not yet published, under final review by JRC as for June 2015]).

Despite the additional 1% public investment share of GDP target, the private GERD – equal to the R&D investments in the business sector (BERD) – remains low, at 0.12% of GDP in 2013, decreasing from 0.19% in 2012 (Eurostat, 2015). This situation is caused by the low level of the high-tech sector in the economy and the limited number of multinationals which establish R&D centres in Romania, but also by the low interest of companies in reporting R&D expenditures (European Commission, Joint Research Centre, 2015 [not yet published, under final review by JRC as for June 2015]).

In 2013, 59% of public funding was allocated institutionally, increasing from 45% in the period 2009-2012. Institutional funding is directed towards (European Commission, Joint Research Centre, 2015 [not yet published, under final review by JRC as for June 2015]):

- The programme of the Romanian Academy, with the institutes of the Romanian Academy as recipients. The allocation is highly proportional to the number of researchers.
- The “Nucleu” programme, with the National R&D Institutes as recipients. Each institute has its own “Nucleu” programme (portfolio of projects), reflecting the specific R&D strategy of the institute, also including objectives related to the development of the economic sector / branch corresponding to the institute's profile. The funding decision taken by MECS reflects a prioritisation of those specific “Nucleu” programmes, based on the joint analysis of the previous performance of the institutes and the relevance of their R&D portfolio in relation to the development priorities of the corresponding sector / branch.

An integrated evaluation for the period 2007-2013 at national programmes' level is difficult because for many programmes (e.g. Romanian Academy programme and “Nucleu”) the output-related information is not available, and the targets set in 2007 were correlated with a planned budget three times larger than the real allocation (European Commission, Joint Research Centre, 2015 [not yet published, under final review by JRC as for June 2015]). The system is also poor in information at institutional level. Hence, at organisational level, on average two out of eight PROs or HEIs have publicly available annual reports for the period 2007-2013 (Zulean, Ioniță, & Vîiu, 2015, p. 52).

For the evolution during the period 2007-2013 of the annual allocation of R&D expenditures (in million EUR) by the main programmes of the national budget, please see Figure 2.

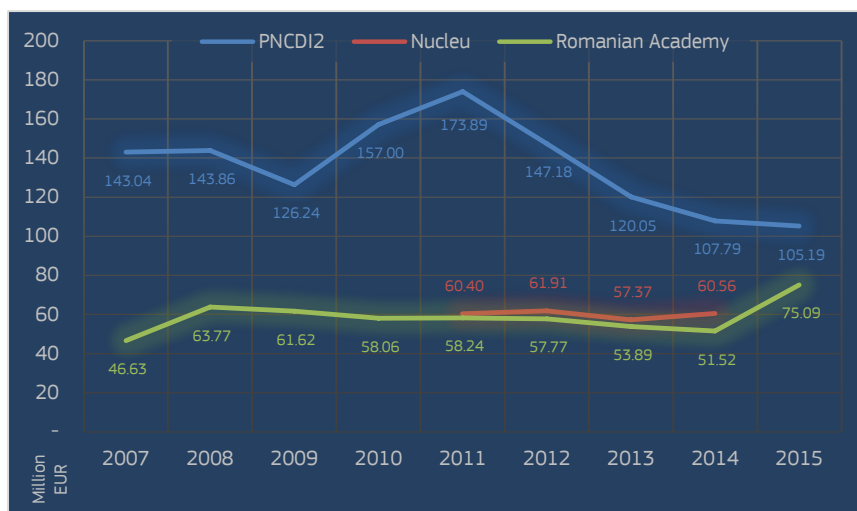


Figure 2. The annual allocation of R&D expenditures by main programmes financed from the national budget (million EUR). Source (Zulean, Ioniță,, & Vîiu, 2015)

The project-based funding through the PNCDI2 (coordinated by UEFISCDI) during 2007-2015 was implemented by a set of schemes with a structure and procedures very similar to FP7 (i.e., the programmes *Ideas, Human Resources, Partnerships, Innovation, Capacities*), open to all RDI actors. International peer review has been the standard for calls starting with 2010. The RDI budget cuts not only affected the pace of the calls, but also translated in further budgetary cuts to projects under way. As a consequence, most of the projects contracted during 2007-2013 have been affected by budgetary cuts of an average of 40% of the initial budget. Figure 3 provides the national allocation (in million EUR) of project-based RDI funding and its evolution in the period 2007-2014.

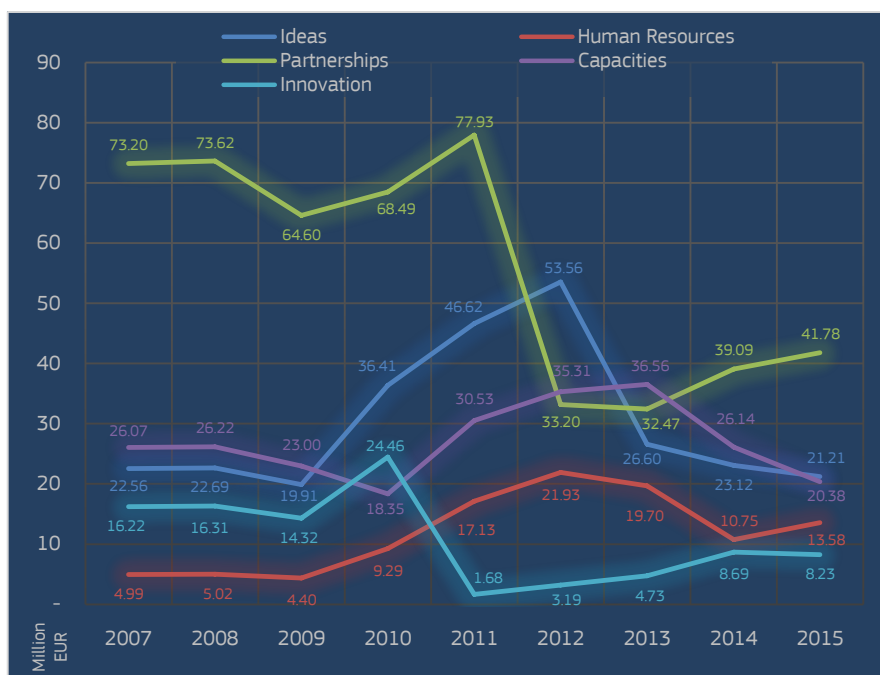


Figure 3. The annual project-based allocation of RDI expenditures by programmes of the PNCDI2 financed from the national budget (million EUR). Source: (Zulean, Ioniță,, & Vîiu, 2015), (Executive Agency for Higher Education, Research, Development and Innovation Funding, 2015a)

The low R&I intensity and the lack of predictability of national funding are factors that have limited the absorption of SF. As a consequence, proper staffing is unsustainable in a competitive environment. Professionals cannot be retained, as they cannot be guaranteed job security, even when project applications are successful. Thus, there are two issues: scarce and unreliable financial resources for research. Still, as limited as they are, these funds need proper management in terms of scheduling and allocation – therefore, rhythmic funding is needed.

By analysing the **governance of the R&I** system (and national programmes), the following **SWOT evaluation** can be set out:

<p>Strengths:</p> <ul style="list-style-type: none"> • Coherent strategic framework (national RDI strategies, priorities for smart specialisation and funding schemes) for the policy cycles 2007-2013 and 2014-2020; • The progress made by the government to harmonize its policies (for the period 2007-2013) with the European regional policies, especially by developing the National Strategic Reference Framework 2007-2013 (NSRF) which, based on the National Development Plan for 2007-2013, was developed as a tool to guide the use of national, EU and other funding sources available to Romania, justifying and prioritising public investments related to the European economic and social cohesion policy and defining Romania's multi-annual strategic planning and financial programming (Government of Romania, 2007); 	<p>Weaknesses:</p> <ul style="list-style-type: none"> • Fragmented and under-financed institutional setting (with frequent changes in the structure of the advisory councils of MECS); • The lack of clarity regarding the institutional roles and responsibilities is a 'chronic disease' of central governance in Romania: the Executive often performs a legislative role (for instance, in 2009 the number of emergency ordinances approved by the Senate – 229 was more than double the number of laws approved – 94), while the General Secretariat of Government organizations play important roles in supporting the decision-making system, but do not have explicit policy mandates (The World Bank, 2011b); • Funding instruments are not implemented in due time, with the required speed and efficiency; • Very low business interest in R&D. Public investment in R&D (and BERD) is only a quarter of GERD, and only one third of the R&D business expenditures are devoted to activities performed by universities or research institutes (European Commission, Joint Research Centre, 2015 [not yet published, under final review by JRC as for June 2015]); • Limited evaluation culture.
<p>Opportunities:</p> <ul style="list-style-type: none"> • Bottom-up/participatory approaches in policy formulation for RDI (NFE1 and NFE2); • Skills of the research performers; • Good research infrastructure and relatively large number of PhDs (both underused resources given the low project funding); • Emerging state-of-the-art private sector innovation especially based on the strong domestic ICT sector and on its engineering excellence (European Commission, Joint Research Centre, 2015 [not yet published, under final review by JRC as for June 2015]). 	<p>Threats:</p> <ul style="list-style-type: none"> • The government shows little interest in the research area in Romania; research is seen as a secondary activity; • Poor understanding of the research phenomenon at the level of central governance; • Political instability or other types of tensions, affecting the institutions in the central administration of R&I; • Lack of critical mass (of policy culture and professional policy makers) for synchronized governance; • Certain lack of coordination between relevant policy actors at the governmental level, starting from the Public Finances and branch ministries; • Frequent legislative changes; • Policy instruments not correlated at inter-sectoral level; • SNCDI2020 was long overdue (and it was approved only in 2015, but still not implemented by April 2015); • There are sectoral strategies however, there are no funds allocated for their implementation; • The available national funds for R&I are slightly below the subsistence level, in some cases causing serious institutional problems for R&I performers; • Very unreliable national funds for R&I.

Implementation of SF and ESIF for R&I

The implementation of the SF / ESIF SOPs in Romania is firstly and most significantly affected by the **quality of governance** that is determined by the administrative capacity, which is still rather weak in comparison to other European countries, by poor institutional coordination and fragmentation, frequent legislative and institutional changes, and insufficient policy capacity in terms of policy design and implementation. The EC country report for Romania (European Commission, 2015a) shows that the weak administrative capacity is causing delays in structural reforms. The government has made progress in identifying the root causes of the structural weaknesses, but implementation of the solutions is delayed. A strategy for strengthening public administration was adopted in October 2014, together with an action plan. The strategy addresses the second ex-ante conditionality agreed by the Romanian Government and the European Commission for the 2014-2020 programming period of ESIF (European Commission, Government of Romania, 2014). The implementation of the strategy faces substantial delay, especially because the action plan is strongly dependent on the SOP for Administrative Capacity (POCA) budget, while the POCA calls for projects are still in preparation as of July 2015; also, the inter-ministerial committee that will coordinate the implementation of the strategy had its first meeting in mid-December 2014 and some of the working groups that will drive each of the five pillars of the strategy were further delayed.

Despite certain progress during the last three years, the strategy for strengthening the public administration is still emphasizing the low and fragmented administrative capacity in Romania. Public institutions are perceived as favouring bureaucracy, over-regulation and limited transparency, weighing down the competitiveness of the economy. The lack of trust among political and administrative layers is not conducive to a real empowerment of professional civil servants, resulting in weak ownership of decisions and policies (Government of Romania, 2014a).

The World Bank undertook six sectoral functional reviews of the public administration on behalf of the Government of Romania, between March and October 2010. As a whole, the functional reviews painted a picture of a public administration characterized by (a) focus on compliance with detailed norms and regulations rather than performance, (b) budget resources spread thinly across policy areas without prioritization, (c) a lack of public transparency on performance, and (d) outdated control systems for managing people and budgets. With a special focus, the functional reviews have identified a poor institutional capacity at the Central structure of the Government (General Secretariat of Government and PM's Office) to coordinate policies and resource commitments across sectors that would better align and achieve medium-term budgets and strategies. (The World Bank, 2011a).

Romania scores below the regional average in many key areas of governance, and lowest in Europe on Quality of Government Index (European Commission, Directorate-General for Regional and Urban Policy, 2015b). Perceptions on the quality of public services, civil service, policy making and implementation, as well as credibility of government's commitment to policies, which are captured by the "government effectiveness" indicator of the World Bank, are well below the EU average. Romania also scores poorly in other relevant indicators including accountability, regulatory quality, political stability, rule of law, and control of corruption (The World Bank, 2015) (European Commission, 2015a).

There is little interest in R&I at the level of central governance, due to a poor understanding of the mission of scientific research. R&I and innovation remain absent from the political discourse on how to achieve sustainable growth in the aftermath of the recent crisis, in contrast to the high priority given to this topic worldwide and in nations competing with Romania (The World Bank, 2012). For example, the interviewees from PROs in biochemistry and bio-resources believe that the Ministry of Environment should manifest a constant and direct institutional interest in the solutions born in the research field, which could aid and fix environmental problems. While this should be the case for many ministries, the government and the policymakers should not wait for solutions to come only from the MECS. In operational terms, there is a need for a common database, a funding agency / sub-agency able to consolidate the information about all the

projects that have been funded, through all public instruments, the results from all academies, universities, the private sector – which is the only method that grants the consolidation of efficient R&I policies.

The problems that still need attention at the governance level are the insufficient predictability, as well as the fragmented and under-financed institutional setting, which affect public policies for innovation, research and development; Romania’s capacity to attract business research and development investment is hampered by the overall low quality of the science base (the lowest in the EU based on the Commission’s composite indicator on research excellence). Unfortunately, the lack of predictability and low level of public research and development funding affected the RDI system in structural terms, contributing to a significant brain drain, decreasing the quality of human resources and leading to under-usage of advanced infrastructure available in several research facilities (European Commission, 2015a).

The institutional framework of the SF in 2007-2013 is presented in Figure 4. The SOPs’ MAs have been coordinated by branch ministries (Ministry of Economy, Commerce and Tourism for POSCCE and Ministry of Labour, Family and Social Protection for POSDRU), under the overall coordination of the Ministry of Public Finance (former Ministry of Economy and Finance) starting with 2008 (by Government Decision no. 457/2008) and of the MEF starting with 2012 (by Emergency Ordinance no. 96/2012). The thematic objectives addressing R&I (PA1.5 of POSDRU and PA2 POSCCE) have been coordinated by IOs within the MECS, being therefore effectively connected with the research practices at the national level. UEFISCDI played an important role as policy adviser since 2005, by implementing the NFEs for developing the national RDI strategies for 2007-2013 and 2014-2020.

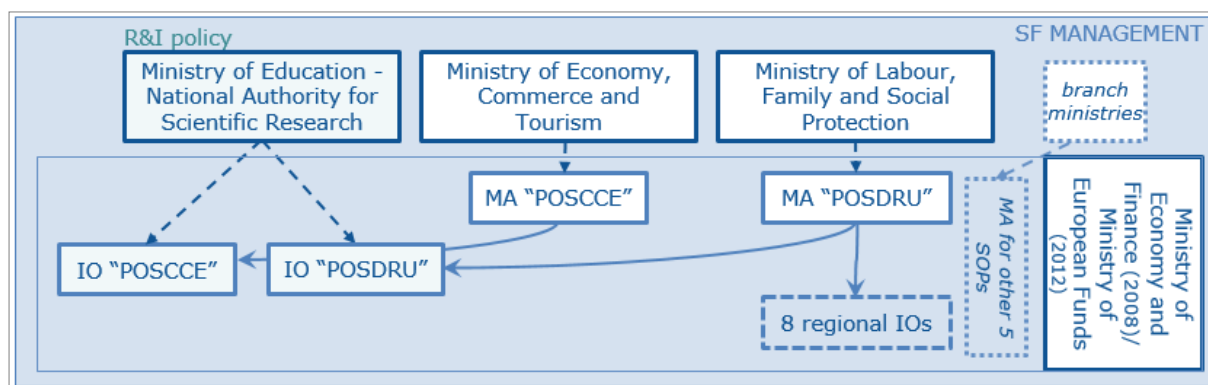


Figure 4. Organogram – governance of SF for R&I in 2007-2013

The institutional framework of EISF in 2014-2020 is presented in Figure 5. Compared to the institutional framework for SF in 2007-2013, the most significant change and progress consists in the centralized coordination of ESIF by MFE, which is now responsible for the coordination of consultation processes and also ensures the presidency of the Inter-institutional Committee for the Partnership Agreement (CIAP). CIAP’s secretariat is provided by the MEF through the Directorate General for Analysis, Programming and Evaluation; (2) also, a number of 12 Consultative Committees (10 sectoral and 2 regional / territorial) have been established under the umbrella of CIAP; (3) the Memorandum approved by the Government on 13 July 2012 established this partnership framework in order to draw up 2014-2020 programming documents and to ensure the relevance of actions supported and the effective delivery of ESIF, the partnership framework will operate beyond the programming phase, and will be extended to the management, implementation, monitoring and control (European Commission, Government of Romania, 2014).

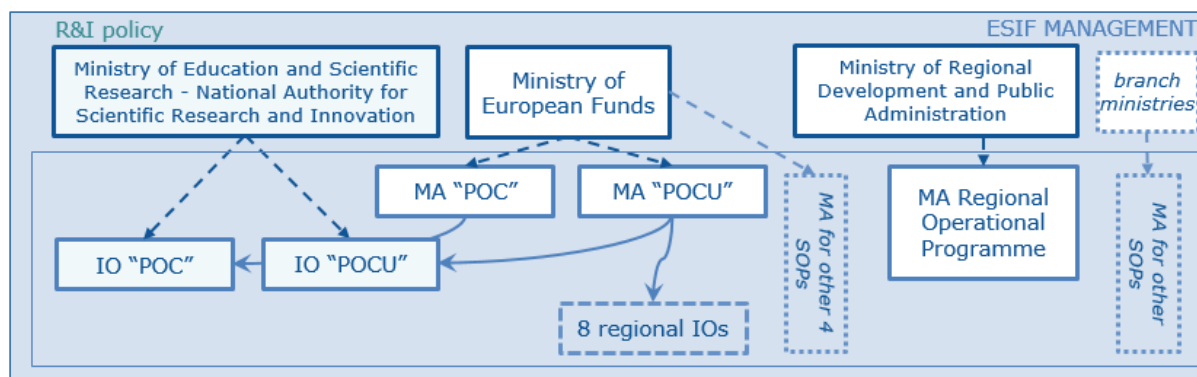


Figure 5. Organogram – governance of ESIF for R&I in 2014-2020

Taking into consideration Romania's drawbacks in absorbing SF, complementarities identified among ESIF and based on the lessons learned in 2007-2013 and the new challenges raised by the ESIF architecture in Romania, a coordination mechanism with structures on three levels (strategic committee, thematic inter-institutional, operational), has been set up in order to ensure the coherence of the interventions, complementarities and synergies in the programming and implementation stages. The coordination mechanism will function in parallel with the institutional framework designed for implementation (European Commission, Government of Romania, 2014). However, bottlenecks still seem to exist at the governance level, concerning the lack of horizontal coherence and coordination. More precisely, even though the mechanisms are set into place, they are irrelevant in the absence of human resources and the proper culture to make them functional.

Synergies between H2020 and ESIF can be created and enhanced around the instruments targeting the (1) research infrastructure (e.g. the prioritization process – a national roadmap) and (2) human resources (e.g. National Instruments and ERC; National Instruments and Marie Curie Fellowships). While synergies were taken into consideration in the programme design stage, they still need to be put into practice.

Regarding human resources involved in research, in the previous cycle no synergies were created between universities and entrepreneurs, businesses, and the civic society. Universities worked mainly with other universities, thus limiting the pool of potential collaborators.

The participation in FP7 / H2020 and the absorption of ESIF at national level are restricted by the high degree of fragmentation of the public research system, which hampers its efficiency and effectiveness. A comprehensive approach aiming at a possible concentration of institutional resources is not yet being developed (European Commission, 2015a).

Planned R&I expenditures from ESIF for 2014-2020

For 2014-2020, Romania has allocated from ESIF EUR 1,066,927.655 for R&I under the Thematic Objective 1 (TO1) "Strengthening research, technological development and innovation" (European Commission, Government of Romania, 2014). Unfortunately, however, this amount represents only 44% of the estimated EUR 2.4 billion needed to attain the required 1.6% of GDP increase in R&D expenditures⁸ only for one year⁹ of the 2015-2020 period. Given that this ESIF TO1 allocation has to be distributed over a six-year period of time, its (quantitative) contribution to bringing combined public and private investment levels in the sector to 2% of GDP (as explicitly asserted in the Partnership Agreement) is modest. On the other hand, when assessing the potential contribution of the national R&I funds to the "2% R&D" target, taking into

⁸ Related to the national EU 2020 target (European Commission, Directorate-General for Regional and Urban Policy, 2015b).

⁹ Calculated as a percentage of the GDP in 2014 (EUR 150 billion).

consideration that the change in rate of R&D expenditures during 2003-2013 was 0 (European Commission, Directorate-General for Regional and Urban Policy, 2015b), it seems that reaching 2% of GDP investments in R&D by 2020 remains questionable.

Looking into the details of the R&I funds allocation by source and the GDP estimates for 2015-2020, the contribution of ESIF TO1 allocation to reaching the targets of 1% private and 1% public expenditures on R&I share of GDP by 2020 can be further analysed:

- In order to reach the target of 1% *private GERD* share of GDP by 2020, a sustained annual increase by 42.4% is needed (from the 0.12% in 2013 to 1% in 2020; see Figure 6). For this strategic objective to be attained, the public funds and the ESIF TO1 should complement and serve as drivers for the private investments in R&I. ESIF contribution plus the focus on innovation and a functional innovation ecosystem supported by SNCDI2020 and PNCDI3 would increase the probability of attracting the 1% private GERD. Moreover, Romania should rely (or should have relied) more on ESIF TO1 especially since they particularly address public-private partnerships, product innovation, technology transfer, regional innovation infrastructures, and broadly support private companies through POC and POR;
- In order to reach the target of 1% *public GERD* share of GDP by 2020, a constant annual increase by 30.35% is needed, without considering the ESIF TO1 'addition'. By distributing the ESIF TO1 over the period 2015-2020 with a constant annual increase of 48.39%¹⁰ (for a progressive allocation and, moreover, to lessen the 'burden' on the national budget for R&I), in Figure 6 it can be seen that the public GERD should increase from 0.2% in 2014 to 0.82% of GDP in 2020.

In conclusion, the actual contribution of the ESIF TO1 to reaching the 1% private and 1% public GERD share of GDP in Romania by 2020 consists in:

- Possibly reaching a 0.18% share of GDP (in the scenario of progressive allocation) in 2020 that, along with a (rather improbable) 0.82% public investment share of GDP, should attract 1% private GERD;
- Helping the Romanian Government in its uphill battle to reach "1% public R&D" target by slightly reducing the needed annual incremental increase from 30.35% of GDP to an average 26.34%; the public GERD in 2014 should increase by 304% to reach the required allocation in 2020, raising the question of feasibility.

¹⁰ The annual ESIF TO1 allocation as percentage of GDP has been calculated based on the actual GDP data for 2014 and 2015 and on the estimates of the National Prognosis Commission's for 2016-2018 (National Prognosis Commission, 2015); the growth rate algorithm of the Commission has been extended for 2019 and 2020.

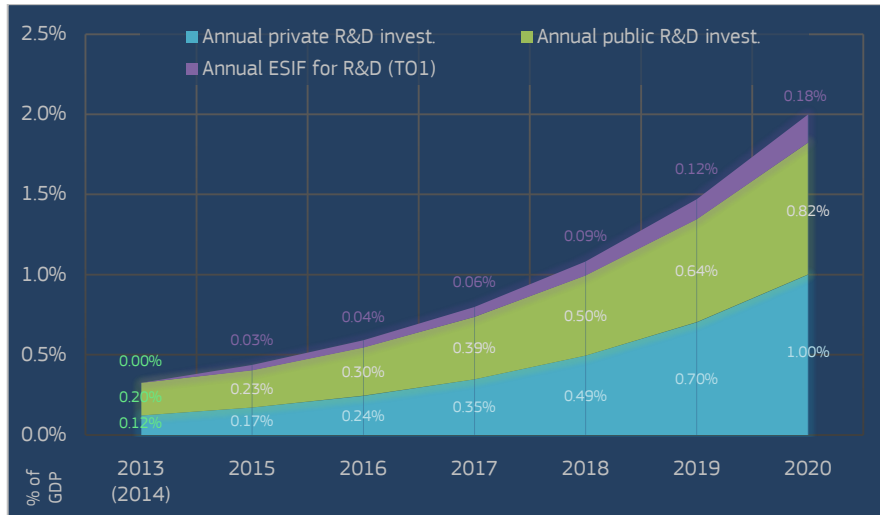


Figure 6. Annual public GERD, private GERD and ESIF for R&I (TO1) expenditures needed to attain the EU 2020 target of 1% public and 1% private investments in R&I (% of GDP). Source: based on the actual ESIF 2014-2020 allocation for TO1 in Romania (European Commission, Government of Romania, 2014)

The question arises whether the ESIF TO1 allocation in Romania could have been more effective in addressing the “2% public and private R&D” EU 2020 target.

The data in the partnership agreements on ESIF funding made between the EC and MS¹¹ shows that Romania has the lowest share of ESIF allocated for R&I for 2014-2020 in the region: 3.48%, compared to the 5.39% and 8.94% of its neighbours Bulgaria and Hungary and to the 12.56% in Slovenia (See Figure 7).

¹¹ Available for each MS at http://ec.europa.eu/contracts_grants/agreements/index_en.htm

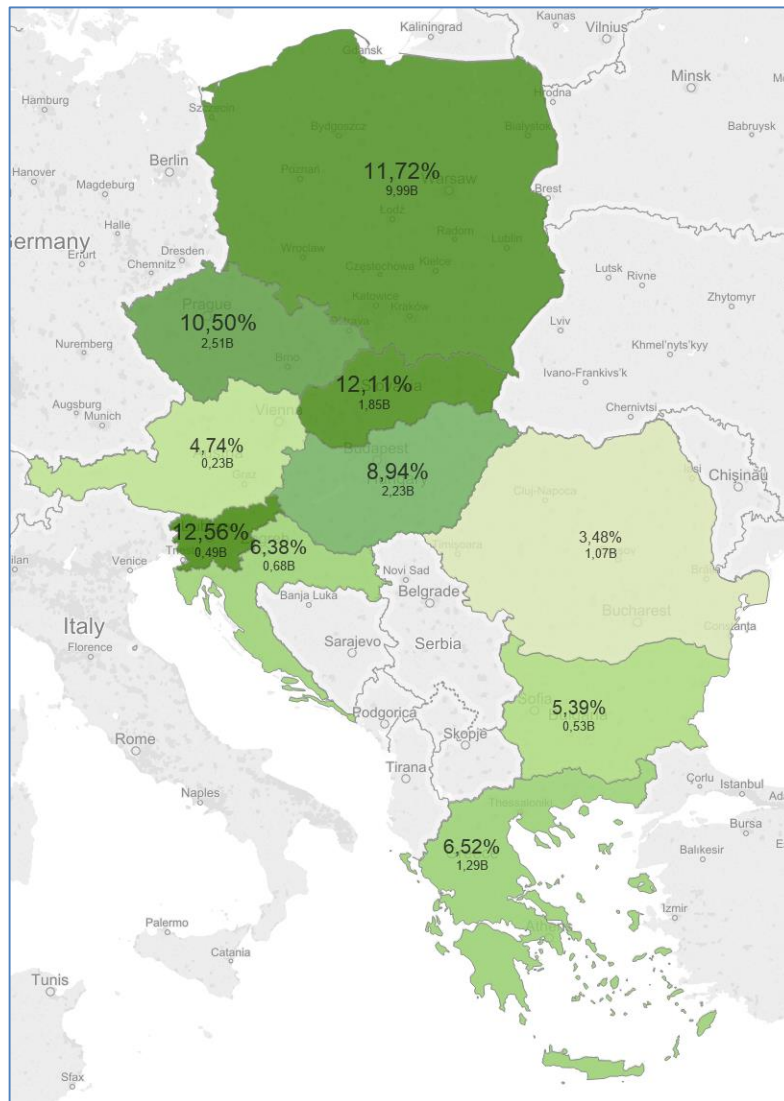


Figure 7. National share of ESIF TO1 (% of ESIF allocation). Source: calculations based on the data presented in the partnership agreements between the EC and MS.

From the data in Figure 7, an alternative scenario in which the ESIF TO1 funds amount to 12.56% of total ESIF allocation (EUR 3,845,771,314.90) is presented in Figure 8. The data show what would have been the ESIF contribution to reaching the “2% public and private R&D” national target by 2020. This scenario is important because it can serve as a basis for eventual future revisions of allocation on and from TOs; for that matter, it has to be mentioned that the funds for R&I allocated in 2007-2013 have been entirely absorbed.

- Regarding the 1% *private GERD* share of GDP by 2020, the 0.63% ESIF investments in R&I would have been more likely to attract the required private funds than the real 0.18% allocation (See Figure 8) (from the calculations in Figure 6);
- Regarding the 1% *public GERD* share of GDP by 2020, the incremental annual increase of 30.35% of public investments would have been largely supported by ESIF – which would have lowered the required increase rate to an average 12.19% (See Figure 8), compared to the actual 26.34% (from the calculations in Figure 6); from 2014 to 2020, the public GERD should have increased by only 79%.

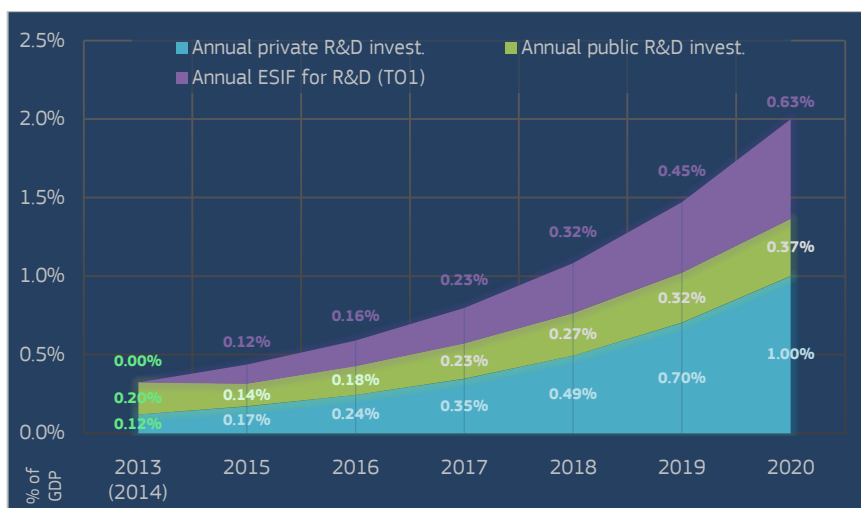


Figure 8. Annual public GERD, private GERD and ESIF for R&I expenditures needed to attain the EU 2020 target of 1% public and 1% private investments in R&I (% of GDP). Simulation: If the total ESIF for R&I (TO1) allocation would have been 12.56% (Slovenia's case¹², the highest TO1 share of ESIF in the region).
 Source: based on the data in Partnership Agreements between the EC and the MS¹³

By analysing the **governance of SF and ESIF for R&I**, the following **SWOT evaluation** can be set out:

Strengths:	Weaknesses:
<ul style="list-style-type: none"> • Adequate SF and ESIF policy instruments due to preparatory actions prior to 2007 and correlations with the national strategic framework of R&I; • A coherent management mechanism for ESIF for R&I for 2014-2020: (1) The Ministry of European Funds (MEF) is responsible for the coordination of the consultation process and also ensures the presidency of the Inter-institutional Committee for the Partnership Agreement (CIAP); CIAP's secretariat is provided by the MEF through the Directorate General for Analysis, Programming and Evaluation; (2) also, 12 Consultative Committees (10 sectoral and 2 regional / territorial) have been established under the umbrella of CIAP; (3) the Memorandum approved by the Government on 13 July 2012 established this partnership framework in order to prepare the 2014-2020 programming documents and, with the aim to ensure the relevance of actions supported and the effective delivery of ESIF, the partnership framework will operate beyond the programming phase, and will be extended to the management, implementation, monitoring and control (European Commission, Government of Romania, 2014); • Satisfactory supply of eligible proposals; • Current ESIF mechanisms aim at simplified costs and more simple and attractive reporting (calls starting 2015); • Consistent pre-financing, as done on some project calls, was the best practice in the R&I performers' opinion; <p><i>Regarding the investment in human resources for R&I from</i></p>	<ul style="list-style-type: none"> • Insufficient consolidation of the IOs mandated to ensure R&I performance through the SF in the period 2007-2013; • The structures were not cohesive in the cycle 2007-2013; • Low administrative capacity of the MAs and IOs (frequent changes; few staff available or poorly trained; lack of consistency and information exchange between the audit authorities; different rules in different SOPs or different interpretations of rules) • Funding instruments not applied in due time, with the required speed and efficiency; • Delayed national co-financing, mainly due to delayed calls and reimbursements; • Lack of consistency at horizontal level: implementing a SF project in different regions involves, most often, different, sometimes even contradictory interpretations in the monitoring by SF funding authorities; • Complex and bureaucratic procedures for SF projects; • Reimbursement (based on invoices) from SF subsequent to the actual expenses was an excessively harsh mechanism, in view of the real capacity of the research market in the 2007-2013 cycle; <p><i>Regarding the investment in human resources for R&I</i></p>

¹² The highest share of ESIF TO1 allocation in the Region.

¹³ Available online at http://ec.europa.eu/contracts_grants/agreements/index_en.htm

<p><i>POSDRU / POCU:</i></p> <ul style="list-style-type: none"> • Large number of doctoral students and postdoctoral researchers assisted (See Table 1); • Large number of scientific publications resulted from the funded projects (See Table 1); <p><i>Regarding the investment in research infrastructures and cooperation from POSCCE / POC:</i></p> <ul style="list-style-type: none"> • POC PA1 is elaborated in correlation with the SNCDI2020 and PNCDI3; • Several key strategic Programme indicators/ targets have been exceeded, some of them three times over, (large companies assisted, innovative start-ups assisted, institutions assisted for improving the administrative capacity, patent applications resulted from the funded projects, research labs created, research labs modernized, foreign specialists employed, scientific papers published, results transferred) (See Table 2). 	<p><i>from POSDRU:</i></p> <ul style="list-style-type: none"> • The Programme did not aim at supporting universities to reach the desired level of sustainability, it was individual-centred at the cost of institutional capacity building, focusing on the training of 15,000 PhD Students (on the PA1.5); <p><i>Regarding the investment in research infrastructures and cooperation from POSCCE:</i></p> <ul style="list-style-type: none"> • The private expenditure with the funded projects was two times lower than expected.
<p>Opportunities:</p> <ul style="list-style-type: none"> • Newly created mechanisms must mature and consolidate during 2015-2020 (the consolidated MFE as a central authority for ESIF management and the institutional partnership framework provided by the Partnership Agreement) (European Commission, Government of Romania, 2014); • Synergies between SF and H2020 planned from the programmatic design of the funding instruments; • Skills of the research performers; • Improvement of the cash flow for public and private beneficiaries which are unable to pay invoices for supplies, works and services by introducing the direct payments mechanism for payment claims during 2007-2013 (KPMG, 2015); • Over the SF funding period in 2007-2013, there was a decrease of the procedural time frame for processing reimbursements claims from 45 to 20 working days; <p><i>Regarding the investment in human resources for R&I from POCU:</i></p> <ul style="list-style-type: none"> • As a funding instrument for HE institutions, there is a particular focus on the HEInnovate platform (the European Commission's self-assessment tool for innovation and entrepreneurship in higher education institutions – HEI); • In 2007-2013 POSDRU have contributed to the creation of a critical mass for research, from the point of view of human resources, especially in major universities; <p><i>Regarding the investment in research infrastructures and cooperation from POC:</i></p> <ul style="list-style-type: none"> • Exceeding the programmatic target 11 times over, a series of research labs have been created (target was 50, attained 375) or modernized (target 0, attained 174) (See Table 2); • Exceeding the programmatic target more than three times, a large number of innovative start-ups have been created (See Table 2). 	<p>Threats:</p> <ul style="list-style-type: none"> • Not enough time to consolidate institutions and good practices; • Romania has allocated from ESIF EUR 1,066,927.655 for research and innovation for the period 2014-2020, amount representing 44% of the estimated EUR 2.36 billion needed to attain the required 1.6% of GDP increase in public R&D expenditures only for one year. Taking into consideration that the change in rate of R&D expenditure during 2003-2013 was 0 (European Commission, Directorate-General for Regional and Urban Policy, 2015b), reaching the target of 2% of GDP investments in R&D by 2020 remains questionable; • Lack of proper management of national funds and SF in terms of schedule and rhythmic funding; • High administrative burden for the beneficiaries; <p><i>Regarding the investment in human resources for R&I from POCU:</i></p> <ul style="list-style-type: none"> • Researchers in universities did not grasp and, implicitly, did not comply with the systemic aim of PA1.5. – “Doctoral and Post-doctoral Programmes in support of research” of POSDRU (2007-2013); therefore, they applied in a fragmented manner, strictly for fellowships, without forming institutional collaborations, clustering into interdisciplinary groups, exploiting the existing RDI infrastructure; <p><i>Regarding the investment in research infrastructures and cooperation from POC:</i></p> <ul style="list-style-type: none"> • The public-private partnership in projects remains rather low (See Table 2) • The financial participation of the private companies in R&I projects remains low (See Table 2).

It can be said that Romania has had, during the policy cycle 2007-2013, a certain degree of inefficiency in the **administration of the SOPs for SF**, mainly caused by insufficient consolidation of the organisations mandated to ensure R&I performance through the SF. That was the first funding wave in Romania and it was to be expected that the newly created mechanisms would take time to mature and consolidate. Nevertheless, the administrative inefficiency resulted in dissatisfaction with the way funds were managed.

The structures were not cohesive in the programmatic cycle 2007-2013. Those six years were a period of experimentation and trials in harmonizing national policies with EU policies; one cannot say that these attempts were ineffective, but results were not always as expected.

Discussing the practicalities of the 2007-2013 cycle of SF in Romania, there are a few features identified by the 27 interviewees as factors that may negatively affect their performance and success in ESIF calls:

- **Payments**

In the previous policy cycle, the reimbursement (based on invoices) in projects funded by SF, subsequent to the actual expenses, followed a mechanism too complex for the real capacity of the research market. Instead, heavy pre-financing, as happened in some project calls, was the best practice for R&I performers.

Besides competitive schemes, performance-based institutional funding is desirable, as is the case for some of the high-performing European R&I systems.

- **Administrative procedures**

Regarding the applications for SF R&I calls, all 27 interviewees report that the procedures are too complex. On the other hand, the funding authorities consider them to be standard in all SOPs. Still, in order to meet the researchers' needs, they aim at simplified costs and more simple and attractive reporting for ESIF (calls starting from 2015).

- **Calls for projects**

Calls for projects are frequently delayed, both in SF and in ESIF. Also, political instability leads to institutional blockages, with a negative impact at sectoral level, resulting in even further delays of the calls.

POSDRU / POCU programme and projects: cross-cutting issues

Regarding the investment in R&I from SF, POSDRU representatives say that researchers in universities did not grasp and, implicitly, did not comply with the systemic aim of the PA1.5 – “Doctoral and Post-doctoral Programmes in support of research” (2007-2013); therefore, they applied in a fragmented manner, strictly for fellowships, without forming institutional collaborations, clustering into interdisciplinary groups, exploiting the existing RDI infrastructure. On the other hand, this issue can also be seen as a policy design fault, as the systemic aim of PA1.5 was not sufficiently reflected in the funding scheme and indicators of POSDRU.

The fact is that the Programme did not aim at supporting universities to reach the desired level of sustainability, it was individual-centred at the cost of institutional capacity building, focusing on the training of 15,000 PhD Students (on the 1.5 priority axis). At the same time, PhD students haven't been employed by universities after completing their fellowship (due to the general lack of reliable funding for R&I) – which is one of the most important measures contributing to sustainable investments in human resources through POSDRU.

In POCU, in the area of human resources development, there is a particular focus on the HEInnovate platform (the European Commission's self-assessment tool for innovation and entrepreneurship in HEI).

Maybe the most important issue is that, in order to ensure the continuity of the interventions, the POCU funds need a multiannual financial scheme.

POSCCE / POC programme and projects: cross-cutting issues

The systemic investment led to attaining and exceeding several targets of the Programme (see Table 2). Nevertheless, the indicator “projects developed in partnerships between R&D PRO and companies” had the lowest rate of attainment, of only 20% of the set target.

An aspect worth mentioning is that funds allocated for one of the Programmes’ Operations (2.2.2) have been entirely directed to the ELI-NP (Extreme Light Infrastructure – Nuclear Physics) project. As a result POSCCE could not reach the indicator “Innovative structures developed – poles of excellence”, which was associated with that specific operation (this indicator was later removed from the Programme).

3 FACTORS THAT SUPPORT OR LIMIT THE NATIONAL PARTICIPATION IN R&D CALLS FUNDED BY SF/ESIF

The most significant current concern for Romania regarding ESIF is the absorption rate. This concern is rooted in the previous cycles of funding, where absorption rate grew more steadily only in the last phases. The reform of public investment, initiated in 2013, led to a substantial increase in the co-funding allocation for SF projects; the SF project co-financing expenditures went substantially up, by RON 2.2 billion, which is 12.7% more compared to 2012, i.e. from 2.9% of GDP in 2012 to 3.1% of GDP in 2013. The reform consisted in setting up an institutional mechanisms to prioritize significant public projects (over EUR 25 million) and a Public Investment Evaluation and Monitoring Unit within the MFE.

In addition, temporary borrowings from the Treasury amounting to over RON 8.8 billion in 2013 were used to pay the project beneficiaries financed from European funds awaiting EU reimbursements. Hence, the absorption rate went up to 40.6 % at the end of March 2014 (Government of Romania, 2014b).

Despite this progress, as of June 2015, Romania continues to display the second lowest rate of SF absorption in the EU (62.2%) (European Commission, Directorate-General for Regional and Urban Policy, 2015a), and last among the group of peer countries in the Cohesion Policy. This is despite the accelerated absorption in the last two years (SF absorption, excluding the European Agricultural Fund for Rural Development, EAFRD, according to European Commission, Inforegio Cohesion Policy Data), from 33.7 % at the end of 2013 to 52.2 % at the end of 2014.

Besides poor strategic steering, difficulties as regards the implementation of the SOPs during 2007-2013 programmes include: persistent weaknesses in the management systems, failure to proactively anticipate and tackle implementation shortcomings, low coordination between responsible departments, low institutional capacity to implement sectoral strategies, cumbersome national procedures for managing public investment projects, and persistent shortcomings in the public procurement system (European Commission, 2015a); by the end of 2014, there were also corruption cases investigated by the National Anticorruption Directorate (a total of 1,400 cases investigated, out of which 149 have already been filled with the courts).

- **Adequate SF / ESIF policy instruments**

The SF policy instruments were adequate mainly because, prior to the 2007-2013 cycle, at national level there were instruments that entailed preparatory actions for implementing the SOPs.

POSCCE and POC, being implemented by the IO in the MECS, are correlated with the national priorities (with the SNCDI2020) and R&I practices. Moreover, through POSCCE there have been calls for a broad spectrum of project types and applicants: research infrastructures, innovation, synergies, partnerships, start-ups and spin-offs, clusters, foreign experts.

In POSDRU, the doctorates and post-doctorates projects have been correlated with the National Strategy for RDI for 2007-2013. Still, when considering POSDRU in the overall framework of funding schemes, it is worth mentioning that the R&I performers consider that there are too many funds allocated for human resources development and too few for research (irrelevant qualifications and no labour market insertion of trained people). As a trend, POCU is much more focused on aiming at systematizing and concentrating the interventions; from the very programming phase the synergies between programmes were prioritized, without neglecting their insertion into the labour market – for which POCU will monitor specific indicators during project implementation.

The different levels of (policy-related) criteria in SF funding schemes were (1) transparent and (2) established in conformity with good practices and also in accord with the national instruments for R&I funding. However,

project implementation suffered from the same financial instability – this was the most significant obstacle, while excessive bureaucracy has been a significant additional problem. Moreover, MAs and IOs had an ongoing suspicion of wrongdoing by the implementers and, consequently, fewer and fewer active researchers / institutions are willing to apply (this was confirmed by interviewees from “Babes-Bolyai” University in Cluj-Napoca, “Transilvania” University of Brasov, SC FM Management Consultancy SRL – FMMC in Bucharest). As a result, Romania could miss out on the opportunity to increase its absorption of ESIF.

- **Satisfactory supply of eligible proposals**

The supply of proposals eligible for funding was satisfactory during 2007-2013 and therefore is not an issue in limiting the absorption of ESIF; the number of submitted projects was constantly high, the interest is manifest, at least as far as the public sector is concerned. However, there are cases where some universities propose a low number of projects, and the reason is that there are not sufficient trained human resources for proposal drafting (this is a general issue, occurring both in Bucharest and at the regional level); the poor management of SF calls' schedules and a lack of time to prepare proposals were also an issue in these cases.

In POSCCE PA2, there was a total over-subscription rate of 160% and even an over-contracted rate of 130% - in comparison to the initial targets and budget plan of the Programme.

As far as the private sector is concerned, these actors are quick learners but, unfortunately, their participation did not increase, not even with SF, because it is very difficult for someone who has had an overall negative experience (either in terms of consistent administrative effort, excessive bureaucracy, unconstructive evaluations, or the difficulties experienced by small actors in maintaining a consistent cash flow) not to lose their enthusiasm. Even if the project has proved to be successful, some will not submit a proposal a second time (this has happened and these are not isolated incidents).

- **Delayed national co-financing**

National co-financing was a limiting factor for the absorption of SF in the R&I sector, because it was not provided nor used at the right time. Also, the absorption rate was very low during the previous cycle, therefore the national co-financing was also low. The delay in payments, and the failure of some projects, were factors contributing to this limited absorption.

The fact that money came in very late (especially in reimbursements) created serious problems, especially in the private sector, among small-sized players. Universities themselves have problems of cash flow and there are some that can no longer start other projects; borrowing money is the biggest problem of universities and their proposal is for the government to guarantee credit arrangements for the projects implementation, possibly through a program similar to the one currently applied for real estate – “The first house”.

In the case of PNCDI2, there were no calls for proposals in 2009 and 2010, and there was a scaling back on amounts already committed to the R&I performers. The co-financing supporting SF increased from 2008 to 2010, but it was not enough to make up for the decrease in PNCDI2 funding, which has significantly affected the HEIs and PROs (The World Bank, 2012).

- **Low administrative capacity of the MAs and IOs (frequent changes; few staff available or poorly trained; lack of consistency and information exchange between the audit authorities; different rules in different SOPs or different interpretations of rules)**

Focusing on the administrative capacity of the SF funding agencies, there are several factors that may highly affect the absorption of ESIF for R&I.

The first aspect consists in the frequent changes and instability in the institutional framework of the funding agencies for SF (within different ministries). The political actors are to blame – in the view of some of the interviewed R&I performers – for disrupting the institutional framework in the field of R&I. In fact, this is the biggest issue when it comes to Romanian institutions: too much politics involved in the institutions.

Secondly, there are various problematic aspects regarding the human resources in terms of both quantity and quality. The challenge some MAs and regional IOs are facing is that there is very little staff available for calls with lots of applications, which leads to the overload of the already insufficient personnel; there were situations in which a POSDRU project officer had to monitor 60 regional projects, situation that he / she obviously was not able to handle efficiently. On this matter of personnel availability, solutions must be found for hiring more specialists, at least in peak-load periods, especially considering that the salaries of MAs and IOs employees are fixed no matter the workload (their salaries are calculated based on the salary grids of the corresponding ministries; the salaries for IO POSCCE PA2 for instance were paid from the state budget, but were further supported from SF through a SOP Technical Assistance project – 15% national funds, 85% ERDF). A different solution consists of the MAs and IOs phasing the starting dates of the projects, not only the calls, for a more efficient workload assignment among staff.

On the same point, the personnel fluctuations at the level of SOPs is a negative phenomenon and it partly explains why there were (1) difficulties in implementation, (2) difficulties in hiring, (3) negative consequences in evaluation and monitoring activities and (4) the major negative impact in terms of delayed payments and late corrective measures. There were also negative financial consequences, as there was no return on the investment made in human resources, who left the IOs and the MAs.

Although in procedural terms there is an adequate administrative capacity, another problem is that the employees of the public authorities (such as the Romanian Court of Accounts) are inflexible and apply high penalties (quite often), which is because they probably don't understand the specifics of R&I well enough.

The financing and audit authorities' staff involved in monitoring does not have, in some cases, appropriate knowledge of research management. To avoid inconsistencies at horizontal level, for instance when rules & regulations are interpreted by different institutions within the same programme, specialists from various authorities must be trained in order to be objective and remove personal interpretations in the monitoring of projects.

Particularly, the staff issue was and remains problematic for POSDRU / POCU. Improvements have been made, but they are insufficient: POSDRU has a total allocation of 37% of the SF, but only 11 employees; the trainings have been carried out only at an informal level, without concrete instruments; moreover, there was a big fluctuation in staff numbers in 2012 (about 25%). Another delicate issue is the parity of the salaries (1/3) between the IO and the MA or other SOP's MAs.

In POSCCE for R&I (PA2), there was insufficient personnel from the start. The problem persisted during the implementation of the SOP, but the situation slightly improved as they turned to acquisition of services and hiring of staff on short-term arrangements. The problem they constantly confronted was the heavy workload and low salaries, generating fluctuation of personnel.

A third negative aspect of the administrative capacity of SF funding agencies is that, apparently, there is a lack of consistency and information exchange between the audit authorities. There is no correlation between the international interpretation (made in Brussels) and the national interpretation (made in Bucharest).

Moreover, there are different rules – not in specific, but in legal and operational terms – in different SOPs: there were many cases in which, for instance, the same aspect was considered misconduct in a project (POSCCE), but not in another one (POR).

A cross-cutting issue related to the administrative capacity of the SF funding agencies is the deficient implementation of public procurement procedures (in the absence of legislative coordination, a help desk for beneficiaries, standardized documentation, and guidelines on public procurement, but also limited technical capacity of beneficiaries in specific areas and a low quality of the technical documentation mainly for infrastructure projects) (European Commission, Government of Romania, 2014), which triggers substantial financial corrections and contributes to a low absorption of EU funds. There is still a general perception of high levels of corruption, fraud and conflict of interests continuing to raise serious concerns for contracting authorities, which relates to both EU and national funds (European Commission, 2014). 40 % of the complaints related to public procurement in Romania are about public procurement contracts financed by EU funds (European Commission, 2015b). There is a growing number of cases opened and solved by the specialised prosecution services dealing with EU funds, as shown by the National Anticorruption Directorate activity report for 2014.

All these difficulties in implementing the SOPs continue to hamper achieving the objectives of the operational programmes. The risk of decommitment of EU funds remains for 2015 and at closure in 2017. Due to the insufficient and delayed preparation of the project pipeline, implementation difficulties might arise also in the 2014-2020 programming period (European Commission, 2015a).

4 PUSH–PULL FACTORS FOR R&I PERFORMERS TO PARTICIPATE IN FP7/H2020

- **More easily accessible national R&I calls**

The national R&I calls – scarce as they are, are definitely more easily accessible than FP7 / H2020, for various reasons: the projects are submitted individually, without the need of an institutional consortium; also, as a Romanian researcher, one might prefer national competitions because they have higher success rates. Another reason for choosing the national programmes is that potential participants are sometimes not sufficiently informed about the benefits they could gain from participating in FP7 or H2020.

At the same time, when the national funding was cut / reduced, the researchers turned to FP7 – with a success rate for FP7 calls during 2007-2013 of around 14.6%; the lowest in the EU, (European Commission, Directorate-General for Research and Innovation, 2015b). Moreover, researchers turned to SF, and POSCCE PA2 calls retained 271 project proposals in 2010 compared to 80 in 2009 (Ministry of European Funds, 2014).

When researchers do apply in FP7 / H2020, they feel disadvantaged: they write project proposals but lose because the Romanian research entities don't have relevant past performance so they cannot be competitive in Europe.

When considering the role of POSDRU in facilitating FP7 / H2020 participation, the mobility of Romanian researchers within EU has facilitated networking opportunities – a primary condition for applying in FP7 / H2020. Still, unfortunately, most projects were based on the personal relations of the researchers, not on institutional relations.

- **Insufficient number of qualified research project managers**

The lack of qualified research project managers is an obstacle when participating in FP7 / H2020. On the one hand, some of the HEIs and PROs have well-prepared research managers with either qualifications or (most often) past experience in FP7 relevant for H2020; on the other hand there are HEIs and PROs that are still confronted with a – sometimes very significant – lack of qualified project managers, which is due to inadequate personnel policies in some cases and, most often, to unattractive salaries in the context of unreliable R&I funding.

The HEI and PROs where they have qualified project managers rely on their scientific competencies and build systematically on the existent professional expertise – which proved to be more valuable in the long run. In addition, they have exploited the experience of earlier projects in groups of researchers providing administrative support for implementation. There are also PROs who have constantly invested over several years in project management training for their employees.

Where there is a lack of qualified professionals, there is the problem of paying for project management services, since funds are not available in most cases. The PROs that have been confronted with a lack of project managers hired professionals, but they find it difficult to keep them beyond one project period. When they keep high standards of proficiency, they face a lack of qualified project managers both in universities and in the national labour market in general.

A particular problem in Romania is that we don't have enough staff for logistics in R&I, and this is a factor for the low application and success rate in SF schemes.

- **Poor quality of the NCP support**

The quality of NCP support is quite low in Romania. This is clearly because of the lack of personnel and it is obvious that in the current formula there is no way that they can cover the entire country.

The NCP capacity can also be improved through functional institutional structures; efficiency can only be attained if structures are created and objectives are clearly set, together with targets, budgets and concrete tasks. The NCP network currently comprises employees who, in addition to what they should do in the network, perform their duties in the institutions they work for. The Romanian H2020 NCP network is hosted and coordinated by the MECS through the Department of European Integration and International Cooperation, and is a combination of specially appointed personnel (35 employees of the ministry) and 19 managers and researchers from various HEIs and PROs; the government is covering the costs of salaries for the permanent staff (within the ministry) and dissemination activities, including training and regional meetings.

Because the NCP network at the national level has insufficient human resources, the quality of support is highly influenced by each individual working in the NCP, hence, it varies from one person to another. There is, sometimes, also a problem of professional performance. Moreover, people who fulfil these roles in various thematic areas do not have, most often, the resources to organize specific information activities. Consequently, the quality of the support provided is variable: it depends either on the professional quality of the NCP's or on the resources available at the NCP network level.

When assessing the quality of support, the interviewed R&I performers characterize the NCPs activity as being rather 'mechanical': they are merely presenting the guides for the calls; they either provide deficient guidance or no answers whatsoever to requests, and they lack solid knowledge of certain H2020 aspects; some regional NCPs often offered contradictory information. There was, for instance, a situation when a project of one university reached the interview stage at European Research Council, they sought the support of NCP in order to prepare the project team for the interview stage, but no answer was received. Unfortunately, so far, many of the researchers couldn't rely on the NCPs.

As a conclusion, it is not that the NCPs don't perform, but the information provided is not of real support (excepting a few regional NCPs), while the institutional capacity and especially funding of the NCP network is low.

What would be needed is for the NCP network to attract specialists that can support potential beneficiaries in writing projects, especially the scientific component. The NCPs should also be the actors promoting partnerships (but, in our case, potential Romanian partners are just a 'basket of emails' – say some of the researchers). The NCP structure should have a consolidated data base to allow them to make valuable recommendations based on scientific expertise and other relevant criteria if, for example, there are requests for partnerships from abroad.

- **Good research infrastructures**

The quality of the research infrastructures is high in Romania. Starting with 2005, systematic investments have been made nationwide in R&I infrastructures through the national programmes, complemented lately by the SF.

Romania has now top-level research infrastructures, considered more than competitive by the highest Western standards, which could support the implementation of successful, complex H2020 projects. There is an excellent infrastructure available, not only in universities, but also at the national level. Romania is hosting one European research infrastructure with global impact – the Eli Extreme Light Infrastructure, with an estimated starting date in 2016 (European Commission, European Strategy Forum on Research Infrastructures, 2012) and other 10 research infrastructures of pan European interest in engineering, energy, socio-economic sciences, physics, environmental, marine and Earth sciences, material sciences, chemistry and

nanotechnologies, and life sciences (European Commission, Directorate-General for Research and Innovation, 2015b) (European Commission, Directorate-General for Research and Innovation, 2015c).

Moreover, in June 2015 UEFISCDI launched the ERRIS platform (Engage in the Romanian Research Infrastructures System) – which maps the services attached to the RDI infrastructures and equipment available in Romania, facilitating the efficient promotion of these services and greater collaboration among RDI actors. 36 national infrastructures, 153 research services and 314 pieces of equipment in 33 R&I domains are registered on ERRIS as of June 2015 (Executive Agency for Higher Education, Research, Development and Innovation Funding, 2015b), including the 19 installations of national interest funded by ANCSI in 2004 (National Authority for Scientific Research and Innovation, Romanian Committee for Research Infrastructures, 2008).

For researchers and policymakers the challenge is to make these infrastructures visible internationally, to provide financing for maintenance and to exploit them for further development, considering that Romania has the lowest budget for R&I in the EU (0.4% of GDP) (European Commission, Directorate-General for Regional and Urban Policy, 2015b).

However, there is a threat of the infrastructures not being properly exploited, not training human resources for that purpose, and not ensuring their proper maintenance. The reality is that there are not enough specialists because the research projects are few and unreliable. Consequently, the future activity must be focused on new projects for human resources training, especially because Romania has the lowest percentage in EU of employees in Science and Technology (13.3%) (European Commission, Directorate-General for Regional and Urban Policy, 2015b).

It's also worth mentioning that the national R&I funds that are being distributed are not proportional to the potential of the infrastructure. This problem – at the level of system management – means that Romania is losing proficient infrastructure, while projects with no available infrastructure are sometimes getting approval; competitiveness is not stimulated and funds are 'wasted' on minor research projects that do not respond, in substance, to Romania's strategic priorities – say some of the interviewees.

- **Lack of experience as evaluators / participants in FP schemes**

Romania is confronting an experience deficit in evaluating and participating in FP schemes, at least compared to other MS and also to the real potential of the Romanian R&I system in terms of human resources and research infrastructures. This results in unconsolidated, marginal experiences that cannot mature into a critical mass of specialists and a proper professional culture.

Furthermore, there is no cohesion among the Romanians who do participate. Those who are implementing the projects do not offer support for those who could apply, and successful practices are not being shared.

But the chronic and fundamental problem in regard to R&I experience is that the talent pool of Romanian entrepreneurs and researchers is not being properly mobilized, and is often lost. The Romanian scientific Diaspora is one of the world's largest, but the level of domestic scientific output lags far behind the country's competitors. Similarly, the Romanian high tech private sector (the group which is sparking growth in neighbouring countries as well as global leaders) is an "abandoned orphan". Moreover, Romanian scientists and researchers emigrate *en masse*; over 15,000 Romanian researchers work abroad. Only 40 were enticed to return to Romania between 2007 and 2009, reflecting poor career prospects in the country, limited compensation or prospects for entrepreneurial gain, and the lack of a proper research milieu (The World Bank, 2012).

- **Motivated researchers**

There don't seem to be any motivational factors affecting the Romanians' participation in FP7 / H2020. Romanian researchers are not financially demotivated, although we have a rather low income rate compared to other MS, and that is because academic recognition is a rather insignificant factor. They are participating in the European calls and if they are not successful it is because of various other reasons.

The Romanian participants in H2020 are interested in gaining reputation. In fact, many of the researchers and project managers who implemented FP7 projects most commonly undervalued their work just to participate, a fact which led to significant efforts (and insufficient remuneration). The Romanian researchers still adopt the 'outsider' role, at least when they negotiate their position in the project and when they evaluate their scientific competences. At the same time, some researchers wish to coordinate consortiums, which is not always a feasible option, at least because of a lack of historical performance (there have been cases in which the project proposal came from a Romanian university, but the final decision was for the coordinating institution of the consortium to be from another state, which has been beneficial for the project)

It is important to underline that researchers sometimes fear that the volume of work in FP and H2020 is too large, that H2020 is about engaging in new and unknown endeavours, with improbable prospects of success. Researchers live under the impression that they would not have chances to win. Low participation rate is a factor in this respect and the national R&I system is confronted, therefore, with a vicious circle.

Some researchers believe that Romania doesn't receive financing because of its bad image and lack of recognition in research areas. Unfortunately, there are no centres of excellence that benefit from research marketing. There is also a problem of visibility and lack of lobbying on Romania's behalf at the European level; this is caused by the decrease of funds allocated for research nationwide. The low visibility of Romanian researchers at congresses and workshops (due to lack of funds for participation and low participation in FP7 / H2020) negatively affects the overall image of research in Romania, and thus contributes to the low institutional rate of success. There has to be more work done to improve the image of Romanian researchers and research in general at the European level.

5 POLICY INSTRUMENTS FACILITATING THE PARTICIPATION IN (FP7) H2020 / (SF) ESIF

- **Financial support for the proposal drafting**

Financial instruments that help in drafting a proposal are missing, but it would be extremely useful if these types of instruments would be developed. For the same reason, private companies are not attracted to research projects. Instead, there are a lot of consulting firms specialized in writing projects, but they are expensive and these funds are not eligible.

There were such instruments in the past (before 2008), such as the “Impact” Programme.

There is an isolated example of one university which is allocating a small amount of money and also salary raise of 10% for one year for proposals that haven't been funded but received a high score (over 80 from 100).

- **Support for drafting proposals provided by National / Regional Contact Points or other specialised offices**

There aren't any special offices for support in drafting project proposals; nevertheless, there are networks formed, but the people involved are overloaded. Efficiency can only be attained if structures are created and objectives are clearly set, together with targets, budgets and concrete tasks. In brief, there is not sufficient institutional effort invested in project writing.

If there are specific questions from the R&I performers, the NCP personnel (especially regional NCP) reply via email or phone. However, there is no support given for writing proposals, especially because there aren't enough human resources available for the NCP network.

One can also get support by acquiring consultancy services, which the market fully provides. The private R&I performers believe that NCP support for drafting proposals should not exist anyway, because the preparation of project applications is a private competence (to be acquired in the form of services or expert work).

- **Staff training in management of research**

There are active departments and training programmes within various universities.

- **Short-term training in Brussels for experienced personnel of institutes having interest in H2020**

Unfortunately, the NCP network does not work with the Romanian Office for Science and Technology (Brussels) to organize such training in Brussels, mainly because there is a lack of available funding for the NCP activities.

- **Awareness events informing the R&I performers about the rules of ESIF and H2020 calls**

There are information events on H2020 that stir up enthusiasm, mainly organized in collaboration by the regional NCP and the HEIs, but unfortunately there is neither continuity nor any concrete actions being followed, and there is very little published material about them. Moreover, previous presentations were too general and this is an issue that needs to be improved. Researchers have reported that the type of information that the public authorities provide should be presented more often to the research institutes.

There are also universities which have sent their administrative staff to attend training courses on H2020 in Brussels and are planning to set up departments for supporting H2020 drafting and implementation.

The lack of awareness is not an important issue. However, the need for sustained administrative engagement at regional level is obvious; currently, the efforts are concentrated in Bucharest. While most of the entities, infrastructures, resources are in the capital city, more focus needs to be put on information activities at the regional level. Only in this way can sustainable development be achieved and the regional potential stimulated.

- **Other types of events bringing together academia, research institutes, business and regional authorities, facilitating the dialogue between them etc.**

These kinds of events are organized in Romania, and they are very useful, at least in terms of networking. However, there are never enough people capable of putting knowledge into practice; in reality, the knowledge 'suppliers' (researchers) are only communicating with each other; sometimes, there is the perception that the national authorities participate only formally, as there is no later follow up. Also, there is the recurring theme of the potential collaboration with the private sector – but which is often unrealistic or not sustained in practice.

The Romanian R&I system needs a better capacity to take advantage and capitalize on those events. With regard to the networking, this is carried and sustained informally, without efficient institutional mechanisms in place.

- **Policy instruments and good practices**

There are policy instruments that can be labelled as 'good practice' in terms of policy design, implementation and results which justify the selection. Some of those instruments are already synthesised in the SNCDI2020.

There was the POSCCE scheme for clusters development, which was useful by supporting international collaborations which in turn led to a better networking of Romanian R&I organizations across European Research Area. The instrument, however, was only launched in August 2013.

Funding doctoral schools through POSDRU PA1.5, addressing individual doctoral students and postdoctoral researchers with mandatory international mobility could be regarded as good practice considering that it contributed to an increased mobility of Romanian researchers in Europe, as well as consolidated partnerships between the institutions involved.

Funding individuals through doctoral and postdoctoral fellowships is regarded as good practice, considering that they contributed to an increased mobility of Romanian researchers in Europe, thus facilitating networking.

The "Impact" programme and the awarding of project ideas in / from enterprises were also good practices, especially for private R&I performers.

- **Instruments are needed for:**

- Better informing and training potential beneficiaries in order to understand and utilize the procedures and instruments, to properly plan and disseminate the schedule of the calls but also the ideas and entities willing and capable to participate in ESIF R&I calls;
- Supporting the development of the administrative capacity to elaborate and promote Romania's position in preparing and negotiating work programs or the calls pertaining to ESIF and H2020;
- Funding meetings abroad, which are essential for networking and strengthening partnerships with researchers from other MS.

6 EVALUATION AND MONITORING MECHANISMS

(1) Evaluation and monitoring in SF and ESIF for R&I

Evaluation in POSDRU / POCU

In POSDRU, the MA took charge of the selection of the evaluators, through the Technical Assistance scheme. Evaluators were selected from the existing pool of evaluators recruited by the MA. In the final stages, the IO was merely involved as a 'third party'.

There are no international evaluators used. As a consequence, proposals are submitted in Romanian.

The eligibility and selection criteria are adequate, but there is some degree of volatility, in the sense that the Guides have been systematically modified, leading to further complicating the procedures, despite efforts to simplify them. In addition, unfortunately, different audit authorities had different interpretations of the Guides.

In the case of POCU, the current plans look promising, but it is premature to jump to conclusions, since no competition has yet been launched.

Organising and accessing a common pool of experts, open to all EU MS could work, in principle, but in practice the local specificities may pose challenges. A common pool of experts might function satisfactorily for research projects, or other projects built around knowledge creation/exploitation. However, in the case of projects focused on social problems, the issues to be evaluated are much more specific and context-dependent.

The representatives of IO POSDRU / POCU believe that the evaluation process is transparent, given that the process takes place online. The fact is that the evaluation grids are clear and public, and the evaluators' scores and justifications are sent to the applicants, as a part of the evaluation procedure.

Evaluation in POSCCE / POC

The experts are being selected from an extensive database of national and foreign experts, which was provided by UEFSICDI; approximately 4,000 Romanian and 4,000 foreign experts (from the evaluators database used in PNCDI2 calls) have been invited to express their interest in evaluation of SF for R&I calls, hence providing a tailored database for POSCCE PA2.

The scientific evaluation process is carried in expert panels, which are automatically formed from the database. The technical evaluation is carried by the IO.

The calls addressing projects for developing public infrastructures and for invited researchers use both national and international experts, therefore the application is written both in Romanian and English, while the other calls of POSCCE PA2 use only Romanian evaluators (therefore applications are written in Romanian).

The IO within ANCSI has insufficient staff for the administrative work required to sustain an efficient implementation of POSCCE PA2. Still, they benefit from the Technical Assistance Operational Programme in periods of peak activity.

The eligibility and selection criteria are adequate because they are adapted to the research culture and practice. Moreover, they are neither arbitrary, nor restrictive, they are only meant to ensure that there are no breaches of law (in European or national regulations).

A common pool of experts at European level would be in the best interest of IO POSCCE. Still, there is reluctance towards the use of external experts because there are national peculiarities that could be difficult to grasp.

The representatives of IO POSCCE / POC within ANCSI believe that the evaluation process is transparent because all the related information is made public on the website and there are also procedures in place for communicating with the beneficiaries throughout the process.

(2) R&I performers' opinions on evaluation and monitoring in SF for R&I

R&I performers believe there is transparency in the evaluation criteria, but problems with evaluators persist. Evaluators are often not well trained and subjective and, consequently, assessment is perceived as a mere lottery.

In the case of SF, the right to challenge an assessment is appreciated, at least because the evaluator reading the draft might make omissions (especially when it comes to documentation packages of over 200 pages per project), or there may be procedural faults; luckily, there is an open attitude towards this aspect.

The scientific dimension is only a part of the evaluation; feasibility and economic impact (sound financial analysis) are added to the equation. These issues need to be considered in a balanced and objective manner, in a standardized framework. So far, there have been no standardized evaluation mechanisms for the financial dimension of projects; there is a low systemic capacity for evaluating financial feasibility and for performing cost-benefit analysis.

There is another problem in the scoring systems: they are insufficiently explicit for the evaluators, and the differences between the scoring margins are unclear. The evaluation process works well and is transparent, feedback is given and deadlines are respected, but additional improvements are needed for standardizing the scoring system (eliminating, as much as possible, subjective evaluations and vague remarks such as 'insufficient').

From the interviews, there is also the perception that, sometimes, the beneficiaries' intentions are misjudged by the funding authorities; overall, Romanian researchers are well-intentioned, but an accusatory approach towards the beneficiaries makes the evaluation – and moreover the monitoring process – seem rather subjective in some cases. In this sense, the project M&E should be focused only on the project idea, considered in the context of the market and technological development.

The monitoring procedures pose a real problem for many research organizations: there is a lot of bureaucracy, lack of institutional capacity and an incoherent legal framework; additionally, the particularities of R&I-related acquisitions are poorly understood by the authorities.

There are public authorities that understand their monitoring role as being 'punitive', rather than a supporting one – so, there is poor cooperation between the authorities and the beneficiaries. The personnel in the bodies entrusted with audits and monitoring are usually not specialized in the fields they assess and they often misunderstand, or even misjudge, the specific R&I issues.

7 ENHANCING OR LIMITING THE SYNERGIES?

From the perspective of the already existing country experience in synergies between national programmes and FP7 ('ERC-like' funding programme), the main factors affecting the synergies for 2014-2020 are the existing regulations at the level of ESIF and H2020.

Mechanisms that could **encourage synergies** were not in place for the policy cycle 2007-2013. Currently, in POC there is the thematic funding Action 1.1.3 "Creating synergies with the H2020 RDI actions and with other international programmes" (under PA1, Specific Objective 1.2 "Increase the participation in EU research"). The funding scheme will support ESIF projects for (1) ERA Chairs, (2) "Teaming" and (3) creating support centres for drafting H2020 (or other international programmes) project proposals¹⁴. The first 1.1.3 call is already open as of July 2015¹⁵.

The following factors would affect the synergies between ESIF and H2020:

- **Coordination between ESIF (country level) and the EU (level) programmes**

Despite the already existing support in common provisions on the ESIF programmes and in the Country Partnership Agreement for the coordination between ESIF, national funds and European Research Policy Horizon 2020, effective functional coordination mechanisms have to be developed. It asks for piloting, mutual learning, and sharing good practices. It requires proactive actions both from the MAs, IOs and NCPs, to cover the whole life cycle of the programmes, from in depth understanding of potential synergies, call documents development, aligning call calendars, selection procedures, funding decisions and contract signing, M&E, while focusing on decreasing administrative burdens on grantees. It needs creativity and professionalism. It is not about *additive manufacturing*. The synergy between programmes asks for 'synergy' and a strong partnership between staff members of NCPs and MAs, each of them bringing in the value of their professional networks. Common task forces focused on problem solving would be an effective way to *walk the talk*. "Act local and share the practice at the EU level" has to be the core message, together with "no good practices left behind". Rewarding the most innovative approaches or quality labelling the good practices, at EU level, would definitely have an impact on further developments.

- **Interoperability, data sharing and open access**

Access to information, data sharing and interoperability issues are critical. It is about procedures (evaluation, implementation, M&E, etc.) and resources (evaluators, applicants, beneficiaries, etc.). *Portability* of evaluations is one of the key issues in making synergy work. It is not about H2020 providing evaluations to external parties but about making evaluation information available while maintaining the anonymity of evaluators (*depersonalization of evaluation*). It would critically help MAs not to duplicate the evaluation work and take time-effective, quality based decisions.

Easing access to the information about already funded projects and their publicly available results, in line with the *open access* to the results of the publicly funded projects, will help avoid unneeded duplications and speed up the take-up of the results of already funded projects to the new developments as well as to the market, with a clear impact focus.

- **Prospective coordinated calls, eligibility and funding rules, M&E**

Synergy asks for coordinating the timing of the ESIF and H2020 calls. This is neither easy nor obvious, mainly because programmes are not *synergy born*. It needs the interests of both sides to be for aligned, ESIFs and

¹⁴ <http://www.poc.research.ro/actiuni-1-1-3>

¹⁵ <http://www.poc.research.ro/diagrama-evaluare>

H2020, and this makes the problem more complicated. It is also worth looking at the ESIF-ESIF... synergies in potentially linked calls and about funding projects with partners from different countries. Here, the experience of e.g. ERA-NETs (PLUS) joint calls and funding decisions is a good practice to share and use. Similar to the EDP, a forward-looking consultation based process involving key stakeholders will help discover new opportunities and create roadmaps for implementation. Collective intelligence will contribute to positive results and innovative solutions. Eligibility issues and funding rules would require very detailed coordination. Clear M&A as well as audit procedures need attention.

8 TAKE-UP OF PUBLIC SECTOR RESEARCH RESULTS

International evidence suggests that BERD is more likely to be conducive to patenting and innovation, as compared to government expenditures. The Europe 2020 strategy recommends countries to aim at having the business sector finance about 2/3 of national R&D expenditures. Yet, business expenditures in R&D in Romania have declined by half in recent years from 0.25 percent of GDP in 2000 to 0.12 in 2013, in sharp contrast to its peer countries and the EU15 / 25 figures (Organisation for Economic Co-operation and Development, 2015). Overall, Romania experienced significant falls in BERD intensity over the last 15 years as it not only deteriorated in absolute value but also as a share of total R&D expenditures. The absolute level may reflect in part a lack of reporting by private businesses but the trend is worrisome (The World Bank, 2012).

In this context, providing SMEs with tailored high-quality services to facilitate innovation remains a challenge in order to improve the firms' research and innovation capacity (European Commission, 2015a).

Collaboration between the public and private sectors and the commercialization of public research are weak. Results from the 2012EU Community Innovation Survey have shown that only 4.9% of surveyed Romanian firms cooperated with the public sector (i.e. government or public research institutions) in the period 2008-2012 (Eurostat, 2012). Several efforts have been made starting with 2007 (with the PNCDI2 and POSCCE PA2) to promote patenting and licensing, emergence of spinoff companies, and the expansion of joint or contract research. Nonetheless, the results of public research remain essentially in academic domains with little impact on economic development (The World Bank, 2012).

The **innovation and technology transfer infrastructure** has been developed to some extent in Romania. The National Network of Technological and Innovation Transfer (ReNITT) consists of 55 specific entities (technological transfer and information centres, technological and business incubators, as well as four scientific and technological parks). The geographical distribution of those entities is shown in Figure 9.

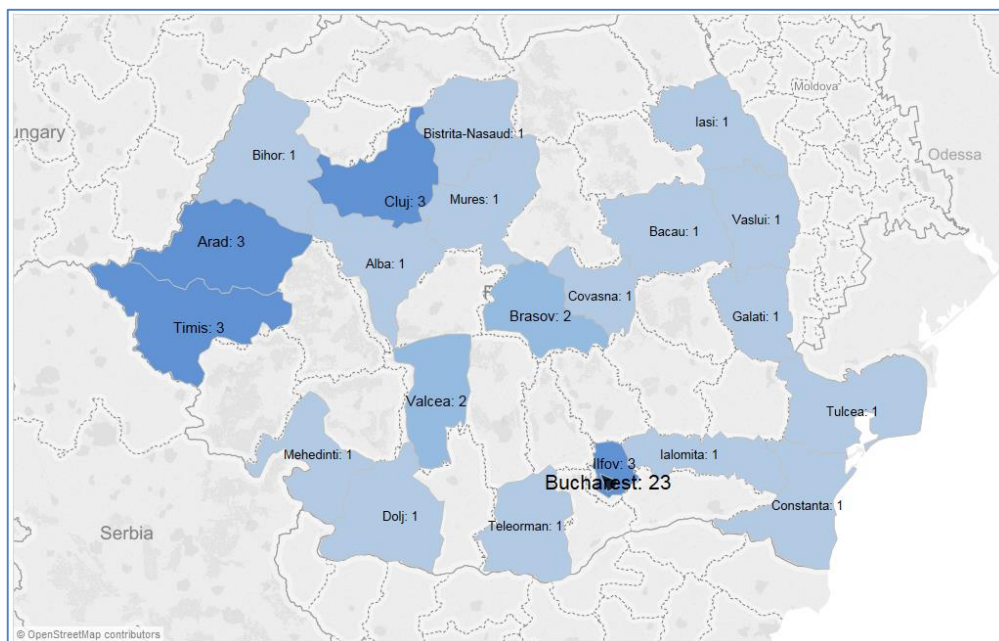


Figure 9. The territorial distribution of the Romanian technology transfer and information centres, technological and business incubators, and scientific and technology parks located

The services meant to be provided by ReNITT to both public and private R&I agents are: information services, technical assistance in drafting R&I project proposals and networking, training, business assistance for innovation and technological transfer, technology audit, technology forecasting, physical or virtual incubation for innovative SMEs, and technical assistance and consulting for developing prototypes, exploiting IP rights (IPR), including legal assistance (National Authority for Scientific Research and Innovation, 2015b). However, the capacity to deliver these services is rather low¹⁶.

Moreover, this technology transfer infrastructure is characterized by low commercialization capacities and funding, requiring efforts to be fully financed from deal-based fees and commissions. This in turn limits the capacity of TTO to promote training, better monitor research and market developments, and in general to help lead the cultural change needed in universities and among R&I performers toward improved collaboration with the private sector. The current funding appears short-sighted in the sense that it does not reflect the externalities, in bringing researchers together with entrepreneurs, supporting the commercialization of research results, and, in general, helping to bridge the gap between research and product development.

These shortcomings of the innovation and technology transfer infrastructure are planned to be addressed by POR PA1 – “Promoting Technology Transfer”. With a budget of EUR 206.51 million for 2014–2020, POR will provide financial support for TTOs circumscribed to the regional and national smart specialization fields through:

- Creation and modernization of innovation and TTOs, including equipment procurement;
- Procurement of technological services, including business consulting;
- Creation and modernization of IP trade platforms (Ministry of Regional Development and Public Administration, 2015).

Romania had a number of regulations on **IP** with several contradictions on invention ownership, use and its transfer creating negative views among domestic as well as potential foreign investors. As a matter of fact, the contradictions of the IP legal framework has resulted in legal battles where companies funding research find that it is difficult to claim the ownership of the results as well as in case by case IP provisions between R&I organizations and their researchers. (The World Bank, 2012). The legal framework for the protection and sharing of IP has been improved by the Law no. 8/ 2014 on service inventions, which is intended to clarify the rights of IP revenue sharing between employees and their employers.

In addition, Romania’s policies should encourage the **private sector’s demand for R&D and innovation** activity. While economic specialization per se plays a role – biotech industries are more likely to invest in R&D than textiles – a number of other factors are also at interplay; some of those could be directly influenced by public policy (The World Bank, 2012). The tax-breaks for R&D that have been implemented since 2010 (by the Order of the Ministry of Public Finance no. 2086/ 2010 and of the Ministry of Education, Research, Youth and Sports no. 4504/ 2010, approving the Norms regarding tax incentives granted for research and development costs) are the most generous among OECD countries (European Commission, Directorate-General for Taxation and Customs Union, 2014).

There are only a few programs aimed at **IP-based start-up companies** in Romania. Also, the term ‘innovative start-ups’ is applied inappropriately to all Small and Medium Enterprises (SMEs). Thus, generic support policies and programs for SMEs are conducted by the Ministry of Economy and the Ministry of Public Finance, with no targeted measures for the innovative start-ups. Despite the various funding programmes in place, the number of start-ups supported is very small. Financial adequacy of the existing programmes (as

¹⁶ An ongoing project implemented by UEFISCDI has recently mapped 177 active TTO (accelerators, centres for information, and technological transfer, clusters, hubs, incubators, industrial parks and science and technological parks); the regional distribution of the TTO is available at:
<https://public.tableau.com/profile/marius.mitroi#!/vizhome/Facilitators/Facilitators>

well as their administrative requirements) is still an issue when aiming to improve access by innovative start-ups.

The RD&I functional review of the World Bank discovered that large **multinational enterprises** studiously avoid R&D in Romania due to a hostile IP environment and fear that Romanian employees could use the legal system to seek recompense through time consuming and publicly controversial suits. This results in missed opportunities for R&I investments, jobs for Romanian researchers, externalities for the country, etc. Not surprisingly, there is no evidence of spill-overs in terms of development of local suppliers or spinoffs initiated by former multinational enterprises' employees since they do little or no R&I work (The World Bank, 2012).

The functional review of the RD&I sector carried out by the World Bank showed that several programs under the two main channels POSCCE PA2 (for R&I) and PNCDI2 target several stages of the innovation value chain at the same time. Out of a total of EUR 1.4 billion of realized and planned expenditures between 2007 and 2011, 33.69% were devoted to basic research – stage one (EUR 972 million) through the *Human Resources, Capacities, and Ideas* programmes (within PNCDI2), and selected subprograms under POSCCE PA2. Almost a third of the funding (29% or EUR 408 million) was directed to either stage one or stage two – proof of concept, through programs like *Partnerships* and *Innovation* under PNCDI2. POSCCE-*Partnerships* targeted specifically stage two with EUR 11.4 million. In sum, POSCCE-*Private infrastructure* targets all stages of the 'valley of death' (stages two to four) with merely EUR 19 million. Finally, all innovation stages are funded by merely 1.4% of the total (EUR 20.7 million) through the subprogram POSCCE-*Innovation*, while stage five – production and marketing receives less than 1%, amounting to only EUR 5.8 million, through POSCCE-*Startups-Spinoffs* (The World Bank, 2012).

9 COUNTRY TAILORED POLICY SUGGESTIONS

Based on the swot analysis and factors presented above, this chapter formulates proposals for specific structural changes and policy suggestions needed to support the synergy between ESIF, EU programmes and national funds. Coordination between programmes asks for country specific actions as well as coordinated actions at the EU level. Some of the identified proposals would be considered country specific, but most of the recommendations could and should be considered at the EU level. The interviewees (PROs and private companies' managers and researchers, policy makers, management personnel from SF funding agencies) who provided valuable insights for focusing this report have also made policy suggestions and recommendations.

Synergy readiness – programmes level communication and coordination

- Support at the EU level, for piloting, mutual learning, and sharing best practice. Common task forces focused on problem solving would be an effective way to *walk the talk*. “Act local and share the practice at the EU level” has to be the core message, together with “no good practices left behind”;
- Develop rewarding schemes for the most innovative approaches, or quality labelling the good practices, at EU level;
- Drive the actions towards understanding the challenges and identify solutions related to access to information, data sharing and interoperability issues;
- Coordinated actions focused on procedures (evaluation, implementation, M&E, etc.), resources (evaluators, applicants, beneficiaries, etc.). *Portability* of evaluations is one of the key issues in making synergy work, avoiding duplications and take time-effective, quality-based decisions;
- Coordinated actions for identifying ways of easing access to the information about already financed projects and their publicly available results, in line with the *open access* to the results of the public financed projects;
- Consolidated actions on the IPR issues related to synergy between ESIF, EU programmes;
- Consolidated actions on the use of state aid regulations, and their impact on the synergy.

Synergy readiness – country level communication and coordination

- Create common task-forces problem solving with participation of MAs, IOs, NCPs and national RDI funding agencies;
- Support the ad-hoc task-forces, with *flexible geometry*, for fast finding solutions to the demand-driven requests;
- Consolidated actions of MAs, IOs and NCPs, with participation of national RDI funding agencies focused on IPR issues related to synergy between ESIF, EU programmes and national funds;
- Consolidated actions of MAs, IOs and NCPs, with participation of national RDI funding agencies focused on use of state aid regulations and their impact on the synergy;
- Support for joint staff training of NCPs, MAs, IOs and national RDI funding agencies, and development of their professional networks. It helps developing the *synergy* and partnership between staff members of the NCPs, MAs, IOs and national RDI funding agencies, mutual trust and stimulate proactive, joint initiatives;
- Support developing the *synergy* and partnership between staff members of the NCPs, MAs, IOs and their EU / EC peers. It helps to exchange practices, lessons learned and stimulate joint initiatives and finding solutions to common problems;
- Support for developing of common NCPs, MAs, IOs documents explaining synergies;
- Support for providing open access to the funded projects, beneficiaries and researchers.

Synergy readiness – capacity building RDI stakeholders' level

- Use ESIF and national funds to invest in capacity building of the research management and administration offices, with a clear focus on professional support for scanning / understanding funding opportunities and correlation between them, writing successful proposals, reduce administrative burdens on the researchers in managing project implementation. Support their network and knowledge sharing initiatives;
- Use ESIF and national funds for very practical, tailored training targeting researchers; use case studies presenting lessons learned from EU, ESIF and nationally funded projects, covering the whole project life cycle, identifying needs and challenges. Focus on stakeholders inclusiveness in order to have *usual and unusual suspects* involved, to create public-public, public-private and private-private understanding of the synergy potential of funds and unlock the collaborative, multi-fund potential;
- Focused trainings on IPR related to synergy between ESIF, EU programmes and national funds;
- Focused trainings on state aid regulations and their impact on the synergy between ESIF, EU programmes and national funds;
- Use ESIF and national funds to cover the effort cost for preparing quality project proposals; waived by the evaluation results;
- Targeted brokerage events synergy focused and case study oriented, for research offices and researchers;
- Support innovative projects using social networks and media for communicating funding opportunities and telling the stories of successful synergies.

10 REGIONAL ANALYSIS

During 2007-2014, Romania funded 15,170 projects through seven SOPs, while Romanian researchers and research organizations participated in 1,049 FP7 projects (European Commission, Directorate-General for Research and Innovation, 2015a). The national distribution of those projects is shown in Figure 10:

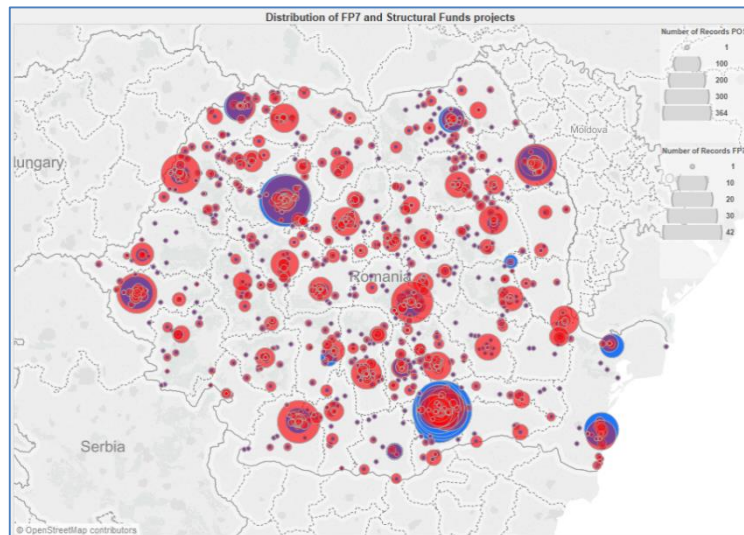


Figure 10. National distribution of SF (red) and FP7 (blue) projects funded in 2007-2014

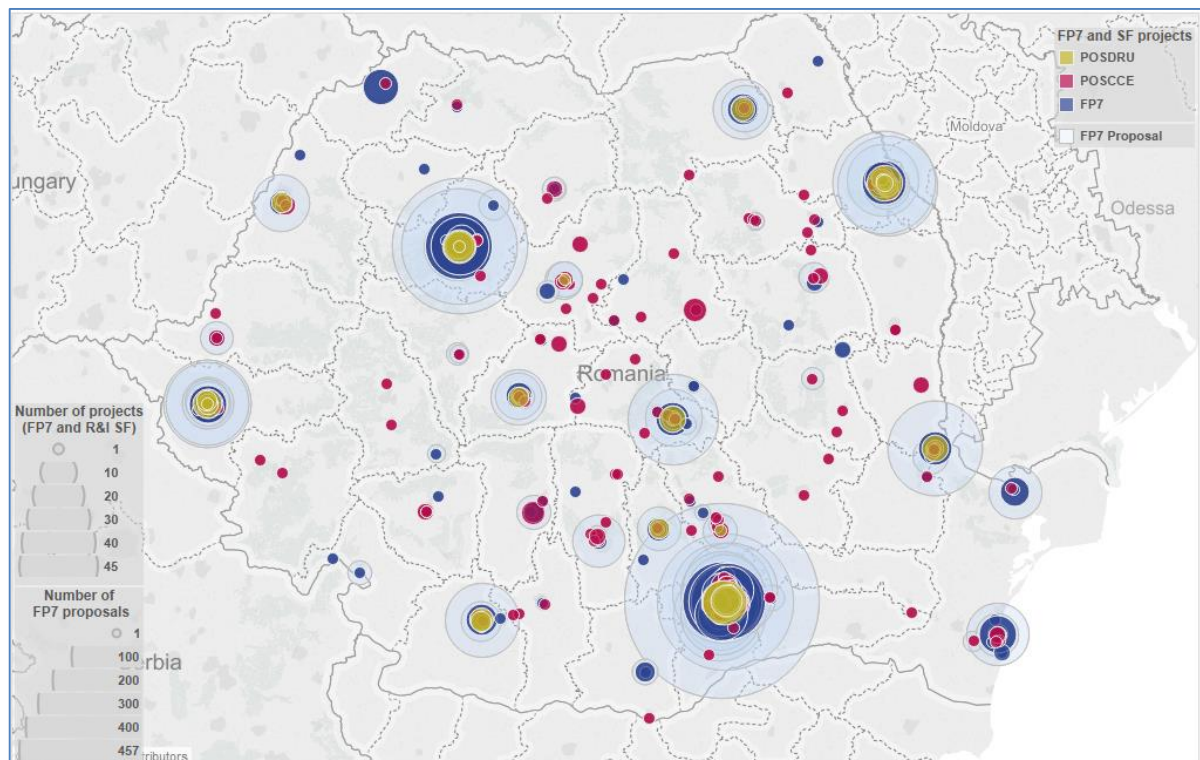


Figure 11. National distribution of SF R&I (red: POSCCE and yellow: POSDRU) and FP7 (blue) projects funded in 2007-2014, and FP7 proposals (light blue)

From the SF, as for 2013, 6,090 projects have been implemented aiming at increasing the economic competitiveness (POSCCE), out of which 620 projects for research cooperation or infrastructures (Ministry of European Funds, 2014); in human resources development, 3,338 projects have been implemented (POSDRU),

out of which 165 projects for human resources for R&I (doctoral and post-doctoral fellowships). The national distribution of the 1,338 POSCCE and 165 POSDRU projects for R&I is shown in Figure 11, together with the FP7 projects and (7,896) proposals.

In detail, the cooperation and research infrastructure projects funded through POSCCE are depicted in red in Figure 12 in relation to the blue FP7 projects and light blue FP7 proposals.

Bellow, the projects for doctoral and post-doctoral fellowships funded through POSDRU are depicted in yellow, in relation to the same FP7 distribution.

One can see that there are three significant clusters of both FP7 and POSCCE and FP7 and POSDRU projects in (1) Bucharest, (NUTS RO32[1]), (2) Cluj-Napoca (RO11[3]), and (2) Iasi (RO21[3]); next – in order of convergence – are the western cluster of projects in Timisoara (RO42[4]) and those centred on Brasov (RO12[2]).

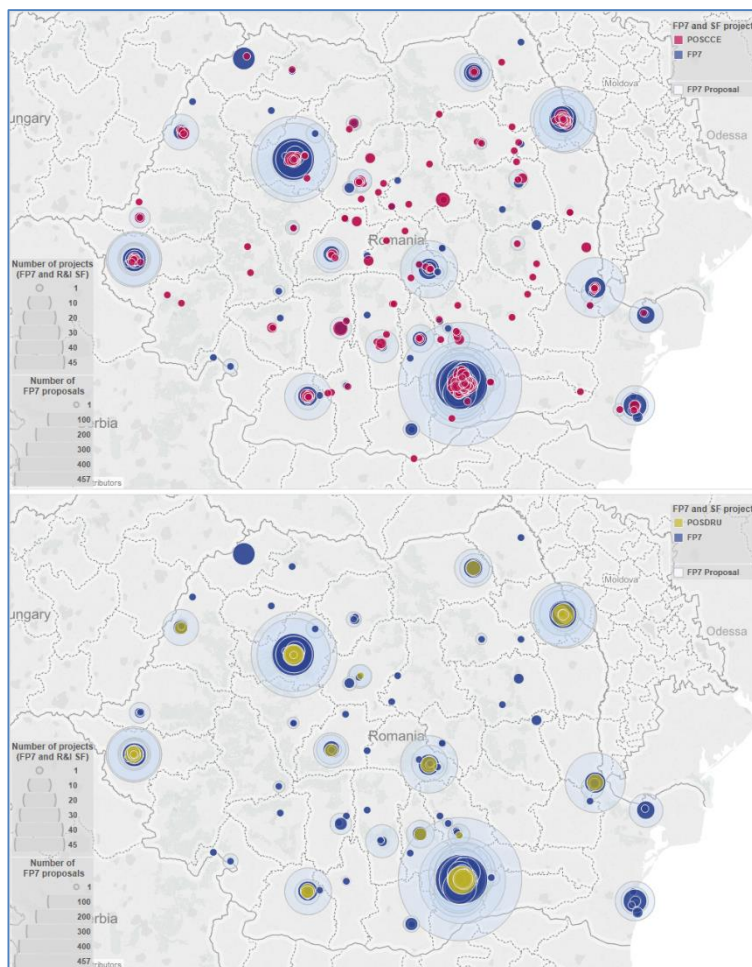


Figure 12. National distribution of SF R&I POSCCE (red) and POSDRU (yellow) projects funded in 2007-2014 against FP7 (blue) projects and FP7 proposals (light blue)

Table 1 and Table 2 present detailed information on the SF investment in human resources and innovation projects for competitiveness through POSDRU PA1.5 and POSCCE PA2. The two tables present internal data from IO POSDRU and IO POSCCE, consolidated as for April 2015 and discussed during the interviews, not yet published. The figures show a consistent investment in human resources development and scientific publications in several university centres at the national level (Table 1), and significant innovation-related results of POSCCE (Table 2), which have exceeded several strategic programmatic targets (more than 3, 5, even 11 times over – in the case of large companies participation, startups, new jobs created for men, patent applications, scientific papers published, results transferred and research labs created or modernized).

Table 1. Output and result indicators of SF investments in human resources through POSDRU PA1.5

Indicator	Value
No of doctoral students assisted	7,798
No and share of doctoral students assisted, who obtained a PhD diploma (<i>*ongoing projects</i>)	3,485 45%
No of doctoral schools assisted	356
No of postdoctoral researchers assisted	2,723
No of scientific papers/ reports presented– doctoral programmes	18,347

No of scientific papers/ reports presented– postdoctoral programmes	8,959
No of scientific papers published – doctoral programmes	19,779
No of scientific papers published – postdoctoral programmes	9,042
No of research reports validated by the Universities' Councils – postdoctoral research	10,053
Transnational partners involved in projects – doctoral and postdoctoral programmes	221

Table 2. Output and result indicators of SF investments in research infrastructures and innovation projects through POSCCE PA2

Indicator	No	
Programme indicators		
Projects implemented in partnerships between R&D PRO and companies	<i>attained</i>	41
	<i>target</i>	200
R&D projects funded	<i>attained</i>	569
	<i>target</i>	600
SMEs assisted	<i>attained</i>	303
	<i>target</i>	270
Large companies assisted	<i>attained</i>	45
	<i>target</i>	0
Innovative start-ups assisted	<i>attained</i>	101
	<i>target</i>	29
Innovative spinoffs assisted	<i>attained</i>	19
	<i>target</i>	21
SF expenditure with RDI projects (mil.EUR)	<i>attained</i>	441.06
	<i>target</i>	608.37
Private expenditure with RDI projects (mil.EUR)	<i>attained</i>	65.15
	<i>target</i>	158.11
R&D centres connected to GRDI structures	<i>attained</i>	11
	<i>target</i>	11
Poles of excellence developed	<i>attained</i>	0
	<i>target</i>	0
Institutions assisted for improving the administrative capacity	<i>attained</i>	80
	<i>target</i>	21
Result indicators		
New jobs created–women	<i>attained</i>	499
	<i>target</i>	538
New jobs created – men	<i>attained</i>	780
	<i>target</i>	662
Patent applications resulted from the funded projects	<i>attained</i>	219
	<i>target</i>	50
Research labs created	<i>attained</i>	375
	<i>target</i>	50
Research labs modernized	<i>attained</i>	174
	<i>target</i>	0
Other indicators		
Foreign specialists employed	<i>attained</i>	53
	<i>target</i>	30
Scientific papers published	<i>attained</i>	906
	<i>target</i>	250
Results transferred	<i>attained</i>	85
	<i>target</i>	0

Figure 13 shows the composition of the three main clusters of projects from Figure 11, in order: Bucharest, Iasi, and Cluj-Napoca.

As for the main cluster of projects in and around Bucharest, there are several centres, mainly central public administration and HE institutions implementing both R&I SF and FP7 projects.

The other two cities, Iasi in the North-East Region (RO21) and Cluj-Napoca in the North-West Region (RO11), have a distribution of projects around big universities and public R&D institutes. In Iasi all four universities and an active project-wise chemistry research institute of the Romanian Academy participate, while in Cluj-Napoca all four universities together with a national R&D institute and two private RDI companies (at the northern and southern tips in the centre of the map) participate.

The research organizations for the three case studies presented on the S2E website have been selected from these three regional poles of excellence (in this particular case, characterized by the high level of participation). The case studies therefore reflect the best and most complex practices at the national level in the operationalization of synergies between national, SF and FP7 / H2020 funds.

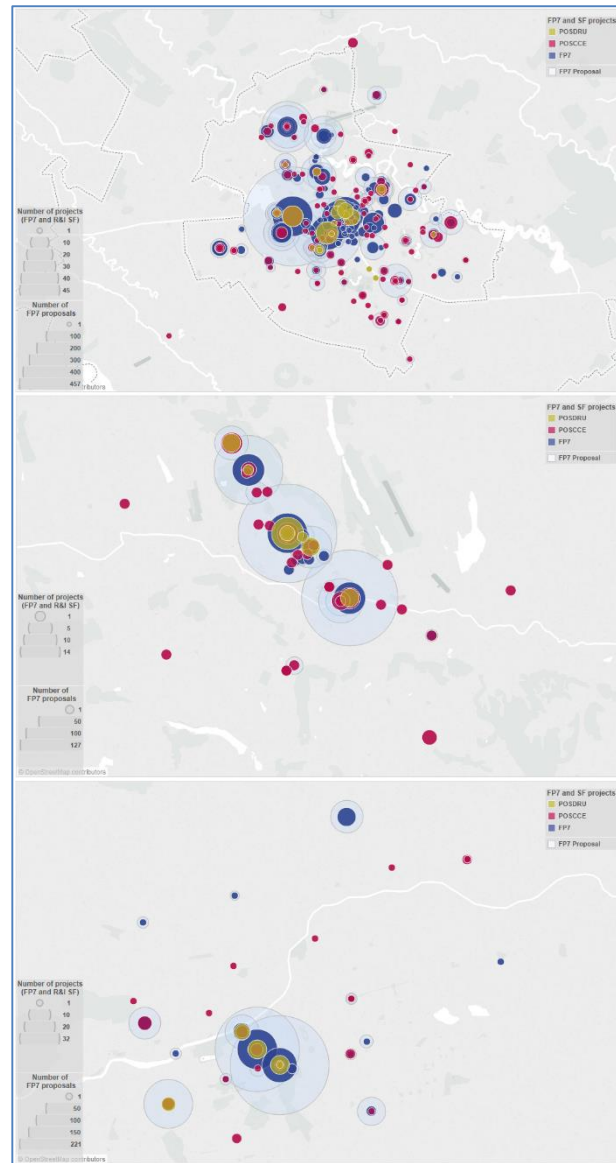


Figure 13. The structure of the main regional clusters of SF R&I POSCCE (red) and POSDRU (yellow) projects funded in 2007-2014 against FP7 (blue) projects and FP7 proposals (light blue)

11 ABBREVIATIONS

	ROMANIAN	ENGLISH
ANCSI	Autoritatea Nationala pentru Cercetare Stiintifica si Inovare	National Authority for Scientific Research and Innovation (Ministry of Education and Scientific Research) ¹⁷
ASAS	Academia de Stiinte Agricole si Silvice	Academy of Agricultural and Forestry Sciences ¹⁸
ASM	Academia de Stiinte Medicale	Academy of Medical Sciences ¹⁹
AST	Academia de Stiinte Tehnice	Academy of Technical Sciences ²⁰
CCCDI	Colegiul Consultativ pentru Cercetare-Dezvoltare si Inovare	Advisory Council for Research, Development and Innovation ²¹
CNCS	Consiliul National al Cercetarii Stiintifice	National Council for Scientific Research ²²
CNECSDTI	Consiliul National de Etica a Cercetarii Stiintifice, Dezvoltarii Tehnologice si Inovarii	National Council for Ethics in Scientific Research, Technological Development and Innovation ²³
BERD		Business Expenditures on R&D
ESIF		European Structural & Investment Funds ²⁴
FP7	Programul Cadru 7 (PC7)	Framework Programme 7 ²⁵
GERD		Gross Domestic Expenditure on R&D
HE		higher education
HEI		higher education institutions
IFA	Institutul de Fizica Atomica	Institute of Atomic Physics ²⁶
IP		intellectual property
IPR		Intellectual property rights
IO	Organism Intermediar (OI)	Intermediary Organism
MA	Autoritate de Management (AM)	Management Authority

¹⁷ <http://www.research.ro/en>

¹⁸ <http://www.asas.ro/en/>

¹⁹ <http://www.adsm.ro/#>

²⁰ <http://www.astr.ro/>

²¹ <http://www.research.ro/en/categorie/964/despre-ancs-organizare-organe-consultative-1-colegiul-consultativ-pentru-cercetare-dezvoltare-si-inovare>

²² <http://www.cnsc-nrc.ro/home/>

²³ <http://cne.ancs.ro/>

²⁴ http://ec.europa.eu/contracts_grants/funds_en.htm

²⁵ http://ec.europa.eu/research/fp7/index_en.cfm

²⁶ http://www.ifa-mg.ro/h_hulubei.php

MECS	Ministerul Educatiei si Cercetarii Stiintifice	Ministry of Education and Scientific Research ²⁷
MFE	Ministerul Fondurilor Europene	Ministry of European Funds ²⁸
MS		member state
NFE1		1 st National Foresight Exercise in Science and Technology (2005-2006)
NFE2		2 nd National Foresight Exercise for Research, Development and Innovation (2013)
NUTS		Nomenclature of Territorial Units for Statistics
PNCDI2	Planul National de CDI 2 pentru 2007-2013	National RDI Plan 2 for 2007-2013
PNCDI3	Planul National de CDI 3 pentru 2014-2020	National RDI Plan 3 for 2014-2020
PA1 / 1.5 / 2	Axa Prioritara 1 / 1.5 / 2	Priority Axis 1 / 1.5 / 2
POC	Programul Operational "Competitivitate" (2014-2020) <i>[cu referire in raport la AP1 – "Cercetare, Dezvoltare Tehnologica si Inovare (CDI) in Sprijinul Competitivitatii Economice si Dezvoltarii Afacerilor"]</i> <i>[fost POSCCE in 2007-2013]</i>	Operational Programme "Competitiveness" (2014-2020) <i>[referring to PA1 – "Research, Technological Development and Innovation (RDI) supporting Competitiveness and Business"]</i> <i>[former POSCCE in 2007-2013]²⁹</i>
POCU	Programul Operational "Capital Uman" (2014-2020) <i>[fost POSDRU in 2007-2013]</i>	Operational Programme "Human Capital" (2014-2020) <i>[former POSDRU in 2007-2013]³⁰</i>
POR	Programul Operational Regional (2014-2020)	Regional Operational Programme (2014-2020) ³¹
POSCCE	Programul Operational Sectorial "Cresterea Competitivitatii Economice" (2007-2014) <i>[cu referire in raport la AP2 – "Cercetare, dezvoltare tehnologica si inovare pentru competitivitate"]</i>	Sectoral Operational Programme "Increase of Economic Competitiveness" (2007-2014) <i>[referring to PA2 – "Research, Technological Development and Innovation for Competitiveness"]³²</i>
POSDRU	Programul Operational Sectorial "Dezvoltarea Resurselor Umane" (2007-2014) <i>[cu referire in raport la AP1.5 – "Programe doctorale si post-doctorale in sprijinul cercetarii"]</i>	Sectoral Operational Programme "Human Resources Development" (2007-2014) <i>[referring to PA1.5 – "Doctoral and postdoctoral programmes supporting research"]³³</i>
PRO		Public research organizations

²⁷ <http://www.edu.ro/>

²⁸ <http://www.fonduri-ue.ro/>

²⁹ <http://www.poc.research.ro/>

³⁰ <http://www.fonduri-ue.ro/po-2014-2020>

³¹ <http://www.mdrap.ro/dezvoltare-regionala/-4970/-7166>

³² <http://www.fonduri-ue.ro/poscce/>

³³ <http://www.fonduri-ue.ro/posdru/index.php/posdru#>

R&D	Cercetare-Dezvoltare (CD)	Research & Development
R&I	Cercetare-Inovare	Research & Innovation
RIS3		Research and Innovation Strategies for Smart Specialisation
RDI	Cercetare, Dezvoltare, Inovare (CDI)	Research, Development and Innovation
ReNITT	Reteaua Nationala pentru Inovare si Transfer Tehnologic	The National Network of Technological and Innovation Transfer ³⁴
ROSA	Agentia Spatiale Romana	Romanian Space Agency ³⁵
SF	Fonduri Structurale	Structural Funds ³⁶
SMEs		small and medium enterprises
SNCDI2020	Strategia Nationala de CDI 2014-2020	National RDI Strategy 2014-2020
SOP	Program Operational Sectorial	Sectoral Operational Programme
TO1	Obiectivul Tematic 1 (OT1)	Thematic Objective 1 (of ESIF, for R&I)
TTO		Technology Transfer Offices
UEFISCDI	Unitatea Executiva pentru Finantarea Invatamantului Superior, a Cercetarii, Dezvoltarii si Inovarii	Executive Agency for Higher Education, Research, Development and Innovation Funding ³⁷

³⁴ <http://site.roinno.ro/?module=info&id=7>

³⁵ <http://www.rosa.ro/index.php/en/>

³⁶ http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=structural_funds

³⁷ <http://uefiscdi.gov.ro/>

12 BIBLIOGRAPHY

- European Commission. (2014). *[COM (2014) 38 final] Report from the Commission to the Council and to the European Parliament: Eu Anti-corruption Report*. Brussels: European Commission.
- European Commission. (2015a). *[SWD (2015) 42 final] Commission Staff Working Document: Country Report Romania 2015. Including an In-Depth Review on the prevention and correction of macroeconomic imbalances*. Brussels: European Commission.
- European Commission. (2015b). *[SWD (2015) 8 final] Commission Staff Working Document: Romania. Technical Report*. Brussels: European Commission.
- European Commission, Directorate-General for Regional and Urban Policy. (2012). *Guide to Research and Innovation Strategies for Smart Specialisations (RIS3)*. Brussels: European Commission. Retrieved June 28, 2015, from http://s3platform.jrc.ec.europa.eu/c/document_library/get_file?uuid=a39fd20b-9fbc-402b-be8c-b51d03450946&groupId=10157
- European Commission, Directorate-General for Regional and Urban Policy. (2015a, June 28). *Cohesion Policy Data*. Retrieved June 28, 2015, from InfoRegio: <https://cohesiondata.ec.europa.eu/EU-Cohesion-Funding/2007-2013-Funds-Absorption-Line-View/inyx-rpy3?>
- European Commission, Directorate-General for Regional and Urban Policy. (2015b). *Country Profile Key Indicators: Romania*. Brussels: European Commission.
- European Commission, Directorate-General for Research and Innovation. (2015a, June). *FP7 Statistics*. Retrieved June 28, 2015, from Research & Innovation: http://ec.europa.eu/research/fp7/index_en.cfm?pg=country-profile
- European Commission, Directorate-General for Research and Innovation. (2015b). *Seventh FP7 Monitoring Report, 2013*. Brussels: European Commission. Retrieved June 28, 2015, from http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf
- European Commission, Directorate-General for Research and Innovation. (2015c). *Research Infrastructures - Romania*. Retrieved June 28, 2015, from European Portal on Research Infrastructures' Services: <http://www.riportal.eu/public/index.cfm?fuseaction=ri.search>
- European Commission, Directorate-General for Taxation and Customs Union. (2014). *[Taxation Working Paper N. 52] A Study on R&D Tax Incentives. Final report*. Luxembourg: Office for Official Publications of the European Communities.
- European Commission, European Strategy Forum on Research Infrastructures. (2012). *European Research Infrastructures with global impact*. Brussels: European Commission. Retrieved June 28, 2015, from http://ec.europa.eu/research/infrastructures/pdf/esfri_brochure_0113.pdf#view=fit&pagemode=none
- European Commission, Government of Romania. (2014). *Partnership Agreement [2014RO16M8PA001.1.2]*. Retrieved June 28, 2015, from http://www.fonduri-ue.ro/res/filepicker_users/cd25a597fd-62/2014-2020/acord-parteneriat/Partnership_Agreement_2014RO16M8PA001_1_2_ro.pdf

- European Commission, Joint Research Centre. (2014). *ERAWATCH Country Reports 2013: Romania [Report EUR 26757 EN]*. (R. Gheorgiu, Ed.) Brussels. Retrieved June 28, 2015, from http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/galleries/generic_files/file_0534.pdf
- European Commission, Joint Research Centre. (2015 [not yet published, under final review by JRC as for June 2015]). *RIO Country Report 2014: Romania*. (R. Gheorghiu, Ed.) Brussels.
- Eurostat. (2012). *Community Innovation Survey*. Retrieved June 28, 2015, from Science, Technology and Innovation Data: <http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database>
- Eurostat. (2015, June). *Data/ Main Tables*. Retrieved June 28, 2015, from Science, Technology and Innovation: <http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsc00001&language=en>
- Executive Agency for Higher Education, Research, Development and Innovation Funding. (2013). *The National RDI Plan for 2014-2020 - draft version [RO]*. Bucharest: UEFISCDI. Retrieved June 28, 2015, from <http://www.cdi2020.ro/wp-content/uploads/2014/02/pn-cdi-2014-2020.pdf>
- Executive Agency for Higher Education, Research, Development and Innovation Funding. (2015a). *EVoC Database*. Retrieved June 28, 2015, from EVoC: <http://uefiscdi-direct.ro/EVoC/main/index.php?>
- Executive Agency for Higher Education, Research, Development and Innovation Funding. (2015b, June). *ERRIS infrastructures*. Retrieved June 28, 2015, from ERRIS: <http://www.researchinfrastructures.ro/main/index.php>
- Government of Romania. (2007). *National Strategic Reference Framework 2007-2013*. Bucharest. Retrieved June 28, 2015, from http://www.fonduri-ue.ro/res/filepicker_users/cd25a597fd-62/Doc_prog/CSNR/1_CSNR_2007-2013_%28eng.%29.pdf
- Government of Romania. (2014a). *Strategy for Strengthening Public Administration 2014-2020*. Bucharest: Ministry of Regional Development and Public Administration.
- Government of Romania. (2014b). *Convergence Programme 2014-2017*. Bucharest: Ministry of Public Finance.
- KPMG. (2015). *EU Funds in Central and Eastern Europe. Progress Report 2007-2014*. KPMG in Central and Eastern Europe.
- Ministry of European Funds. (2014). *The Annual Implementation Report for 2013 of the Sectoral Operational Programme Increase of Economic Competitiveness*. Bucharest.
- Ministry of Regional Development and Public Administration. (2015). *POR 2014-2020*. Retrieved August 1, 2015, from POR budget and PAs: <http://www.mdrap.ro/dezvoltare-regionala/-4970/-7166>
- National Authority for Scientific Research and Innovation. (2015a). *National RDI Strategy for 2014-2020 (SNCDI2020) [RO]*. Bucharest: ANCSI. Retrieved August 1, 2015, from <http://www.research.ro/ro/articol/3343/strategia-nationala-de-cercetare-si-inovare-2014-2020>
- National Authority for Scientific Research and Innovation. (2015b). *ReNITT [RO]*. Retrieved June 28, 2015, from RO INNO ROMANIA: <http://site.roinno.ro/index.php?module=info&id=7&sid=20>

- National Authority for Scientific Research and Innovation, Romanian Committee for Research Infrastructures. (2008). *Report regarding Research Infrastructures of Romania*. Bucharest. Retrieved June 28, 2015, from http://www.research.ro/uploads/imported/1242293614cric_eng.pdf
- National Prognosis Commission. (2015). [RO] *Forecast of the Main Macroeconomic Indicators - Spring 2015 forecast*. Bucharest. Retrieved August 1, 2015, from http://www.cnp.ro/user/repository/prognoza_2015_2018_varianta_de_primavara_2015.pdf
- Organisation for Economic Co-operation and Development. (2015, May). *Main Science and Technology Indicators*. Retrieved from OECD.StatExtracts: https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB#
- The World Bank. (2011a). *Functional Review of the Central Public Administration in Romania – I: Public Administration Reform – An Overview of Cross-Cutting Issues*. Bucharest: The World Bank.
- The World Bank. (2011b). *Functional Review of the Central Public Administration in Romania – I: Center of Government Sector*. Bucharest: The World Bank.
- The World Bank. (2012). *Functional Review of the Central Public Administration in Romania – II: Functional Review of the Research, Development & Innovation Sector*. Bucharest: The World Bank.
- The World Bank. (2015). *Worldwide Governance Indicators*. Retrieved from <http://info.worldbank.org/governance/wgi/index.aspx#home>
- World Economic Forum. (2014). *The Global Competitiveness Report 2014-2015*. (K. Schwab, Ed.) Geneva: World Economic Forum.
- Zulean, M., I. I., & Vîiu, G. (2015). *The assessment of the RDI governance in Romania 2007-2013 [RO]*. Bucharest: UEFISCDI.

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