



***Performance-based research funding –
towards more effective national research and
innovation systems in the Danube region***

Discussion paper

In preparation of the third policy dialogue workshop held on “Innovation Union and ERA in the Danube Region” (Task 2.3), 23 June 2016, Chisinau, Moldova

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1. INTRODUCTION

Danube-INCO.NET¹ as a strategic high-level coordination and support action is founded in the macro-regional approach of the European Union, in particular the **EU Strategy for the Danube Region (EUSDR²)** and its **Priority Areas for Knowledge Society (PA7) and for Competitiveness (PA8)**. Based on strong institutionalised links with the PA Coordinators and the PA Steering Groups, it aims at supporting the policy dialogue within the EUSDR, to exchange with other regional policy initiatives and to enhance the bi-regional dialogue with a focus on the implementation of the ‘Innovation Union’ (IU) and the European Research Area (ERA) Framework.

In order to facilitate the policy dialogue, a **series of three workshops is organised on specific IU commitments or ERA priorities**, respectively, held in different non-EU Member States, i.e. Serbia, Ukraine and Moldova. Each workshop focuses on a coherent set of topics related to ERA priorities and IU commitments, respectively, that have been identified as priority subject for the partners involved in the task, and that are of particular relevance for the host country.

Based on the outcome of a survey conducted among all partners on the scope of Task 2.3 “Innovation Union and ERA in the Danube Region”, the current (third) workshop, addresses a multifaceted subject area specifically identified as a priority for dialogue between project partner countries: effective national research systems (ERA Priority 1).

Efficient and effective national research systems featuring performance-enhancing structures, framework conditions and processes are the precondition for a strong European research environment. This involves questions of quality (e.g. selection of the best projects), relevance (e.g. potential for using possible results) and efficiency (e.g. input-output ratio). Effectiveness is also influenced by factors such as good cooperation between the research stakeholders and the availability of efficient national research and innovation strategies.

Within the ERA framework, the European Commission has singled out a number of aspects related to which all Member States should attain best-practice performance. The key call on EU Member States is to **introduce or enhance competitive research and innovation funding through calls for proposals and institutional assessments as the main modes of allocating public funds to research and innovation. This may include the introduction of legislative reforms if necessary.**

The **underlying rationales for the implementation of research performance-based funding (RPBF)** systems is to maximize the **effectiveness** (relevance, quality etc.) and **efficiency** (cost-benefit-ratio etc.) of public spending on research by, i.e. ensuring a good balance of competitive and institutional funding. This includes 1) providing incentives for improving research performance, e.g. through a suitable share of competitive funding allocated to projects, and 2) the concentration of resources in the best performing organisations, which includes a suitable level of organizational funding in order to secure continuity of research efforts in strategic fields.

With a view to the workshop and in the context of Horizon 2020 and the EU Strategy for the Danube Region, this call for reforms of the national R&I systems should be extended to countries associated to Horizon 2020 and third countries subject to EU-accession processes or neighborhood policy, in

¹ <http://danube-inco.net/>

² <http://www.danube-region.eu/>

order to live up to the underlying ambition of the priority that **the national science systems can cooperate more effectively with one another and establish stronger external networks, so that Europe can become more attractive for excellent international talent as a whole.**

Within this scope, the specific objectives of the workshop are to:

- analyse the state of progress in both EU countries and in non-EU countries regarding the level of competition in research and innovation funding and usage of performance indicators as criteria for R&D funding;
- discuss key issues in the Danube countries in this regard from the national perspectives, focussing on Moldova as the host country and the non-EU Danube region countries at large (this may include, wherever relevant, the exchange of arguments regarding data availability, robustness and / harmonisation towards the Innovation Union Scoreboard and the EU innovation indicator);
- transfer good practice from Danube countries with well-functioning R&I systems to those with identified deficiencies in this regard; and
- identify concrete measures to be recommended to policy-makers and funding agencies in the countries with ongoing reformation processes of the R&I systems for enhancing progress towards catching-up to international excellence standards.

2. AIM AND SCOPE OF THE DISCUSSION PAPER

The aim of the discussion paper is to offer a common ground for further discussions within the workshop on the role of performance-based research funding systems for increasing the efficiency of the national research and innovation systems of the Danube countries. In the document, a short overview of the current practices in this area is presented, as well as the relevance of the topic for the Danube countries, especially non-EU member states. Taking into consideration the fact that the majority of the last mentioned category are undertaking reforms in the area of R&I policies, the information from the present discussion paper, together with the recommendations elaborated afterwards, should serve as a basis for more broader actions to be undertaken at the national level, depending on the different levels of commitment towards performance-based research funding of each of the respective countries.

To reach meaningful results in this respect, the paper attempts – by proposing **guiding questions for discussion** – to narrow the scope of the ERA and the IU by focusing on the aspects particularly relevant for the Danube region.

Participants are expected to consider the discussion paper and actively contribute to the discussion at the workshop based on the respective country's official opinions or on personal views and experiences, respectively.

3. EVIDENCE – PREVIOUS WORK TO BUILD UPON

Due to its direct relevance to the ERA Priority 1: effective national research systems, there are several relevant reports on the usage of PBF systems by the EU MS issued in the recent years.

The most recent one was launched in May 2016 by the EC **Joint Research Center - *Research Performance Based Funding Systems: a Comparative Assessment***³. The initial aim of the report was to provide an input to a DG R&I managed *Mutual Learning Exercise on performance based funding* in the framework of the Horizon 2020 Policy Support Facility. It presents an analysis of the different approaches taken by EU Member States, selected associated and third countries, for using performance based allocation of public R&D funding. In addition, it identifies a number of issues which Member States should take into account when evaluating/implementing these types of funding allocation mechanisms. The report contains a brief overview of the ongoing debate regarding the benefits and disadvantages of peer review and of different types of bibliometric assessment approaches. While RPBF aimed to increase the quality of research outputs, they have also the potential to generate perverse incentives. The costs involved in setting up different types of assessment, is also a factor to consider.

In a nutshell, there are five different models of performance-based funding as a means for an effective and efficient allocation of public funding:

1. Funding allocation formula based on quantitative indicators
2. Education and PhD awards based formula
3. RPBF based on Journal based impact assessments
4. RPBF based on citation-based impact assessments
5. RPBF based on peer review assessments.

According to a report commissioned by the EC Directorate General for Research and Innovation⁴, two collected indicators, at the EU MS level, relate to research evaluations:

- share of national institutional funding allocated based on institutional assessments; and
- share of block and institutional funding allocated using performance-based criteria, as share of national GBAORD / *ERA Facts and Figures 2014*

Many countries use a funding formula partially based on the quantitative assessment of research outputs. Another set of countries base their funding formulae instead on more qualitative measures such as evaluations of research output through peer review. A subset of the latter uses complementary quantitative assessments of research outputs to inform their peer review process. The available evidence on the effect of this funding mechanism is mixed. Some systems without a clear RPBF system perform very well, probably in part because they have an alternative way of concentrating resources in top performing organisations. An interesting observation is that all the EU Member States which did not experience a consistent improvement in impact scores over the decade

³ Jonkers, K. & Zacharewicz, T., *Research Performance Based Funding Systems: a Comparative Assessment*, 2016 ([http://publications.jrc.ec.europa.eu/repository/bitstream/JRC101043/jrc101043_pbf%20final\(1\).pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/JRC101043/jrc101043_pbf%20final(1).pdf))

⁴ *Assessment of progress in achieving ERA in Member States and Associated Countries, Final Report to DG Research and Innovation; report submitted by ICF International in association with Technopolis, 2015*

studied, did not have a RPBF system in place. Some systems suffer from relative underfunding and/or the outbound mobility of their scientists.⁵

RPBF systems vary considerably between Member States. Differences include the share of organisational level funding which is allocated through RPBF, the speed within which the system is introduced, the degree of stakeholder involvement, the impact different systems have on the autonomy of research performers, the criteria on which research outputs are assessed as well as the other missions and behaviors which the government wants to promote in these organisations.

Within the **DEFINE project** (co-founded by EC Life Long Learning Program), European University Association launched in 2015 a thematic report – *Performance-based funding of Universities in Europe*⁶, covering 28 European university systems. The report provides an overview of allocation mechanisms for core public funding to universities across Europe and identifies performance elements, notably in funding formulae and contracts between universities and public authorities. Secondly, it assesses the impact of performance-based funding at both system and institutional level and highlights possible unintended effects with a view to provide recommendations to policy makers, funders and university managers.

There is a wealth of other material available addressing the topic, including (selection):

- ERA Dashboard on country-specific progress regarding ‘more effective national research systems’ (<https://visualise.jrc.ec.europa.eu/views/ERA/Priority1/country/DE?%3Aembed=y&%3Atoolbar=no&%3Atabs=no>) (data basis is the ERA survey for the latest ERA progress report 2014)
- Smart specialization peer-review reports (<http://s3platform.jrc.ec.europa.eu/s3-design-peer-review/>);
- H2020-Policy Support Facility (PSF) country reports (<https://rio.jrc.ec.europa.eu/en>) and similar current information as sources for learning transfer (e.g. on National reporting standards in Germany <https://rio.jrc.ec.europa.eu/en/news/national-reporting-standard-published>; peer-review evaluation system for Swedish universities <https://rio.jrc.ec.europa.eu/en/news/proposal-peer-review-evaluation-system-fokus-met-criticism>)
- Stairway to Excellence (S2E) reports (<http://s3platform.jrc.ec.europa.eu/country-region-information/>);
- Report on ERAC Mutual Learning Seminar on Research and Innovation Policies (2012): <http://ec.europa.eu/research/innovation-union/pdf/erac-report-2012.pdf#view=fit&pagemode=none>
- Innovation Union Scoreboard (progress) reports: http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=keydocs
- ERAWATCH reports (part. for non-EU countries): <https://wbc-rti.info/object/link/6566>
- Self-assessment tool (SAT): Features of well performing national and regional research and innovation systems (Commission Communication ‘Europe 2020 Flagship Initiative Innovation Union’: https://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf)

⁵ Jonkers, K. & Zacharewicz, T., *ibid.*

⁶ http://eua.be/Libraries/publications-homepage-list/define-thematic-report_-pbf_final-version.pdf?sfvrsn=26

- Performance-based Funding for Public Research in Tertiary Education Institutions. Workshop Proceedings/ OECD, 2010 (http://www.oecd-ilibrary.org/education/performance-based-funding-for-public-research-in-tertiary-education-institutions/executive-summary_9789264094611-2-en;jsessionid=208p0b1m2faq.x-oecd-live-02)

4. OVERVIEW OF THE EXISTING PERFORMANCE-BASED RESEARCH FUNDING PRACTICES IN THE DANUBE COUNTRIES

Based on the JRC Science for Policy Report “Research Performance Based Funding Systems: a Comparative Assessment”⁷, the problem of reliable, comprehensive and comparative data becomes once again apparent. Data is only available in a very patchy form even for the EU Member countries and data for non-EU Member States is hardly available at all, making it difficult to get a clear picture of the situation in the Danube Region.

Overall, it seems that performance-based funding is only used to a limited extent in the region. According to the study

- Bulgaria, Hungary, Romania and Slovenia have no significant elements of performance-based funding introduced in their research systems;
- Austria, Germany only use them to a limited extent ;
- while the Czech Republic, Croatia and Slovakia partly use a quantitative formula with bibliometric assessment within their research funding system;
- no information is available for the other countries (Bosnia and Herzegovina, Montenegro, Moldova, Serbia and Ukraine).

Regarding the **share of project versus institutional funding**, the situation is quite diverse: While Austria, Bulgaria, Germany and Slovenia show a significantly higher share of institutional funding, the Czech Republic and – even more pronounced – Croatia has a high share of project-based funding, but, also here, **there is a striking lack of data in the Region making a comprehensive overview impossible.**

⁷ Jonkers, K. & Zacharewicz, T., 2016

Table: The share of project vs. organisational level funding

Country	Year	Organisational Funding	Project Funding	Organisational Funding	Project Funding
		Source EUROSTAT		Source PREF*	
Austria	2013	73%	27%	72%	27%
Slovenia	2013	–	–	69%	31%
Germany	2013	64%	36%	64%	36%
Bulgaria a)	2013	–	–	54%	46%
Czech Republic	2013	49%	51%	21%	79%
Croatia	2014	–	–	8%	92%
Hungary		–	–	–	–
Romania		–	–	–	–
Slovakia		–	–	–	–
Bosnia and Herzegovina		not covered by the study			
Moldova		not covered by the study			
Montenegro		not covered by the study			
Serbia		not covered by the study			
Ukraine		not covered in the study			

* Public Funding of Research (project commissioned by the JRC)

a) Deviation from GBARD still to be checked

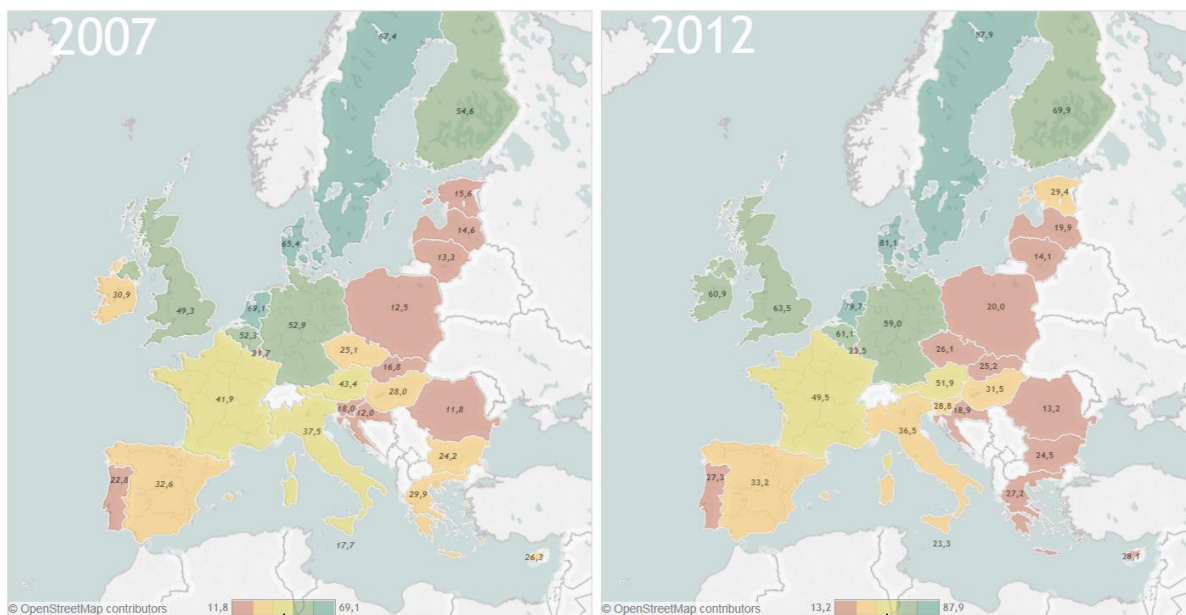
Source: authors' compilation based on Jonkers, K. & Zacharewicz, T., 2016

5. THE IMPACT OF PBF SYSTEMS ON THE OVERALL NATIONAL RESEARCH AND INNOVATION PERFORMANCE

As explained in the JRC Report there are various reasons for introducing Research Performance Based Funding (RPBF) that range from improving research cultures and facilitating institutional changes to overall increasing the research performance.

The “Research excellence composite indicator” was introduced by the JRC in 2012; it is available in the RIO Monitoring System⁸. This indicator combines information on Highly cited publications per Total Publications, PCT patents, ERC grants per public R&D and Top Universities and Research organizations per GERD. Within the EU the Nordic countries, the Netherlands and UK are on top of the list of countries. From the Danube Region, Germany and Austria rank 8th and 9th, followed by Hungary (13), Slovenia (15), Czech Republic (19), Slovakia (20), Bulgaria (21), Croatia (26) and Romania (28).

Figure 1: Research excellence composite indicator 2007 and 2012



Source: <https://rio.jrc.ec.europa.eu/en/stats/research-excellence-composite-indicator>

⁸ <https://rio.jrc.ec.europa.eu/en/stats/research-excellence-composite-indicator>

6. CONCEIVABLE POLICY INTERVENTIONS AND SUPPORT TOOLS

The non-EU MS Danube countries are associated to Horizon 2020 (Ukraine being the most recent one). This status involves that they are represented as observers in the ERA related groups, thus, entailing their participation together with the EU Member States in the discussions concerning the implementation of the ERA principles.

Some of the countries are currently using the opportunities offered by the **Horizon 2020 instruments** in order to support the reforms undertaken of the national R&I systems and to increase their competitiveness:

The **Horizon 2020 Policy Support Facility (H2020 PSF)**⁹ is a new instrument under Horizon 2020 Spreading Excellence and Widening Participation, to support Member States and Associated Countries in the design, implementation and evaluation of national R&I strategies, programmes and institutions. It offers, on a voluntary basis, high level expertise and tailor-made advice to national public authorities. A framework contract was established in 2015 to provide overall support to the management of the Policy Support Facility (PSF). The following services are foreseen: support to Peer Reviews of national R&I strategies, programmes and institutions; specific support to countries (pre-peer reviews, post peer reviews, ad-hoc requests for support needed in the design, implementation or evaluation of specific R&I reforms); support to in depth mutual learning between a group of countries and dissemination activities. Two countries from the region, Republic of Moldova and Ukraine, applied for PSF Peer Review. In case of Moldova the final document of the review will be soon presented, and the Ukrainian exercise was launched in May 2016.

Like the H2020 PSF, **Teaming, Twinning and ERA Chairs** are all programmes under the specific objective of Horizon 2020 “Spreading Excellence and Widening Participation”; they are tailored to increase the excellence and competitiveness of the national R&I systems in EU Member States and H2020 associated countries. Participation as a coordinator (one of the main drivers for R&I third party funding) may serve for the target countries – many of which are Danube countries – as a catalyst to drive reforms in research institutions, i.e. towards

- merit-based assessment of research centres through national pre-selection processes for Teaming,
- performance-based funding allocation through proven competitiveness in third-party funding acquisition in the context of H2020,
- open and transparent recruitment of excellent researchers,
- strategic orientations of research agendas underpinned by research budgets on key national and regional priorities, and
- linking research institutions to excellent international partners.

Key elements of the strategies expected from H2020 applicants are directly linked to the aspects raised within the ERA priority on effective R&I systems, in that, for Teaming, projects need to demonstrate how the newly established or upgraded centres will have full autonomy in decision making and to elaborate on the steps that will be taken towards eventual long term self-sustainability in terms of funding.

⁹ <https://rio.jrc.ec.europa.eu/>

These Horizon 2020 programmes are complemented by various support initiatives at European level, namely the **S3 platform**¹⁰ hosted by the JRC on the design and implementation of R&I strategies for smart specialization (RIS3) and European transnational networking opportunities for regions, and the **Stairway to Excellence (S2E) project**¹¹ addressed specifically to less-performing R&I countries and regions. The most relevant services provided with regard to R&I systems are country-specific peer review reports and online benchmarking tools.

Among other instruments relevant for identifying reform options related to R&I funding allocation are the policy mix peer reviews organized within the **Danube-INCO.NET project**. Two policy mix peer reviews are planned; one to Bosnia and Herzegovina and one to Serbia. The outcomes of the peer review visits will be included into a synthesis report to summarize the actual R&I policy mix of countries and formulate recommendations for possible improvements. The whole process of the policy mix peer review will be implemented to: support the improvement of R&I policy mixes of the selected countries, provide food for evaluation based on critical friend approach and formulate policy recommendations.

*For the non-EU MS Danube countries, **European Neighborhood Policy Twinning and TAIEX technical assistance instruments** are also relevant:*

Twinning is an instrument for institutional cooperation between Public Administrations of EU Member States and of beneficiary or partner countries. Twinning projects bring together public sector expertise from EU Member States and beneficiary countries with the aim of achieving concrete mandatory operational results through peer to peer activities. In the IPA region, Twinning aims to provide support for the transposition, implementation and enforcement of the EU legislation (the Union acquis). It builds up capacities of beneficiary countries' public administrations throughout the accession process, resulting in progressive, positive developments in the region. Twinning strives to share good practices developed within the EU with beneficiary public administrations and to foster long-term relationships between administrations of existing and future EU countries.

Since 2004 the Twinning instrument is also available to some of the EU Eastern and Southern Neighbourhood partner countries. In this framework it aims at upgrading the administrative capacities of the public administration of a partner country through the training of its staff and the support to the reorganisation of its structure. It also supports the approximation of national laws, regulations and quality standards to those of EU Member States in the framework of Cooperation or Association agreements signed with the EU.

The beneficiary / partner administration in a Twinning project is a public administration with sufficient staff and absorption capacity to work with a Member State institution having a similar structure and mandate. Twinning is not a one-way technical assistance instrument but a shared commitment.

Twinning projects are implemented with a view to the mandatory results to be achieved. They are usually articulated in components corresponding to the expected results and foresee a number of activities including workshops, training sessions, expert missions, study visits, internships and counselling. Twinning lies on learning by doing principle and sharing of best practices.

¹⁰ <http://s3platform.jrc.ec.europa.eu/>

¹¹ <http://s3platform.jrc.ec.europa.eu/stairway-to-excellence>

To set up Twinning projects, the European Union relies on the co-operation and administrative experience of EU Member States (MS), which mobilize public expertise both from public administrations and semi-public bodies.

TAIEX is the Technical Assistance and Information Exchange instrument of the European Commission. TAIEX supports public administrations with regard to the approximation, application and enforcement of EU legislation as well as facilitating the sharing of EU best practices. It is largely needs-driven and delivers appropriate tailor-made expertise to address issues at short notice in three ways:

- Workshops: EU Member State experts present specific areas of EU legislation in workshops to a large number of beneficiary officials.
- Expert missions: EU Member States expert(s) are sent to the beneficiary administration to provide in-depth advice on the transposition, implementation or enforcement of a specific part of EU legislation.
- Study visits: a group of three practitioners from a beneficiary administration take part in a study visit to an EU Member State's administration.

TAIEX seems to be beneficial for involving short term expertise from the EU Member States in drafting policy documents in the S&T field, according to the EU legal framework provision and identified good practices.

7. GUIDING QUESTIONS FOR THE WORKSHOP DISCUSSIONS

The following questions should be taken into consideration by the participants:

Tour de table:

- *To what extent is performance embedded into national research and innovation strategies and current funding practices of the Danube countries?*

Methodological aspects:

- *What are the preconditions to be fulfilled prior to the introduction of a certain performance-based funding system?*
- *Peer reviews versus bibliometric approaches: is there a clear ratio between costs and effectiveness for the both models?*
- *How to take into account the specificities of scientific fields in performance assessment?*
- *What are the criteria on which research outputs should be assessed?*
- *Are performance contracts diminishing the autonomy of research performing organizations (especially in the case of universities)?*

Strategic aspects:

- *Which should be the suitable share of performance-based research funding from the overall R&D funding? Is there a need for certain non-performance based funding that will ensure the long-lasting stability of the research performing institutions?*
- *Which is the impact of the performance-based research funding at the institutional level?*
- *How to implement performance-based funding systems in a period when the funding of public research performers is not increasing? How to avoid stakeholder's reluctance in the context of budgetary scarcity in the area of R&D funding (especially relevant for the Danube non-EU MS)?*

The way forward:

- *What are the short-term actions to be undertaken by the non-EU Danube Countries in order to include performance research funding principles within the national R&D policies?*
- *What are the needs of expertise in this regard to be offered by the EU Member States (from the Danube region)?*
- *To what extent are existing support initiatives and tools suitable for building capacities of the Danube countries in the area of PBF? Is there a need for a specific regional initiative/project supported by the European Commission?*