

# Measuring scientific performance for improved policy making

## Options Brief

This study had as its main objective to analyse the desirability and feasibility of creating a transnational system for collecting and monitoring research performance data (on inputs, outputs and productivity) in order to improve policymaking and to identify relevant research policy options.

For this purpose, we analysed the key policy drivers, i.e. the key reasons why there is growing pressure for monitoring and measurement of research in Europe – pressures that ultimately drive a desire for a more integrated way to understand not only research performance but also its efficiency and effects. We also looked into current approaches to the collection of strategic information and research performance assessment in Europe and at the national levels in the Member States and considered benefits and challenges.

### **Policy Option A: Support and commitment to an improved methodological framework for science performance assessments**

#### **The need**

Current trends in the landscape for research and research governance generate new demands for the practice of evaluation, expanding its scope and use. Policymaking is increasingly required to be ‘evidence-based’ and evaluation becomes an integral component of the priority setting and strategy building processes at the level of national policy-makers as well as the research actors.

In international practice, evaluation has become an integral part of the policy and programme cycle. It has taken on a more pronounced prospective and formative function, in addition to the traditional retrospective one. Evaluation is expected to foster learning and improvement as well as to ensure accountability.

The pressures set upon the evaluation practice and the broadening of its scope and function due to the changes in the current policy landscape implies the need for evaluation methodologies to renew and update. The most challenging task for the evaluation community in this context is to reach an improved understanding of the dynamics leading to knowledge creation and innovation and the possibilities and opportunities to assess the economic and societal returns of public investment in research.

#### **The context**

Recognising the increased methodological complexity of the evaluation practice in the context of Horizon 2020, the European Commission (DG Research and Innovation) announced its intentions to develop a European Research and Innovation Evaluation Network, setting up a platform for discussion with the evaluation constituencies in Europe. It intends to respond to the challenges that are posed for the Horizon 2020 evaluation system, which go beyond the collection of data and evidence: analytical skills need to be improved and there is a need to explore also new methodologies for the evaluation of research and innovation activities.

### **The policy option**

This framework constitutes an ideal context for the creation of an evaluation network that would expand the focus for discussion from analyses geared towards H2020 (i.e. EC funded research) to evaluation methodologies in the context of knowledge and innovation systems in general.

Such network should be 'interdisciplinary', i.e. involving indicator development experts, policy evaluation experts, and IT experts in information systems. These three communities currently work in relative isolation from each other; considerable benefits could be attained from the integration of their different perspectives on the possible roads towards an improved methodological framework. The focus of the network should be on the transfer of knowledge on needs, challenges, and existing or emerging opportunities.

Activities to be implemented should encompass the stocktaking of current practices at the national, European and worldwide levels; discussion forums with the wider constituencies – including European and national policymakers; and pilot exercises tackling exploratory methods.

### **Policy Option B: To support and coordinate the development of national research information systems in the European Member States**

#### **The need**

In recent years, Europe saw a considerable increase in the development of national research information systems, exploiting current technological developments for an improved strategy development at the national and institutional levels. These information systems yield significant opportunities for all stakeholders in the national research systems and have the capacity to respond to the multiple needs of researchers, research institutions and research policymakers. It created a momentum for the development of a pan-European comprehensive research information system, geared to supporting science management as well as serving scientists.

The current wave in Europe towards the development of national research information systems, interconnecting the systems existing at agency and institutional levels – often also to external datasets, needs to be set against the context of a growing pressure for monitoring and measurement of research in Europe. The need for accessible information and 'strategic intelligence' has grown across all parts of the research system, requiring a much higher level of data availability and analysis across multiple domains and countries than has previously been the case.

#### **The context**

The majority of the currently existing national research information systems as well as those under construction are fully interoperable. Experiences at the national level have shown that the already existing level of interoperability between systems at institutional or agency level considerably facilitated the development of the integrated system. The same can be envisaged to be the case for the development of the European research infrastructure.

Experiences at the national level show that political commitment at the highest levels is key for the authoritative decision-making and the successful completion of the research information system.

#### **The policy option**

Early-stage steering of this trend is critical in order to ensure inclusiveness of the process as well as to foster the acceleration of the current development of national research information systems.

Such policy actions require the commitment and involvement of a 'neutral' policy agency at the European level. Support at the level of the European Parliament and Council may be needed in particular in relation to the decision-making on the need and relevance of the development of national research information systems in all member states and their interoperability. A potential issue is also the budgeting for the development of such information systems.

Involvement of relevant stakeholder communities, including Science Europe as the association of the European funding agencies, seems appropriate.

Specific actions that could be implemented in this context include in particular the raising of awareness on the benefits of national research information systems for all actors in the research system and the sharing of best practices.

### **Policy Option C: To support and coordinate the development of a standard approach to the definition of outputs and other indicators**

#### **The need**

The literature review in this study showed a growing need for an integrated – rather than aggregated – European view on research performance and impacts. This is to be seen in the context of the increasing consistency between European and national research policies as well as the fostering of transnational research collaborations, in both European and national research policies.

Key for the development of integrated systems is the correct understanding and mapping of the terms used in different systems. Technically this constitutes no longer an issue thanks to the capacity for ‘semantic cross-walking’ of research information systems. Experts consulted in this study considered that nevertheless, a standard approach to the definition of outputs and other indicators should be defined. This would also ensure the possible use of the data collected in the transnational information system for the creation of ‘aggregated’ indicators, thus combining the strengths of both an integrated system and an aggregated framework.

A second line of action needed in this context is the selection of key indicators for which availability is required in all national research information systems. This implies agreement on the focus, quality, and depth of the minimal set of data to collect.

#### **The context**

The technical developments imply that standardisation in this context does not require Member States to agree upon a standard set of indicators against which to collect information, possibly disregarding their ‘local’ needs.

Experts as well as current experience in the national systems highlight the researcher and the research communities as central for the development and identification of indicators. In the case of a system at the European level, this also affects national research policymakers and funding agencies. In fact, experts stress the importance of the social construction of the micro-data indicators and data selection model at the European level, which should take into account the different national cultures and approaches.

#### **The policy option**

A set of workshops and possibly working groups should be launched in order to agree on the common definition of a key set of indicators as well as on the minimum set of indicators for which data should be available in all Member States.

Organisations to be invited to these activities include representatives of the various stakeholder communities, i.e. indicator development and policy analysis experts, IT experts, Science Europe as representative organisation of national funding agencies and the researcher communities, Eurostat as key actor in the field of European STI indicators, and the European Commission, and more specifically DG Research and Innovation and DG CONNECT as key actors in the development and implementation of the infrastructure and therefore taking up the overall coordination of the initiative.

## **Policy Option D: To support and commit to the technical development of an integrated European research information infrastructure**

### **The need**

The integrated European research information infrastructure should not be considered as a substitution of the existing national research information systems, but essentially as an additional layer on top of them. It should take the features of a distributed infrastructure, inter-connecting the existing national research information systems, thus allowing for querying depending on the needs as well as for the eventual exploitation of the data in terms of indicators and/or metrics. In this context, the cost for the development of such a system should be relatively limited.

### **The context**

The development of a European integrated research information infrastructure should not constitute a major technical endeavour. This is due to the recent technological developments and especially the maturity of the European CERIF standard, which allows for a seamless interlinking of datasets and/or research information systems, in different formats and including non-CERIF systems.

### **The policy option**

There is a clear drive among the stakeholder communities towards an improved harmonisation and interconnection of strategic information and information systems. However, the achievement of a common system or approach to the measurement of research performance is not manageable only through bottom-up initiatives. Early-stage steering at the European level and coordination of the process towards integration is critical. It would ensure the inclusiveness of the process, involving all EU Member States and relevant stakeholder communities, as well as facilitate an acceleration of the development of national research information systems.

Ownership of the monitoring activities in relation to the fulfilment of the ERA and current active support to the development of European research e-infrastructures make the European Commission the most plausible lead actor and coordinator.

Organisations to be involved include representatives of the various stakeholder communities, i.e. indicator development and policy analysis experts, IT experts, Science Europe as representative organisation of national funding agencies and the researcher communities, and managers of the national research information systems in the different Member States.

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