European Commission

Mutual Learning Exercise

Performance-Based Funding of University Research: Summary Report

Horizon 2020 Policy Support Facility

POLICY RECOMMENDATIONS

EXCHANGE OF PRACTICE

ON-DEMAND SUPPORT

PEER LEARNING

HIGH-LEVEL EXPERTISE

Research and Innovation

Performance-Based Funding of University Research: Summary Report

This document has been prepared for the European Commission however it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

More information on the European Union is available on the internet (http://europa.eu).

Mutual Learning Exercise

Performance-Based Funding of University Research: Summary Report

Prepared by the independent experts:

Koenraad Debackere (Chair)

Erik Arnold (Rapporteur)

Gunnar Sivertsen

Jack Spaapen

Dorothea Sturn

Table of Contents

LIST OF ABBREVIATIONS

Abbreviation	Full name
CRIS	Current Research Information System
DG RTD	Directorate-General for Research & Innovation, European Commission
DORA	Declaration On Research Assessment
EN	English
EU	European Union
EUR	Euro
FP	EU Framework Programme for Research & Innovation
FWF	Austrian Science Foundation
ISBN	International Standard Book Number
ISSN	International Standard Serial Number
JIF	Journal Impact Factor
MLE	Mutual Learning Exercise under the Horizon 2020 Policy Support Facility
PRFS	Performance-based Research Funding System
UK	United Kingdom

REPRESENTATIVES OF PARTICIPATING COUNTRIES

Country	Representative
Armenia	Vardan Sahakyan
Austria	Sandra Mukherjee-Cosmidis
Croatia	Ivana Pavlaković
Cyprus	Irene Kyriacou
Czech Republic	Vlastimil Růžička
Estonia	Taivo Raud
Italy	Marco Malgarini
Moldova	Aurelia Hanganu
Norway	Steinar Johannesen
Portugal	Rui Durão
Slovenia	Urban Krajcar
Sweden	Lars Olof Mikaelsson Michael Jacob
Spain	Clemente López Bote
Turkey	Resul Turgay

INDEPENDENT EXPERTS

Name	Role
Koenraad Debackere	Chair
Erik Arnold	Rapporteur
Gunnar Sivertsen	Expert on Bibliometrics
Jack Spaapen	Expert on Third Stream Indicators
Dorothea Sturn	Expert on Peer Review

EUROPEAN COMMISSION

Name	Unit
Marta Truco	Unit A4 "Analysis and monitoring of national research and innovation policies", Directorate General for Research and Innovation

PERFORMANCE-BASED FUNDING OF UNIVERSITY RESEARCH: SUMMARY REPORT

This Mutual Learning Exercise (MLE) on performance-based research funding systems (PRFS) was conducted under the Horizon 2020 Policy Support Facility run by the Directorate-General for Research and Innovation of the European Commission.

The countries that participated were Armenia, Austria, Croatia, the Czech Republic, Estonia, Italy, Moldova, Norway, Portugal, Slovenia, Spain, Sweden and Turkey.

The MLE was supported by a panel of experts: Koenraad Debackere (Chair), Erik Arnold (Rapporteur), Gunnar Sivertsen, Jack Spaapen, and Dorothea Sturn. The MLE was overseen by Marta Truco from Unit 4 'Analysis and monitoring of national research and innovation policies', DG Research & Innovation, European Commission. The contributions of Bea Mahieu (project manager and quality reviewer) are acknowledged.

The work of the panel of experts was based on written and oral contributions from representatives of the participating states and field visits to some of them, as well as from a wider literature review and experiences from contributors in relation to the design, implementation and evaluation of PRFS practice.

Regular meetings both in Brussels and in participating states provided considerable scope for discussion and exchange of ideas. Although not participating in the MLE, the Higher Education Funding Council of England kindly invited the members of the MLE to visit it in London and shared its experience of the UK system with the team.

This short report summarises the lessons the team drew from the exercise and makes a number of recommendations to those considering the adoption and use of PRFS. A longer report[1] is published in parallel with this one. It presents the evidence and analysis underlying this shorter report, together with a number of lessons and recommendations. The longer report contains detailed data, evidence, experiences and insights brought forward by the participating countries on the status of their respective PRFS approaches.

---

[1] Koenraad Debackere, Erik Arnold, Gunnar Sivertsen, Jack Spaapen, Dorothea Sturn, Performance-Based Funding of University Research: Final Report, DG-RTD, H2020 Policy Support Facility, Brussels: European Commission, 2018

1 PERFORMANCE-BASED RESEARCH FUNDING SYSTEMS (PRFS)

1.1 *What are PRFS?*

PRFS are a comparatively recent innovation in university funding. They are two-part systems that assess the 'goodness' of university research on various performance dimensions and use the results in a funding formula to allocate part or all of the institutional funding for research provided to universities. In addition to finding ways to measure various kinds of output and quality, they must also relate the quality measurement to the different sizes of the institutions involved as assessed through a volume measure.

Most PRFS focus on the quality of research and its scientific impact. In more recent systems, a growing number of other, additional criteria are being used, especially in relation to societal impact. PRFS are normally used to allocate a fixed pot of money or budget among institutions. They rarely trigger increases in total funding, though sometimes they allocate increases in funding. In principle, PRFS are backwards-looking systems for allocating funding so in practice, few PRFS contain prospective elements that consider potential future performance.

The fundamental units of analysis used in PRFS are individuals or research groups but whichever approach is taken, PRFS do not report at the levels of individuals. Analysis of both individuals and groups can be aggregated to the institutional level. Innovation is also possible in the scope of PRFS, for example by stretching group definitions across institutional boundaries.

Traditionally, universities were provided with institutional funding through a 'block grant': a single lump of money, which the university managed itself in order to cover its costs. In a growing number of countries this institutional funding has been split between block grants for education, research or both together on the one hand, and performance-based funding for education and research on the other. PRFS are the systems used to determine how much performance-based research funding universities should receive. In most countries, the principle of university autonomy means that the government does not interfere in the specific ways universities use institutional funding.

Over time, universities have additionally derived a growing part of their income via 'external funding' from research councils, other government agencies, private donors and industry. Unlike institutional funding, this involves competing for money on a project or mandate basis. When it is won, it has 'strings attached' and has to be used for the specific purpose agreed with the external funder. The combined effect of growth in the use of PRFS and growth in the proportion of external funding is to put universities under increasing competitive pressure.

There are at least six key parameters which policymakers can use in designing a PRFS.

1. The model used for research assessment – peer review, bibliometrics and other indicators, or a mixture of these
2. The scope of activity to be assessed in the PRFS - research only or also the role of research in innovation and its relevance and impact upon society

3. The type of indicators used – only direct outputs of research or also indicators or information about outcomes and societal impacts and about the extent to which the institution attracts external funding from various sources

4. The assessment criteria used

5. The granularity of the PRFS, in the sense of how aggregated or disaggregated the groups of researchers considered are (institution, faculty, department, discipline, wider field, and so on)

6. The frequency with which the PRFS is run

1.2 PRFS among the participating states

All the participating states in the MLE, except Moldova, use some form of PRFS pursuing a range of policy objectives that focus on increasing the quality, productivity, accountability and competitiveness of their university research systems and in some cases trying to encourage systemic changes in organisation and behaviour.

Austria uses performance contracts with a small performance-based incentive based on the amount of income universities obtain from the national research council (FWF) funding rather than on a more specific research assessment. Among the eleven remaining countries, Italy, Portugal and Slovenia use informed peer review while Armenia, Spain[2] and Turkey use a mix of peer review and bibliometrics. In all these countries, the Web of Science and/or Scopus are the main bibliometric information sources, both for citation-based and publication-based indicators. The five remaining countries, Croatia, Czech Republic, Estonia, Norway and Sweden, have PRFS with direct use of metrics.

There is considerable variation among the countries in the proportion of institutional funding governed by the PRFS and in the importance of external funding in university income. Internationally, the UK and Finland (neither of which participated in this MLE) have a very large degree of competition in university funding with both state external research funding and PRFS funding forming a large proportion of total research income. In those participating states able to provide data, the combined proportion of these competitive sources was much lower. Estonia has a very high proportion of external sources in the income universities receive from the central state while Italy has a very low one[3]. Others tended to have a more mixed pattern. Detailed, validated data are presented in the longer report.

All the participating states that used PRFS reported that they were enjoying benefits from the introduction of the system, typically in the form of improved quality and productivity of research, the adoption of quality-orientated policies in the universities, transparency, improved prospects for PhD students and young researchers. In one case the PRFS also incorporated a mechanism for testing

---

[2] The Spanish Sexenio System is regarded as a PRFS in this context.

[3] Italian universities nonetheless obtain significant income from regional, private and international sources

whether research institutions should qualify for institutional funding. Those states able to indicate their operating costs for the PRFS found that these were low.

2   LESSONS AND RECOMMENDATIONS FROM THE MLE

2.1   PRFS in the policy toolkit

PRFS are a useful addition to the set of instruments and policies governments can use to improve the quality and performance of university research systems. The evidence is that they help improve system performance but that they do so in interaction with other policy instruments and aspects of the context. They are not sufficient for performance improvement and while there are alternative ways to achieve the same end a PRFS can usefully be a component in a wider policy for such improvement. A PRFS that governs a high proportion of institutional funding risks making a dangerously high proportion of funding contestable. Many countries have obtained performance improvements using PRFS that govern only a small fraction of institutional funding.

A PRFS is one of several mechanisms available to policymakers to encourage the improvement of quality, relevance, impact and other desiderata in university research. The PRFS and the other parts of the policy mix need to address policy goals in a complementary manner. The other mechanisms include

- Providing or changing the amount of state external research funding provided

- Altering the ratio between institutional funding and state external research funding

- Increasing international collaboration in research

- Reforming and modernising university governance

- Increasing overall investment in higher education research

There is wide divergence among the countries participating in the MLE in their balance of funding mechanisms and research funding. There is no clear theory available about how the individual components, their balance or changes in these relates to overall performance and – given the differences among national contexts – it is therefore unlikely that there is some 'optimum' mix of incentives that will work in all countries and at all times.

The proportion of universities' research income driven by PRFS also varies considerably among countries. Effects on behaviour are visible at both low and high proportions of funding, so it is not necessary to make large changes in funding structures in order to obtain positive effects on performance.

As with some of the other policy options, the introduction of a PRFS can administer a shock to the research system, changing culture and behaviour. Striking a balance between shock and continuity is another challenge for designers of PRFS.

PRFS also can play a part within the narrower domain of research funding policy, where – like other sources of research funding – they can help steer the balance of the universities' research effort among fields, between 'basic' and 'applied' research and various aspects of relevance.

In introducing a PRFS, it is important to consider its systemic implications in the sense of its influence on the overall pattern of funding and incentives and whether the incentive system is then balanced so that universities are encouraged to fulfil well all their three missions of education, research and exchange of knowledge with wider society and not improve one at the cost of the others.

- **Depending upon the specific developmental needs of the university research system, states should consider adopting a PRFS or an appropriate alternative if the national university system's research performance is in need of improvement.**

- **The scope and design of the PRFS should be consistent with other policy measures operating and with the national context.**

- **In particular, the proportion of institutional funding governed by the PRFS should be given careful consideration, based on national policy needs and the likely interplay between the PRFS and other policy instruments.**

- **Where PRFS risks triggering abrupt changes in funding, use damping mechanisms that limit these changes to levels that are sustainable.**

- **Care must be taken in introducing new goals that old ones are not impeded, for example by creating a focus on research performance that is not balanced by incentives for universities to pursue their two other missions of education and knowledge exchange with society**

2.2 Linking the PRFS to policy design

A PRFS is intended, in combination with other policy instruments, to help reach not only new but also often older policy goals that remain relevant. Despite widespread fascination in the academic community with their details, PRFS are rarely 'just' mechanisms for distributing money.

- **Both the assessment criteria and the funding formula used in the PRFS should encourage behavioural and institutional changes that reflect the policy goals**

2.3 Issues in PRFS design

PRFS design is important not only in itself but also because there is a tendency for the design to become institutionalised into the way universities are funded and manage themselves, creating lock-in. In practice, some countries have become more or less culturally wedded to a particular broad design. Hence, there is a premium on getting the overall design right first time as once it is implemented it may be politically difficult to make more than incremental changes to it. Some more experienced countries have learnt over time but the changes tend to be incremental.

It is hard for the university system to react appropriately to a PRFS unless it is transparent and the incentives provided by the system can easily be understood. It is important to keep the two elements of a PRFS – an assessment process and a funding formula – separate if the PRFS is to be transparent. It is therefore

important to avoid putting elements of the funding calculation into the assessment process or vice versa.

While early PRFS tended to be wholly based either on peer review or metrics, a growing number rely on a combination of these approaches to produce higher-quality judgements at lower cost. There is continued disagreement about whether peer review or metrics approaches are 'best'. Key issues in the choice between these models are: cost; whether a formative element is needed; and periodicity, with peer review tending to be done infrequently while metrics approaches can be taken annually.

Inter-field differences ranging from the methodological and epistemological norms of the epistemic communities involved, different propensities to publish and publication traditions make it hard to compare fields directly. Peer review systems can do this through the use of common quality scales interpreted by practitioners from the respective fields. (Biblio) metric systems must do this through field normalisation calculations.

Metrics approaches can be much more complex than peer review systems tend to be, though it is not necessary that metrics systems should be complex. There is probably a trade-off between complexity and the PRFS' ability to influence behaviour, suggesting that a good design principle is 'as simple as possible but no simpler' and hence limiting the number of indicators used.

The greater the proportion of universities' research income governed by a PRFS, the more robust its methods need to be in order to withstand scrutiny by the beneficiaries.

While much of the discussion about PRFS focuses on the assessment processes, different funding formulae provide incentives for different kinds of behaviour. The use of skewed formulae – where the best performers are rewarded disproportionately – is a way to concentrate resources on 'excellence'. Overhead and infrastructure costs vary among fields. Consideration should be given to weighting the formulae in order to take this into account.

Small countries face particular design issues: the costs associated with small scale; the limited number of fields that can be addressed in peer review systems, as a result of which the few fields defined have to be broader than in big systems; the need to use foreign peers; the constraints of 'small' languages on peer recruitment for the assessment and the corresponding need for a quality-assured national current research information system (CRIS); national capacity to run a research assessment exercise.

The costs of running a PRFS appears to be driven by: scale, the model used, whether there is a formative element; use of qualitative vs quantitative data; the number of people in scope to the assessment; whether there is a quality-controlled national CRIS; the degree of opposition from the academic community and the consequent need to justify and consult about methodology (particularly where the PRFS governs a large proportion of research funding).

The evaluation community – and especially bibliometricians – has devoted considerable effort to clarifying principles for good research assessment and in identifying practices that lead to distortions. These are documented in the DORA declaration[4] and the Leiden Manifesto.[5]

- **Designers should anticipate that it may be hard to make more than incremental adjustments to the design once the PRFS has been fully implemented**

- **Design requires expertise in the design and implementation of assessment and funding systems and in technical aspects of the assessment process, such as the use of bibliometrics, peer review and impact indicators**

- **The choice and weighting of criteria or indicators can affect researcher behaviour. The likely intended and unintended effects of the PRFS on behaviour should be anticipated and simulated as far as possible at the design stage**

- **The assessment process and the funding formula should be distinct and independent**

- **Wherever possible, the effects of a PRFS should be simulated or piloted before the system is put into full-scale practice**

- **PRFS should be simple to understand and easy to communicate to universities and researchers alike**

- **They should avoid using large numbers of criteria and indicators as these create conflicting incentives and researchers cannot satisfy them all**

- **PRFS designers should routinely consult both the DORA declaration and the Leiden Manifesto during the design process. These documents define good practice for assessment design**

2.4   PRFS model

The choice between a peer-review based and a metrics-based approach (or some combination of the two) involves a number of important trade-offs. These include the cost of the system, the frequency with which it can operate, its likely credibility with the academic community and its ability to make qualitative judgements and provide formative information.

---

[4] http://www.ascb.org/dora/

[5] http://www.leidenmanifesto.org/

PRFS outcomes are influenced by the characteristics and quality of the information upon which the research assessment is based. Key issues include: biases introduced if universities or other actors select a sub-set of research results for submission to the PRFS; biases introduced by the way and extent to which sources (such as CRIS or commercial bibliometric databases) decide what should be included in, or excluded from, the database; and the definition of who counts or does not count as a researcher, for the purpose of the PRFS. In order to obtain robust outcomes, the PRFS managers need to ensure that there are processes in place to quality-assure that information and that they understand the biases and omissions to which that information is prone.

Self-assessments are necessary for collecting qualitative information, for example on strategy, human resource management and research infrastructure. Where other facts – such as lists of publications or numbers of researchers – are needed it is preferable to obtain them from quality-assured sources. When self-assessment is used, the PRFS manager must ensure that the information needs are well explained and understandable not only by people used to being evaluated but also by those with little or no experience.

A quality-assured CRIS is a very useful tool to support PRFS, especially in countries using 'small' languages, which tend to be under-represented in the commercial bibliometric databases and where a recognised national authority can categorise outputs in terms of quality. Care must be taken in populating a CRIS to ensure that data are quality assured, complete and extend to those categories of non-scholarly data needed for research assessment.

- **The choice of a peer review-based or a metrics-based system should be made based on the needs that the PRFS is intended to satisfy and the constraints under which it will operate. A combination of the two approaches is often useful and should be considered**

- **Where a PRFS reviews a sub-set of research output, the biases created through selection must be understood**

- **The character and biases inherent in bibliographic and other databases as well as in other metrics should be understood and accounted for**

- **Self-assessment is a useful tool in research assessment, especially where a formative element is desired. Where self-assessment is used, it should involve transparent questions which have been clearly explained by the PRFS managers. Researchers not used to self-evaluation may need particular guidance. Self-assessment should not be used to collect data available from quality-assured sources elsewhere as this increases the burden on those completing self-assessments and introduces errors**

- **A national CRIS should be considered as a way to maintain a high quality of input data to the PRFS, especially in smaller countries that work in 'small' languages**

Bibliometrics

Bibliometric tools are now widely available. However, generating and using robust bibliometric indicators still requires skill and considerable understanding of the limitations of the relevant databases and the characteristics of different fields of research.

Limitations of bibliometric data need to be understood. These include bias towards English-language journals, differences in the amount and pattern of publication among disciplines, the extent to which research outputs figure in the available databases, the self-referential nature of those databases and the lack of transparency and opportunities to game the criteria governing which journals are indexed.

Important considerations about bibliometrics

- Bibliometrics is not 'objective' but contains many in-built assumptions and limitations

- Stakeholder consultation and advice from disinterested bibliometricians are preconditions for using bibliometrics in PRFS

- The strength of the incentives provided via bibliometrics depends on their economic importance as well as interplay with other incentives

- Whatever bibliometrics data sources are used, the main considerations are data quality, disinterested data production, incentives for internationalisation, costs, comprehensiveness, balanced representation of all fields and the representation of national language publishing

- The principles used for including publications in databases must be understood and considered in the light of the PRFS' objectives

- Publication, collaboration and citation are typically analysed using bibliometric indicators. Care must be taken to ensure consistency and comparability across fields

- Where bibliometric indicators are used in PRFS, they should be field normalised, taking account of differences in productivity, use of publication channels, citation practice, authorship and co-publication conventions

- Counting methods for multi-author and multi-institution papers affect collaboration behaviour. This must be taken into account in PRFS design

- Different types of publications (e.g. books versus journal articles) need to be differently weighted, in order to take account of differences in publication behaviour among epistemic communities

Rating publication channels as opposed to individual research outputs can be misleading not only because a journal impact factor (JIF) does not predict the quality of an individual article but also because of differences in practice among fields. JIFs and h-indices are easily accessible indicators but should be interpreted carefully because they can generate misleading results.

- **Professional bibliometricians (independent of the commercial database vendors) should be involved in the design and implementation of any PRFS that uses bibliometric information**

- **Building advanced bibliometric expertise requires a significant investment in a research centre in the field. There are a handful of such centres in Europe already. Especially small countries with limited resources should exploit existing expertise abroad rather than necessarily themselves making a heavy national investment in one**

Peer review

The composition of different panels as well as their appropriate staffing seems to be one of the biggest challenges in the design of peer review-based research assessment approaches. When selecting peer panels, it must be understood that the choice of people affects the outcomes of the exercise. Panels are social entities, in which individual behaviour affects outcomes.

The right choice of information provided to peer review panels depends upon the purposes of the PRFS and the criteria used. A well-balanced mix of different measures (e.g. peer review and bibliometrics) may offer additional insight and enhance the outcome of the research assessment. Both high quality of the bibliometric indicators and transparency in their use by peers or panels are important in this context.

Qualitative aspects of self-assessment can only be analysed by peer or expert panels. These have no place in metrics-only systems. Peer review is indispensable when the assessment of quality requires a detailed understanding of the research or field in question.

Peer-based PRFS often make use of self-assessment. These make it possible to introduce a formative element into the PRFS.

Peer review in PRFS is increasingly 'informed' by bibliometrics. This has the benefit that panel members can work with relatively robust indicators, rather than themselves looking up crude measures such as JIFs or h-indices.

Most PRFS focus on the quality of research and its scientific impact. However, a growing number of other criteria are being used, especially in relation to societal impact. However, traditional peer reviewers are not necessarily good judges of the impact dimension. Extending peer review beyond scientific quality calls for the involvement of non-scientists. In the absence of reliable impact indicators, extended peer panels have proven themselves able to assess narrative impact statements though it is not yet known whether these judgements are reliable or reproducible.

New forms of peer review considering multiple criteria and relying at least partly on non-scientific peers have been innovated to help extend peer review beyond scientific excellence, to address wider socio-economic criteria like relevance, impact, and new forms of interaction with society.

To establish and maintain confidence in the system, procedures and rules should be developed to avoid conflicts of interest. Especially in small countries, international expertise should be used.

Peer review is inherently labour-intensive and therefore expensive. It is impractical to run a PRFS with a single panel. Potentially high costs of peer review can be mitigated by introducing a proper panel system with elements of remote review as well as by international cooperation both in the design and in the application phase. In order to ensure consistency some kind of calibration between different disciplines, interest groups and different panels is needed

Mutual learning among universities can be considered as an alternative to a peer review PRFS as a source of formative assessment – though it is naturally less binding.

- **Care must be taken in defining the membership of peer panels not to predetermine outcomes by excluding relevant disciplines or schools of thought and to ensure that members have a track record of being 'team players'**
- **Where criteria other than scientific quality are to be considered, panels should be 'extended' beyond academic peers to include relevant representatives of other parts of society**
- **Procedures should be in place to prevent conflicts of interest. In small countries, all peers should be international. A good proportion of international peers is also desirable in larger systems, to maintain contact with world science**
- **A PRFS cannot be run by a single panel. There have to be sub-panels and/or panels informed by remote peer assessment. Judgements have to be calibrated and made consistent across different panels and reviewers**

2.5 Societal impact

Societal impact comprises many different things and can occur through a wide range of mechanisms. A useful categorisation is to distinguish among effects on policy and practice, society and culture, and economic impact.

Assessing or trying to measure societal impacts of research is extremely difficult because of the importance of differences in context, differences in impact mechanisms (including the fact that some impacts involve things **not** happening), different conceptualisations of 'impact', the lack of a unitary 'measure' of impact that goes beyond economic to non-economic impacts and difficulties of attribution. Societal impact assessment in PRFS requires even greater caution than quality assessment and should not be undertaken lightly by PRFS designers.

Many researchers are not used to analysing or reporting impact, so the quality of their self-reporting is likely to be variable.

While countries participating in the MLE were keen to understand how such an approach could be taken, there is no case of systematic integration of third stream indicators into a PRFS in the countries studied. PRFS therefore have to use more or less ad hoc measures, preferably combining quantitative and qualitative methods.

Impact assessment methods are being researched but have to be customised to the individual context and tend to be labour-intensive. It is not evident that these are yet ripe to be used systematically across fields in the way necessary in PRFS.

- **Societal impacts of research arise partly because of the value of new knowledge and partly through a range of other contextual factors, not the least of which may be luck. PRFS experimenting with assessing societal impacts should consider whether it is better to reward outputs and outcomes that can reasonably be expected to be steps on the way to impact or whether they want to reward impact itself**

- **Impact metrics should not be used on their own in a PRFS. Their meaning are unclear and they are easily gamed**

- **At the current state of the art, human judgement is the only way to assess impact. This can be supported by metrics but these must be interpreted by people**

- **Extended peer review of impact narratives can be used, though defining how these are to be prepared and assessed in a consistent way is very labour-intensive. Judgements are subjective and it is not known whether they are reproducible**

- **Impact assessment should therefore be attempted with caution and can in certain cases be included in the assessment module of a PRFS while being excluded from the funding formula so that the incentive to generate impact is prestige rather than money**

Using the results of assessment

In a PRFS, the primary intended use of assessment is – by definition – to drive a funding formula. However, the assessment exercise also provides an opportunity to generate strategic intelligence for universities and policymakers.

Different funding formulae provide incentives for different kinds of behaviour. The use of skewed formulae – where the best performers are rewarded disproportionately – is a way to concentrate resources on 'excellence'.

Overhead and infrastructure costs vary among fields. Consideration can be given to weighting the formulae in order to take this into account. This appears to be especially important where the PRFS governs a large proportion of institutional income, leaving universities little 'slack' in using the block grant to tackle variations in costs among disciplines.

The opportunities to use PRFS results as a source of strategic intelligence for policy are often under-exploited and are not necessarily considered in PRFS

design. Explicit consideration should be given to whether and how to exploit information generated by the PRFS in research policy and management more widely.

While PRFS results are widely claimed to provide the universities with strategic intelligence, they are at best an incomplete source of it and are often not designed to provide it. Universities should be monitoring their own quality on a frequent basis in any case. Peer review based PRFS can nonetheless be designed so as to provide formative information to universities, but this can be done only at long intervals. It is especially useful in emerging or developing research systems but becomes less so as systems mature.

- **Funding formulae should reflect the policy priorities of the PRFS. They can be skewed towards high-performing institutions if the desire is to concentrate funding in fewer places, they can drive quality or quantity or both, they can be used to adjust the relative incentives for researchers to perform along different dimensions (such as scientific quality versus societal impact), and so on**

- **In systems where the PRFS steers a high proportion of institutional funding, it is especially important that funding formulae take account of the need to align with influences on the institutional cost of doing research such as variations in cost among disciplines and the need to pay the overhead costs of doing research for external funders such as research councils, charities and sometimes industry that can or will not pay the full economic costs**

- **Assessment results can provide useful strategic intelligence for policymaking, such as offering a picture of national research performance in different fields. It is not necessarily difficult to combine and recombine assessment results at different levels to provide such strategic intelligence. PRFS systems should do so, where they are able to make a unique contribution to policy development**

2.6 What are the effects of PRFS?

There is evidence that PRFS in combination with other measures can improve university research performance on a range of dimensions, though the amount of evaluation that has been done in this area is modest. There is also a range of concerns about actual and potential negative consequences that appears in the scientific literature and in surveys of researchers, especially in the UK, but for which there is limited systematic evidence from changes in behaviour and performance, as opposed to opinions. Given the growing importance of PRFS in funding systems, this situation is clearly unsatisfactory.

There is evidence from studies and evaluations that PRFS can increase the volume and quality of research. Since the trend towards including incentives for non-scholarly performance in PRFS is relatively new, it is too early to see much evidence that these are affected though there is anecdotal evidence that incentives such as those encouraging PhD education are effective.

While performance generally rises after the introduction of PRFS, it is also rising in countries with no PRFS and changes in performance are sometimes triggered by other policy changes than the introduction of a PRFS. It seems that PRFS can contribute to structural changes as part of larger processes of output-orientation rather than always being the unique cause of such changes. At this stage in our knowledge, it is probably best to regard PRFS as supporting performance improvement in the context of a wider set of measures intended to do so. This is also consistent with the perception that PRFS have systemic effects and that their design and introduction must also be considered in a systemic context.

Literature about the effects of PRFS indicates that university managers often believe PRFS improve performance while other academics are inclined to point to actual and potential negative effects on the character of research and on research carers.

Key risks identified in the scientific literature in connection with PRFS include

- Discouraging interdisciplinary research, which is normally regarded as one of the key sources of progress in science, by encouraging 'safe' disciplinary work that will allow the researcher to produce publications during the period of assessment. There is little evidence that this is the case – though there is clear evidence that the risk-averseness of university managers in deciding what research to submit to the UK PRFS means that interdisciplinary research is less likely to be submitted (implying negative effects on interdisciplinary researchers' career prospects)

- Similarly, discouraging 'blue skies', 'high risk' and 'transformative' research because these are risky to the career of the researcher. This would be a loss in terms of scientific progress. Equally, research on infrastructures and instrumentalities are said to be discouraged. However, while the literature and researchers speculate that this might be the case there is little systematic evidence that these risk change researchers' behaviour.

- Discouraging research in non-mainstream topics or using heterodox theories and methods. These may receive low ratings from peer reviewers from mainstream research 'schools' and be hard to publish in the mainstream journals. Here there is supporting evidence, at least from UK economics

- While discouragement of applied research has been raised as a concern, there is little solid evidence that PRFS affect the attractiveness of applied research, provided the approach takes account of differences among fields and the rating system is not skewed in such a way as to judge basic research as being better than applied research more or less by definition. This implies that the risk may be more serious in bibliometrics- than peer-based PRFS

- Under-valuing research published in languages other than English. This concern reflects a real bias in the way the scientific literature is indexed but has not been systematically tested in relation to PRFS

- Reducing researcher autonomy, owing to a need to conform with university management's efforts to encourage research that will generate income from the PRFS. There is literature and survey evidence that this is in fact the case

- Discouraging collaboration. Whether PRFS do this or not depends on the detail of how research publications and activities are 'credited' to different people

- Discouraging popularisation of science and – depending on the system – potentially also third stream activities. Again, the concern is credible but there is little evidence. We also lack evidence about whether changes in PRFS to include criteria related to impact and societal engagement has an effect on behaviour

Effects of PRFS on universities and research are mediated by universities' human resource and research management practices. They are likely over time to change the composition of the faculty, building in any positive or perverse effects of the PRFS to the staffing and culture of the university.

- **Member States should consider evaluating their PRFS periodically, if possible aiming not only to describe the gross effect of the current range of policies on research performance but also the net effect of the PRFS itself and the extent to which it leads to behavioural and organisational changes that render the PRFS redundant over time**

- **They should also conduct specific studies in order to search for stronger evidence about potential negative consequences**

- **Member states should understand those potential risks and consider them when deciding on the mix of university funding instruments deployed and in the design and architecture of their PRFS**

- **Internationally comparative studies and evaluations are also needed in order to start to disentangle the operation of PRFS from national contexts**

Getting in touch with the EU

IN PERSON

All over the European Union there are hundreds of Europe Direct Information Centres.
You can find the address of the centre nearest you at: http://europa.eu/contact

ON THE PHONE OR BY E-MAIL

Europe Direct is a service that answers your questions about the European Union.
You can contact this service
– by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
– at the following standard number: +32 22999696 or
– by electronic mail via: http://europa.eu/contact

Finding information about the EU

ONLINE

Information about the European Union in all the official languages of the EU is available on
the Europa website at: http://europa.eu

EU PUBLICATIONS

You can download or order free and priced EU publications from EU Bookshop at:
http://bookshop.europa.eu. Multiple copies of free publications may be obtained by contacting
Europe Direct or your local information centre (see http://europa.eu/contact)

EU LAW AND RELATED DOCUMENTS

For access to legal information from the EU, including all EU law since 1951 in all the official
language versions, go to EUR-Lex at: http://eur-lex.europa.eu

OPEN DATA FROM THE EU

The EU Open Data Portal (http://data.europa.eu/euodp/en/data) provides access to datasets
from the EU. Data can be downloaded and reused for free, both for commercial and non-
commercial purposes.

To support countries in reforming their research and innovation systems, the Directorate-General for Research & Innovation (DG RTD) of the European Commission set up a Policy Support Facility (PSF) under the European Framework Programme for Research & Innovation 'Horizon 2020'. It aims to support Member States and associated countries in improving their national science, technology and innovation systems.

This report documents a mutual learning exercise on performance-based research funding systems (PRFS) for universities. Armenia, Austria, Croatia, the Czech Republic, Estonia, Italy, Moldova, Norway, Portugal, Slovenia, Spain, Sweden and Turkey all participated in the exercise, which was supported by a group of five experts.

This report summarises the main learnings drawn from the exercise and makes a number of policy recommendations about how and when to design and use PRFS for policymakers and PRFS designers. A longer report is published in parallel with this one, which presents the evidence and analysis underlying this one, together with the lessons and recommendations.

Studies and reports