Horizon 2020
Policy Support Facility
Specific Support to Armenia

Draft conclusions and policy options

September 2019

PSF Armenia mission - to provide operational recommendations on:

DEVELOPMENT OF A MODEL FOR EVALUATION AND ASSESSMENT OF THE PUBLIC RESEARCH INSTITUTIONS PERFORMANCE

ASSESSMENT AND IMPROVEMENT OF THE PERFORMANCE-BASED FUNDING SYSTEM AND ADVICE ON ITS IMPLEMENTATION

MEASURES AIMED AT BRIDGING THE GAP BETWEEN HIGHER EDUCATION AND RESEARCH

PSF Armenia – process steps

Scoping and background analysis

Literature review

Drafting of background report

Kick off meeting (April 2019)

Evidence and idea gathering

Mission 1 (20-22/5/19):

Benchmarking of international comparators for the topics

1st draft report (August 19)

Developing recommendations

Review meeting (August 2019)

Second mission : (7-10/10/19) panel discussions

Final draft report (November 2019)

Structure of the presentation

Fundamental challenges of the Armenian science system

Developing a research evaluation framework fitted to Armenian needs

Performance based funding : rebalancing the funding system for science

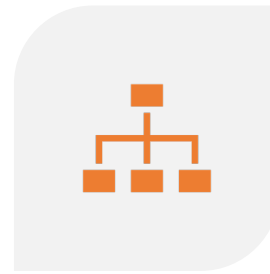Boosting co-operation between higher education and the research institutes systems
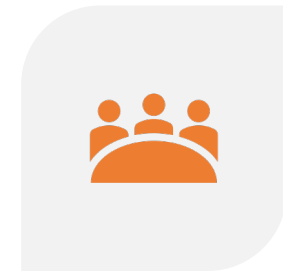
Four key aspects for a functioning science system

A SHARED VISION OF THE SCIENCE SYSTEM

THE LEVEL AND FORMS OF FUNDING

THE ORGANISATION OF RESEARCH ACTIVITIES

GOVERNANCE OF THE SYSTEM

The Armenian science system: key challenges 1

- Lack of a shared vision/agreement about the role of science for Armenian socio-economic development and hence the future of the science system.

- Critically low level of State funding:
  - leading to a decline in Armenian science
  - Inability to retain the brightest minds in science (salary differentials with industry) or in the country (emigration of scientists).

- An inadequate structure of research funding:
  - an absence of 'real' base line funding for science undermines the capacity for research organisations to maintain, never mind upgrade, the conditions for doing research.
  - Grants funding is too small scale to foster the medium-term development of existing or new performing research teams
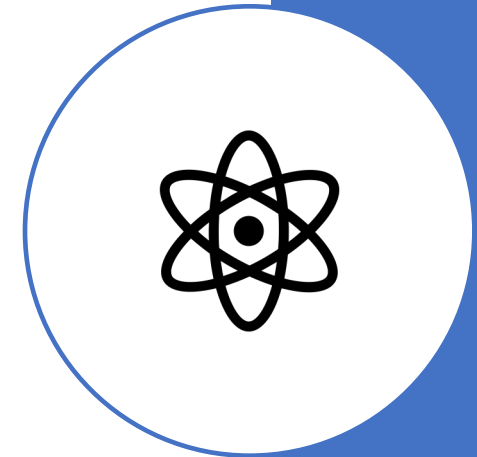
The Armenian science system: key challenges 2

- Fragmentation, and hence likely duplication, of effort within the science system:
  - Weak linkages between NAS RIs, university labs/institutes and sector research institutes in carrying out joint research
  - Little mobility of staff or exchange of expertise between types of research organisations
- Research based education is weak and there is a lack of a structured research career path:
  - Institutional barriers to researchers from RI teaching in HEI and lack of resources (funding) for RI to accept students from HEIs to do research.
  - Need for more focus on experimental research at doctoral and post-doctoral level (including industrial PhDs, , etc.)
  - Absence of funding for post-doctoral research
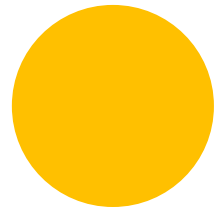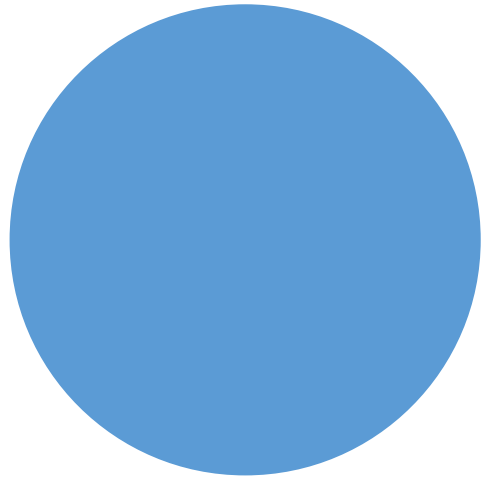
Developing a research evaluation framework fitted to Armenian needs
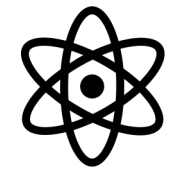
Research evaluation – no one size fits all model

- Research evaluation arrangements (REA) exist in countries with highly developed science systems (e.g. Australia, Netherlands, UK)

- REA in these countries are embedded in the institutional system and highly complex (and not without their critics).

- Unlikely that the implementation of, say, the UK's research evaluation practices would be possible, or even desirable in Armenia.

- Instead, the co-design and implementation of an tailored REA to the Armenian science system could be used as vehicle to address the fundamental challenges identified.

Examples of REA

- United Kingdom: Type One Steering evaluation system – REF (Research Excellence Framework) conducted every four-six years.
  - Highest weight attributed to research output as a direct measure of 'research excellence'.
  - Quality judged by panels that inform funding – only units rated above a certain threshold receive block grant funding for research.
- Netherlands: dual system built around:
  - six-year cycle of peer review evaluation (including review of core indicators)
  - Performance contract between State and Universities
  - Less direct link to funding
- Latvia: First assessment to reform science system in 2012, then every six years.
  - In 2012, the Ministry of Education & Science launched a Research Assessment Exercise – based on self—evaluation reports, bibliometric analysis and international peer review including site visits
  - The panel assessed research institutions (units) on five criteria: scientific quality, relevance, socio-economic impact, research environment and development potential.
  - Led to restructuring of the system with mergers and closures and the best performing institutions received 15M additional annual (base) funding.

Three Framing Questions

What is? (This is about collecting information regarding the current state of the object of evaluation relevant to the overall aim of the exercise.)

What ought to be? (This is a vision of the desired state of the object of evaluation and involves the development of norms, standards, etc.)

How to get there? (This is about the steps/action necessary to progress from the current state to the desired one were there to be a difference between them.)

Three elements of a research evaluation

Information	Judgement	Action
Research output Research environment Impact	Lay policy Lay admin Lay academic	Material (funding, facilities)
Narrative Indicators	Outside science Proxies	Reputational (rankings)
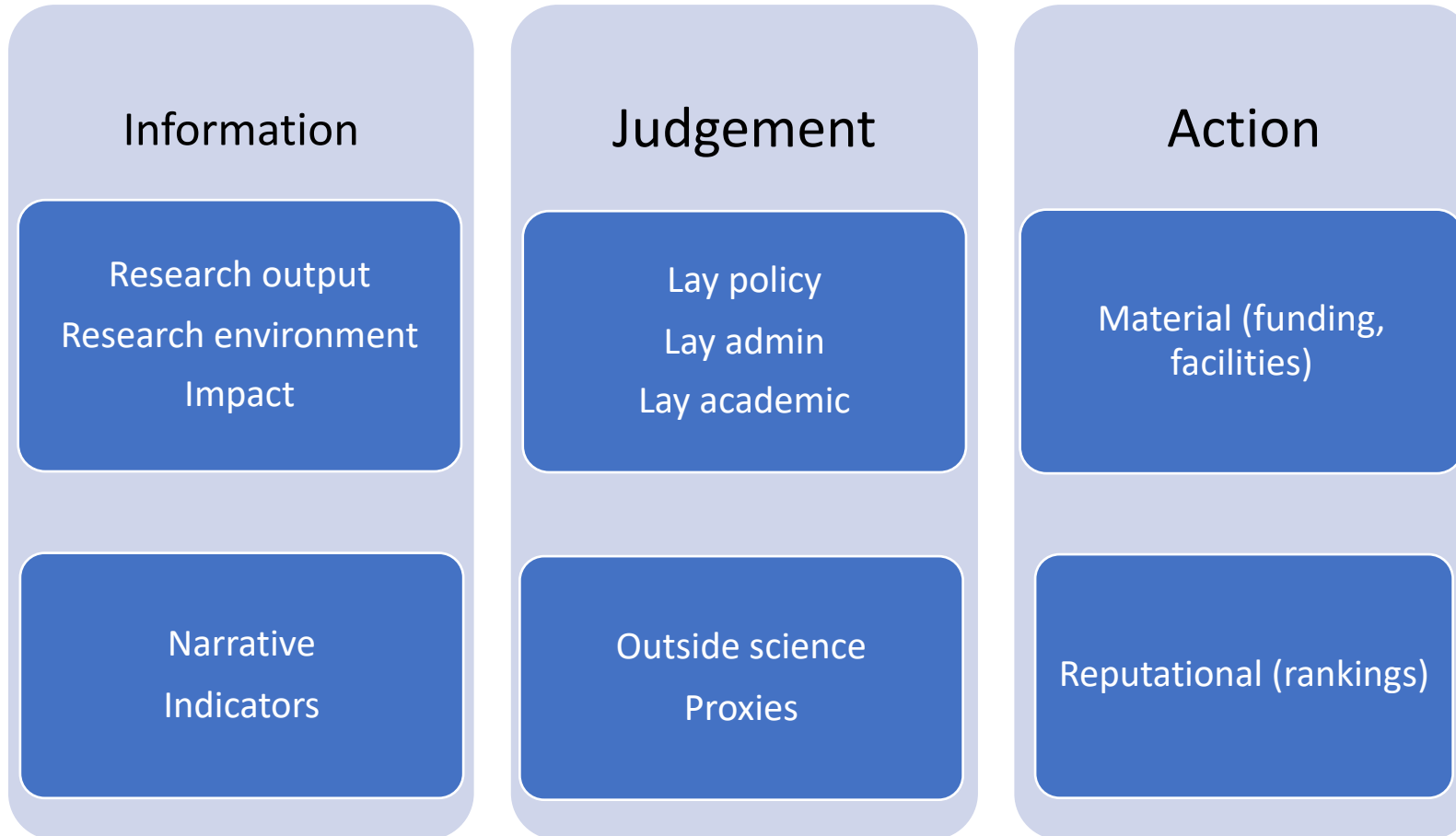
Four types of REA

	Steering REA Mark 1	Steering REA Mark 2	Enabling REA Mark 1	Enabling REA Mark2
Information	Research output Narrative	Research output Indicators	Research environment Narrative	Research environment Indicators
Judgment	Lay academic Proxies	Lay any Proxies	Lay any Proxies	Lay any Proxies
Action	Material	Material	Reputational	Reputational

Key principles for a REA

- **Congruence** with broader national aspirations for wellbeing, wealth and defence by agreeing on the role that science, education, technology, and innovation play in the future development of Armenia.

- **Transparency,** from an early stage in the REA, is important for building trust in the exercise and engendering the broad support it demands to succeed and willingness of all stakeholders to undertake action.

- **Legitimacy**. A REA has to have legitimacy with all relevant actors, that is it must have its authority recognised by being endorsed by the highest levels of decision-making.

- **Trust**: mechanisms for selection, including variants of peer review and REAs, can suffer from a break down in trust. It is a serious matter anywhere. Building trust in system(s) and rules is especially important in small countries.

Three core organisational decisions

1. Who collects information;

2. Who is responsible for developing the judgment (including who sets the criteria, how are these elaborated etc.); and

3. Who decides on the policy action and implementation?

These aspects are very context-sensitive and the organisational aspects of an REA need to be based on detailed, and mainly local, understanding of the roles and limitations of policy, expert and research actors

Assessment of existing basis for developing an REA in Armenia

- Long-standing practice of submitting annual reports (within NAS system) – but more a form of reporting than an accountability process (leading to change).

- One off 'peer-based' evaluation of the NAS research institutes in 2016 based on a mix of indicators, self-assessment and strategic vision for each institute. A basis for future REA but several issues to address:

  - Only addressed the NAS RIs – not a basis for a system wide transformation of the national science base

  - Focused on identifying measures to improve existing institutes – rather than integrating and streamlining the overall system

  - Outcome were a set of recommendations that were not backed by clear incentives (e.g. increased funding or investment) for change.

Suggestions for setting up a REA in Armenia

- Level of evaluation : system wide – including research institutes of NAS, research units/departments in universities and 'branch' research institutes.

- Type of REA : given eroding conditions for science in Armenia, a variant of a steering type research evaluation is appropriate

- Periodicity : begin as a priority with a one-off REA that will assess research capacity and link capacity to national research (and ultimately socio-economic) priorities.

- Focus on the conditions for conducting high-quality research to be produced – based on a combination of indicators and peer assessment.

- Link evaluation outcomes to baseline funding for research with possible additional appropriations (for investments and developing research teams) to higher ranked/priority research units/groups

An outline framework for a first REA in Armenia

Focus :
- State of the art research conditions (secondary on impact/ engagement and output)

Responsibility :
- Research field peers from overseas, local peers
- Decision: high political level

Criteria
- State of equipment and facilities;
- Collaboration with groups overseas;
- Collaboration with groups in Armenia;
- Duplication of research activity;
- Engagement with the global community (conferences, visits, training)
- Provisions for training (and retaining) junior scientists
- Engagement with society and economy (mechanisms)
- Traditional bibliometrics

Action :
- Link the evaluation outcomes with streams of funding.
- Form groups of research units:
  - #1. Keep as it is and grow
  - #2. Integrate with another unit
  - #3. Close unit (this may be the case with whole research fields)

Questions to discuss with Armenian stakeholders

- Criteria to be used for assessing performance - which ones fit context?

- Who does evaluation (neutrality of evaluators vs role of Armenian diaspora, cost given budgetary constraints etc.)

- What sort of training/capacity development will be needed ?

- Who runs evaluations (SCS vs role of NAS…) ?
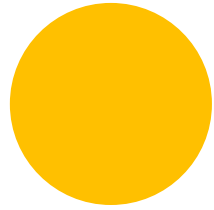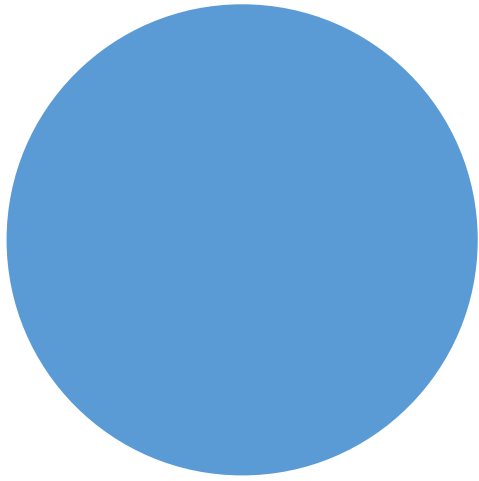
Performance based funding : rebalancing the funding system for science

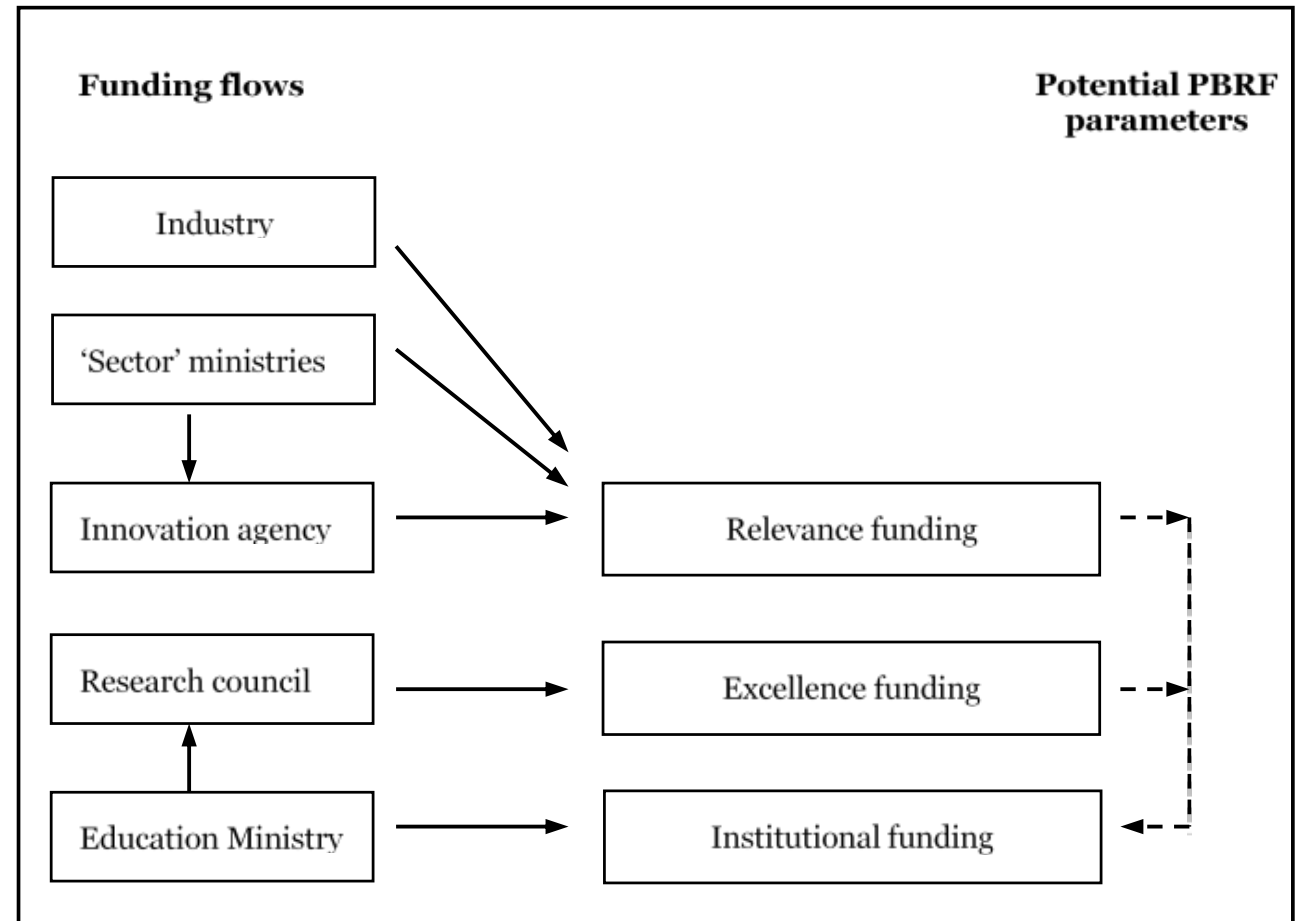# What is performance-based research funding (PBRF)?

- PBRF is the proportion of institutional funding to research institutes or higher education institutions which is driven by indicators that assess performance of the organisation.

- The indicators that assess the performance of an organisation can include the quality of the research, relevance for innovation/society etc.

- The proportion that is driven by these indicators as well as the characteristics of the indicators and ultimately, the objectives of the PBRF, vary from country to country

Integrating PBRF in a national research funding system

Institutional funding for research usually has one or more of the following components:

- **Block grant**: fixed proportion of the institutional funding allocated to a research organisation. This may be linked to a 'performance agreement' setting some longer-term strategic targets.

- **Formula funding:** proportion of the institutional funding decided by certain indicators such as the size of the organisation (number of staff, etc.), its role in the R&D system (e.g. number of PhD students). Both research and education activities can impact the level of formula funding

- **Performance-based research funding**

30/09/2019

Funding flows   **Potential PBRF parameters**

Industry → Sector ministries → Innovation agency → Relevance funding

Research council → Excellence funding

Education Ministry → Institutional funding

Many PBRF systems use the amount of external research funding as a quality indicator and a sign of both 'excellence' and 'relevance' (the dotted arrows in Figure)

Current funding system in Armenia

None of the current funding streams in Armenia adopt PBRF principles, government funding for research (managed by the SCS) is channelled from the science budget via four main financing mechanisms:

- Financing the maintenance and development of science infrastructure (about 60% of total budget) which is allocated to State-recognised research institutes;
- Special purpose R&D, such as defence-related projects (about 11%);
- Thematic funding based on calls for proposals from the research community (about 7%);
- A small portion for collaborative and applied research (less than 1.5%).

- Nb: targeted funding is evaluated on a competitive basis by independent experts, but this is not the same thing as PBRF

The current system does not encourage change or renewal

- Clear policy choices to be made: a balance between forces that encourage renewal and flexibility, and forces supporting stability.

- The Armenian research funding system lacks economic incentives to perform well on institutional level. This hampers the quality development of the system as a whole as there are no incentives to change and try to perform better.

- The result is that the Armenian research system, despite some promising preconditions, remains in a steady state.

A proposal for a transition to PBRF in Armenia

It is recommended that the Armenian authorities introduce a functional and effective funding system that combines a sufficient level of direct appropriations (also called block funding, or base-line funding) and PBRF.

Even a relatively small performance-based component of the total government funding can have substantial game-changing effects, both in terms of creating incentives to perform better, but also to pave the way for organisational reformation on system level.

It is recommended that the Armenian government consider setting (initially) the share of the performance-based component in the range of 20 percent of total funding.

Possible criteria for a PBRF model

Research
- Indicators include PhD awards, research publication output, research impact, external research income as percentage of total income, and postdoctoral positions

Teaching and Learning
- Indicators include completion/progression rates, pedagogical qualifications/training of academic staff, graduate unemployment rate vs. national average, and staff-student ratio

Knowledge Transfer
- Indicators include start-up enterprises and spin-offs, patents and licenses

Engagement
- Indicators include internships, joint programmes and joint publications

Access
- Indicators include participation by targeted (disadvantaged) socio-economic groups, share of learners with a disability, participation by ethnic minorities, and labour market support for unemployed

Internationalisation
- Indicators measure percentage of international students, percentage of international staff, participation in international research programmes, and joint publications
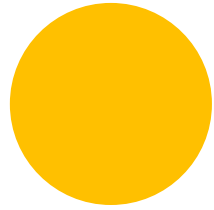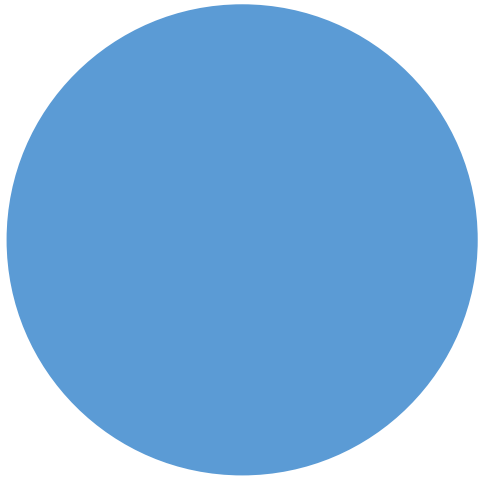
Boosting co-operation between higher education and research institutes

Assessment of the framework for research-higher education co-operation in Armenia

The legal and financial frameworks in place governing research institutes and universities place restrictions on the potential and capacity to co-operate

The incentive system (both for universities and teaching staff) are driven by optimising income and undermine a shift to research-based education.

The doctoral research system is not organised optimally to encourage experimental (or industrial) research orientated PhDs and there is a lack of post-doctoral funding

Research careers are not structured and salary levels unattractive limiting the retention of young graduates in the research and higher education system.

Options for reinforcing co-operation

Joint Doctoral Schools

- Creation of thematic/disciplinary doctoral schools at an inter-institutional level so as to optimise research based education

Research pooling

- Stimulate inter-institutional groupings of university and RI researchers and hence create larger and more competitive teams than exist in single institutions.

Open access system for research equipment

- Develop an open access system to ensure that researchers (including doctoral and post-graduate students) are able to use existing equipment available in the research system

Collaborative research programmes

- Reinforce the collaborative research dimension in SCS funding programmes prioritising joint proposals from research teams at HEIs and Ris.
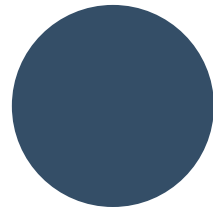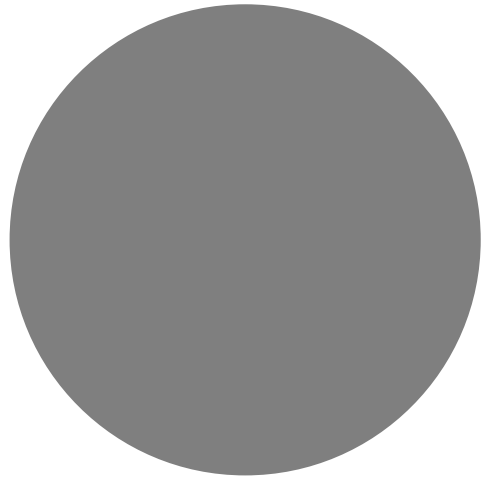
Next steps | For discussion
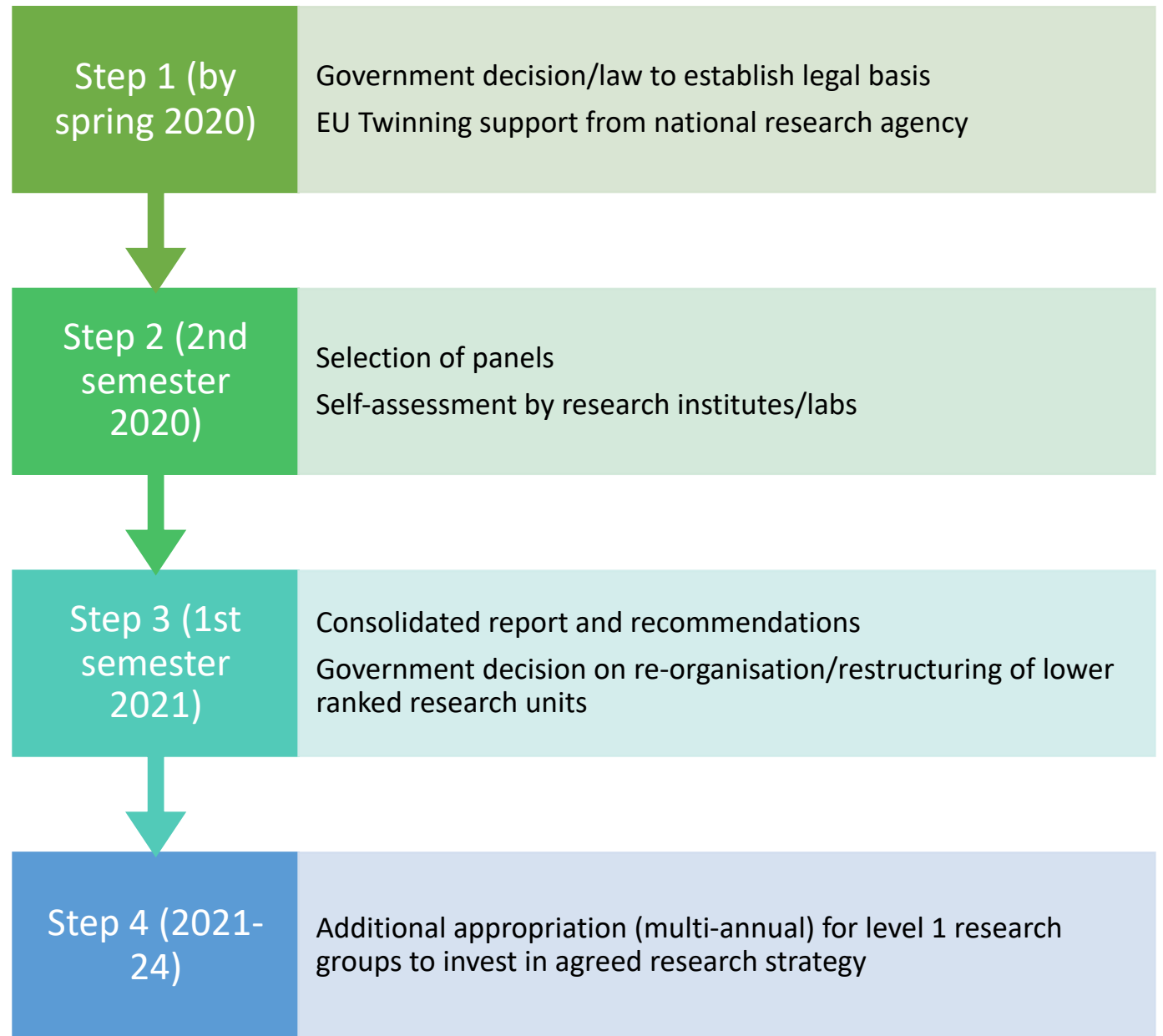
Links between proposals in three topics

Research Evaluation Exercise : identification of a core group of viable research institutes/teams

PBRF : orientate greater share of funding to higher performing institutes &/or research groups (inter-university/RI)

REA and PBRF implementation will foster Research-Higher Education Co-operation further boosted by dedicated measures:

- Creation of joint doctoral school involving RIs and HEIs
- Develop research pools to reinforce access to and encourage sharing of equipment/research infrastructures across institutes
- Reinforce incentive for joint projects via SCS funding calls – additional bonus for collaborative projects.

Research Evaluation Arrangement

Step 1 (by spring 2020)
Government decision/law to establish legal basis
EU Twinning support from national research agency

Step 2 (2nd semester 2020)
Selection of panels
Self-assessment by research institutes/labs

Step 3 (1st semester 2021)
Consolidated report and recommendations
Government decision on re-organisation/restructuring of lower ranked research units

Step 4 (2021-24)
Additional appropriation (multi-annual) for level 1 research groups to invest in agreed research strategy

Performance-based research funding

Step 1 (2020)	Design during 2020 and then introduce a PBRF component in the 2021 SCS budget (allowing time for the REA process to be completed)
Step 2 (2021-23)	The government should encourage mergers between institutions, initially on a voluntary basis. Financial support could be allocated to institutions that decide to merge with each other, to stimulate the process but also to cover the actual costs involved
Step 3 (2023)	After three years, institutions that clearly underperform (based on RAE and PBRF criteria) and have not engaged in a merger, should be forced to do so or be closed down
Step 4 (2024)	The system should be evaluated after approximately three years, and if the effects are not satisfactory, adjustments of the level of PBRF should be made.

Research – Higher Education Co-operation

Step 1 (2020) — Redesign SCS competitive programmes to give higher priority to inter-institutional co-operation.

Step 2 (2nd Semester 2020) — Call for proposals for creation of thematic research pools. Development of research infrastructure roadmap

Step 3 (2nd Semester 2020) — Call for proposals for development of joint doctoral schools and design of new funding model for post-doctoral research

Step 4 (2020-22) — Review of research career path and reform of access for researchers to provide research-based teaching in universities (as part of broader reform of HEI teaching)

Feedback and ideas welcomed

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