



Australian Government

Department of Industry, Innovation,
Climate Change, Science, Research
and Tertiary Education

Australian Research Council

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Assessing the wider benefits arising from university-based research: Discussion paper

June 2013

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Preamble

On 29 May 2013, the Minister for Tertiary Education, Skills, Science and Research, The Hon Dr Craig Emerson MP, and the Minister for Higher Education and Skills, The Hon Sharon Bird MP, jointly issued a statement on *Assuring quality while reducing the higher education regulatory burden*.

The statement addresses concerns within the higher education sector about the cost of regulatory compliance and reporting, and the need for constant vigilance to prevent the imposition of inefficient new reporting requirements. The statement announces that the Government is taking some immediate steps to address these concerns and identify what further action is needed. This includes scaling back and streamlining a number of current data collection and analysis exercises.

Given this policy context, any new research assessment to be implemented by the department will make the maximum possible use of data that is already being collected and will seek to provide universities with significantly increased value from this data.

The department will pay particular attention to the ongoing implementation of the United Kingdom's (UK) Research Excellence Framework (REF) to ensure that wherever possible lessons are learned from the UK government's and university sector's experience with the REF. Moreover, the process to design, develop and implement the new assessment in Australia will take place in ongoing consultation with universities. Within the context of this ongoing consultation the department will provide every opportunity for the university sector, as well as from experts on data reporting and regulation, to provide advice on how the new assessment should best be structured so as to minimise its administrative footprint.

The Government recognises the contribution that science and research make towards driving innovation and to addressing the social, economic, technological and environmental challenges we confront. Through the implementation of a new assessment process universities will be provided with a new way to communicate the significant role their research plays in increasing national wellbeing. The Government intends that this will take place without adding to the reporting burden that universities already face.

1 Introduction

1.1 Overview

The Australian Government commits significant public funding to support science, research and innovation activities every year (and \$8.9 billion in 2012-13)¹. These funds are allocated to support:

- ‘supply side’ activities, such as research training and infrastructure (e.g. through the research block grants); and
- ‘demand side’ activities, such as innovation within business (e.g. through the R&D Tax Incentive and the Researchers in Business initiative).

Through this expenditure, the government seeks to maximise:

- the public benefits arising from publicly funded research;
- engagement and collaboration between research organisations and research users; and
- innovative activity occurring within research user organisations.

In 2011, the *Focusing Australia’s Publicly Funded Research Review* noted the need for increased evidence of the broader economic, social and environmental benefits of publicly funded research and recommended that a feasibility study be undertaken on options for assessing these benefits.

The feasibility study was undertaken during 2012 and, in November 2012, the Government announced plans to undertake work to develop a mechanism to assess the broader economic, social and environmental benefits resulting from all elements of government research investment, including the benefits arising from university-based research². Details may be found in the [National Research Investment Plan](#)³.

Besides the importance of demonstrating the broad benefits of publicly funded research, reviewing the evidence for benefits should also improve the understanding of the mechanisms through which they are realised, supporting the development of policies and practices that foster and encourage the translation of research into impacts.

1.2 Scope of this paper

Research is undertaken across many sectors including industry, universities, research institutes and publicly funded research agencies. This paper relates specifically to research undertaken in universities because of the volume of data that is already collected from these institutions and the opportunity to build on the assessment of research quality through the [Excellence in Research for Australia](#) (ERA) initiative. The research and engagement activities undertaken within publicly funded research agencies, independent research institutes and within business outside of universities are out of scope for this consultation.

¹ The Australian Government’s 2012-13 Science, Research and Innovation Budget Tables.

² Speech given at the ATN-Go8 Symposium on Excellence in Innovation for Australia, Canberra, 28 November 2012, by Senator the Hon Chris Evans, then Minister for Tertiary Education, Skills, Science and Research.

³ 2012 [National Research Investment Plan](#), pp. 86-87.

This paper addresses:

- the definitions of research, benefits and research engagement (Section 1.5);
- end use (Section 2.2);
- design principles (Section 2.3); and
- methodological considerations (Section 3).

1.3 Purpose of the paper

The Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education ('the department'), together with the Australian Research Council (ARC), is seeking the views of interested parties regarding a future assessment of the benefits arising from university-based research. The proposed assessment will include a strong industry focus and will be designed to complement the assessment of academic impact being undertaken through ERA.

Release of this paper initiates a public consultation process on the design and development of the assessment. Views are sought from the research sector and from research users within business, the not-for-profit sector, across government and the broader public.

This paper raises some general methodological questions and then proposes specific models in order to elicit targeted feedback from stakeholders. These models – it is important to note – have no formal status and do not represent any decision by the government. They have been included only as aids to the consultation process.

1.4 Approaches to assessing benefits

The timeframes for the benefits of a given program of research to be realised, or indeed to be clearly understood, can be long. For instance, the Excellence in Innovation for Australia (EIA) trial assessment of research benefits (discussed in Section 3) considered impacts from research that preceded the impact period by 15 years. Assessment of benefits over these long periods is naturally complex and may include contributions from multiple institutions and other actors. Because every history of benefit is particular, assessments will typically involve case studies. However, many public good benefits are difficult to quantify and objective comparison of benefits from different cases is challenging.

This inherent delay before outcomes are visible presents one of the main disadvantages of case study analyses. It would be desirable to also have measures that provide more current information on the prospect of benefits from research and so it will be important to identify lead indicators for eventual impact. These indicators should measure behaviours, activities and characteristics of the research and innovation system that are associated with subsequent benefit. They would be used to monitor the success of policy and practice or, potentially, to create incentives for desired changes. However, care would have to be taken to not create perverse incentives.

In practice, both approaches should make an important contribution to assessing and monitoring the health and effectiveness of the research system and its contribution to Australia's future. The focus on assessing benefit will complement the current emphasis on research quality and will support universities to better manage the research funding invested through them.

1.5 Definitions

For the purposes of this discussion paper:

Benefits

Benefits are defined as positive economic, social and environmental changes that can be attributed to university research.⁴

Benefits do not include changes to the body of academic knowledge but may include improvements within universities, including on teaching or students, where these extend significantly beyond the university.

Research engagement

Research engagement is defined as the pathways from university research activities to uptake and adoption of research outputs by research users and the realisation of subsequent economic, social and environmental benefits. These pathways may encompass activities (such as knowledge transfer and dissemination), policy frameworks, governance arrangements and skill development.

Research

Research is defined as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it is new and creative.

This definition of research encompasses any of the following four types of research and experimental development activity (as per ABS 1297.0 2008⁵):

- Pure basic research: experimental and theoretical work undertaken to acquire new knowledge without looking for long term benefits other than the advancement of knowledge.
- Strategic basic research: experimental and theoretical work undertaken to acquire new knowledge directed into specified broad areas in the expectation of practical discoveries. It provides the broad base of knowledge necessary for the solution of recognised practical problems.
- Applied research: original work undertaken primarily to acquire new knowledge with a specific application in view. It is undertaken either to determine possible uses for the findings of basic research or to determine new ways of achieving some specific and predetermined objectives.
- Experimental development: systematic work, using existing knowledge gained from research or practical experience, which is directed to producing new materials, products, devices, policies, behaviours or outlooks; to installing new processes, systems and services; or to improving substantially those already produced or installed.

⁴ No attempt has been made here to exhaustively define benefits, however the [National Research Investment Plan](#) describes a number of avenues through which Australia benefits from research (refer pp. 5-11), while the ABS's *Measures of Australia's Progress: Summary Indicators 2012* provides a collection of [progress indicators](#) that are also relevant to research benefits.

⁵ Australian Bureau of Statistics, [1297.0 - Australian and New Zealand Standard Research Classification \(ANZSRC\), 2008](#).

Questions

- How might the above definitions be improved or supplemented?
- Are these definitions sufficient to describe the relationship between research, research engagement and benefits?

2 Aims, outcomes and principles

2.1 Aims

A university research benefit assessment is being introduced to:

1. demonstrate the public benefits attributable to university-based research;
2. identify the successful pathways to benefit;
3. support the development of a culture and practices within universities that encourage and value research collaboration and engagement; and
4. further develop the evidence base upon which to facilitate future engagement between the research sector and research users, as well as future policy and strategy.

Questions

- Are there alternative or additional aims that should be included?

2.2 Outcomes

The outcomes of assessing the benefits of research may be used for a variety of purposes including:

- providing an evidence base for decision making by universities, government and industry, including universities and businesses outside Australia;
- promoting engagement both between university researchers and potential users of university research, as well as within the university sector;
- promoting the research outcomes and engagement strategies of Australia's publicly funded universities both domestically and internationally;
- providing an evidence base for benchmarking standards within the university sector; and
- linking outcomes to funding allocations.

Questions

- Are there additional purposes or uses that should be considered to assist the design of the assessment?

2.3 Principles for design and implementation

Principle 1: Provide useful information to universities

The report of the PhillipsKPA *Review of Reporting Requirements for Universities* noted that university representatives interviewed as part of the review were unanimous in identifying a set of key issues where they believed reforms were required. One of these issues was a concern about universities' access to useful and timely information. A recurring theme in consultations and submissions to the

review was the concern that universities were supplying government with large amounts of information but did not have commensurate levels of access to this data.

Given this, the report proposed that an important principle relevant to higher education data collection was:

- *accessibility* - data collections and dissemination arrangements should be developed in ways that are useful and accessible to the institutions providing the data, as well as government (p.90)

Given the above, it is proposed that the data collected by universities as part of an impact assessment, and any data created during the assessment, should to the maximum extent possible be both useful to universities and accessible by them, their staff, students, organisational units and the public more broadly.

Principle 2: Minimise administrative burden

The process of collecting data and the results of assessment should:

- be effective and fit for purpose; and
- utilise currently available data.

With agreement from institutions, existing data sets and collection mechanisms that could be utilised include (for example):

- Excellence in Research for Australia (ERA);
- Higher Education Research Data Collection (HERDC);
- Higher Education Student Data collection;
- National Survey of Research Commercialisation;
- Graduate Destination Survey;
- AusPat and other patent databases; and
- data collected by the Australian Bureau of Statistics.

Given the large amount of data that is already being collected it is likely that a new assessment process could obtain much of the data that it required from existing sources. Therefore, and following another recommendation of the PhillipsKPA report, a second proposed principle is that data collection for the new assessment should make use of existing data (including reasonable proxy data) if at all possible.

Principle 3: Encourage research engagement and collaboration, and research that benefits the nation

The introduction of an assessment of the benefits arising from university-based research should encourage increased collaboration and engagement between university researchers and industry, government, the not-for-profit sector and the broader community and so encourage research that has a positive outcome for the Australian economy, society and/or environment.

The process of collecting data and the results of assessment should, wherever practicable, encourage and assist universities to:

- develop more and deeper institutional collaborations with non-academic organisations;
- develop industry-linked research training and research careers; and

- better recognise and reward (for example, in recruitment and promotion exercises) the contribution of academics to engagement and collaborative activities.

Principle 4: Involve research users

Participation of research users in the design, implementation and assessment phases of the process is essential for the development of an effective model. It will also enable government and the public to develop a comprehensive appreciation of the full range of benefits arising from university-based research activity in Australia.

The publication of relevant information collected through the assessment exercise should lead to new opportunities for collaboration and investment.

Principle 5: Collect and assess at the institution level, with some granularity by discipline

Rather than assess benefits at a national (macro) level, or at a project (micro) level, benefits are most meaningfully assessed at the institution level, where 'institution' can be a school, discipline or university as a whole.

Within individual components of the assessment process, information may be collected at the level of the individual benefit; however, the overall assessment process is aimed at assessing the performance of each university at the institution level.

Questions

- What are your views on the draft principles? What other principles or considerations should be addressed?

3 Methodological considerations

3.1 Rationale for the use of metrics and case studies

A number of existing models of research assessment have been considered in preparation for this consultation, including:

Model	Organisation/mechanism	Key methodology
Research block grants	DIICCSRTE	Metrics only. Formula driven.
ERA	ARC	Expert review informed by metrics and peer review.
Excellence in Innovation for Australia (EIA) Trial	Australian Technology Network of Universities (ATN), Group of Eight (Go8)	Case studies only. Assessment by expert panel.
Research Excellence Framework (REF)	Higher Education Funding Council for England (HEFCE)	Case studies. Assessment by expert panel.
Higher Education Innovation Fund	HEFCE	Metrics only. Formula driven.

Section 1 of this paper noted some of the features of research and innovation systems that constrain assessment of benefits, including the often considerable lag-time between when research takes place and when benefits arise. It noted the consequent need to have measures that provide more current information on the prospect of benefits from research.

Reflecting this, it is proposed that this assessment consist of two distinct methodologies, being the collection and assessment of:

1. research engagement metrics; and
2. research benefit case studies.

It is useful for both the sector and for government to understand what constitutes successful (and unsuccessful) pathways to research benefit. Recent government and non-government reports have suggested that engagement activities are central to realising research benefits. As activities on the pathways are happening now, in real time, they are generally quantifiable – which allows for the use of metrics. Metrics can provide robust baseline measures that allow for comparison across and within research disciplines.

A collection of a sample of research benefit case studies is desirable as case studies can both capture information on research benefits and allow for independent experts to validate the cases being presented. Use of case studies would allow institutions to report data that best communicates the nature of their research benefits rather than being constrained to reporting against particular metrics.

Used together, these approaches can provide a holistic assessment that demonstrates the extent and range of benefits brought about by university research and recognises successful pathways to realising these benefits.

3.2 Research engagement metrics

3.2.1 Proposed general approach

It is proposed that research engagement metrics, as indicators of pathways to research benefits, form a part of the assessment.

Metrics should meet the following criteria:

- be quantitative, research relevant, verifiable and comparable;
- be repeatable and time-bound;
- be sensitive to disciplinary differences; and
- quantify relevant pathways to research benefits.

Further, the following are proposed as broad considerations for the inclusion of metrics in an assessment of research engagement:

- the collection of data must be comprehensive, and not based upon a sample of research;
- preference be given to metrics where they make use of existing data collected by institutions; and
- metrics should speak directly to pathways to research benefit but may also consider volume or productivity measures.

There are a number of existing data collections that could be used to develop metrics to measure research engagement. These include ERA, HERDC and the National Survey of Research Commercialisation, which are outlined below.

Questions

- What considerations should guide the inclusion of metrics within the assessment?
- What are the lead indicators for research benefits?
- What information do universities currently collect that might form the basis for research engagement metrics?
- What metrics are currently available (or could be developed) that would help to reveal other pathways to research benefit?
- Noting that the Higher Education Staff Data collection is currently being reviewed, are there any research engagement metrics related to university staff that should be considered for inclusion?

3.2.2 ERA

ERA uses expert review informed by metrics and peer review to evaluate research quality. As stated in the foreword to the ERA 2012 report:

While the primary purpose of ERA is to identify research quality and assure Australians their investment in research is being spent wisely, ERA data also provide other valuable information about the research activities of universities. It provides insights into research capacity and patterns of research application, knowledge transfer and collaboration... and it can illuminate the pathways to research impact.⁶

ERA 2012 evaluated data including:

- professional and applied research publications (e.g. policy reports to government; commissioned reports; architectural designs etc.);
- sealed patents;
- Higher Education Research Data Collection (HERDC) income categories 1-4;
- NHMRC endorsed guidelines;
- plant breeder's rights; and
- research commercialisation income (see also *National Survey of Research Commercialisation* below).

In addition, ERA data on research outputs (books, book chapters, journal articles, conference publications and non-traditional research outputs) could be used to identify a range of bibliometric data on collaboration. The following could make useful indicators of research engagement:

- national and international collaborations with other universities; and
- national and international collaborations with public and private enterprises, as well as interactions with other scientific, artistic or technical organisations.

3.2.3 HERDC

HERDC comprises research income and research publications data submitted by universities each year. Data must be submitted on:

Research income	<ul style="list-style-type: none">• Category 1: Australian competitive grants• Category 2: Other public sector research income• Category 3: Industry and other research income• Category 4: Cooperative Research Centre (CRC) research
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⁶ Excellence in Research for Australia 2012: National Report, Foreword, p. iii.

	income
Research publications	<ul style="list-style-type: none"> • Books • Book chapters • Journal articles • Conference publications
Students	<ul style="list-style-type: none"> • Higher degree by research student load and completions

3.2.4 National Survey of Research Commercialisation

The **National Survey of Research Commercialisation** (NSRC) is a survey of research commercialisation inputs, activity and outputs for Australian publicly funded research organisations (PFROs) including universities, government research agencies and a range of medical research institutes. It measures the extent to which public researchers have successfully translated their ideas into technologies, services, business models and other intellectual property.⁷

The NSRC typically surveys approximately 70 institutions and is undertaken on a biennial basis, with the latest report covering the period 2010-11.

Key data collected through the survey are:

- numbers of research commercialisation staff employed and associated costs;
- levels of patenting activity (filings, grants and holdings);
- volume and value of licensing, optioning and/or the assigning of intellectual property;
- numbers of start-up companies launched and continuing, and the value of associated equity holdings;
- volume and value of contract research and consultancy activity; and
- research commercialisation training inputs and outputs (starting with the third iteration).

3.2.5 AusPAT

IP Australia receives patent applications, examines and grants patents, maintains registers of patents, designs, trademarks and plant breeder's rights and regularly produces journals detailing new applications and registrations.

Australian patent documents that are collected by IP Australia are available online through **AusPAT**. Some information about patents filed by universities is also reported as part of the ERA process and also through the NSRC.

Patents demonstrate that researchers or their institution consider that research is of a quality worth protecting and translating into new technologies with a potential commercial value, often in collaboration with industry. Patents thus may act as proxies for impact.

IP Australia is able to attribute granted patents to universities and to calculate metrics based upon the quality of inventions disclosed in patent documents.

3.2.6 Graduate Destination Survey

The **Graduate Destination Survey** (GDS) collects information about graduate employment outcomes and previous employment, continuing study and work-seeking status, work-seeking behaviour, past

⁷ National Survey of Research Commercialisation 2011-2012, Foreword, p. iii.

education and key respondent characteristics (e.g. recent qualifications, residency status, etc.). The GDS is administered as part of the Australian Graduate Survey Questionnaire and appears alongside the Course Experience Questionnaire and the Postgraduate Research Experience Questionnaire (the former distributed to coursework graduates and the latter to research award graduates). The GDS provides information on the movement of research graduates into various employment areas. These metrics could be used to illuminate the transfer of research-derived knowledge from universities to industry (including government and community organisations) through these graduates.

Questions

- In addition to ERA, NSRC, GDS, AusPat and HERDC data, are there other existing data collections that may be of relevance?
- What are the challenges of using these data collections to assess research engagement?

3.2.7 Unit of Evaluation

The assessment of research engagement should capture the changing engagement performance of the university sector over time and enable comparison across universities. To enable this, it is proposed to use the Australian Bureau of Statistics' (ABS) **Field of Research (FoR)** classification which categorises research activity according to disciplines. There are 22 two-digit FoR codes, 157 four-digit FoR codes, and an extensive range of six-digit codes.

Two-digit FoR code

This is the highest level of the FoR hierarchy. A two-digit FoR code relates to a broad discipline field, such as 02 Physical Sciences. A two-digit FoR code consists of a collection of related four-digit FoR codes, such that Physical Sciences comprises, among others, 0201 Astronomical and Space Sciences and 0203 Classical Physics.

Four-digit FoR code

This is the second level of the FoR hierarchy. A four-digit FoR code is a specific discipline field of a two-digit FoR code, for example, 0201 Astronomical and Space Sciences. A four-digit FoR code consists of a collection of related six-digit FoR codes.

Six-digit FoR code

This is the lowest level of the hierarchy of FoR codes. A six-digit FoR code is a further breakdown of a four-digit FoR code, for example, 020101 Astrobiology is within 0201 Astronomical and Space Sciences. Institutions currently submit data for ERA at the four-digit FoR level.

Questions

- What is your preferred unit of evaluation for research engagement and why?
- What are the issues related to using FoR codes?
- Is there a need to use four- or six- digit FoR codes or will the two-digit code suffice?
- What are the opportunities and costs of breaking down analysis to the more detailed level?
- Given an interest in "outcomes", would it be better to use the ABS's Socio-Economic Objectives for research (SEO) codes? Why/why not?

Box 1 – Approach to metrics

The following model is proposed as a basis for discussion and to elicit feedback.

Proposal	Details and rationale
<p><u>1. Overall process</u> Research engagement metrics would be collected as part of the assessment</p>	<p>Research engagement metrics would be collected to:</p> <ul style="list-style-type: none"> • support the development of a culture and practices within universities that encourage and value research collaboration and engagement; • highlight opportunities for further participation in activities that lead to research benefit; • demonstrate the extent and range of research engagement; and • improve the evidence base upon which the research sector and research users may develop future policy and strategy.
<p><u>2. Periodicity of process</u> Synchronised with ERA</p>	<ul style="list-style-type: none"> • Timing would be synchronised with but offset from ERA to enable universities to balance the workloads of their research offices and staff. • Depending on the scale and scope of the process, it may be possible to subsume collection of research engagement metrics into the annual HERDC data collection exercise in order to streamline and simplify data collection and use.
<p><u>3. Data to be collected</u> Data would be collected from a number of sources</p>	<ul style="list-style-type: none"> • Some options for metrics that could be used within the assessment are noted at Appendix A. These metrics are included as a prompt for discussion only and all comments are welcome (including suggestions for additional metrics). • Any metric to be included would need to be a ‘quality’ metric rather than recognise (increased) quantity of activity without regard to the value of that activity. • To address this, metrics used should have to demonstrate uptake or some other type of involvement by research users.
<p><u>4. Unit of Evaluation</u> ABS Fields of Research (FoR)</p>	<ul style="list-style-type: none"> • Where research engagement data allowed it would be captured at the 4-digit FoR level. Otherwise it would be captured at the 2-digit level or at the institutional level. • This would allow – where possible – comparability with ERA data. • As with ERA, there will also be opportunity for institutions to indicate alignment of data with a relevant Socio-Economic Objective (SEO) code.
<p><u>5. Quality assurance and assessment</u></p>	<ul style="list-style-type: none"> • Some of the data to be collected may already be quality assured. Where this is not the case, the same quality assurance mechanisms used as part of HERDC would apply (i.e. institutions provide audited statements and the department periodically conducts its own external audit). This approach would help to minimise administrative burden but ensure that data was sound.

	<ul style="list-style-type: none"> Assessment provides benchmarks of performance for decision-making by the sector and by stakeholders outside of academia.
<p><u>6. Reporting</u> Through a number of mechanisms</p>	<p>Performance measures would be formally reported by Government through:</p> <ul style="list-style-type: none"> A dedicated 'Benefits of university research report'; MyUniversity; Mission-based compacts; the Australian Innovation System Report; and Other mechanisms where suitable. <p>The outcomes of the assessment process would be reported widely in order to promote the public benefits from the investment in university-based research.</p>
<p>Questions</p> <ul style="list-style-type: none"> What are the strengths and weaknesses of the model? 	

3.3 Research benefit case studies

3.3.1 Proposed approach

It is proposed that research benefit case studies be included within the assessment.

Case studies are a narrative method whereby an institution is able to describe research benefits.

A case study based assessment should be designed to:

- include key information to enable effective and verifiable comparison;
- have evidence supporting the claim(s) made; and
- capture and encourage cross-sectoral engagement.

It is proposed that:

- only a limited sample of case studies would be requested and not a census of all research that has been undertaken or benefits that have arisen;
- there be no set metrics or data that must be included in case studies, with case studies providing an opportunity for any relevant and verifiable data to be included;
- claims in case studies must be verifiable;
- case studies be assessed primarily by research end-users on panels formed for this purpose; and
- separate research areas within an institution, and also separate institutions, be able to submit joint case studies.

Questions

- What considerations should guide the inclusion of research benefit case studies within the assessment?
- How should the number of case studies provided by each university be determined?
- Are there any issues with institutions being able to submit joint case studies? If so, what are they?
- What information should be included within a case study?
- How should a case study be assessed? Should it be scored or rated in some way?
- Are reach and significance useful concepts for an assessment of the benefits arising from university-based research?
- What would make useful criteria for assessing the benefit of university research?
- Are there data/evidence collection standards that you consider best practice within the university research context?
- Is there data regularly collected by universities that could be employed to provide a picture of research benefits? If so, how is this information captured and validated?

3.3.2 Establishing timeframes

In the EIA Trial “Universities were asked to submit information on research impacts between 1 January 2007 – 31 May 2012. Recognising that impact may occur quickly and also that it may take considerable time to be demonstrated, the impacts submitted were required to relate to research during the impact period, or, in the 15-year period preceding claimed impact, i.e. 1 January 1992 – 31 December 2006. Whilst much research may lead to future, as yet unrecognised, or only partly recognised impact, the Trial focus was on demonstrated impact, i.e. impact that has occurred within the reference period above.”⁸

Similarly, the UK REF 2014 will be covering “impacts that have occurred during the assessment period (1 January 2008 to 31 July 2013) that were underpinned by excellent research undertaken in the submitted unit. The underpinning research must have been produced by the submitting HEI [higher education institution] during the period 1 January 1993 to 31 December 2013.”⁹

As an alternative to the above approaches, and recognising institutions will have strong incentives to report on their most recent impacts, as well as a limited ability to provide evidence for impacts that occurred many years ago, it might be possible to forgo the use of timeframes altogether.

Questions

- Should timeframes be used to limit what is reported on through case studies? If so, what timeframe(s) should be used?

3.3.3 Unit of Evaluation

The assessment of research benefits must verify claims that have been made for how a given research activity has contributed to national wellbeing, productivity growth and/or the solution to national and global challenges.

To enable this, it is proposed to use the Australian Bureau of Statistics’ (ABS) Socio-Economic Objective (SEO) classification, as did the EIA trial.

⁸ Excellence in Innovation: Research impacting our nation’s future – assessing the benefits, p. 13.

⁹ Research Excellence Framework Assessment Guidelines July 2011 (updated January 2012), p. 27.

The SEO classification allows R&D activity to be categorised according to the intended purpose or outcome of the research, rather than the processes or techniques used in order to achieve this objective. The purpose categories include processes, products, health, education and other social and environmental aspects that R&D activity aims to improve. This classification consists of five Sectors, 17 Divisions, 119 Groups and 847 Objectives. The Sector and Division levels are as follows:

Sector	Division
A: Defence	81 Defence
B: Economic Development	82 Plant Production and Plant Primary Products 83 Animal Production and Animal Primary Products 84 Mineral Resources (excl. Energy Resources) 85 Energy 86 Manufacturing 87 Construction 88 Transport 89 Information and Communication Services 90 Commercial Services and Tourism 91 Economic Framework
C: Society	92 Health 93 Education and Training 94 Law, Politics and Community Services 95 Cultural Understanding
D: Environment	96 Environment
E: Expanding Knowledge	97 Expanding Knowledge

While it is proposed the SEOs be used as the primary method for classifying and assessing case studies, underpinning research referred to within each case study would be assigned FoR codes.

Questions

- What is your preferred unit of evaluation for the assessment of research benefits and why?

Box 2 – Approach to case studies

The following model is proposed as a basis for discussion and to elicit feedback.

Proposal	Details and rationale
<p><u>1. Overall process</u> Research benefit case studies would be collected as part of the assessment</p>	<ul style="list-style-type: none"> To enable universities to more effectively communicate the public benefits that arise from the research that they conduct. To provide a source of evidence for the public regarding these benefits. To provide increased insight into the pathways from research to public benefits.
<p><u>2. Periodicity of process</u> Synchronised with ERA</p>	<ul style="list-style-type: none"> Timing would be synchronised with but offset from ERA to enable universities to balance the workloads of their research offices and staff.
<p><u>3. Number of case studies</u> <i>A minimum of five per institution with a set maximum</i></p>	<ul style="list-style-type: none"> The maximum number of case studies from each institution would be proportional to each institution's total research capacity. This approach would enable universities considerable discretion regarding how many case studies that they produced below a set maximum. It would encourage universities to only submit case studies where they had significant and well evidenced benefits to report.
<p><u>4. Unit of Evaluation</u> Research benefits, categorised according to ABS Socio-Economic Objectives at the 2-digit level in Sectors A-D</p>	<ul style="list-style-type: none"> Each case study would report on a particular example of where research had contributed to a benefit of some kind, noting the Socio-Economic Objective(s) with which it aligns. Contributing research may have been undertaken by a number of disciplinary areas within one or more universities. Joint submissions would therefore be permitted. Contributing disciplines would be reported using FoR codes at the 4-digit level. Use of this approach would facilitate and recognise collaborative research while at the same time enabling case studies to be linked to performance as assessed through ERA.
<p><u>5. Quality assurance and assessment</u> Panel based</p>	<ul style="list-style-type: none"> Assessment panels consisting of at least 70% research users would assess research benefits. Panel members would assess case studies within SEO areas relevant to the industrial areas that they work in. This would provide assurance that the research being reported on was considered beneficial by relevant stakeholders, and stakeholders outside of academia.
<p><u>6. Assessment criteria</u> Case studies would be assessed along a number of dimensions.</p>	<p>Case studies would be assessed in terms of the following criteria (as per the EIA trial):</p> <ul style="list-style-type: none"> Reach (i.e. the spread or breadth of the reported benefit); Significance (i.e. the intensity of the reported benefit); Contribution (of the research to the reported benefit); and

	<ul style="list-style-type: none"> • Validation (i.e. key impact claims are able to be corroborated) <p>This approach would help to ensure public confidence in the outcomes of the process, while at the same time it would not seek to reduce all case studies to a single number.</p>
<p>7. Reporting Assessment results would be reported through a number of mechanisms</p>	<p>Selected case studies along with case study assessment results would be formally reported by Government through:</p> <ul style="list-style-type: none"> • A dedicated 'Benefits of university research report' • MyUniversity • Mission-based compacts • the Australian Innovation System Report • other mechanisms where suitable <p>The outcomes of the assessment process would be reported widely in order to promote the public benefits from the investment in university-based research.</p>
<p>Questions</p> <ul style="list-style-type: none"> • What are the strengths and weaknesses of the model? 	

3.4 Use of collected information

Once metrics and case studies have been collected from universities, a number of options exist for how they might be used or assessed and for how the results of assessment might be reported and used to support government policy for higher education research.

Option 1. No assessment (validation and dissemination only)

Case studies and metrics are provided to the department along with an audited certification from the institution that they are accurate.

- Basic validation of the case studies is completed by the department. Case studies are then published (with no rating) in order to share stories of research benefit within the sector and more widely.
- Metrics are transformed into performance measures using appropriate volume measures without other interrogation or analysis.

Option 2. Assessment of metrics only (case studies only collected)

Using this approach, a panel-based assessment would be conducted only on the pathways to research benefit. Research benefit case studies would be collected, without other interrogation or analysis.

Option 3. Assessment of case studies only (metrics only validated and disseminated)

Using this approach, an expert panel-based assessment would be conducted only on the research benefit case studies, while the metrics would be transformed into performance measures using a formula-based approach, without other interrogation or analysis.

Option 4. Combined assessment

Alternatively, both metrics and case studies could be provided to expert assessment panels. These panels could interrogate and analyse this data and generate ratings, in a similar manner to the approach used for ERA.

3.4.1 Reporting

It is proposed that the primary public output of the assessment process be a report that communicates the case studies and metrics and that presents some analysis of them.

Given that a primary aim of the exercise is to demonstrate the public benefits arising from university research, this report might include detailed information on the highest rated case studies as well as an overall analysis, by SEO code, of the broader array of benefits that had been reported. The document could include tables of the reported engagement metrics by FoR code and institution as well as analyses of, for example, preferred modes of engagement by discipline.

Alongside this report, as much as possible of the data collected from universities and generated by the department as part of the assessment would be made publicly available online. This would help to ensure both the transparency of the process and that maximum possible value could be gained from this data by universities, research users and government.

Reporting could also take place through mission-based compacts, MyUniversity, the Australian Innovation System Report and other suitable mechanisms.

Questions

- How might case studies and metrics be combined within the assessment?
- Should outputs of the assessment be included within compacts and/or the research block grants calculation methodology?
- What other existing instruments might they be integrated within?

4 Next steps in the consultation process

In order to facilitate thorough consideration of this paper by interested parties, an eight week response period has been allowed. Your feedback on matters raised within the paper is therefore sought by close of business on Friday 16 August 2013. Feedback should be provided to impact@innovation.gov.au in the first instance. A preferred template for submissions is available at www.innovation.gov.au/impact. Submissions will be placed online.

During and after the close of the consultation period, the department proposes to hold a small number of workshops focused on the design and development of key elements of the assessment mechanism. These workshops would be attended by academics and research users with particular expertise in the area under discussion.

Following the close of the consultation period and based upon the submissions received, the department and the ARC will develop and release a detailed analysis of the issues raised in submissions, specifically noting areas of general agreement and areas of contention. A document will then be issued outlining the basic elements of an assessment of research benefits and pathways to benefit.

4.1 Pilot exercise

During 2014, the department proposes to undertake a 'proof-of-concept' or pilot exercise that will enable testing of elements of the proposed assessment and assist universities to develop the necessary institutional capacity to participate in a full-scale exercise.

The exact nature of the pilot will be determined following the consultation process outlined above, however at this stage it is anticipated that the exercise will consist of a component based upon engagement metrics and a component based upon research benefit case studies.

4.1.1 Engagement metrics

The component based upon engagement metrics will make use of data that is already being collected.

During 2013, the department will analyse a wide range of currently available sources of information about university research engagement, including new datasets that are suggested by universities during the present consultation. On the basis of this analysis and these suggestions, the department will produce a report describing the broad range of available metrics and suggesting a subset of these metrics as being suitable for closer analysis, as well as potential volume measures for normalising the data. The report will include a trial assessment based upon these metrics and measures and a description of the underlying calculation methodology. This report will be released in the first half of 2014.

During 2014, using the report as a basis for discussion, the department will undertake a series of workshops with universities aimed at clarifying and communicating:

- the principles behind the selection of a final suite of metrics
- technical considerations relating to the collection, production and assessment of these metrics
- institutional strategies for improving performance within the engagement areas relevant to these metrics
- how performance will be reported.

These workshops will provide further opportunity for the sector to contribute to the shape of the full-scale exercise.

4.1.2 Research benefit case studies

The component based upon research benefit case studies will take full advantage of:

- experience gained through the EIA trial
- latest developments of the UK's REF
- case studies already collected and made publicly available by Australian and overseas universities.

This component of the pilot will not involve the mandatory collection of new or additional case studies from universities.

During 2013, the department will seek advice on methodological and technical aspects associated with case study based assessment and analyse a wide range of currently available sources of information about this type of assessment. This work will include consultations with government and higher education sector institutions in the UK. Based upon this work the department will produce a report setting out a proposed approach to research benefit data collection, case study development and assessment. This report will be released in the first half of 2014.

During 2014, using the report as a basis for discussion, the department will undertake a series of workshops with universities aimed at clarifying and communicating:

- the principles behind the proposed approach to collecting and assessing case studies
- any issues around the identification of research benefits and the collection and assessment of case studies
- institutional strategies for improving performance within the case study based assessment
- how case studies will be reported.

These workshops will provide further opportunity for the sector to contribute to the shape of the full-scale exercise.

4.1.3 Outcome

Indicatively, in the second half of 2014 the department would produce a public report on outcomes of the pilot exercise and recommendations for Government regarding how and when to proceed to a full-scale implementation.

Examples of possible metrics

Note: the following list is indicative only and is not intended to be exhaustive.

Research engagement mechanism	Measures	Source
Consultancies, collaborative and contract research with government	<ul style="list-style-type: none"> Category 2 research income 	HERDC
Consultancies, collaborative and contract research with industry	<ul style="list-style-type: none"> Category 3 and 4 research income 	HERDC
Patenting	<ul style="list-style-type: none"> Various measures of patent quality 	IP Australia
Licensing	<ul style="list-style-type: none"> Income from licenses, options and assignments 	NSRC
Research commercialisation	<ul style="list-style-type: none"> Number of FTE staff employed for the purposes of driving or supporting research commercialisation 	NSRC
Training in commercialisation and entrepreneurship	<ul style="list-style-type: none"> Number of participants completing in-house and external training programs 	NSRC
Employment in start ups	<ul style="list-style-type: none"> Number of research postgraduates employed in dependent start-up companies Number of institutional staff employed in dependent start-up companies 	NSRC
Students	<ul style="list-style-type: none"> Rate of graduate employment Importance to employment in main job of qualification just received, major fields of education studied and other skills and knowledge acquired during course (as identified by the student) Primary employer supported study 	GDS - PREQ
Research engagement via online publications	<ul style="list-style-type: none"> Unique article views per author 	Websites such as The Conversation
Research engagement via other publications	<ul style="list-style-type: none"> Sales of professional and applied research publications Peer review of professional and applied research publications 	Universities ERA
Continuing professional development (CPD)	<ul style="list-style-type: none"> Income from CPD courses 	Universities
Research engagement via events	<ul style="list-style-type: none"> Income from research engagement events Numbers attending research engagement events 	Universities