



Australian Academy of Science

Consultation response

DIICCSRTE discussion paper – Assessing the wider benefits arising from university-based research

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Consultation response to the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education discussion paper - *Assessing the wider benefits arising from university-based research*

The relatively modest financial investment that Australia makes in science and its scientists continues to deliver considerable economic, social and environmental benefits both to the nation, and to the wider international community. Australian scientists through their research have had a positive impact on millions of lives throughout the world. The Australian Academy of Science believes that we have a responsibility to communicate the positive benefits that result from our publicly funded research to the wider community. Whilst high-profile Australian-led science breakthroughs such as the development of the cervical cancer vaccine; the cochlear implant; the eradication of smallpox; and Wi-Fi technology might be familiar to many, these represent just a fraction of the positive benefits that result from our investment in science.

Other nations are taking the lead in prioritising investment in scientific research as a key mechanism that will ensure future prosperity. Investing in science is fundamental to future economic prosperity, growth and well-being. If we are to maintain a high quality of life and meet the long-term challenges that we face, then Australia will need to increase its investment in scientific research to avoid falling behind. A significant part of making the case and gaining community support for such investment is through demonstrating how our past investments have delivered real positive economic, social and environmental benefits for the nation.

This discussion paper is a welcome opportunity for the research sector to reflect on how it might best communicate the benefits arising from publicly funded research. However the Academy believes that a different approach to the one outlined in the discussion paper is needed; there are more effective and more efficient ways to achieve this objective. The Academy recommends that the most effective way to demonstrate the benefits and vital necessity of publicly funded research is not through individual university assessment, but rather through a 'whole system approach'. Such an approach could provide a deep-level cost/public benefit analysis of high-profile and high-impact Australian research.

As requested the Academy has provided specific comments on the discussion paper using the consultation response template.

1. Introduction

Please provide any comments you have in relation to the issues raised in Part 1 of the paper, addressing if possible the following questions raised in Section 1.5:

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

Academy response:

Preamble

The most fundamental question, *why we need to assess the wider benefits of university-based research*, has not been addressed in the discussion paper, and as a result the paper articulates different purposes and outcomes from the exercise throughout. It is imperative that we understand the purpose and objective of the exercise *before* attempting to develop the methodology. As with any piece of research, policy development or project management, if we do not know what we are trying to achieve, then the path to how we can achieve it is unclear.

In the Preamble the purpose of the exercise is stated as giving universities ‘a new way to communicate the significant role their research plays in increasing national wellbeing’. However in the Aims section, the purpose appears to be about demonstrating public benefits attributable to university-based research. While in the outcomes section, the purpose appears to be to link outcomes to funding allocations. In section 2.3 it is stated that the aim of the exercise is to assess the performance of each university at the institution level. So there are four different aims expressed in the document and each would merit a different methodological approach for assessment.

The fundamental question of “why are we doing this?” needs to be addressed so that an appropriate methodology can be designed to meet the objectives of the exercise. If the exercise is being undertaken to help justify public investment in research, then there may be more effective ways to meet this objective rather than the metric assessment and case study approach detailed in the paper, and no other approaches have been explored in the discussion paper.

The Academy recommends that the Preamble to the discussion paper be updated to provide a clear statement as to why a benefits of research exercise assessment needs to be undertaken.

The Preamble states that the government has committed to reduce the regulatory burden facing universities and has commissioned a review to find ways to do this. This review is to be commended. Furthermore, the Preamble also states that the Government will implement a “benefits of research” assessment exercise without adding to the reporting burden that universities already face. This is simply not possible as the exercise relies on collecting new data through case studies, and may involve the collection of additional data if new indices are developed. The preparation and collection of case studies from universities would require extensive research, collection and verification. If the exercise follows the UK approach, it will necessitate the employment of additional people by universities.¹ Undertaking this new assessment process will come at a financial cost and will result in lost productivity. Given the Preamble states that where possible lessons will be learnt from the UK’s experience of the REF, then it should be noted that in

¹ Robinson, N. (2013) Tell your story clearly, and consider getting a little help if needed. *Times Higher Education*, 10 January 2013. Available at: <http://www.timeshighereducation.co.uk/comment/opinion/tell-your-story-clearly-and-consider-getting-a-little-help-if-needed/422321.article>

the UK universities have reported that the case study methodology alone being used within the REF is costing universities millions of pounds to implement.²

The Academy recommends that work be undertaken to determine the cost and impact of the exercise on universities, and that regulatory burden and reporting in other areas be reduced by at least that amount before any new reporting requirements are introduced through a benefits of research assessment exercise.

1.1 Overview

The discussion paper states that the 2011 *Focussing Australia's Publicly Funded Research Review*³ 'noted the need for increased evidence of the broader economic, social and environmental benefits of publicly funded research...'. The discussion paper is overstating the recommendation from this report. The actual recommendation was much more qualified and stated that the review identified 'some stakeholder support' with a justification largely based upon a UK context.

1.2 Scope of this paper

Undertaking a 'benefits of research assessment exercise' would be more meaningful if it included the whole research sector. Part of the purpose of the exercise is to aid comparisons within the university sector, but it would be as effective to be able to undertake comparisons between sectors rather than just within one sector. All of the reasons stated in the discussion paper for undertaking this exercise, such as discovering more effective pathways to impact, and the responsibility of the sector to demonstrate the value of public investment in research, apply equally across the whole of the annual \$9 billion public investment in science and research.

Unfortunately, the discussion paper does not include a justification or explanation for not including CSIRO, the medical research institutes, ANSTO, and other publicly funded research organisations within this exercise. According to the paper, the need to undertake a research impact exercise has arisen from one of the recommendations of the 2011 *Focussing Australia's Publicly Funded Research Review*. However it should be noted that this review recommended 'undertaking a feasibility study to examine options for the development of performance measures to assess the wider benefits of publicly funded research'.⁴ Part of the justification for this recommendation was the work that CSIRO had been undertaking to assess its own research impact, and the report did not envision or recommend that such an exercise would only apply to universities.

The Academy recommends that if a benefits of research assessment exercise is to proceed then a feasibility study be undertaken to determine practicality of including other publicly funded organisations in any future benefits of research assessment exercise.

1.3 Purpose of this paper

The discussion paper states that the 'proposed assessment will include a strong industry focus'. It might be useful to define 'industry' for the purposes of this exercise. The impact of research within business is important, but it is also important to look at the impact of research in other areas too,

² Jump, P. (2012) Bracing for impact may cost sector millions. *Times Higher Education*, 11 October 2013. Available at: <http://www.timeshighereducation.co.uk/news/bracing-for-impact-may-cost-sector-millions/421445.article>

³ DISSR (2011) *Focusing Australia's Publicly Funded Research Review: Maximising the Innovation Dividend Review and Key Findings*. Available at <http://www.innovation.gov.au/Research/Documents/ReviewAdvicePaper.pdf>

⁴ DISSR (2011) *Focusing Australia's Publicly Funded Research Review: Maximising the Innovation Dividend Review and Key Findings*. Available at <http://www.innovation.gov.au/Research/Documents/ReviewAdvicePaper.pdf>

such as its use by NGOs, the not-for-profit sector, practitioners, and where relevant, government agencies.

1.4 Approaches to assessing benefits

As the discussion paper states, the timeframes for the benefits of a given program of research to be realised can be long. Whilst the EIA trial considered impacts from research that preceded the impact period by 15 years, this might be an unreasonably short window. Research has shown the normal time lag between research and impact can be between 15-20 years^{5 6 7 8 9}, and therefore there will be outliers where the lag time is even greater. Such lag times will differ considerably between disciplines and types of research being undertaken. It is likely that the time lag time for basic research will be much longer than for applied research and longer for biomedical research than for research in the physical sciences. Furthermore, delineating where a particular piece of research starts and ends in terms of impact is a particularly important issue that is not covered in the paper but needs to be addressed.

The Academy suggests that any assessment of the benefits of research needs to be undertaken without a restrictive time frame.

The discussion paper states that the ‘many public good benefits [of research] are difficult to quantify and objective comparison of benefits from different cases is challenging’. The use of this type of qualitative research (i.e. the case study approach) makes objective comparisons impossible rather than challenging. Comparisons of case studies will be made on a subjective rather than an objective basis, because comparing and ranking different case studies according to their impact on the public good depends on what we define as a public good. Defining “public good” is a value determination (for example are economic benefits more important than health benefits, and if so, which types of economic benefits). We should not pretend that we can be objective when comparing case studies.

The Academy recommends updating this part of the discussion paper to remove reference to trying to be objective if a case study approach is to be used.

It is very difficult to see how determining the ‘prospect of benefits from research’ might be determined through examining past ‘indicators for eventual impact’ in a reliable and useful way. Any prediction on future success based upon past events, events that could potentially have happened over 20 years previously and of which we only have a very slight and partial picture, is likely to be a very difficult exercise in any context. Perhaps a better way to articulate the purpose of using such ‘indicators for eventual impact’ might be to try to discover the barriers that stand between research and impact, and then to use such information to inform policy that will remove barriers and aid in the development of quicker pathways to impact.

The Academy recommends that reference to evaluating the ‘prospect of benefits from research’ when examining ‘indicators for eventual impact’ be removed from the discussion paper , and that

⁵ DiMasi, J., Hansen, R., Grabowski, H. and L. Lasagna. (1991) “Cost of innovation in the pharmaceutical industry.” *Journal of Health Economics*, 10: 107–42.

⁶ Grant, J., Cottrell, R., Cluzeau, F. and Fawcett, G. (2000) “Evaluating ‘payback’ on biomedical research from papers cited in clinical guidelines: applied bibliometric study.” *British Medical Journal*, 320: 1107–1111

⁷ Balas, E. and Boren, S. (2000) Managing clinical knowledge for health care improvement. *Yearbook of medical informatics*. Stuttgart, Germany: Schattauer Verlagsgesellschaft mbH.

⁸ Contopoulos-Ionnadis, D., Alexiou, G., Gouvias, T. and Ioannidis, J. (2008) “Life cycle of translational research for medical interventions.” *Science*, 321: 1298–9.

⁹ HERG, Office of Health Economics and RAND Europe (2008) Medical research: what’s it worth? Estimating the economic benefits from medical research in the UK. *UK Evaluation Forum*.

it instead focuses on using such indicators to identify why pathways to impact differ, and how they might be improved.

Presumably an approach that will look at ‘indicators for eventual impact’ might look to see whether indicators such as collaboration, international links, location, situational context, experience and track record of researcher, basic or applied research, and regulatory context might be examined. In this regard, the Wooding *et al* (2011) report does provide some insights in the area of cardiovascular research¹⁰. However, the indicators required will differ by discipline, sub-discipline, and probably by type of research problem. For example, in medical research an important indicator might be whether the research was being undertaken at a co-located research facility and hospital.

The Academy recommends exploring whether the indicators required for such an exercise need to differ by discipline, sub-discipline, or research field.

1.5 Definitions

The definitions provided are reasonable however it will be necessary to provide an additional definition of ‘university research’. This will need to define which precise activities, and undertaken by who, would count as university research within the context of a benefits of research assessment exercise. Part of this definition will need to explore the issue of attribution. For example how would developed research benefits be assigned to the institution where research took place, or where the researcher is now based? Furthermore, how will attribution be determined for collaborative research that has taken place across multiple universities and/or other research institutions?

The definition of ‘benefits’ should be expanded to include the acquisition of new knowledge and understanding, which can include such acquisition beyond the university sector. It should also be expanded to include positive capacity building (such as through the development of a skilled workforce) that will enable future challenges to be met.

As discussed above, a definition of ‘pathways’ should be provided in this section.

2. Aims, outcomes and principles

Please provide any comments you have in relation to the issues raised in Part 2 of the paper, addressing if possible the following questions raised in Sections 2.1, 2.2, and 2.3:

- Are there alternative or additional aims that should be included?
- Are there additional purposes or uses that should be considered to assist the design of the assessment?
- What are your views on the draft principles? What other principles or considerations should be addressed?

Academy response

2.1 Aims

Aim number 3 - support the development of a culture and practices within universities that encourage and value research collaboration and engagement.

Encouraging research collaboration and engagement is a worthy aim that should be supported. However the exercise envisioned by the discussion paper will not ‘drive’ collaboration, and could result in perverse behaviour that undermines collaboration. It is not clear within this aim whether

¹⁰ Wooding *et al* (2011) *Project Retrosight: Understanding the returns from cardiovascular and stroke research*. RAND Europe.

the exercise is aiming to encourage and value collaboration and engagement between different universities, or between universities and research end users, and the discussion paper would benefit from some further insight here. Unfortunately a research benefit assessment exercise could lead to the perverse outcome of discouraging collaboration between universities as there becomes an incentive for universities to “hold on to” research and potential benefits rather than collaborating and potentially having to share the assessed benefits with others. Care needs to be taken in designing any assessment exercise to ensure that such perverse behaviour is not encouraged.

2.2 Outcomes

Outcome number 1 – *providing an evidence base for decision making by universities, government and industry, including universities and businesses outside Australia.*

The discussion paper should expand on how the evidence base might be used for decision making by universities, government and industry. For this outcome to be achieved, the outputs of the exercise would need to be considerably more than a set of rankings or details of a few case studies. A methodology would need to be developed (perhaps along the lines of Wooding *et al* 2011). There appear to be three primary ways in which the exercise could be used as an evidence base:

1. To demonstrate the high value of public investment in research, and thereby encourage further public investment in universities.
2. To alter future research investment within universities (picking winners), for example by reducing support in low-impact areas, and increasing support in high impact areas.
3. To identify successful pathways to impact, for example determining why some research has impact, whilst other research does not, or determining why some research has impact sooner than other research which takes longer, and then use this to try and decrease the lag time between research and impact.

The academy recommends that a statement be added to the discussion paper that articulates how the data is intended to be used for decision-making, as this will aid the development of an appropriate methodology and will help to determine how results of the exercise should be analysed and reported.

Outcome number 2 – *promoting engagement both between university researchers and potential users of university research, as well as within the university sector.*

As discussed in the comments about section 2.1 above, there is a danger that this exercise could lead to the perverse outcome of discouraging engagement within the university sector as “success” might have to be shared with other universities.

Outcome number 5 (and also, in part, related to the other outcomes) – *linking outcomes to funding allocations.*

The most contentious part of the discussion paper is linking future funding allocations with the outcomes of a “benefits of research” assessment exercise. It would appear that the purpose for pursuing this outcome would be to encourage universities to engage in research activities that are more likely to have demonstrable impact benefits beyond universities. There are a number of issues that need to be considered further before implementing such a policy:

- i) The average time-lag from research to impact (at least in the medical sciences) is 17 years. Therefore it would seem unrealistic to base future funding decisions on actions taken by researchers so long ago if the aim is to encourage universities to engage a greater proportion of their research in the areas with ‘demonstrable impact’. It is not realistic to expect institutions to be able to collect

both the evidence, and the information about how such impact was achieved, so long after the event.

ii) Past performance (particularly distant past performance) in any sector is not necessarily an indicator of future success.

iii) How will the issue of attribution be determined? Would future funding be allocated to the institution where the past successful research took place, or to where the researcher (s) is (are) now based? Furthermore, where there has been collaboration across multiple institutions how will future funding be allocated?

iv) On what scale will future funding be allocated? The UK REF system will allocate a significant proportion of research funding based upon an assessment of quality and impact. The current ERA system by comparison leads to the allocation of a much smaller proportion of the research budget. Both systems have affected research behaviour¹¹. It is less problematic to allocate future investment based on research quality as both research metrics and peer review systems can assess the relative quality of research in a robust manner fairly quickly after it has been published.

v) It is not clear whether 'linking outcomes to funding allocations' is referring to block-grant funding to universities, or whether it refers to funding specific research areas over others by research councils, or perhaps it could refer to it being used as a parameter for success in applications by individuals for grants/programs.

The Academy recommends that any research impact exercise not be used to determine future research funding allocations at least until a sufficient pilot exercise and financial modelling has been undertaken to determine what effect it would have on the sector, and in particular what effect it might have on the place and value of pure research within universities.

2.3 Principles for design and implementation

Principle 1: Accessibility

Accessibility is a desirable principle and the sector needs to have timely access to the results of the exercise if it is to have confidence in the process.

Principle 2: Minimise administrative burden

It is clearly desirable for such an exercise to make use of existing data sets and collection mechanisms where possible. It is unlikely that all the data that is required for this exercise is in existing data sets and at a minimum data will need to be developed and collected for case studies.

The Academy recommends delaying the implementation of any benefits of research assessment exercise until after the government has responded to the review of regulation in higher education. This report and its recommendations should be carefully considered to identify ways to streamline and reduce the burden of reporting elsewhere before imposing additional data collection requirements on universities.

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

¹¹ For example see the recent papers on the ERA by Frank Larkins at the LH Martin Institute: <http://www.lhmartininstitute.edu.au/insights-blog/2013/06/134-era-case-studies-chemical-sciences-behavioural-responses>

Care needs to be taken to ensure that the exercise does not focus solely on research that has identifiable benefits in Australia only. There is a considerable body of research that is undertaken that delivers benefits to other nations, particularly developing countries. This would include research in areas such as aid, development, the environment, and health. Such research supports Australia in meeting its broader development goals, foreign policy objectives, and raising the profile of Australian research.

The Academy recommends that a broad definition be adopted in terms of research that ‘benefits the nation’ or alternatively change ‘research that benefits the nation’ to ‘research that delivers identifiable benefits’.

Principle 4: Involve research users

The statement in the discussion paper that ‘The publication of relevant information collected through the assessment exercise should lead to new opportunities for collaboration and investment’ appears to be a very grand claim, and one which is not backed up by evidence. The UK REF exercise, which involves a research impact component, has yet to report and so it has not yet shown that such demonstrable change has or will occur. If such change is to be achieved then the output of the exercise will need to be more than league tables and descriptive case studies. As discussed in the comments above regarding section 2.2 *Outcomes*, an analysis of why some research has greater impact, or moves more quickly along the ‘pathways to impact’ will need to be undertaken and reported. Otherwise universities and research users will not know which types of future research collaborations might be more likely to be successful and therefore worth pursuing.

The Academy recommends changing this statement from a definitive outcome to a desired outcome. The Academy recommends that any benefits of research assessment exercise examine and report both the outputs of research impact, and how they were achieved.

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

The discussion paper asserts that benefits are most meaningfully assessed at the institution level rather than at the national (macro) level, or at the project (micro) level. However the paper does not expand or provide evidence on why this might be the case. Given the variety of different outcomes envisioned from this exercise, it is probable that the different outcomes might be best achieved with assessments at different scales (although this would increase the scale and burden of the exercise). Demonstrating the wider benefits of public investment in research might be best achieved at the national (macro) level as it allows the sum of all the parts and a coherent story to be told.

The paper states that ‘*the overall assessment process is aimed at assessing the performance of each university at the institution level*’. This statement should be withdrawn from the paper. This is a new aim within the discussion paper that does not appear in the Aims section. The Aims section of the paper states that the purpose of the exercise is to demonstrate public benefits; identify successful pathways to benefit; encourage collaboration; and to further develop the evidence base upon which to facilitate engagement. It does not state that a primary aim is to assess the relative performance of universities. Furthermore, this statement implies that an assessment of research impact is solely an assessment of the work undertaken by universities. The assessment of university research impact cannot just be defined to assessing the *performance* of universities as this statement implies. Research impact depends on other actors and stakeholders too and undertaking an exercise that appears to solely attribute the success or failure of research to deliver wider benefits to universities is unreasonable.

The Academy recommends fully investigating the advantages and disadvantages of undertaking a research impact exercise at different scales.

The Academy recommends removing reference to the assessment process being aimed at assessing the performance of each university at the institution level.

3. Methodological considerations

Please provide any comments you have in relation to the issues raised in Part 3 of the paper, addressing if possible the following questions on research engagement metrics, research benefit case studies, and use of collected information.

Research engagement metrics

- 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?
- 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?
- 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

What are the strengths and weaknesses of the model?

Research benefit case studies

- 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?

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

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

Box 2 – Approach to case studies

What are the strengths and weaknesses of the model?

Use of collected information

- 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?

Academy response:

Overall comments

3.2 Research engagement metrics

3.2.1 Proposed general approach

The use of metrics to identify research resulting in wider benefits appears to be an appropriate course to follow if suitable metrics can be found. However what is not clear is how quality will be distinguished from quantity. If metrics are developed that only count the benefits of research by a narrow range of crude measures such as number of patents, citations, partnerships, private finance generated and so on, a deeper and more useful understanding of the quality of relative benefits developed from research will be overlooked.

Using metrics to assess the probable impact or benefits of research before they have been realised is problematic (or lead indicators as they are described on page 10 of the paper). While such an exercise could be useful for macro level forecasting, using the results to determine specific areas of future public research investment, which is what the discussion paper suggests, would be imprudent. Moreover, it would likely result in a number of unintended consequences whereby researchers are under pressure to follow the defined metrics if they believe that future research funding depends on their performance in this area. For example if a metric such as the number of patents developed was used to assess prospective benefits of research this could lead to researchers unnecessarily attempting to patent research that previously would appropriately have been left unpatented.

The final bullet point in this section states that ‘metrics should speak directly to pathways to research benefit’. Notwithstanding the above points on the profound difficulty of identifying likely success through metrics, research will need to be undertaken on past university research that resulted in research benefits so that such proxy measures can be developed. For example, work needs to be undertaken to find out what the relationship is between factors such as size of grant, size of research group, stage of commercial collaboration, size of commercial collaboration, and other metric indicators, and how they have in the past affected the delivery of research benefits.

The third criterion of metrics being sensitive to disciplinary differences is particularly important. Metrics that might appear relevant to one discipline may be wholly irrelevant to others, for example examining the number of patents created would be irrelevant to many disciplines.

The Academy recommends investigating a far wider range of metrics that not only report on the volume of output in terms of research benefit, but also the quality of output.

The Academy recommends removing any link between prospective pathways to research benefits and future research funding.

The Academy recommends undertaking research to understand what ‘successful’ metrics would appear to be for prospective pathways to research, and how they might differ by discipline.

3.2.2 ERA

The discussion paper states that bibliometric data on research outputs could be used to identify data on collaborations and that this could be used as an indicator of research engagement. Using such an indicator to measure, and therefore drive, collaborations will lead to seriously perverse behaviour. Researchers will be encouraged to collaborate for the sake of collaboration so that they can gain an improved metric in this area, rather than to pursue activities that will lead to research benefits. Increasing the number of authors on a research output does not improve either the quality of the research undertaken or its likely research benefits. In many disciplines it can be the norm, or be more prestigious, to have sole authorship on research outputs, whilst in others this is not the case. The threshold for inclusion as an author or collaborator on a research output also differs significantly by discipline.

If the purpose of this metric is to assess the collaboration between university researchers, and researchers, practitioners, or research end-users outside of universities then it will likely encourage perverse behaviour. It is inevitable that university researchers will start to invite non-university researchers to be co-authors of research outputs irrespective of their level of involvement so that they can improve on such bibliometric measures.

A more useful metric to find real collaborations might be to look at peer review grants and grant applications such as the ARC Linkage or the CRC scheme. Unfortunately both schemes have been dramatically scaled back over recent years and so this metric might be limited in scope.

The Academy recommends that the size of collaborations should not be used as a proxy for indicating the benefits of research.

3.2.4 National Survey of Research Commercialisation

There is merit in making better use of this survey to show the wider benefits of research, however there may need to be some adjustment to the survey to discern real commercialisation benefits, as opposed to showing a catalogue of outputs.

The Academy recommends exploring how the survey could be used to discern real commercialisation benefits from research, rather than listing the total commercial output as currently collected in the survey.

3.2.5 AusPAT

The discussion paper states that ‘Patents may act as proxies for impact’. However care will need to be taken in designing any benefits of research assessment exercise to account for differences in disciplines. Measuring patents in some disciplines, particularly disciplines in the social sciences and humanities, but also some sciences, would be inappropriate. It should also be recognised that a patent in itself is not an impact and does not deliver research benefits. A patent that has been granted, but then subsequently never further developed or used, would have no impact but if used

as a proxy in a research benefits assessment could incorrectly show benefit was delivered. Furthermore, in using such a proxy, researchers might be encouraged to pursue patents on intellectual material that they might have otherwise have placed in the public domain. Placing research in the public domain can also generate significant research benefits as it allows free and open access to research developments for both researchers and end-users. Putting research into the public domain can arguably increase the penetration and eventual uptake of some research outputs. Therefore using patents as a proxy could encourage the perverse outcome of actually inhibiting the dissemination and uptake of research that could otherwise have brought benefits.

The Academy cautions against inappropriate weight being given to patent applications in assessing the benefits of research.

The Academy recommends exploring ways to ensure that any benefits of research assessment exercise does not encourage or stifle innovation through unnecessary or inappropriate patent applications.

3.2.6 Graduate destination survey

It is not clear in the discussion paper how looking at the employment of research graduates will 'illuminate the transfer of research-derived knowledge from universities to industry' as the discussion paper suggests.

3.2.7 Unit of evaluation

The reporting of the ERA exercise using two digit FoR codes presents a number of problems in terms of its usefulness as a planning tool for universities. Whilst the ERA identifies research excellence by discipline, it does not allow universities to readily see where that excellence exists in terms of its organisational structure. This considerably weakens the effectiveness and use of the ERA by universities. The discussion paper suggests that the benefits of the research assessment exercise should also be reported by FoR code. Using the same unit of evaluation as the ERA is desirable, but consideration needs to be given to reporting information so that it can be usefully used by universities and research end users. Reporting that a particular discipline scored highly for research impact or quality still does not allow universities or end users of research to map outcomes to the particular department, school, research centre etc. where that high quality and high impact research originated.

The Academy recommends investigating alternative units of evaluation for both the ERA and also this research impact exercise.

Box 1 – Approaches to metrics

Proposal 2. Periodicity of process – Even if the proposed process can be subsumed into either the ERA or HERDC, the exercise will still be a colossal undertaking by universities and would be a significant increase in regulatory burden.

The Academy recommends:

- **for the reasons outlined earlier, further development of the assessment methodology be undertaken to avoid inadvertently encouraging perverse behaviour that could threaten the sound aim of developing a culture and practices within universities that encourage and value research collaboration and engagement.**
- **undertaking a cost-benefit analysis of undertaking this exercise which would include analysing its total financial and productivity cost to both government and universities.**

3.3 Research benefit case studies

3.3.1 Proposed approach

Case studies can provide detailed and accessible information that helps to demonstrate the value of public investment in research. There are three main difficulties of using case studies. The first is that they are retrospective over a very long period, making it difficult to collate the evidence required to demonstrate the benefits of research. The second is the issue of attribution, whereby impact or benefits are believed to have been delivered, but where verifiable evidence is difficult to supply. For example, research may have informed decision-making or a change in policy by government, or could have led to changes in processes in a particular industry, but there has not been an official recognition by the end user of the role the research has played.

3.3.2 Establishing timeframes

As discussed in the comments on section 2.2, the average timelag from research to impact (at least in the medical sciences) is 17 years. Whilst the timelag will differ by discipline, and by research project, it would be prudent to use a timeframe of at least 20 years if the most important benefits of research are to be captured in the exercise.

3.3.3 Unit of evaluation

The reporting unit of evaluation for the case studies and the metrics part of the exercise should be the same, and must also align with the ERA exercise. See comments on section 3.2.7.

Box 2 – Approach to case studies

Each case study requires an immense amount of work to develop, and then to internally peer review before submission. The experience from the UK REF is that the case study approach is a very significant burden on larger institutions.

Proposal 4 - Unit of Evaluation – the units of evaluation must align with the ERA exercise, and should not be SEO codes (see comments on section 3.2.7).

Proposal 5 – Quality assurance and assessment – establishing assessment panels and managing them is a significant undertaking. Identifying research end users with the skills, expertise and background in the different relevant areas will take time. It may be necessary to offer remuneration to panel members who will be expected to give up significant amounts of time to participate on assessment panels. Careful procedures to manage conflicts of interest will need to be developed so that confidential information supplied within the case studies is not revealed beyond the assessment panel, or to those on the panel with a conflict of interest.

3.4 Use of collected information

Option 1 No assessment

This approach should only be taken if the purpose of the exercise is solely to provide public media stories about the benefits of research. If there is no method of assessment then there is likely to be little impact on research behaviour.

Option 2 Assessment of metrics only

See comments on option 1 above.

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

If there is to be no interrogation of the data then it will be difficult for users of the data to identify the pathways to impact.

Option 4 Combined assessment

It is not clear if a combined or separate mark will be given to metrics and case study data. If it is combined then consideration needs to be given to the relative weighting of the components.

4. Next steps in the consultation process

Please provide any comments you have in relation to the issues raised in Part 4 of the paper, including on the proposed pilot exercise.

Academy response:

4. Next steps in the consultation process

The discussion paper states that an analysis will be undertaken of the issues raised in the submissions, noting areas of general agreement and areas of contention. Following this a document outlining the basic elements of an assessment of research benefits and pathways to benefit will be issued. It is not stated within the paper the process for resolving the areas of contention before the basic elements document is released.

The Academy recommends releasing the analysis of the submissions for further comment so that the sector can comment on how areas of contention might be best resolved.

4.1 Pilot exercise

The pilot exercise will be most effective if is carried out in a range of different size institutions, with different research traditions, and across a variety of different disciplines.

Appendix A

It is important that any metrics used are relevant, verifiable and preferably data that is already collected. Some of the metrics suggested in the discussion paper are very problematic and should not be included. It would be better to agree on the general principles of the exercise before consulting on specific metrics.

Comments on specific metrics

Consultancies, collaborative and contract research with industry

This should exclude category three donations and bequests and international A&B.

Patenting

The use of patents is possible, but care needs to be taken to avoid encouraging perverse outcomes. The issue of patent quality needs to be addressed. Provisional patents should not be included as it will encourage patent applications with an unrealistic chance of being granted.

Licensing

This would be appropriate.

Research commercialisation

Including the number of staff employed in supporting research commercialisation will encourage perverse behaviour. In many cases, institutions outsource this function. The number of staff employed in supporting research commercialisation has nothing to do with measuring the benefits of research and so should not be included.

Training in commercialisation and entrepreneurship

This would drive perverse behaviour. Training, commercialisation and entrepreneurship are very important skills that researchers should develop, but they have nothing to do with measuring research engagement and so should not be included.

Research engagement via online publications (e.g. website such as The Conversation)

This cannot be included as there is no element of quality control. The Conversation and other websites are effectively part of the spectrum of public blog sites. Research engagement via online publications has nothing to do with measuring the benefits of publicly funded research and so should not be included.

Research engagement via other publications (sales of professional and applied research publications)

The sales of professional and applied publications have nothing to do with measuring the benefits of publicly funded research and so should not be included.

Research engagement via events (e.g. income from research events and number of attendees)

Public engagement events are not a measure of the benefits of publicly funded research and so should not be included.