

## ASSESSING RESEARCH IMPACT BEYOND ACADEMIA: A NEW ZEALAND INTRODUCTION

Lesley Brook

### ABSTRACT:

In anticipation of changes in the research funding environment in New Zealand, it is timely for tertiary education institutions to consider how they might assess the impact beyond academia of their research. This article considers international models for the assessment of research impact beyond academia that are relevant to the New Zealand context. Common elements for a research impact assessment model are identified and different approaches to each element considered. The focus is on the United Kingdom's Research Excellence Impact Framework in 2014 and prior and subsequent work on research impact assessment in Australia. The identified elements together comprise a framework which may assist institutions looking to develop an appropriate model for research impact assessment.

### INTRODUCTION:

Governments are beginning to introduce national models for research impact assessment. The first to do so was the United Kingdom, as part of its Research Excellence Framework (REF) exercise in 2014.<sup>1</sup> The Australian Government will conduct research impact assessment nationwide in 2018.<sup>2</sup>

The New Zealand Government's Tertiary Education Strategy 2014-1019 already expects tertiary education organisations to 'achieve greater transfer of knowledge, ideas and expertise to industry and wider society' to increase innovation.<sup>3</sup> This has been reinforced by the Tertiary Education Commission (TEC) which will give researchers the option of referencing the impact of their research in the 2018 quality evaluation process that influences institutional funding from the Performance-Based Research Fund (PBRF).<sup>4</sup>

New Zealand is part of the international Small Advanced Economies Initiative, which has developed a framework for considering impact when making decisions about whether to publicly fund research programmes.<sup>5</sup> The Ministry of Business Innovation and Employment now gives significant weighting to the impact of the research that it will fund, encompassing not only the benefits to New Zealand's economic, social, human or natural capital, but also the credibility of the indicative implementation pathways to deliver those benefits.<sup>6</sup>

Against this background, the Tertiary Education Commission (TEC) is expected to allocate tertiary education institution funding in part based on research impact assessment by 2024, when the subsequent Performance-Based Research Fund quality evaluation round would be expected on the current six year cycle.

Allocation of funding however is only one of four primary purposes for research impact assessment which have been identified, the other three being advocacy, accountability, and analysis.<sup>7</sup> The same four purposes drove the development of an institutional impact assessment framework by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), an Australian federal government research institution:<sup>8</sup>

1. 'Accountability: the ability to provide defensible, robust evidence of impact'
2. 'Allocation: to enable more informed decision making'
3. 'Advocacy: an increased capacity to articulate future and delivered impact'
4. 'Analysis: the opportunity to better understand and maximise research impact'

For these four purposes it is timely for New Zealand tertiary education institutions to begin to consider how to assess research impact beyond academia.

## LITERATURE REVIEW

Relevant literature was reviewed to identify the important elements of an institutional model for impact assessment, and the possible approaches that could be taken in respect of each of those elements. The literature included policy papers discussing the feasibility and desirability of research impact assessment, articles reviewing one research impact model or comparing different models, and documentation for selected models.

The likely future direction of national research impact assessment is relevant, in so far as that can be anticipated. A future New Zealand research impact assessment model is likely to be informed by what has been happening in the United Kingdom and Australia.

The REF2014 in the United Kingdom was conducted jointly by the Higher Education Funding Council of England (HEFCE), the Scottish Funding Council, the Higher Education Funding Council for Wales, and the Department for Employment and Learning Northern Ireland. Managed by a HEFCE-based team, the REF2014 assessed the quality of research outputs, and the vitality and sustainability of the research environment, as well as research impact beyond academia.<sup>9</sup>

In 2012 an Excellence in Innovation for Australia (EIA) Research Impact Trial was held in Australia. The EIA Trial was initiated by the Group of Eight and the Australian Technology Network of Universities. Twelve universities participated. That Trial relied heavily on preparatory work by HEFCE for the REF2014, which in turn had drawn upon earlier international work including in Australia.<sup>10</sup>

In the first half of 2017 the Australian Research Council has run a pilot exercise assessing research engagement and impact separately for 10 broad discipline groups. Participation by Australian universities was voluntary. The assessment of engagement involved both metric indicators and a narrative statement. Impact was to be assessed with qualitative information in impact case studies supplemented with quantitative information if any is available. Panels with both academic and end-user representation were to carry out these assessments. The pilot exercise will inform a full engagement and impact assessment process in 2018.<sup>11</sup>

The EIA Trial and the REF2014 had key similarities: they retrospectively examined impact already achieved, used a case study approach, and excluded impacts within the academic community. They defined impact as 'an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia'.<sup>12</sup> The accompanying lists of inclusions and exclusions for the definition of impact were virtually identical.

“Impact” has become the term of choice in the UK for research influence beyond academia.<sup>13</sup> The same could be said of the Australian government,<sup>14</sup> and the CSIRO’s institutional impact assessment framework excludes contributions to academic knowledge because CSIRO had existing systems in place which track research excellence.<sup>15</sup> New Zealand is following suit: in 2018 researchers will have the opportunity to demonstrate ‘any impact that their research has had outside academia.’<sup>16</sup> Other models for impact assessment that include academic impact were therefore not examined in detail.

The literature review identified the following as important elements of a model for impact assessment:

- Retrospective vs prospective approach
- Categorisation of types of impact
- Indicators of impact
- Comparing different types of impact
- Assessment approach

It is suggested that these elements together provide a framework against which decisions can be made about the design of an impact assessment model for an institution. Various approaches that could be taken in respect of each of these elements are considered and compared below.

## DISCUSSION: ELEMENTS FOR RESEARCH IMPACT ASSESSMENT

### Retrospective v prospective

The EIA Trial and the REF2014 were retrospective assessments, to assess the track records of institutions in achieving impact during a defined period, however a prospective approach to impact assessment has several benefits for institutions. The first of these benefits is to enable the collection of evidence of impact in preparation for participation in a national impact assessment process. The EIA Trial ‘... highlighted the need to introduce mechanisms to capture impact systematically and regularly ...’<sup>17</sup> This evidence of impact includes baseline data.<sup>18</sup>

A second benefit of a prospective approach is that it will assist researchers to prepare and plan for impact<sup>19</sup> and hence maximise the impact achieved. For example, the opportunities for altered behaviour include stakeholder engagement activities by researchers during their research, to increase interest and understanding amongst stakeholders.<sup>20</sup>

Thirdly, a prospective approach is likely to help researchers to strengthen funding applications by anticipating research impact and to track impact for reporting to funding agencies.<sup>21</sup> In the United Kingdom research councils ‘have begun to request that research proposals should explain how the planned research is likely to have an impact and to outline the “pathways” by which that impact is likely to be achieved’.<sup>22</sup>

A national impact assessment model for New Zealand is likely to be retrospective, consistent with the approach of the TEC to its evaluation of research quality in the Performance-Based Research Fund. Nevertheless because of the approach which New Zealand funding agencies such as the Ministry of Business, Innovation and Employment are now taking to impact, and the advantages for planning and maximising impact, institutions would benefit from a prospective approach to impact assessment.

## Types of impacts

Categorising impacts by type assists researchers to consider a variety of impacts which their research may have, helps with the decision-making process, and enables mapping onto other frameworks internationally.<sup>23</sup> Categorising impacts by type also communicates and measures what is valued. The priorities of New Zealand's Ministry of Business Innovation and Employment are reflected in the indicative fund portfolio balance: 70 per cent for Economic objectives, 25 per cent for Environment objectives and 5 per cent for Society objectives.<sup>24</sup> The Tertiary Education Strategy also refers to economic, environmental and social outcomes.<sup>25</sup> The National Statement of Science Investment includes Health as a fourth dimension of impact, and anticipates impacts will span economic, social, cultural and environmental objectives. By way of example, 'the impact of endangered species protection could be considered in terms of economic (tourism revenue), environmental (role in the ecosystem), and cultural or social (as taonga or public amenity) values'.<sup>26</sup>

Choosing types of impact for assessment in an institution is not just about how many types or what to call them; it also involves deciding how widely or narrowly to define impact. Although designed for the evaluation of programmes rather than research, the Kellogg logic model illustrates the process to achieve impact and helps us understand what impact is and is not: **Inputs** are the resources needed, **Activities** are what is done with those inputs, **Outputs** are the direct products of the activities, **Outcomes** are changes in behaviour, knowledge, skills, status and level of functioning in the short to medium term, and **Impacts** are the changes to organisations, communities or systems in the longer term.<sup>27</sup> The Kellogg logic model has been adopted,<sup>28</sup> adapted,<sup>29</sup> and endorsed<sup>30</sup> for research impact assessment. Impact may be defined broadly to include some or all of those intermediary outcomes, or may be confined to the final impacts.

An example of such an intermediary outcome is policy change, which is included in some impact assessment models.<sup>31</sup> However the Society Panels in the EIA Trial reported that: 'case studies often claimed the effect on policy as impact when the actual impact would be changes that arose from new policy. Evidence of the latter was rarely presented.'<sup>32</sup> One of the REF2014 case studies, from Swansea University, illustrates the effects of changes in policy and practice. Intermediary outcomes of this research included new recommendations from the Department of Health, the implementation of phone-based advice by ambulance service providers, and assessment of patients for alternatives to hospital admission. The final impacts were estimated at some 1.2 million fewer than expected hospital conveyances, the costs saved from those journeys of approximately £24 million, and unspecified benefits for patients and their families.<sup>33</sup>

The variety in number and names for types of impact in various models indicates that the categorisation of impacts is somewhat arbitrary,<sup>34</sup> including whether to include outcomes and in particular whether to include policy change. Nevertheless it is suggested that maintaining the distinction between outcomes and impacts is important, because the outcomes are desirable not as an end in themselves but as a means to achieving the beneficial impacts. Otherwise the impact assessment model risks incentivising researchers to engage in the activities or produce the outcomes that are rewarded, even if those activities or outcomes might not be the most effective ways to achieve impact from the particular research.<sup>35</sup>

For a New Zealand institution it would be appropriate to use the three impact types being used by the government – economic, environmental and social. Either or both of cultural and health impacts could be identified separately rather than including them as social impacts.

## Indicators of impact

Having identified what the research impacts are, it then becomes necessary to determine how to measure whether and to what extent those impacts are achieved. The approach adopted to measuring research impact needs to be applicable to all institutional disciplines. '[F]or some important impacts there may be no meaningful quantitative measure, or there may only exist metrics that are illustrative or indicative of the impact in some approximate way. Any evaluation that excluded those impacts that cannot be directly quantified would be biased'.<sup>36</sup> In similar vein: 'The quality and reliability of impact indicators will vary according to the impact we are trying to describe and link to research.' and 'A collation of several indicators of impact may be enough to convince that an impact has taken place.', especially a combination of quantitative and qualitative indicators.<sup>37</sup>

Outcomes are useful indicators of impact to capture in a research impact assessment model. They show that impacts are more likely to be achieved, that progress is being made along the pathway towards impacts.<sup>38</sup> Even if public policy change is not included as a type of impact, it can be an indirect indicator that impact is reasonably expected to occur as a result of implementation of that policy change.

## Engagement activities

An institution considering introducing research impact assessment must also decide whether to include engagement activities as evidence of impact. It is attractive, particularly for funding allocation, to measure researcher and institutional activities to disseminate research findings because that is a variable that can be controlled by the researchers and their institution, whereas outcomes and impact depend upon the successful uptake and use of research by others.<sup>39</sup> Such engagement activities would be included under a 'contributions' approach<sup>40</sup> or 'productive interactions' approach.<sup>41</sup> The Australian 2017 pilot's engagement assessment examines the interaction between researchers and research end-users, for mutually beneficial exchange of knowledge, technologies and methods, and resources. The focus is on exchange, partnership and reciprocity, rather than knowledge transfer and dissemination.<sup>42</sup>

Such engagement or translational activities can be described as enabling; they create the environment in which impact can occur; by facilitating uptake. In that sense they are a necessary pre-condition of impact,<sup>43</sup> however they do not guarantee that the research will be used let alone that impact will occur.<sup>44</sup> Similarly a focus on knowledge exchange activities 'may only demonstrate immediate uptake and use of research and make it difficult to identify impact over any longer time period'.<sup>45</sup> It is concluded that engagement activities are a poor indicator of impact, so measuring them may result merely in more engagement activities rather than encouraging a focus on those engagement activities most likely to lead to impact.

It is therefore not sufficient to measure only engagement as evidence of impact, but is it necessary for an institution to measure engagement? It has been suggested that '... to link research to ensuing events and impacts, systems require the capacity to capture any interactions between researchers, the institution, and external stakeholders and link these with research findings and outputs or interim impacts to provide a network of data'.<sup>46</sup> The advantage of capturing engagement in a research impact assessment model is to provide evidence of the causal link between the research and the impact.

If there were no limits on the cost of a research impact assessment model, evidence that research has caused impact could encompass relevant outputs (dissemination), outcomes (uptake and use, for example implementation in policy or practice) and impact (the difference made). The outputs and outcomes would provide both evidence that impact is possible or likely to occur and evidence of causation. However although engagement activities are necessary for impact to occur, evidence of them may not be required to verify causation of impact. For example in the United Kingdom the Department of Culture, Media and Sport's Film Policy Select Committee 2012 report 'A Future For British Film' expressly acknowledged the research of Dr Charlotte Crofts, so no supplementary evidence of engagement activities was necessary.<sup>47</sup> In another example, white papers and government documents citing the research could be identified.<sup>48</sup>

If engagement activities do not reliably evidence impact, and are not necessarily required to evidence the pathway by which impact has been caused, the main reason for an assessment model to capture engagement activities would appear to be as a learning tool, to assist researchers to consider what they can do to create the conditions in which impact is most likely to be achieved.<sup>49</sup> It is suggested that this object can be achieved in other ways, without requiring researchers to record all engagement activities. It is concluded that it is therefore unnecessary for a research impact assessment model to capture engagement.

### Standard metrics

A case study approach allows for a wide variety of impacts and pathways to impact to be assessed, but using metrics for assessment has been suggested as a low-cost alternative.<sup>50</sup> A standard set of metrics is also useful for analysis of the results of assessment.<sup>51</sup> However the major drawback to using metrics is the difficulty in establishing a comprehensive list of indicators of impact.<sup>52</sup> Setting up and maintaining a comprehensive list of indicators of impact could be very costly.<sup>53</sup>

It is also questionable whether a comprehensive list of indicators of impact is possible. Any prescriptive list of metrics is likely to be incomplete, due to the wide variety of impacts that are possible, which risks disadvantaging some disciplines.<sup>54</sup> The King's College London review of the REF2014 impact case studies found that the development of robust metrics is unlikely due to the diverse and inconsistent quantitative evidence supporting claims for impact. The diversity of impacts claimed would also not have been captured 'through a "top-down" taxonomy'. The lack of standard metrics can be a strength because it allows researchers 'to select the appropriate data to evidence their impact'.<sup>55</sup>

Another drawback of standard metrics is that '... it is likely to encourage researchers/research groups/HEIs to game the evaluation process to their advantage'.<sup>56</sup> For example it was only a year or so after the introduction of university spin-offs as an indicator of technology transfer before 'the actors involved adjusted their behavior in order to maximise their "score"'.<sup>57</sup>

Metrics and case studies are not mutually exclusive. Metrics could be used in addition to case studies, to provide quantitative as well as qualitative measures.<sup>58</sup> To help with analysis, tags and codes<sup>59</sup> and some drop-down menus and standard definitions<sup>60</sup> could be useful. Some metrics, such as quality adjusted life years or an audience participation index, would allow for easier comparison of case studies with similar impacts.<sup>61</sup>

The New Zealand Government is likely to follow the case study approach used in the United Kingdom and Australia, allowing institutional choice of the indicators of impact to include in a narrative description. The TEC's approach to impact for the 2018 PBRF quality evaluation includes a generic "other evidence" category as well as broadly described examples of impact.<sup>62</sup> A New Zealand institution can therefore take a flexible approach to the choice of indicators of research impact, including intermediary outcomes such as policy change, and without standard metrics. Including both quantitative and qualitative evidence of impact may strengthen the evidence of impact.

## Comparing impacts

The EIA Trial considered reach and significance together to compare and rank different kinds of impacts. 'Reach' was defined as 'the spread or breadth of influence or effect on the relevant constituencies', and 'significance' as 'the intensity of the influence or effect'. In hindsight the panels recommended that these components should be rated separately and the results shown on a matrix or integrated somehow.<sup>63</sup> Reach and significance have also been used in assessing impact case studies in the REF2014 and another model.<sup>64</sup> Panel members for the REF2014 did not agree whether reach and significance should be assessed together or separately.<sup>65</sup>

There are alternatives to the "reach and significance" approach. The Small Advanced Economies Initiative proposed the allocation of a maximum of eight points for all impacts with a maximum of three points for any one impact.<sup>66</sup> Other alternatives include a cost-benefit approach<sup>67</sup> or an econometric approach.<sup>68</sup>

In some models contribution, or attribution, has been added to the "reach and significance" approach.<sup>69</sup> This recognises that besides the research under consideration, other factors are likely to contribute to impact, for example collaborators, independent or subsequent research, and other influences on uptake and use, because '... research is one factor amongst many influencing outcomes'.<sup>70</sup> The review of the EIA Trial commented on the narrow focus on reach and significance and recommended consideration be given to including contribution as an additional assessment criterion.<sup>71</sup> In the review of the assessment process for the REF2014, there were views for and against adding contribution as a separate factor.<sup>72</sup> If contribution is to be added, this must be done in such a way as 'to avoid inflating an assessment of an impact that had low reach and significance but high contribution'.<sup>73</sup>

Institutions in New Zealand may also wish to consider gathering information on contribution to impact as well as reach and significance. Contribution is already taken into account for co-authored publications as part of the TEC's PBRF quality evaluation of research.

## Assessment approach

There are a range of methods for measuring impact: peer review, input measures, output measures and benchmarking, anecdotes, case studies, cost-benefit analysis, hindsight studies, surveys, economic models, and econometric analysis.<sup>74</sup> In the REF2014 and in Australia peer review has been used, with panels assessing case studies submitted by institutions. Panel assessment is time-intensive for panellists, which limits the number of case studies that can be considered.<sup>75</sup> The '... right balance between comprehensiveness and feasibility must be struck'.<sup>76</sup>

If panel assessment is used then panel structure must be determined. The REF2014 had sub-panels for each of the 36 discipline-based units of assessment, grouped under four main panels.<sup>77</sup> Analysis using Field of Research codes has revealed the multidisciplinary and diverse nature of the research underpinning the impact case studies for each unit of assessment.<sup>78</sup> This discipline-based approach has been questioned, because a wide range of impacts may be generated within each discipline.<sup>79</sup> The EIA Trial grouped impact case studies into four clusters that were outcomes-based.<sup>80</sup> Nevertheless, the Australian Government's national impact assessment may follow the Fields of Research framework.<sup>81</sup>

Panel membership must also be decided, in particular whether it should comprise only academic peers or include a proportion of stakeholders or users of research. The EIA Trial demonstrated that expert panels comprising majority end-user representation are able to assess case studies.<sup>82</sup> A subsequent study also recommends having a predominance of non-researchers and a high mix of different stakeholders on the assessment panels.<sup>83</sup>

At the institutional level self-assessment is a possible alternative to panel assessment.<sup>84</sup> Self-assessment is limited by the extent of the researchers' understanding and knowledge of the impacts which their research is likely to have or has had.<sup>85</sup> However it has the advantage of being able to be more comprehensive, because it is not limited in the number of case studies that can be considered.

The New Zealand Government is likely to adopt a panel assessment for national impact assessment to consider impact case studies submitted by institutions. For the institutions themselves however, self-assessment is a more cost-effective way to apply impact assessment to more than just a selection of case studies, and could be used as a first step in identifying and selecting impact case studies for further attention by the institution.

## CONCLUSION

Adopting a research impact assessment model provides a tertiary education institution with a foundation to work up impact examples for a future national impact assessment process (the Allocation purpose), to inform funding applications (Advocacy), and for reporting to funding agencies and promotion of the institution (Accountability). It is suggested that internal impact assessment should also be designed to help researchers grow in understanding of impact and how it is achieved, to maximise the impact of their research (Analysis).

A research impact assessment model should have the flexibility to be strengthened and adapted as required in future, due to the institution's own increasing experience with impact assessment, as well as the evolving national and international context, in particular the results of the 2017 pilot in Australia and the approach adopted by the Australian Research Council for research assessment in 2018.

**Lesley Brook** is Research and Projects Assistant at Otago Polytechnic. She has a research interest in research impact.

## REFERENCES

- 1 King's College London and Digital Science, *The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework (REF) 2014 impact case studies* (2015), HEFCE, <http://www.kcl.ac.uk/sspp/policy-institute/publications/Analysis-of-REF-impact.pdf> [accessed 30 May 2017]; HEFCE, Scottish Funding Council, Higher Education Funding Council for Wales, and Department for Employment and Learning Northern Ireland, *Assessment Framework and Guidance on Submissions* (2011, updated 2012), doi: 10.1093/reseval/rvt021.
- 2 Australian Government, *Engagement and Impact Assessment Consultation Paper* (2016), [http://www.arc.gov.au/sites/default/files/filedepot/Public/ARC/consultation\\_papers/ARC\\_Engagement\\_and\\_Impact\\_Consultation\\_Paper.pdf](http://www.arc.gov.au/sites/default/files/filedepot/Public/ARC/consultation_papers/ARC_Engagement_and_Impact_Consultation_Paper.pdf) [accessed 30 May 2017].
- 3 New Zealand Government, *Tertiary Education Strategy 2014-2019* (2014) at 17, <http://www.education.govt.nz/assets/Documents/Further-education/Tertiary-Education-Strategy.pdf> [accessed 30 May 2017].
- 4 Tertiary Education Commission, *Performance-Based Research Fund: Guidelines for tertiary education organisations participating in the 2018 Quality Evaluation* (2016), <http://www.tec.govt.nz/assets/Forms-templates-and-guides/TEO-guidelines-May-2017.pdf> [accessed 30 May 2017].
- 5 Small Advanced Economies Initiative, *Broadening the Scope of Impact: Defining, assessing and measuring impact of major public research programmes, with lessons from 6 small advanced economies* (2015), [http://www.smalladvancedeconomies.org/wp-content/uploads/SAEI\\_Impact-Framework\\_Feb\\_2015\\_Issue2.pdf](http://www.smalladvancedeconomies.org/wp-content/uploads/SAEI_Impact-Framework_Feb_2015_Issue2.pdf) [accessed 30 May 2017].
- 6 New Zealand Government, *MBIE Contestable Research Fund Investment Plan 2016-2018*, (2015). Retrieved from <http://www.mbie.govt.nz/info-services/science-innovation/investment-funding/previous-funding-rounds/science-investment-round/document-image-library/investment-plan.pdf> [accessed 30 May 2017].
- 7 Molly Morgan Jones, Sophie Castle-Clarke, Catriona Manville, Salil Gunashekar, and Jonathan Grant, *Assessing Research Impact. An International Review of the Excellence in Innovation for Australia Trial*, (2013), RAND Europe, [http://www.rand.org/content/dam/rand/pubs/research\\_reports/RR200/RR278/RAND\\_RR278.pdf](http://www.rand.org/content/dam/rand/pubs/research_reports/RR200/RR278/RAND_RR278.pdf) [accessed 30 May 2017].
- 8 CSIRO, *How CSIRO ensures it delivers impact* (2014), at 1, <https://www.csiro.au/en/About/Our-impact/Our-impact-model/Ensuring-we-deliver-impact> [accessed 30 May 2017].
- 9 HEFCE et al, *Assessment Framework and Guidance*.
- 10 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research Impacting Our Nation's Future – Assessing the Benefits*, (2012), at 12, <https://go8.edu.au/sites/default/files/docs/atn-go8-report-web-pdf.pdf> [accessed 30 May 2017]; Jonathan Grant, Philipp-Bastian Brutscher, Susan Ella Kirk, Linda Butler and Steven Wooding, *Capturing Research Impacts: a review of international practice*, (2009) at 18, RAND Europe, [http://www.rand.org/content/dam/rand/pubs/documented\\_briefings/2010/RAND\\_DB578.pdf](http://www.rand.org/content/dam/rand/pubs/documented_briefings/2010/RAND_DB578.pdf) [accessed 30 May 2017]; Morgan Jones et al, *Assessing Research Impact*
- 11 Australian Research Council, *EI: Pilot Overview*, 2016, <http://www.arc.gov.au/ei-pilot-overview> [accessed 30 May 2017]
- 12 Australian Technology Network of Universities and Group of Eight, *Guidelines for Completion of Case Studies in ATN/Go8 EIA Impact Assessment Trial*, 2012, [https://www.go8.edu.au/sites/default/files/docs/eia\\_trial\\_guidelines\\_final\\_mrb.pdf](https://www.go8.edu.au/sites/default/files/docs/eia_trial_guidelines_final_mrb.pdf) [accessed 30 May 2017]; Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*; HEFCE et al, *Assessment Framework and Guidance*, at 26.
- 13 Teresa Penfield, Matthew J. Baker, Rosa Scobie, and Michael C. Wykes, "Assessment, evaluations, and definitions of research impact: A review", *Research Evaluation*, 23(1) (2014): 21-32, at 21, doi: 10.1093/reseval/rvt021.
- 14 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*; Australian Government, *Engagement and Impact Assessment Consultation Paper*.
- 15 M.A. Johnson, personal communication, October 29, 2014.
- 16 Tertiary Education Commission, *Performance-Based Research Fund: Guidelines for tertiary education organisations* (2016) at 53.

- 17 Morgan Jones et al, *Assessing Research Impact*, at 76.
- 18 M.A. Johnson, personal communication, October 29, 2014.
- Penfield et al., "Assessment, evaluations, and definitions of research impact".
- 19 M.A. Johnson, personal communication, October 29, 2014.
- 20 Small Advanced Economies Initiative, *Broadening the Scope of Impact*.
- 21 Cathy C.Sarli, Ellen K. Dubinsky, and Kristi L. Holmes, "Beyond citation analysis: a model for assessment of research impact", *Journal of the Medical Library Association*, 98(1) (2010): 17-23, doi: 10.3163/1536-5050.98.1.008.
- 22 Ben R. Martin, "The Research Excellence Framework and the 'impact agenda': are we creating a Frankenstein monster?", *Research Evaluation*, 20(3) (2011): 247-254, at 247, doi: 10.3152/095820211X13118583635693.
- 23 Adam B. Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*, (2015), <http://motu.nz/assets/Documents/our-work/productivity-and-innovation/science-and-innovation-policy/Motu-Note-15.pdf> [accessed 30 May 2017].
- 24 New Zealand Government, *MBIE Contestable Research Fund Investment Plan 2016-2018*.
- 25 New Zealand Government, *Tertiary Education Strategy 2014-2019*, at 7.
- 26 New Zealand Government, *National Statement of Science Investment* (2015) at 11-12.
- 27 W.K. Kellogg Foundation, *Logic Model Development Guide*, (1998, updated 2004), <https://www.wkcf.org/resource-directory/resource/2006/02/wk-kellogg-foundation-logic-model-development-guide> (1998, updated 2004).
- 28 CSIRO, *How CSIRO ensures it delivers impact*.
- 29 Sarli et al, "Beyond citation analysis".
- 30 Small Advanced Economies Initiative, *Broadening the Scope of Impact*.
- 31 Gillian Cohen, Jacqueline Schroeder, Robyn Newson, Lesley King, Lucie Rychetnik, Andrew J. Milat, Adrian E. Bauman, Sally Redman and Simon Chapman, "Does health intervention research have real world policy and practice impacts: testing a new impact assessment tool", *Health Research Policy and Systems* 13 (2014) :3, doi: 10.1186/1478-4505-13-3; Penfield et al, "Assessment, evaluations, and definitions of research impact"; Rosa Scoble, Keith Dickson, Justin Fisher, and Stephen R. Hanney, "Research Impact Evaluation, a Wider Context: Findings from a Research Impact Pilot", Working Paper (2009), <https://core.ac.uk/download/files/14/336066.pdf> [accessed 30 May 2017].
- 32 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*, at 20.
- 33 Swansea University, *Reducing unnecessary attendance at hospital emergency departments by improving care out of hospital*, (2014) REF2014 Impact Case Study 35234, <http://impact.ref.ac.uk/casestudies2/refservice.svc/GetCaseStudyPDF/35234> [accessed 30 May 2017].
- 34 Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*.
- 35 Australian Government, *Engagement and Impact Assessment Consultation Paper*; Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*; Federica Rossi and Ainurul Rosli, "Indicators of university-industry knowledge transfer performance and their implications for universities: evidence from the United Kingdom", *Studies in Higher Education*, 40(10) (2015): 1970-1991, doi: 10.1080/03075079.2014.914914.
- 36 Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*, at 3.
- 37 Penfield et al, "Assessment, evaluations, and definitions of research impact", at 25, 30.
- 38 Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*; W K Kellogg Foundation, *Logic Model Development Guide*.

- 39 Sarah Morton, "Progressing research impact assessment: A 'contributions' approach", *Research Evaluation*, 24(4) (2015): 405-419, doi: 10.1093/reseval/rvv016.
- 40 Morton, "Progressing research impact assessment".
- 41 Jack Spaapen and Leonie van Drooge, "Introducing 'productive interactions' in social impact assessment", *Research Evaluation* 20(3) (2011): 211-218, doi: 10.3152/095820211X12941371876742.
- 42 Australian Research Council, *El: Pilot Overview*
- 43 Rosa Scoble, Keith Dickson, Steve Hanney, and G. J. Rodgers, "Institutional Strategies for Capturing Socio-Economic Impact of Research", *Journal of Higher Education Policy and Management*, 32 (2010): 499-511, doi: 10.1080/1360080X.2010.511122; Spaapen & van Drooge, "Introducing 'productive interactions' in social impact assessment"; Universitas 21, *Measuring and Enhancing Impact from University Research; a report of the U21 Workshop on Research Impact* (2014), <http://www.innovations.unsw.edu.au/sites/all/files/uploads/U21%20Workshop%20on%20Research%20Impact%20-%20Report.pdf> [accessed 30 May 2017].
- 44 Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*; Rossi and Rosli, *Indicators of university-industry knowledge transfer performance*; Scoble et al, "Institutional Strategies"; Cohen et al, "Does health intervention research have real world policy and practice impacts", at 2, 7 of 12.
- 45 Morton, "Progressing research impact assessment", at 407.
- 46 Penfield et al, "Assessment, evaluations, and definitions of research impact", at 30.
- 47 University of the West of England, *Actors Agents & Attendants*, (2014) REF2014 Impact Case Study 42451, <http://impact.ref.ac.uk/casestudies2/refservice.svc/GetCaseStudyPDF/42451> [accessed 30 May 2017]
- 48 Steven Wooding, Edward Nason, Lisa Klautzer, Jennifer Rubin, Stephen Hanney, and Jonathan Grant, *Policy and Practice Impacts of Research Funded by the Economic Social Research Council: A case study of the Future of Work programme, approach and analysis*, (2007), RAND Europe, [http://www.rand.org/content/dam/rand/pubs/technical\\_reports/2007/RAND\\_TR435.pdf](http://www.rand.org/content/dam/rand/pubs/technical_reports/2007/RAND_TR435.pdf) [accessed 30 May 2017].
- 49 Morton, "Progressing research impact assessment"; Penfield et al, "Assessment, evaluations, and definitions of research impact".
- 50 Australian Government, *Engagement and Impact Assessment Consultation Paper*.
- 51 Grant et al, *Capturing Research Impacts*.
- 52 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*, at 18.
- 53 Martin, "The Research Excellence Framework and the 'impact agenda'".
- 54 Australian Government, *Engagement and Impact Assessment Consultation Paper*.
- 55 King's College London and Digital Science, *The nature, scale and beneficiaries of research impact*, at 7, 71-72.
- 56 Grant et al, *Capturing Research Impacts*, at 64.
- 57 Martin, "The Research Excellence Framework and the 'impact agenda'", at 250.
- 58 Grant et al, *Capturing Research Impacts*.
- 59 Christina H. Drew, Kristianna G. Pettibone, and Elizabeth Ruben, "Greatest 'HITS': A new tool for tracking impacts at the National Institute of Environmental Health Sciences", *Research Evaluation*, 22 (2013), 307-315, doi: 10.1093/reseval/rvt022/.
- 60 King's College London and Digital Science, *The nature, scale and beneficiaries of research impact*
- 61 Catriona Manville, Susan Guthrie, Marie-Louise Henham, Bryn Garrod, Sonia Sousa, Anne Kirtley, Sophie Castle-Clarke and Tom Ling, *Assessing impact submissions for REF 2014: An evaluation*, (2015), RAND Europe, [http://www.rand.org/content/dam/rand/pubs/research\\_reports/RR1000/RR1032/RAND\\_RR1032.pdf](http://www.rand.org/content/dam/rand/pubs/research_reports/RR1000/RR1032/RAND_RR1032.pdf) [accessed 30 May 2017].

- 62 New Zealand Government, *Tertiary Education Strategy 2014-2019*.
- 63 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*, at 19.
- 64 HEFCE et al, *Assessment Framework and Guidance*; Scoble et al, "Research Impact Evaluation, a Wider Context"; Scoble, et al, "Institutional Strategies".
- 65 Manville et al, *Assessing impact submissions*.
- 66 Small Advanced Economies Initiative 2015, *Broadening the Scope of Impact*, at 32.
- 67 CSIRO, *How CSIRO ensures it delivers impact*.
- 68 Australian Government, *Engagement and Impact Assessment Consultation Paper*; Jaffe, *A Framework for Evaluating the Beneficial Impacts of Publicly Funded Research*.
- 69 Cohen et al, "Does health intervention research have real world policy and practice impacts"; Wooding et al, *Policy and Practice Impacts of Research*.
- 70 Morton, "Progressing research impact assessment", at 407.
- 71 Morgan Jones et al, *Assessing Research Impact*, at x, xi-xii, and 14-17.
- 72 Manville et al, *Assessing impact submissions*, at 33-34.
- 73 Morgan Jones et al, *Assessing Research Impact*, at 16.
- 74 Group of Eight. (2011). *Measuring the impact of research – the context for metric development*. [https://go8.edu.au/sites/default/files/docs/go8backgrounder23\\_measimpactresearch.pdf](https://go8.edu.au/sites/default/files/docs/go8backgrounder23_measimpactresearch.pdf) [accessed 30 May 2017]
- 75 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*, at 7; Morgan Jones et al, *Assessing Research Impact*, at xiii, 23-24.
- 76 Cohen et al, "Does health intervention research have real world policy and practice impacts", at 11 of 12; see also Martin, "The Research Excellence Framework and the 'impact agenda'".
- 77 HEFCE et al, *Assessment Framework and Guidance*, at 49.
- 78 King's College London and Digital Science, *The nature, scale and beneficiaries of research impact*.
- 79 Penfield et al, "Assessment, evaluations, and definitions of research impact".
- 80 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*, at 39.
- 81 Australian Government, *Engagement and Impact Assessment Consultation Paper*.
- 82 Australian Technology Network of Universities and Group of Eight, *Excellence in Innovation Research*, at 6, 9.
- 83 Cohen et al, "Does health intervention research have real world policy and practice impacts".
- 84 Thomas Niederkrotenthaler; Thomas E. Dorner; and Manfred Maier; "Development of a practical tool to measure the impact of publications on the society based on focus group discussions with scientists", *BMC Public Health*, 11 (2011):588, doi: 10.1186/1471-2458-11-588.
- 85 Cohen et al, "Does health intervention research have real world policy and practice impacts".

