

Measuring the impact of research

In most cases, the traditional assessment of research does not extend beyond the publication of results. However, this trend may change significantly, as the Australian Government considers introducing 'impact' as an additional research quality measure. **Michelle Duryea, Mark Hochman and Andrew Parfitt** discuss.

Introduction

On 14th November 2006, the Australian Federal Education Minister, the Hon Julie Bishop MP, announced that the Government had decided to proceed with implementing a Research Quality Framework (RQF). The RQF is a research evaluation model similar to the UK Research Assessment Exercise (RAE) and the New Zealand Performance-Based Research Fund (PBRF). Assessment of research under the RQF will inform future public funding decisions.

The RQF differs from existing international research assessment methods by considering research impact in addition to the more conventional quality measures normally used in the academic community. This inclusion has created some controversy. Detractors argue that the inclusion of impact devalues the assessment process by moving beyond the scholarly domain, and that there may be undue emphasis on research that can demonstrably show shorter-term economic or other gains. An alternative view is that the absence of an assessment of impact seriously unbalances the evaluation of research and its importance to national and global priorities.

Nevertheless, the inclusion of impact is, as the Minister called it, a pioneering move which will create a world-first research evaluation measure.

But what exactly is 'research impact'? How can we measure it and what kind of evidence would be adequate to validate that impact as directly attributable to a specific body of research and/or group of researchers?

Defining impact

'Research impact' is defined within the RQF as the beneficial application of research to achieve social, economic, environmental and/or cultural outcomes. This is not to be confused with impact in the academic domain, which is seen more as an indicator of the intrinsic quality of the research on scholarly or academic measures. The RQF, in its proposed form, will allow both of these

considerations to coexist.

In 2005 the ATN (Australian Technology Network of Universities, which includes Curtin University of Technology, University of South Australia, RMIT University, University of Technology, Sydney and Queensland University of Technology) undertook a RQF trial to evaluate how the parameters of the RQF might be implemented. The ATN has an applied research focus and was particularly keen to explore methods for the assessment of research impact appropriate to this focus. An objective was to develop and test a robust and efficient mechanism for the assessment of research impact which was informed by relevant national and international approaches.

In the trial, participating research groups were asked to include impact in the contextualisation of their research, and up to three case study examples of impact were allowed from each group. Parameters around how impact was demonstrated were deliberately left broad in order to allow maximum flexibility for researchers to identify and validate their claims. Researchers were, however, asked to ensure that their claims were verifiable and could be tested by an internationally attuned assessment panel.

Each assessment panel was comprised of both academics and end-users. After assessing over 200 impact case studies, it became clear that researchers were sufficiently able to provide tangible examples of impact to enable an assessment to be made of the depth of that impact. Moreover it was evident that, in many discipline areas, sound qualitative and quantitative evidence was readily available to be drawn on in the case study submissions. Of special significance is the fact that there was a high degree of agreement between academics and end-users on the assessment panels in the rating of impact.

Nevertheless, it also became evident that the differences between 'research outputs', 'research outcomes' and 'research impact' need very clear descriptions to ensure that researchers are able

to make their cases for impact in a way that demonstrates how the impact of their research is achieved and substantiated.

Subsequently, the ATN drew on the considerable literature relating to research adoption and knowledge transfer to develop a model to define the fundamental nature of research impact. It was shown from the information gathered during the trial that impact can be understood in a sequence of stages having increasing benefit (see Figure 1). This model attempts to clarify the differences between research outputs, outcomes and impact.

It is noted that in some cases the stages may not form a continuum. However that on the whole, the model is able to convey the meaning of impact in a way that allows research groups to present appropriate evidence, for the depth of impact their research has achieved in a variety of domains (ranging from economic and environmental through to social and cultural). While impact occurs in its most direct form at the last stage, it is recognised that earlier or lesser impact can be achieved in the initial stages.

Measuring impact

The impact assessment model employs a scale of end-user benefits against which research groups provide verifiable impact claims. The scale spans reciprocal engagement, adoption of research, and creating significant and substantial public value. The methodology for measuring the scale involves the use of case studies, supported by qualitative or quantitative indicators that support the claims.

The trial demonstrated that such indicators were used with varying degrees of effectiveness. To some extent, discipline variations affect the availability and robustness of the indicators, with the commercialisation and economic impact measures being more widely studied and available. Nevertheless, some impact measures other than economic were measured in the ATN trial, and these can be reliably attributed to the different stages of the impact process continuum, are provided for other than economic impacts. Table 1 gives some indicative examples.

The trial also confirmed that, in the absence of available indicators, other forms of evidence such as those shown in Table 2 can assist with

Traditional Quality Domain

Research Impact Scope

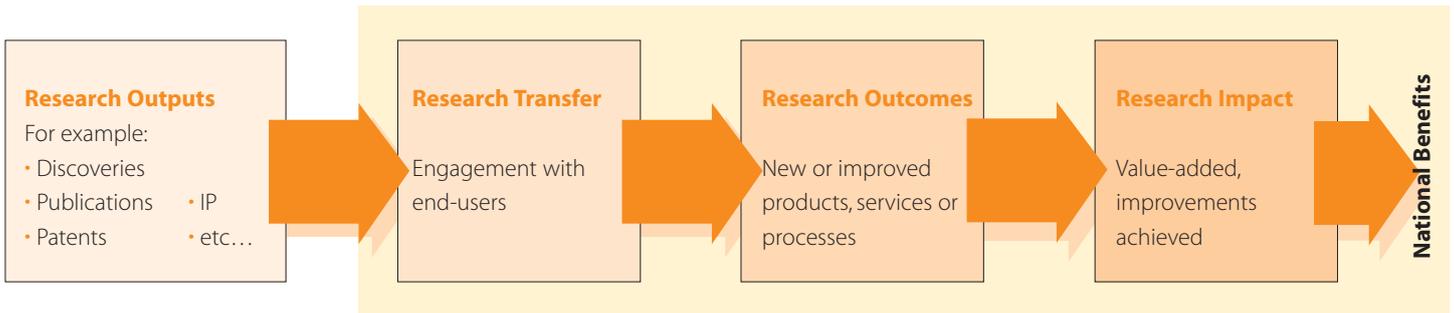


Figure 1: ATN Model of Research Impact Scope

validating claims and confirming the extent of the impact. As with the indicators presented in Table 1, these are by no means exhaustive and suggestions will not be applicable in all cases. In any event, a case would need to be made by the research group that the evidence directly supports any impact claims.

ATN impact examples

The following three case studies are examples from the ATN RQF trial which demonstrate the various types of research impact achieved.

Nanochemistry Research Institute (NRI), Curtin University of Technology – Improving industrial crystallisation

Research into industrial crystallisation within the NRI led to substantial savings for the minerals industry and, through improving efficiency, this has also reduced waste thus benefiting the environment.

An independent assessment was carried out by a consulting group in order to gain a quantitative measure of the impact of NRI's crystallisation research on business performance. The direct benefit realised in the period 1999-2003 is AUD34 million. The anticipated benefit is estimated to exceed AUD350 million.

Centre for Sleep Research, University of South Australia – Fatigue risk management policy development

The work undertaken by this Centre informed national and international transport sector policy, which led to new and improved codes of practice and legislation in relation to managing fatigue-related risks more effectively. These codes of practice have demonstrably resulted in improved safety and a reduction in fatigue-related accidents and injuries.

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Table 1: Impact Indicators

Impact Type	Research Transfer	Research Outcomes	Research Impact
Economic/ Commercial	<ul style="list-style-type: none"> Licences, options, assignments (no. and value) Royalty agreements (no. and value) Pilots, prototypes, clinical trials (no.) 	<ul style="list-style-type: none"> New products, services (no.) Gross revenue Start-ups/spin-outs (no. and revenue) Joint ventures (no. and revenue) Repeat business (% of contracts with previous clients) 	<ul style="list-style-type: none"> Fuel or time savings Reduced risk Increased productivity Reduced costs Increased competitiveness Improved processes/efficiency Increased employment Increased investment
Social/ Cultural/ Environmental/	<ul style="list-style-type: none"> Informing government or industry policy Engagement in community groups 	<ul style="list-style-type: none"> Changed practice in waste management Uptake of recycling techniques developed New or improved government policy 	<ul style="list-style-type: none"> Reduced consumption of natural resources e.g. fossil fuels and water Reduced waste Improved health and/or wellbeing

Table 2: Impact Evidence

All Stages	Research Transfer	Research Outcomes	Research Impact
<ul style="list-style-type: none"> End-user statements Third-party surveys, analyses or data References/citations in policy documents, regulations etc. Media attention Presentation invitations 	<ul style="list-style-type: none"> National competitive grants with end-user participation Cooperative Research Centre participation in end-user sponsored projects Supporting testimonials by industry collaborators 	<ul style="list-style-type: none"> Transfer of ownership of IP Licensing agreements with industry Independent valuations of spin-off companies or IP packages 	<ul style="list-style-type: none"> Evidence of significant commercial value through product sales, process savings etc. Evidence of employment or health outcomes at a population level International or national awards

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Early Years Research Program, Queensland University of Technology – Evaluation of the ‘Preparing for School’ trial

This research evaluated the effectiveness of a new full-time, prior to year one, play-based program. A comparison of the progress of children from the trial with children who were enrolled in alternative programs was undertaken.

The research found a benefit to children, in all domains of development, of attending a full-time program, which subsequently led to a change in government educational policy.

Conclusion

In summary, the ATN found that impact as defined above:

- is an important element in understanding the value of research,

- requires a clear definition relating to measurable benefits,
- can be described accurately through research group level case studies,
- can be measured reliably by an expert panel applying judgement to a combination of the qualitative and quantitative indicators.

The ATN trial has shown that the RQF provides an opportunity for Australian researchers to demonstrate the value of both excellent and relevant research. One of the remaining questions will be the extent to which the inclusion of both quality and impact measures in a national research assessment affects the research landscape in the future. Whatever that outcome, a robust and balanced approach to assessing research impact has been shown to be feasible.

RG



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