A Process Approach to Research Impact

'The answer is 17 years' (Morris et al., 2011[1])

The question to which this is the answer was, in essence, 'how long does it take for translational (health) research benefits to be realised'? Time lags in the translation of research to impact have always been very difficult to measure even if a clear 'line of sight' from the science to use is evident. Establishing causality bugs even the best research impact evaluations.

Research Impact is certainly the interest of the moment with respect to evaluating the role of research in society. However, it has been a part of the system in various guises since the notion of the linear model of innovation was introduced by American Vannevar Bush in the closing months of WWII. In his very influential 1944 report to US President Franklin Roosevelt, Bush expounded upon the important role of basic research as the generator of commercial development and economic growth.

Evaluation of impact in public sector funded research is now core to the UK's REF (Research Evaluation Framework), Australia's Research Quality Framework (RQF) and possibly will be so in future PBRF rounds in NZ. Studies of the 'impact' of these impact assessments have spawned writing on the 'impact industry', the 'impact agenda' and even 'impact fatigue'.

What is Impact?

In its most basic form, impact is to have some influence on something and can be a noun (an impact) or verb (to impact). MBIE's definition, introduced in their October 2019 Position Paper[2], of research impact is:

"A change to the economy, society or environment, beyond contribution to knowledge and skills in research organisations."

This definition suggests that impact be thought of in a more expansive way than just occurring in economic domains and aligns with a well-being approach (which would also include cultural impact). However, it marks an explicit move away from impact as traditionally used in research institutions (and the PBRF) as a) publication of research articles in apparently influential journals that boast their 'impact factors' to attract top authors, or more recently, b) an individual academic's 'H-factor' which is another citation measure based on having 'H' number of articles cited 'H' times. For both of these, the higher number the more impactful your research is perceived to be. However, the impact (other than on the individual's likelihood of being promoted or of attracting research funding) is really only in the researcher's own or related disciplinary communities so is rather insular.

How is Impact Usually Measured?

As soon as measurement is mentioned, there is a tendency to look for quantifiable indicators. Numbers of patents granted, numbers of new products, processes or services, number of public or private sector organizations engaged in the research and implementing the findings, economic return on the products, number of new employees created and so on.

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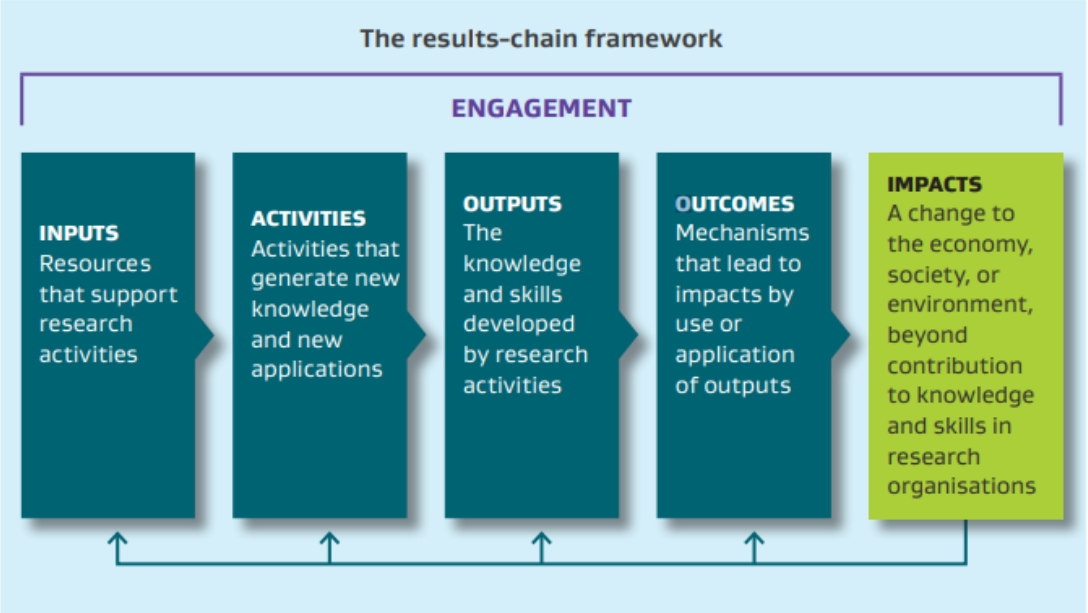
[1] Morris, Z. S., Wooding, S., & Grant, J. (2011). The answer is 17 years, what is the question: understanding time lags in translational research. *Journal of the Royal Society of Medicine*, *104*(12), 510-520. https://journals.sagepub.com/doi/full/10.1258/jrsm.2011.110180

[2] MBIE, The Impact of Research Position Paper, October 2019 https://www.mbie.govt.nz/dmsdocument/6983-the-impact-of-research-position-paper-october-2019-pdf

Many of these quantifiable measures are immediate outputs and intermediate outcomes on the way to eventual impact which is captured in Outcomes Frameworks that each NSC developed for itself. This is a fairly linear approach with the control over impact (at the top) more diffuse the further away from direct NSC project activities (at the bottom) that are undertaken. The MBIE Impact position paper presented 'The Results-Chain Framework' which bares remarkable resemblance to the Outcomes framework rotated onto its side, albeit with a few arrows to reflect that the pathway to impact is much more iterative in practice.



The principle underlying the development of both these frameworks for research programmes like SfTI, is that they should ideally be developed prior to planning any activities. In other words, they should be reverse engineered starting with the desired impacts and working back so that the links (or 'lines of sight' to use the MBIE terminology) from activities to impact may be observed, if not evaluated and quantified.

The best approach to exhibiting impact, is through a range of qualitative and quantitative assessments, many of which are already embodied in our annual report narratives, KPI assessments and project level spreadsheets. Typically, those items that can be measured are the easiest to manage, so space needs to be created for qualitative or mixed assessments as well.

Such assessments might include surveys (with Likert type scales as well as open-ended questions) of participants and stakeholders (done both by MBIE and internally, especially by our Capacity Development Team and Spearhead 1, Building New Zealand's Innovation Capacity); following the changing demographics of our community and how they are interacting with our activities, especially the capacity development programme; interviews and case studies of impact exemplars; interest in and uptake of our stories in various media. And probably most importantly, many of these assessments need to be repeated over time to capture some of the longer terms impacts which may take that '17 years'!

Moving on from 'What is Impact?'

Our mission is to 'enhance capacity' so a key question for any impact evaluation is not just 'what is the impact?' but 'who is impacted, and how?', that is, have they changed their behaviour as a result

of engaging with SfTI. This approach is similar to behavioural additionality, a concept I have discussed before and of which I am a big fan[3].

But who are the 'who', whose capacity might be enhanced? In traditional evaluations of policy interventions, the target is usually a firm that has received government support. But for SfTI, there are also other levels of 'who': from the individual researcher, industry or Māori collaborator; to the project teams and their industry/Māori Advisory Groups; to those organisations that directly engage with SfTI; as well as those in the wider innovation system including public research institutions and policy departments, private businesses and their industry peak bodies and Māori organisations. The 'how' of the impact will also be highly variable, which reinforces the need to take a portfolio approach.

With so many dimensions of 'who and how', that is a lot of data to collect. Surveys help to give some very valuable indicative data, but interviews and subsequent stories we can tell of exemplars (and also potentially when we fail to achieve much impact), can also turn into another form of impact, in that they can lead others to follow suit, especially if accompanied by some analysis (by BNZIC).

Impact as a Noun AND a Verb.

To include capacity development and changing behaviours, we need to focus not just on the impact but also the processes that are producing the effect, and that are affecting behaviour. Broadening the notion of what impact can be achieved by the National Science Challenges will be vital for understanding the efficacy of the overall policy as well as the success (or otherwise – still important for learning) of the various process experiments that each NSC has undertaken. SfTI is not the only one exploring how we might better frame and capture our impact[4], and it may be worthwhile facilitating a cross challenge discussion with MBIE as we head towards the final stages of this phase of the policy.

This discussion reminds me very much of the old Chinese proverb: "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." In SfTI terminology, if we give a researcher/collaborator/firm/Māori organisation/policy organisation an impact (new tech = fish) then we support them for this impact. However, if we change behaviour by demonstrating the benefits of orchestrating such inter-disciplinary collaborative teams including industry and Māori, they will be embraced and can potentially be repeated in many different realms and for many different challenges (everyone knows how to fish). Let's go impacting (fishing)!

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[3] https://www.sftichallenge.govt.nz/assets/Uploads/Download-PDFs/Sally-SCIBLOG-Additionality.pdf

[4] Duncan, R., Robson-Williams, M., & Fam, D. (2020). Assessing research impact potential: using the transdisciplinary outcome spaces framework with New Zealand's national science challenges. *Kōtuitui: New Zealand Journal of Social Sciences Online*, *15*(1), 217-235.
https://www.tandfonline.com/doi/full/10.1080/1177083X.2020.1713825