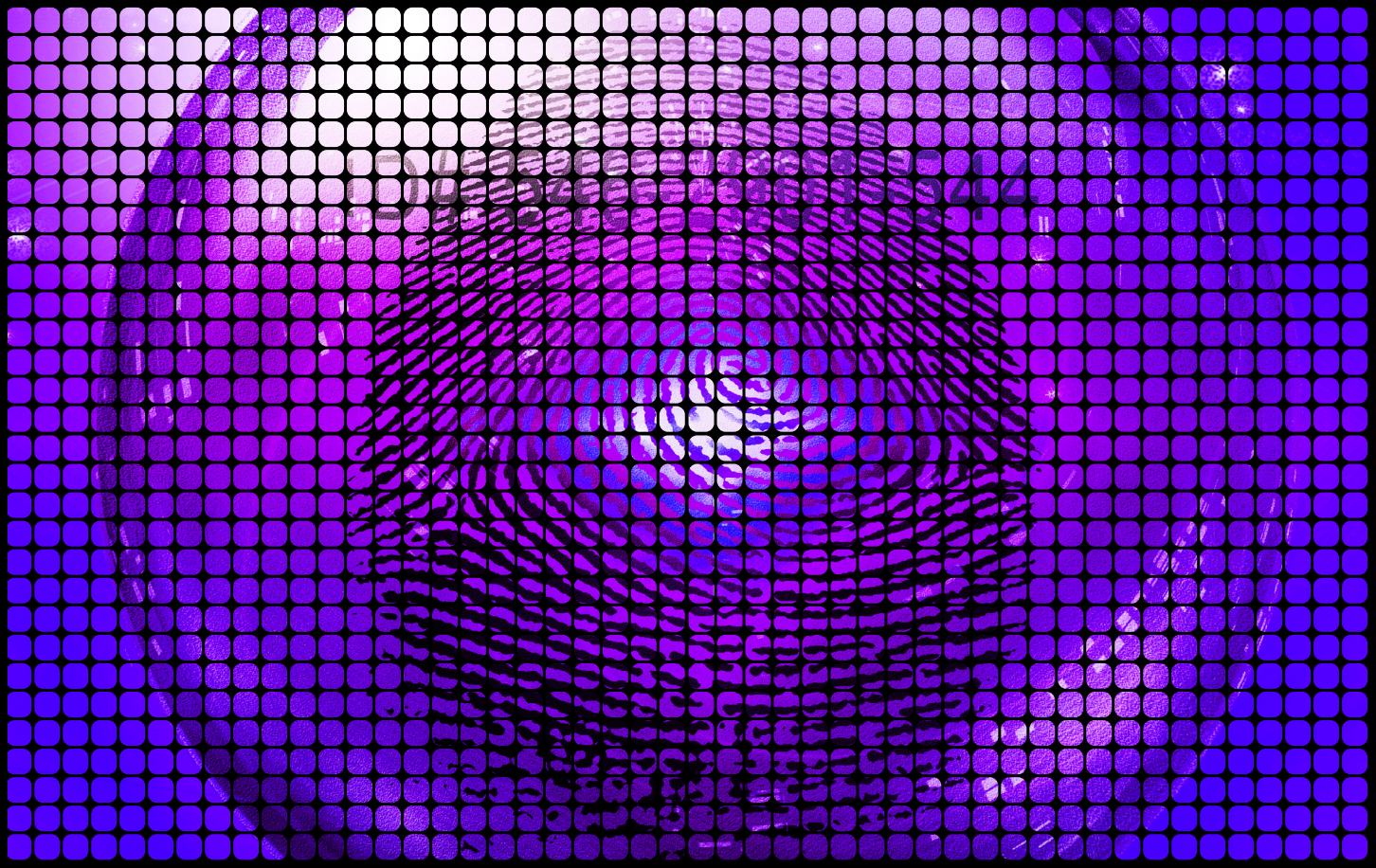

Digital Research Reports

The Societal and Economic Impacts of Academic Research

International perspectives on good practice and managing evidence

MARCH 2016

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The Societal and Economic Impacts of Academic Research: International perspectives on good practice and managing evidence

Introduction

Jonathan Adams, Digital Science

This report was created to support a workshop in London in March 2016, supported by the Higher Education Funding Council for England (HEFCE). The objectives are to encourage researchers across all disciplines to reflect on what socio-economic research impact means for their areas of interest and what types of evidence best reflect achievement. The report and its contents are freely available under a CC-BY licence to others conducting similar events.

When impact case studies were added to the UK's 2014 Research Excellence Framework they created a new way of looking at what research delivers. This has proven remarkably amenable and incredibly revealing. There is a flavour to research outcomes that analytical indicators can never provide. But this was the first time such an exercise had been tried across all subjects in all universities in one cycle. One very flexible template fitted all. Now, with this experience, we have an opportunity to reflect on what worked and what could be improved.

Disciplinary communities must reflect on what they believe culturally constitutes proper, acceptable and appropriate evidence of economic, social or other impact and what constitutes strong or weak levels of achievement. It seems unlikely that broad-based sciences and arts will conceptualise impact, evidence of impact and assessment of impact in the same ways. There may also be divergence between professionally-focussed areas, like social policy, and their background academic disciplines, like sociology. And, whereas citation impact is used in the same way across continents, does the cultural construction of research impact allow it to become a global comparator?

The expert contributors to this report provide topical background, direct experience and key material to guide our deliberations in working though these considerations.

UK impact assessment

Key lessons from analysis of REF impact case studies

- You can assess research impact on a national scale
- It is expensive, but worthwhile (the absolute costs are high but the proportionate costs are low)
- Assessing research impact drives behaviours
- Assessing impact is difficult
- Research impact is multidisciplinary, multi-impactful and multinational

Lessons learned from analysing evidence in REF 2014

Jonathan Grant and Saba Hinrichs, The Policy Institute at King's College London

The evaluation of the non-academic impact of research is not new, but the Research Excellence Framework (REF) was the first, largest and most comprehensive assessment of its kind worldwide. The outcomes of the impact element of REF can be structured around four "As" of allocation, advocacy, accountability, and analysis (Morgan-Jones and Grant, 2013).

The primary purpose of REF was to inform the allocation of QR ('quality related') funding to UK universities. As noted elsewhere (Grant, 2016), REF is a bargain – the overall costs of £250 million (Technopolis, 2015) represent just 2.5% of the £10 billion allocated. This is significantly cheaper than the estimated transaction costs for RCUK funding (approximately 13%) (RCUK, 2006). The impact case studies – which accounted for 20% of the overall grade given to each submission – cost £55 million (Grant, 2016) and drive the allocation of £1.6 billion over the next 6 years.

The impact case studies have also been widely used by universities and funding agencies to 'make the case' or advocate for research. For example, the Engineering and Physical Sciences Research Council (EPSRC) used the case studies to demonstrate the sustained economic and social impact of their investments in engineering and physical sciences research (EPSRC, 2014). A similar report commissioned by the UK Collaborative on Development Sciences (UKCDS) outlined the non-academic impact of development research in UK universities.

The case studies have also been used to account for research investments. As taxpayers and donors to research charities, we want an account of how researchers have used our money. What do we mean by an account? It is a narrative, a story, about what has been achieved. That is what the REF has effectively done, but its innovation is not just to demand an account, but to very explicitly tie funding to the quality of the account received.

As part of a collaboration with Digital Science we were involved in the publication and synthetic analysis (King's College and Digital Science, 2015) of the impact case studies. With only four months to do the analysis, all 6,975 could not be read and text mining technologies were used. A number of interesting observations arose from this analysis. The first is that we identified 60 impact topics. This is quite challenging for people with an interest in 'impact' as the conceptual frameworks we typically use only have between six and twelve categories. The second observation is that topics are interrelated. A single piece of research will impact on multiple topics. We identified around 13,000 connections, or 'pathways to impact', between fields of research and impact topics (over 3,000 of which were unique). Finally, and possibly the most extraordinary result, was that we found that every single country in the world is mentioned in the impact case studies analysed. So when we talk about impact, and about the impact of UK research, it is a massive global public good.

There are a number of important limitations to the analysis of the REF impact case studies which should be acknowledged. Most importantly the impact case studies were not reflective self critical documents – nor was there any requirement or mechanism for standardised reporting of units or impact outputs. For this reason,

if the case studies are to be used for research purposes to understand better how, why and when impact occurs, they would have to be re-purposed for analysis, by linking to other data sources and adding missing information.

Lessons learned from a stakeholder perspective on the evidence

Fiona Goff and Phil Heads, NERC and RCUK

Research Councils (RCs) have both an obligation and an interest in reporting the richness and variety of economic and societal benefits, or impacts, both UK and global, that result from our long-term investment in research and innovation. Robust impact evidence is now fundamental to support the case for the UK government's Science Budget, including RC budgets, plays a key role in communicating and celebrating success, and provides public accountability (RCUK, 2016).

The REF is a vital source of evidence for the RCs as it assesses outcomes of the *whole UK dual support system* for publicly funded research.[1] It is part of a holistic and efficient investment appraisal and evaluation cycle that contributes positively to the strength of UK research. The dual support system relies on complementary roles: Research Councils focus on prospective quality assurance through rigorous peer reviewed competition for grants, while Higher Education Funding Councils focus on *retrospective quality evaluation* through the REF. The REF evaluates the excellence and impact of university research supported by all funders, including Research Councils, avoiding unnecessary duplication of the evaluation burden.

[1]Dual support: Higher Education Funding Councils (HEFCE, DELNI, SFC, HEFCW) provide stable 'quality-related' (QR) funding to support research capability in universities; Research Councils operate at arms-length from government and provide specific project funding to named researchers.

The RCs have used the REF 2014 impact evidence base extensively and creatively alongside our own evidence base:

- Reusing case studies to demonstrate the range and types of impacts arising from RC funding (ESRC, 2015)
- Further developing impact evidence from specific case studies, including adding information from other sources e.g. research outputs information (Monitor Deloitte, 2015; MRC, 2016)
- Identifying multidisciplinary impacts (based on funding from more than one RC) and impacts based on research and innovation partnerships (e.g. with Innovate UK)
- Summarising and synthesising entire portfolios of case studies (BBSRC, 2015; EPSRC, 2015), and groups of case studies in particular sectors, topic areas or themes (AHRC, 2016)

We propose that the following changes would improve both the quality and value of future REF exercises as an impact evidence base for research funders:

- To ensure that the full range of meaningful impacts can be recognised, consider extending the eligible period both for impacts and for the research on which they were based
- Require listing of funders and grant references in the case study template
- To aid assessment and further use, consider developing guidance on certain types of evidence where appropriate e.g. sales, staff numbers, company investment
- Where possible, re-use information from other systems e.g. ORCID, ISNI, Researchfish®

The quality of the impact evidence in the case studies varied. Our experience with REF 2014 and other impact work has shown that the most useful impact evidence includes:

- **Context**: brief description of the societal challenge or economic opportunity e.g. market size
- **Beneficiary and benefit**: evidence of a realised outcome for specific beneficiaries – this is particularly powerful when quantified or backed by data or testimony from research users
- **Pathway**: how the funding, partnership and collaboration led to the impact, i.e. clarity of attribution

Stakeholder information

- Annual reports from institutes, companies, governments and NGOs
- Community meetings and minutes
- Company websites and press releases
- Work cited in further funding applications by community/ voluntary groups
- Press coverage

Testimonials

- Letters of support
- One-to-one testimonials
- Focus groups
- Personal letters from individuals at third party organisations
- Surveys – paper and online
- Event feedback
- On-going testimonials from community organisations

Online traffic

- Newsletter 'open' rates
- Social media website hits
- Tweets
- Comments on TV programmes, news articles and websites
- Interaction statistics, e.g. retweets by influencers

Positions of responsibility

- Steering group positions
- Dialogue through public-facing (recorded) events
- Secondments
- Offer letters
- Hansard
- Parliamentary Office of Science and Technology

Figure 1. Impact evidence types selected frequently by researchers in UK universities

Evidence gathering systems and structures

Laura Fedorciow and Bokani Tshidzu, Vertigo Ventures

Research impact evidence corroborates claims of impact and gives tangible proof of the difference that research makes. Impact evidence offers a critical route into the ways in which research has been assimilated by users outside the academic community. Gathering this information in a consistent and structured way helps stakeholders and researchers to better understand how research utility can be most effectively developed.

Most definitions of impact recognise the breadth and diversity of impact created by different research activities. UK research funders describe impact as: benefits or changes to society, the economy or the environment. This may include academic impacts such as improvements to methodology and theory, but these are distinct from output-driven data such as citations, bibliometrics and alternative metrics. They offer an insight into one valuation of research, but not the utility and adoption of research by wider stakeholder groups.

At Vertigo Ventures we recognise the Kellogg Model for impact (Kellogg Foundation, 2004) and its logical pathway from inputs through outputs, activities and outcomes as a useful way to distinguish impact from outputs and the activities that lead to impact, such as public engagement.

For funders, the rigour and consistency of impact assessment is increasing as they look to demonstrate the impact achieved in a quantifiable manner combined with independent, third-party, high-quality evidence. From the sector, there are calls for consistency in the criteria of measuring, reporting and assessing impact.

For example, funders need to be sure that job creation is reported consistently across multiple organisations, so researchers need an agreed standard such as 'full-time equivalent jobs created' to avoid counting part-time roles. Claims of impact remain assertions, however, unless there is independent validation of impact evidence. This means that evaluators require an audit trail to use impact data for evaluation purposes. The impact evidence must be collected over time, attributing each impact to original research or expertise and tracing the developing sequences of activities.

Evidence types can vary widely depending on the discipline, the stakeholders and the changes that have occurred. Impact evidence can include quantitative reports of increased sales for a commercial stakeholder or quality of life improvements. Qualitative testimonials can directly attribute changes to the research or the contributions made by researchers because of their expertise. But this information needs more standard structure and categorisation.

Research impact evidence can be collected from various sources over the lifespan of a research project. The examples of impact evidence in Figure 1 are the types we see in our work with researchers and from users of the VV-Impact Tracker tool.

Experience enabling clients to report research impact confirms that planning for impact is best done at the beginning of the research process, putting in place impact data and evidence capture as the project is being conceptualised. Researchers then consider what impact could occur and how to provide the environment for that. Impact is contingent and emergent, and rarely either

predictable or linear. Storing all the impact evidence allows for narratives to be told as they develop, sometimes years after the data were first collated.

Not only does this support applications for funding translational activities but it also supports mechanisms for capturing impact evidence 'in project' rather than retrospectively. Over this time, the evidence is of value to the whole organisation, whether in support of funding applications or by attracting new talent. It can be made available centrally in an institution to allow access to collaborators and for repurposing for different audiences. This enables aggregated data to shed light on comparative productivity for different projects or departments as well as creating an institutional memory. Reporting impact continuously in this way supports the institutional case for research funding. It also gives funders the material to show the return on research investment to the government or to donors.

Understanding the diversity and value of impact evidence

Tamar Loach and Martin Szomszor, Digital Science

For the UK's REF 2014 Impact Case Studies, it was stipulated that institutions include in their submissions supporting evidence pieces which "if audited, provide corroboration of specific claims made in the case study" (HEFCE, 2011). The evidence that was submitted varies in terms of type (included are academic publications, testimonials, reports, videos, patents and web-links) and it was not reported in any standard form. However, for the first time such data were collated in a common structure across an entire national research system, and are hence amenable to analysis.

Research around the REF case studies (King's College and Digital Science, 2015) has previously led to observations about variance in content across subject panel (the four broad subject area breakdowns that group research for UK assessment). This has identified diversity in practise for referencing research content that underpinned impact and in the type of impact claimed. We can now ask: do forms of evidence submitted by UK institutions also vary by subject panel? And can we elucidate any relationship between evidence of impact and the 'score' that the case study received in peer review?

By searching text for terms that are indicative of the evidence type, we were able to group pieces of evidence into eight categories. Figure 2 shows that testimonials are the most frequently used form of evidence in panels B, C, and D, whereas reports are the most prevalent in panel A.

This preliminary analysis has uncovered differences in the types of evidence that researchers draw on to support their claims of impact. It confirms the expectation that there is no one size fits all approach to impact assessment.

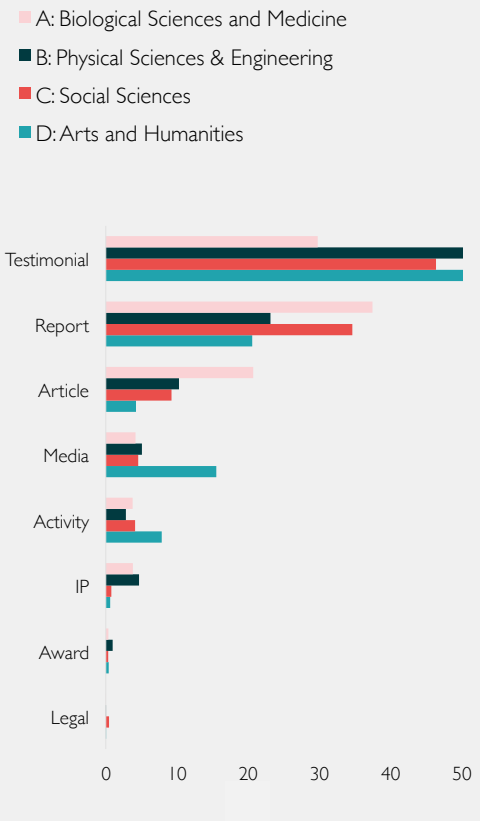

Figure 2. The percentage of REF 2014 Impact Case Studies, by main panel, that contain categorised types of evidence.

Figure 3. Spearman correlation between the indicative score and the amount of various types of evidence; there is a column for each subject panel. A value of 1 implies maximal positive correlation, 0 no correlation, and -1 a maximal inverse correlation. The values in bold are significant ($P < 0.05$), where the null hypothesis is that the indicative score and the amount of a given evidence type are uncorrelated.

	A: Biological Sciences & Medicine	B: Physical Sciences & Engineering	C: Social Sciences	D: Arts & Humanities
Activity	-0.03	-0.02	-0.04	**-0.06**
Article	**0.19**	**0.09**	0.02	-0.01
Award	**-0.06**	0.01	0.01	0
IP	0.05	0.05	-0.01	0
Legal	-0.03	0	0	0
Media	-0.01	**0.07**	**-0.07**	0
Report	**0.19**	**0.11**	**0.15**	**0.08**
Testimonial	**-0.15**	**0.04**	**0.08**	**0.17**

While scores are not available for individual case studies, it is possible to assign an indicative numeric score to each based on GPAs for submissions. Using this indicator, we can test whether or not there is an association between scores and the use of particular evidence types. There are a number of interesting differences between panels found in the correlations between scores and particular evidence types (Figure 3). Panel A shows a positive correlation between score and use of reports as evidence: it might be expected that much health impact is corroborated by reports like policy documents and clinical guidelines. This contrasts with panel D, where testimonials are the evidence type most positively associated with score. In fact, testimonial count is slightly *negatively* correlated with score for Panel A. For Panel B, scores are positively correlated with a wide range of evidence types including articles, media, reports *and* testimonials.

The case study format allowed a variety of evidence to be displayed, and these types appeared - and were assessed - differently across research communities. But this is not a comprehensive evidence ontology, and this was just the first UK cycle of impact assessment. Research communities and stakeholders will want to shape the further determination of what sources of evidence are most useful in corroborating societal and economic impact.

International development of impact assessment

Research engagement and impact in Australia

Tim Cahill, The Conversation

In Australia, discussions around measuring the impact of university research have been ongoing since 2005, when Dr Brendan Nelson, then Minister for Education, Science and Training, announced the introduction of the Research Quality Framework (RQF). The RQF was to take a case-study based approach to evaluating the economic, environmental and social benefits of research.

By 2007, the Rudd Labor Government had moved away from RQF, citing significant issues with the approach, including timing (impact long after the research is completed), attribution (innovation via multiple projects, actors and inputs), appropriability (problem of identifying research beneficiaries and accounting for diverse impacts) and inequality (difficult to compare across different impact types) (Georghiou and Laredo, 2006). The costs of the exercise were thought to likely exceed the benefits (Productivity Commission, 2007).

In the years since, Australia has developed what the OECD (2010) describes as a state of the art research quality evaluation framework, utilising peer judgement informed by a suite of metrics – Excellence in Research for Australia (ERA) (ARC, 2015a). ERA has been credited with increasing Australian university research quality, focussing researchers' attention on what constitutes 'quality', and influencing researchers' publishing behaviours (Acil Allen, 2013). On the debit side, ERA's focus on scholarly publication is associated with directing researchers away from such activities as knowledge translation, entrepreneurial behaviour, collaboration with research users in the public and private sectors (ATSE, 2015) and the other activities Australian universities are expected to undertake (Australia Government, Higher Education Support Act, 2003).

In response, the Government has announced changes to university research funding and evaluation as part of its National Innovation and Science Agenda (NISA). A proportion of research funding is to be redirected, away from publication metrics, towards measures of the income universities received from research end-users (NISA, 2016a). During 2016, the Australian Research Council (ARC) will develop a new research evaluation framework, to sit alongside ERA, to measure the impact and engagement for Australian university research. It will be piloted in 2017 (NISA, 2016b).

Government hopes that a focus on research engagement will assist industry (including public, private and not-for-profit sectors) innovate and improve competitiveness, enhance products, processes and services, and create jobs. Here, the discussion around research engagement means "the interaction between researchers and research organisations and their larger communities/ industries for the mutually beneficial exchange of knowledge, understanding and resources in a context of partnership and reciprocity" (ARC, 2015b).

'Engagement metrics' are likely to play a role in the new framework, and ongoing projects demonstrate what may be possible. For example, recent work by the

Australian Academy of Technological Sciences and Engineering (ATSE) directly measured financial inputs into research engagement activities and devised a suite of indicators (ATSE, 2015). Additional engagement metrics are being developed by The Conversation demonstrating how research expertise is being unlocked for public benefit. With 30,000 academic authors, a global audience of 23M per month, and comprised 80 per cent by non-academic readers, The Conversation (2016) provides a massive platform for researchers to engage the public.

The thinking behind these developments is that engagement between publicly funded researchers and research users across the public and private sectors is an important precursor to impact. Encouraging and increasing these activities should therefore maximise the likelihood that impacts occur. We still need to develop compelling empirical evidence demonstrating these impact pathways (CSIRO, 2015), which is where there may be a role for structured case studies, teaching us the mechanisms that support and foster impacts.

Ireland – a proposed national system for assessing impact

Lisa Murphy, Science Foundation Ireland

Ireland recognises the potential for the science and innovation system to drive economic growth and, in spite of the recent downturn, has maintained, and recently increased, its level of investment in scientific research. As a small economy, Ireland cannot invest in all areas of research. Across the research sector, research performing and research funding bodies face the challenge of selecting research projects and programmes that are aligned with national priorities and can have the most impact on the economy and society as a whole. The position of funding along the output-to-impact spectrum and the methods of evaluation of potential impact vary across funders. There is growing commonality in relation to the definition of impact and the importance of placing impact at the heart of funder strategies.

Science Foundation Ireland (SFI) is Ireland's largest scientific funding agency. In support of delivering impact from State investment, SFI has set out within its strategy "Agenda 2020" a vision in which Ireland, by 2020, is the best science funding agency in the world at creating impact from excellent research and demonstrating clear value for money invested. While scientific excellence continues to be at the core of all funding decisions, in recent years impact has gained equal focus across all significant funding programmes. SFI recognises that this impact may be short or long term, non-linear, difficult to measure and, perhaps more importantly, that there are many types of impact, not just economic or commercial.

SFI classifies the impacts of scientific research according to 8 pillars: Economic and Commercial; Societal; International Engagement; Impacts on Public Policy, Services and Regulations; Health & Well Being; Environmental; Impact on Professional Services; Impacts on Human Capacity. Cutting across all pillars are 3 consistent themes: Creating new products, processes, policies or behaviours; improving efficiency and efficacy of existing practices, policies etc; and Building resilience, sustainability and reducing risk. This model evolved from the framework defined as part of SFI's work with the Small Advanced Economies Initiative (SAEI). The SAEI involves a group of 6 economies: New Zealand, Singapore, Israel, Denmark, Finland and Ireland. The framework is discussed in the recent SAEI report and it is against

these pillars that the potential and actual impact of research proposals and grants are assessed (SAEI, 2015).

SFI is one of a range of forward-thinking agencies and bodies in Ireland that emphasise a broad definition of research impact. Several of the Higher Education Institutions (HEIs) have developed Impact Frameworks, again emphasising Economic, Societal, Environmental, Human Capacity and Health Impacts. The Higher Education Authority has developed Performance Compacts with each of the HEIs that will in the future make funding contingent on the delivery of pre-agreed outcomes.

In addition to evaluation of impact at a project level (ex-ante and ex-post), SFI works with its research community to endeavour to evaluate and communicate the longer term impacts of scientific research. As a result there is a growing collection of case studies arising from the research base that point to a highly productive and impactful scientific research sector.

As a small country, Ireland continues to keep an eye on how other countries "do impact well". In the spirit of learning from international best practice as well as home-grown expertise, in 2015, SFI hosted an Open Policy Debate on Measuring Impact from Publicly Funded Scientific Research. This event brought senior national personnel from a wide range of sectors and disciplines together with international experts to discuss how impact can be measured and delivered. Significant learning came out of this debate, learning that will feed back into policy and practice.

Sweden – emerging ideas about the use of impact case studies

Johan Blaus, KTH Royal Institute of Technology

In Sweden, there is currently much discussion around the definition and governance of impact. In late 2016, the government will introduce the next bill of Research and Innovation, where some of the issues may be clarified on a national level. Impact appeared as an agenda in Sweden's 2012 Research and Innovation Bill which stated:

"The Swedish Agency for Innovation Systems should be tasked with designing methods to enable performance and quality in higher education and community partnerships to be assessed in terms of relevance and utilization. Based on this, the Agency should be able to allocate funds to the higher education institutions.

A Swedish system for resource allocation involving peer review should now be further investigated with a view to introduction in the longer term. This kind of system could offer a more complete assessment that can also take account of a research area's current potential, rather than basing resource allocation purely on historical data. This allows a more balanced assessment of an institution's research whereby different subject areas are evaluated based on their distinctive features." (Government Offices of Sweden, 2012).

What evidence is needed to support systematic cross-national comparator analysis of impact?

Christian Herzog, UberResearch

What would make impact case studies discoverable and comparable?

- Standardized document structure (Summary, underpinning research, references to the research, details of the impact, sources to corroborate the impact)
- Robust search capabilities
- Cluster by curated metadata (geography, institution and researcher level)
- Cluster by research classifications (based on the analysis of the text, automated)
- Show similar and related impact case studies, supporting serendipity
- Link research evidence directly to the impact description
- Openly available (search and bulk download impact case studies for further use)

Impact case studies are empowering the researcher: she or he can tell a comprehensive story, putting the results in context and highlighting what the advancement of science helped to achieve. They also tell stories about the successful application of research funds and of scientific work in solving problems on different levels. This is the best way to communicate research both to stakeholders like funding agencies and policy makers and to a wider 'lay' public. Case studies significantly extend the accessible dissemination of knowledge - and the value of knowledge - beyond the professional and academic routes to research publication.

But how do we 'unleash' the power of impact case studies and connect scientific work with the real world? In the UK, the Higher Education Funding Councils and the Wellcome Trust worked with King's College London and Digital Science to make the UK case studies accessible and searchable, categorising and clustering them into a standard Fields of Research classification system (from Australia and New Zealand) using machine learning techniques (Dimensions, 2015), and making the impact reports more readily accessible in each area of research. The REF case studies website (REF, 2014) has been well received. It is a direct, simple and intuitive way of looking at each case study. There are some general comparisons that can be made and search results can be downloaded.

There is little to add to the underlying approach Jonathan Grant and Saba Hinrichs described for the UK case studies earlier in this report, but that approach must now be re-created in a scenario where impact case studies from other countries can be easily integrated as well. As the data accumulate, there will be new opportunities to compare and index what is coming out of research. Some of this will provide intriguing statistics. Much more, this will be a helpful way for researchers themselves to compare and learn from what has been done in different places, not just by reading journal papers (which can be selective marketing documents) but also reading the narrative of the project and what it delivered. This adds so much more to research communication.

All the elements listed in the side-bar are realised in the reference tool created for the REF2014 case studies. For a general platform, to make impact case studies discoverable - which means they may also generate additional impact in new places - the systems needs to be supported by more advanced tools such as the automatic translation of non-English case studies. It will also be important to capturing a detailed picture of the geographical scope of impact as an additional dimension and more information on the time aspect of impact (one time, ongoing, in the past, in the future).

Making impact case studies technically available is important – but making them relevant documents accessible for research management as well as assessment processes within institutions or on a country level will respond to a deep underlying objective: enhancing the impact of research beyond its direct beneficiaries.

Future directions

Steven Hill, Higher Education Funding Council for England

Investment in research is a global phenomenon. The OECD countries invest nearly 2.5% of their GDP into research (OECD, 2016), and there are many other countries investing at even higher rates. While there is substantial private funding in most cases, there is nonetheless a significant worldwide commitment of public funds to research. Despite variations in patterns of investment and strategic priorities, there is a consensus that research spending is a wise public investment because of the positive difference that research can make.

In a sense, the evidence of the difference that research makes – its impact – is all around us. But there is also a wealth of more structured evidence. While much of this evidence has been focussed on specific types of benefit, like health improvements or economic growth, the case studies that were collected for REF2014 (REF, 2014) provide a more systematic look (King's College and Digital Science, 2015). The impact definition used for REF was broad, and that broad definition was matched by an incredibly diverse array of impacts that were submitted for assessment. All research disciplines were able to articulate the benefits that come from research, and in the majority of cases the combination and integration of disciplinary knowledge was central to delivery of impact.

This systematic evaluation and assessment of impact is incredibly valuable for two distinct and complementary reasons.

National retrospective assessments, like the REF, provide accountability for prior public investment, and also provide a mechanism to reward and incentivise researchers and institutions for the delivery of benefits. Having robust processes to measure impact is an essential component of a national research system that seeks to maximise the benefits from investment. This assessment is about looking back, taking a snapshot of impact, and rewarding on that basis. And the assessment also provides valuable evidence to support the case for continued public investment.

But equally, there is a need to assess and measure impact in a much more dynamic way. Not at the national level, but for institutions, research units and researchers, having real-time insights into impact delivery is important for maximising benefits. Better understanding of what has worked well in the past, combined with a robust assessment of progress in ongoing projects, will enable adjustments and improvement, and so better delivery.

There has, then, never been a greater need for evidence of impact. What the evidence from the REF case studies tells us is that the types of evidence that are powerful and helpful varies depending on the type of impact, and, most importantly, the disciplinary context. As we think about the evidence needed to support both retrospective and real-time assessment, it is important to recognise both this disciplinary context and the differing purposes for which evidence is being gathered. While measuring the processes of knowledge exchange may not be needed for outcome-focussed retrospective assessment, it will provide valuable information to monitor progress.

Delivering broad societal benefits needs to be at the heart of the research endeavour. Understanding, collecting and analysing evidence of impact is an essential part of an effective research base of the future.

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