Rethinking Policy Impact
Literature review

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Introduction

'Although the majority of voices commenting on the UK's approach to research impact are critical of specific aspects', wrote Katherine Smith and her colleagues in their 2020 book *The Impact Agenda: Controversies, Consequences and Challenges*, 'this does not mean that they disagree with the basic underlying assumption: that science should be, in some way, beneficial to society (27). To capture both the concerns and potentials existing in scholarly literature on the assessment of research impact, this overview document starts by reviewing the challenges associated with the UK's Impact Agenda (section 1). It proceeds by exploring how the use of social media ties in with research dissemination and impact and broader aims of public engagement (section 2). Next, it discusses the use of indicators to assess research impact (section 3) and alternative approaches to the UK's REF for assessing the impact of research (section 4). Finally, it presents the ways forward proposed by literature looking to improve existing attempts to promote research's benefit to society (section 5).

1. Three Challenges to the Impact Agenda

In Chapter three of their 2020 book, Smith and her colleagues identify and collate various areas of concern surrounding the UK's impact agenda in existing scholarly literature. These can be grouped broadly into theoretical concerns (a), practical challenges (b) and concerns over the impact on higher education institutions and academics (c), which are addressed in the following sections.

1.1 Theoretical concerns

Scholars widely agree that the UK's impact agenda relies on largely discredited ideas that draw on narrow assumptions of a simple and linear relationship between research and policy. Christina Boswell and Katherine Smith (2017) argue this is not because this relationship is under-theorised. However, the sophisticated theories that exist are fragmented, come from different disciplinary fields and rely on different conceptual and theoretical premises, raising issues of commensurability. Additionally, there has been little effort to systematically compare and synthesise main contributions to this field. Relatedly, Kathryn Oliver and Paul Cairney (2019) criticise 'how to' guides for academics interested in making impact. However, unlike Boswell and Smith, who identify a rich body of theoretical work that challenges assumptions of a linear relation between research and policy, Oliver and Cairney link the shortcomings of these 'how to' guides to a lack of adequate theories on this relationship.

Boswell and Smith elucidate four alternative approaches (categorised according to their core assumptions) to theorising research-policy relations. The first approach examines how knowledge and ideas diffusely shape policy in what they term the 'enlightenment model'. The second focuses the influence political power has in shaping knowledge, thus challenging the assumption that research is independent from politics and policy. The third argues that knowledge and policy are co-produced through perpetual processes of mutual constitution. The fourth acknowledges no interchange between politics and science, except for occasions when politics selectively appropriates and gives meaning to scientific findings.

The second and fourth approaches imply that incentivisation of research's

impact on policy would be problematic, since impact likely results from pre-given interests, independent political dynamics and the alignment of research questions and approaches by researchers to political agendas. As such, rewarding researchers for achieving impact, at best, decouples rewards from research quality and, at worst, threatens the autonomy and integrity of social science by encouraging a problematic relationship. The first approach (such as the enlightenment model) and third approach (emphasising co-production) imply that collaborative endeavours that build on existing wider bodies of work, the development of longer-term relationships with various non-academic audiences and the encouragement of conceptual shifts should be rewarded (vs individual projects). The first approach would require using more complex designs with longer timeframes to chart impact.

The third would require process-tracing methods to reconstruct interactions between research and policy, and it would require acknowledging that social science itself can affect the social and political world, and it can introduce additional problems. Oliver and Cairney (2019) also note that existing models emphasise how individuals can make impact, despite evidence indicating that research-policy interrelations tend to be driven by systemic factors.

As such, the UK's approach may (i) encourage academic engagement in activities unlikely to achieve impact (ii) mistakenly award academics and institutions for impact that is likely the result of other, serendipitous or interest-based factors; (iii) fail to capture particular forms of 'impact' (e.g. conceptual influences); (iv) facilitate external interests and politics in shaping academic work (politicising research); and (v) ignore the potential for research to imagine and enact new social

problems (rather than responding to existing problems) (Smith *et al* 2020: 30).

1.2 Practical challenges – operationalisation

This section addresses five challenges surrounding the Impact Agenda that relate to practical issues regarding its implementation and operationalisation. *First, there are problems with demonstrating and "attributing" impact*, which raise several questions such as (i) can research impact and academics' role in achieving it be adequately demonstrated and judged? (ii) will assessments distinguish between, for example, significant vs incremental impacts and significant vs minor roles in achieving impact? (iii) who will be rewarded for synthesised research outputs? (iv) how, if at all, will the serendipitous nature of impact be reflected in assessments? (v) does the ease of demonstrating impact vary with the time/significance of impact?

Several scholars address these questions. For example, Alan Hughes and Ben Martin (2012) argue that as time passes, impact's effects are likely to increase while the ease of attributing impact decreases. For Teresa Penfield and colleagues (2014), basic research is likely to create unforeseen and cumulative impact, and they argue this cumulative nature of the impact achieved by such intellectual advances should be reflected in evaluation. Katherine Smith and Ellen Stewart (2017) explain why impact may decrease as the significance of impact increases. For example, they argue conceptual change (Weiss 1980) can reframe policy issues in a way that opens or closes entire policy domains (Pettigrew 2011). Yet, these types of ideational shifts that prompt first-order change (e.g. changes in thinking) are harder to demonstrate than more short-term, readily visible and easily measurable second order

change. Indeed, articulations of more complex ways in which impact is achieved somewhat challenge to the short impact cases studies of the Research Excellence Framework (REF) and to the term 'impact' itself.

Second, difficulty in meaningfully measuring research "impact" reflects broader issues in measuring something elusive, complex and context dependent (Oancea, forthcoming). Questions about how to measure impact raise concerns amongst even the academics who support the idea that research should have impact (Leathwood and Read 2012). Additionally, measuring something often changes what is being studied. In response to evaluation indicators, for example, actors trying to perform well might alter their behaviour by game playing, asking certain questions or undertaking certain types of scholarship.

Relatedly, preoccupation with questions about how to measure impact most accurately might condition practice by making assumptions that determine what is understood as impact, precluding other questions about whether it can be meaningfully measured (McCowan 2018).

The UK currently uses narrative-based impact case studies that allow impact to be evidenced in a range of ways, leaving the decision open of whether to employ quantifiable indicators of impact. This approach is widely acknowledged to be better than alternatives like bibliometric and metricised approaches (Donovan 2019). Yet, the case-study approach still has limitations. First, there appears to be a tension between studies of the policy impact of policy work and REF accounts. Around 88% of all impact case studies in the REF were awarded either a 3* or 4* grade, advancing a more positive account of academics' research's ability to influence the external world than found in qualitative

studies (Smith 2013) or theoretical accounts (Boswell and Smith 2017). Some case studies may perform well simply because they are written more persuasively – several of the REF2014 panels raised this as a concern in their final reports. There are suggestions that impact case studies are being ghost written by professionals (REF2014 2015: 12), indicating the emergence of an 'impact industry' and the prioritisation of 'storyboarding' of impact generation (Watermeyer 2019). This highlights the role of universities who, as Richard Watermeyer and Mark Olssen (2016) argue, may selectively put forward best candidates to the detriment of others. Academics also report feeling compelled to relate achievements in simplistic and reassuring ways (Bandola-Gill and Smith, 2021).

A further possible limitation of the case-study approach is cost. Although the 2016 Stern review, a government commissioned independent review of REF, argued that REF2014 was a success and brought benefits to the higher education sector, the report did acknowledge the high costs of the case study approach (Stern 2016: 9). A freedom of information request revealed around £2.2 million is spent on preparations for impact assessment (Watermeyer 2016). A RAND led assessment estimates the cost of REF2014 impact assessment at around £57 million. Some argue initial costs may be higher (Penfield *et al.* 2014) while others argue that costs will rise with incremental refinements leading to costs outweighing benefits (Martin 2011). As pressures on public finances in the UK increase, calls for simplifying the way in which impact is assessed with a view to reducing the resource burden, could re-emerge in the context of broader discussions about the future of REF.

Third, there is potential to encourage and reward 'symbolic' research use or 'performative impact'. The commissioning of research might itself be understood as a political act, or an act that generates political benefits (Bailey and Scott-Jones 1984). Or decision-makers may potentially place high-value on evidence that supports their decisions or policy trajectories, while ignoring research that offers challenges or critiques (Boswell 2009). Carol Weiss (1980), for example, describes a 'political model' by which research is deployed to support pre-determined policy preferences. Here, the decision to employ research is political even though the process of designing and executing the research itself is not necessarily informed by politics.

Various scholars empirically show that politics does inform responses to research evidence (Bambra 2013; Boswell 2009). As Smith and her colleagues claim, efforts to reward researchers for achieving impact might be understood as facilitating this influence of politics over research. Even so, determining where research has symbolically or instrumentally influenced policy might be difficult since decision-making processes are usually opaque and involve multiple actors and environments (Watermeyer 2016). Indeed, it can be in the interests of both researchers and policy actors to claim more instrumental impact, especially when the financial rewards for high-performing REF case studies are so high. In this sense, those who support the fundamental idea that academics and universities should do more to engage with external audiences often criticise the current impact agenda for facilitating publicly oriented 'PR work' (Watermeyer 2014).

A broader, longer-standing political science and sociological literature examines how state-building and modern governance techniques shape knowledge production (e.g. Heclo 1974). The more sophisticated of these accounts highlight the potential for influence to occur via the production of self-regulating subjects (Gramscian analyses). Organisational and decision-making structures are also theorised to influence the construction and translation of knowledge. For example, various forms of institutionalism suggest policy processes are shaped by the historically constructed institutions, procedures and ideas in which they are embedded (Schmidt 2008), making it difficult to change the overall direction of a policy trajectory (Smith 2013b).

Fourth, the assumption that research impact is necessarily 'positive' is another underlying assumption of the impact agenda that is criticised. Related assumptions include that, first, 'excellent' research unequivocally leads to positive impact and, second, that there is consensus about what constitutes positive impact. Tristan McCowan (2018) notes that negative impacts ('grimpacts') are not generally acknowledged. Further, perceptions of whether impact is positive or negative can change over time (Penfield and colleagues 2014). Similarly, since research can impact various groups differently, 'having impact' is considered an inadequate criterion both in describing and normatively evaluating a process operating through diverse channels and involving multiple actors.

Smith and Stewart (2017) find that current models incentivise unhelpful practices, for example, seeking impact from a single study regardless of how its findings relate to larger available research. The authors show how this contrasts with notions of academic excellence implied by medical 'hierarchies of evidence' which prioritise syntheses and meta-analyses of research evidence (Black 2001;

Murad *et al.* 2016). Furthermore, it is unclear whether in systematic reviews or syntheses of bodies of research it should be the reviewer/synthesiser or the original authors who should be awarded credit. Funders have noted that applicants can state that their research will not (or should not) have impact; however, ability to do so seems slim given the funding incentives attached (Smith *et al.* 2020: 48). Although UKRI funding applications recently discontinued 'pathways to impact' and 'impact summary' of grant applications, advice continues to state that impact remains a 'core' requirement.

Smith and Stewart (2017) argue that the way in which REF assesses impact means peer-reviewed research scoring 2* that demonstrates clear impact is likely to score higher than 4* outputs with less demonstrable impact, noting that this approach is open to critique. Further, ethical questions involve whether in cases where research is misinterpreted or misapplied by non-academics (journalistic, political and policy contexts) researchers should promote the 'impact' of their work. For example, this occurs in the repurposing of research and scientific claims posted on social media, discussed more in section 3. Together, these questions introduce additional questions about how to define 'misinterpretation' or 'misapplication'. Lastly, scholars find problems with high quality research with ethically dubious applications/impacts, for example, by supporting businesses profiting from sales on socially harmful products (Collini 2012; Freudenberg *et al.* 2009; Hastings 2007). Gemma Derrick and Paul Benneworth (2019) further argue that research that enables impact to be quantified tends to be rewarded.

Finally, there is concern over overloading policy audiences and/or confusing 'more research use' with 'better research use'. A substantial strand of

current guidance seems predicated on ideas that increasing the flow of research into policy is desired, and to encourage researchers to form ongoing relationships with decision-makers to increase chances of impact (Innvær *et al*, 2002; Greenhalgh *et al.* 2004; Walter *et al.* 2005; Mitton *et al.* 2007; Contandriopoulos *et al.* 2010). However, empirically formed theories (Lindblom's 1959 concept of 'muddling through' and Kingdon's 'policy streams' model) suggest that decision-makers face a daily barrage of unmanageable levels of information (Hallsworth and Rutter 2011).

The tension between acknowledging the limited capacity of policy-makers to engage with research in a meaningful sense, and the growing impetus to achieve engagement has not been explored (Cairney and Oliver 2018).

1.3 Impact on higher education institutions and academics

Four challenges relate to concerns that the impact agenda will have negative implications in shaping practices and institutional aspects of research and universities. *First, impact can be seen as a challenge to the autonomy of academia.* Concerns have arisen over the impact agenda's limiting academics' ability to ask questions other than those directly addressing accepted (implicitly short-term) policy issues, thus precluding 'curiosity driven' (Phillips 2010), 'blue-skies' (McCowan 2018; Wilkinson 2019) and 'critical' research (Leathwood and Read 2012). This could fundamentally change the type of scholarship produced in UK universities, promoting research with already-known findings and feasible impact. Alternatively, it might encourage highly fictionalised accounts of potential impacts (since findings are not yet known). GlynWilliams (2012) warns that encouraging academics to 'perform' impact might preclude their ability to openly criticise public

policy. These kinds of critiques align with Stefan Collini's (2012) broader argument that academics working in the UK are becoming increasingly restricted in the types intellectual work they can pursue. Tom Slater's (2012) argument is informed by Weber, and Said, who both foretold of institutionalisation evident in Western societies as eventually limiting the free-thinking intelligentsia (Weber 1906) and an 'inevitable drift towards power and authority' in academia (Said 1994).

From this perspective, the impact agenda threatens researcher autonomy and suggesting a two-way street between research and non-academic audiences invites censorship and is detrimental to work challenging the status quo (Eynon 2012).

If research is assumed to be continuously under the influence of politics – as outlined in broader political science and sociological literature – efforts to bring researchers and policy-makers closer potentially exacerbate this in undesirable ways. Martyn Hammersley (2005) claims this might limit academics' ability to issue ideas out of line with current political thinking. Davey Smith and colleagues (2001) argue it might do more to shape research according to policy needs (than achieve evidence-based policy). As such, the impact agenda might be understood as a conscious effort to shift academic work from traditional, intellectual work to applied problem solving, while extending broader 'neoliberal' reforms in UK universities in ways that increase the pressure for research staff to secure funding.

Research directly or indirectly funded by commercial or government sources offer further evidence of the possibility of political and economic interests shaping research (Bailey and Scott-Jones 1984; Barnes 1996; Bero 2005; Lundh *et al*. 2012; Smith

2010). The UK's impact agenda could increase responsiveness to these kinds of external interests. On the other hand, some, such as sociologist Michael Burawoy (2005), maintain that career and institutional pressures 'rarely vanquished' the 'originating moral impetus' of academic work. Further, some academics are opposed to the idea academics can or should have complete freedom.

Moreover, recent interviews with UK academics indicated that providing evidence of impact was less a driving force and more an additional element to consider weaving into work (Marcella *et al*. 2018). This suggests that the various concerns raised throughout may not come to be. Pain and colleagues (2011) go even further to indicate the possibilities in encouraging academics to build collaborative relationships with less powerful actors to co-produce knowledge, and REF assessment should consider influence on NGOs and research challenging conventional wisdom.

Second, some impact examples are unnecessarily excluded via the application of an arbitrary time limit. Numerous commentators assert that the impact of research can come many years (even decades) after research production (Gunn and Mintrom 2017; McCowan 2018). REF2014 applied a twenty-year cut off for unclear reasons, despite Russell group universities recommending that no time limit should be applied (Russell Group 2009). Some commentators argue this excluded research with very significant impact occurring over longer periods (Smith *et al*. 2020), and this is consistent with policy studies scholars who claim ten years to be a minimum period for studying substantial policy change (see Fischer and Miller 2007). McCowan (2018) argues the imposition of a time limit reduces support for 'blue skies', curiosity driven research.

Third, significant resources are required to achieve, demonstrate and assess research. Achieving research impact is resource intensive when done effectively (e.g. via building relationships of trust, close collaboration etc.). For some, this work is considered a 'full time occupation' (Watermeyer 2014).

Yet, for academics, it is usually work that must be undertaken in additional to teaching and research and administration, suggesting the growing emphasis on impact and knowledge exchange may be informing broader concerns about the ballooning workloads of UK-based academics (Leathwood and Read 2012). Others have highlighted that work to achieve impact is rarely adequately reflected in workload allocation models (Yarrow and Davies 2018).

Fourth, the impact agenda might reify 'impact heroes' and traditional elites. Some academics (e.g. Ball and Exley 2010; Smith and Stewart 2017; Dunlop 2018) argue that impact is more easily achieved by senior academics with strong reputations or connections to policy circles or senior beneficiaries. An ESRC report asserted that pre-existing networks and relationships with research users was the most important factor contributing to the generation of impact (2009). Similarly, Claire Dunlop (2018) found two-thirds of impact submissions used a single academic as key author. Les Back (2015) writes of impact through 'big research stars' scripted as 'super heroes' advising cabinet ministers (Back 2015), sometimes without their knowledge (Watermeyer 2019). Though some REF2014 case studies sought to couch achievements in larger bodies of work and the development of impact case studies, in the context of REF2021, seeks to mediate incentives for individualistic and noncollegial behaviour by moving away from singular claims of excellence, concerns remain. Individualising impact and 'heroic impact narratives' (Thomson 2013) are inadequate ways for capturing the complex and diffuse ways in which research contributes to society (Bandola-Gill and Smith, 2021).

This also prompts questions about how early-career academics go about impact (Watermeyer 2014), with empirical explorations suggesting that many feel they lack institutional support for developing their understanding of, and approaches to, research impact (Marcella *et al.* 2018). Larger, more resourceful non-academic partners and end-users of research are also favoured since researchers may need buy-in by users, who are unlikely to see benefits until much later, at an early stage of research to secure funding provision. As such, there is a bias towards - and even explicit encouragement to enlist - high profile users as seniority and status equate to 'reach' in some sense (Williams 2012; Back 2015). Thus, it is not clear that REF in its current form encourages/incentivises academics' public citizenry (Watermeyer and Tomlinson 2022).

Other hierarchies based on gender, class and global inequalities may also be reified. Gender hierarchies are underlined, first, by assumptions that women are better at outward-facing communication/engagement work, less valued than traditional academic work (Watermeyer and Rowe 2021), and second, by the timing of key opportunities for impact (evening events) when caring duties conflict (Smith and Stewart 2017). Pavel Ovseiko and colleagues (2016) call for assessments of gender equity to be integrated into research impact assessments (see also Dunlop 2018; Smith and Stewart 2017). As for class hierarchies, Williams (2012) indicates a gap to exist between the

'middle class' lifestyles researchers share with policy-makers and the life worlds of those on whose behalf poverty alleviation policies are being made. In terms of global inequalities, there are concerns that the 'push' to achieve impact might encourage researchers to take opportunities that invite risks unevenly born by members of a research team in low and middle-income countries (Williams 2012). In this case, while researchers in the UK reap the benefits of demonstrating impact, local team members and research participants are left bearing the risk in situations when, for example, research is used instrumentally to support a political agenda that would label the local research team as critics of the government.

2. Research, social media and public engagement

The last section discussed literature addressing the key concerns over the UK's impact agenda, noting the theoretical and practical challenges as well as concerns over how higher education institutions and academics' work might be affected. This section addresses the influence of social media platforms like Twitter and YouTube, which have presented additional challenges for assessing research impact as well as opportunities to bring research findings in front of the public eye. Social media is often seen as a way to enhance the impact and public engagement with research being able to connect with potential new,

non-academic audiences (Jordan and Carrigan 2018; see also LSE Impact blog 2015). This highlights the importance of clarifying the relationship between public engagement and research impact. Katy Jordan (2022) explores academics' own perceptions of what constitutes research impact through social media and finds that many of the examples given by participants are more clearly examples of public engagement rather than research impact as institutionally defined.

On the positive side, scholars point out that social media allows scientific collaboration to occur transparently and quickly, in real-time, while also introducing the public to excellent scientists and researchers (Holden Thorp 2022; Greenhalgh 2022).

This can have benefits for research. For example, Twitter hastened the global diffusion of the first whole genome sequence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) ten days after an outbreak alert, enabling cross-comparisons and open critique, which then facilitated important counter-narratives while leading to quick refutation of invalid conclusions (Pollett and Rivers 2020). Some scientists see online communication as a way of to increase impact by encouraging public engagement through making science more equitable and accessible, thus addressing information asymmetries between lay audiences and experts (Science 2022).

On the downside, while the systematic inquiry of research relies on the process of revising findings as new data is gathered, it also allows 'naysayers to paint scientists as flip-floppers when they're just doing what scientists are supposed to do' (Holden Thorp 2022; Science 2022)[1]. Further, using preprints,

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[1] Devi Sridhar suggests this may shape scientists' behaviour in a column she wrote for The Guardian: Sridhar, D. (2022). 'Why can't some scientists just admit they were wrong about Covid?'. The Guardian, 24 March 2022.

a non-peer reviewed version of a scientific paper, can also be risky as it undermines public perception about science as a dependable way of understanding an issue (Brossard and Scheufele 2022). Brossard and Scheufele (2022) argue that ideas of making science equitable through social media represent 'outdated thinking in this space', instead noting three challenges. First is the difficulty for researchers to reach individuals who are not already receptive to scientific messages, for example, introducing religious audiences to embryonic stem cell research and conservative audiences to research on climate change.

Second is the 'siloing' effect of researchers who may follow and retweet each other, but who do so in an environment that looks very different from the rest of society. Third, scientific exchange prioritises 'reliable, cumulative evidence over persuasive power', which is at odds with social media exchanges, and the attempts of researchers to increase their persuasive appeal is risky (Brossard and Scheufele 2022). For example, it could encourage simple, short snippets that may, among other problems, impede the ability to think nonlinearly and deeply (Science 2022).

Herbert Holden Thorp (2022) further identifies social media's wide-open forums as problematically allowing cherry-picking by those wishing to undermine science. Trish Greenhalgh (2022) also identifies risk in an open public domain where a researcher cannot control who uses, or for what purposes the scientific claims they place on these domains are being used. Yet, Greenhalgh (2022) cautions against viewing the dynamic between media and the scientific community as one where 'trolls' distort information that emerges from a singular and unified community of scientists and researchers devoted to finding truth. Instead, she claims

a plurality of scientific communities exists, each of which come with shared mental models and existing power and prestige structures in which members have vested interests in defending. Into this dynamic media enters (not necessarily as a negative force) and can pick the science that offers the best story that aligns with their narrative. She notes examples of this in debates that played out in social media over the effectiveness of masks early in the COVID-19 pandemic.

Many other scholars identify problems with social media platforms having become the gatekeepers of scientific information and communication. Namely, the algorithms used by social media companies have encouraged dispute and provocative statements, which result in more engagement, while discouraging authoritative information (Golbeck 2022; Holden Thorp 2022) which might offer more nuanced discussion on complex issues (Science 2022). Algorithms using digital trace data, demographic data and consumer information intensify already 'hyperpolarized' public attitudes on issues like COVID-19, which threatens to impact public views more than the specific research findings that scientists try to communicate (Brossard and Scheufele 2022). Further, algorithms determine which individuals receive what scientific information meaning that, for example, those adhering to conspiracy theories are more prone to see content of other conspiracy groups – which share language and tactics (Golbeck 2022). Eventually, the implication is that reliable scientific information could be crowded out by other online noise (Brossard and Scheufele 2022).

Given the opportunities and challenges presented by social media, the question is what is to be done. Some scholars claim that scientists must learn about

and consider the 'inner workings of social media to use the medium effectively without inadvertently causing misunderstandings and being gamed by hyperalert trolls' (Holden Thorp 2022). Others point to creating partnerships between the scientific community, social media platforms and democratic institutions, noting that access to information is a lynchpin of 'enlightened democracies' (Brossard and Scheufele 2022).

To some extent, such partnerships might encourage the changing of algorithms; for example, in 2019, YouTube altered its recommendation algorithm to make flat earth conspiracy theories hard to find (Golbeck 2022). Scientists can also continue learning to better communicate their science, increasing the electorate's scientific literacy, using digital marketing and being savvier at gaming the algorithms (Brossard and Scheufele 2022).

In addition to its role in affecting public engagement, social media has also influenced academic impact. Clayton T. Lamb and his colleagues (2018) note that in ecology and conservation, online media communication can predict or influence traditional metrics of scholarship like citations but offers diminishing return on investment, plateauing after a point (Lamb *et al*. 2018). Mark Carrigan and Katy Jordan (2021) presented a case study of social media in the 2014 REF impact case studies. They observe that data generated by social media platforms is being incorporated into the evaluative infrastructures of higher education through its inclusion in impact case studies (Carrigan and Jordan 2021: 366). They call for much more research on the institutional dimension of

the exponential use of social media platforms, a trend accelerated by the pandemic, not only by individual academics but also by higher education institutions and caution that platforms are not neutral mediator of the activity directly recorded in the metrics. The use of traditional metrics to assess research impact is discussed more in the next two sections.

3. Using indicators to assess research impact

This section addresses the use of indicators and metrics to assess research impact, noting both traditional and emerging approaches. Generally, there is broad scepticism amongst academics that indicators and metrics can be used to assess research impact. Such scepticism is reflected in the 2013 San Francisco Declaration on Research Assessment (DORA) signed by 19,452 individuals and 2827 organisations[2], many of which are UK based. Critics of indicator-based methods point to the potential negative consequences from placing too much emphasis on indicators which are poorly-designed and narrowly defined, as well as creating perverse incentives such as 'gaming the system' and strategic behaviour (De Rijcke *et al*. 2016, 4; Wilsdon *et al*. 2015).

Indeed, a the authors of a 2015 independent review on the role of metrics in research assessment argued that metrics and indicators would not be able to assess the impact component of REF or the quality of Unit of Assessments (UOAs) in place of narrative impact case studies,

as metrics and indicators could not capture the nuanced judgement presently provided by case studies. Correlation analysis of REF2014 results demonstrated that replacing the peer review process with individual metrics yielded significantly different outcomes (Wilsdon *et al*. 2015, ix-x). Publication year proved a significant factor as more recent outputs decreased in correlation with REF scores in all but two metrics.

Further, women and early-career researchers arguably had statistically significant differences in correlation with REF scores (Wilsdon *et al*. 2015, ix). Some HEIs also proved better at presenting data in impact case studies than others. For example, lower impact profile HEIs tended to rely on prescribed formats and did not present information explicitly. In part, the use of different formats by HEIs was due to lack of clarity and instruction; nonetheless, this did have implications during evaluation (Chowdhury *et al*. 2016, 11).

However, a significant minority of academics is more optimistic that metrics can be used to support peer review, although they emphasise that indicators should be used in support, not as a replacement of narrative case studies. The question, then, is about how and to what extent indicators can achieve the desired aims. Literature indicates that the answer might not be straightforward. Peter Dahler-Larsen (2014) argues that several constructivist studies have challenged assumptions about the 'proper uses' of indicators as well as terms like 'misuse' or 'unintended effects', which perpetuate a fallacy that a group of experts can know the 'right' use of indicators (De Rijcke *et al*. 2016, 12). Instead, Dahler-Larsen underscores the importance of imbibing indicators with meaning through their contexts of use rather than an external point of reference, which highlights the need for a more nuanced

and contextualised understanding of improving indicator usage (De Rijcke *et al*. 2016, 12). This is consistent with the 2015 independent review's caution against considering all disciplines with similar indicators akin to bibliometric databases (Wilsdon *et al*. 2015, x).

Indeed, among the recommendations that the independent review made on improving current indicator use was a need to heed context and disciplinary diversity in assessing research, to provide contextual information along with indicators and to encourage HEI leaders and funders to develop – and clearly justify – context-specific principles for using indicators based on aims and principles (Wilsdon *et al*. 2015, viii). Building on literature on responsible research and innovation (RRI), the review proposed adopting a concept of 'responsible metrics' and to potentially create a Forum for Responsible Metrics.

Here, the proposal is that 'responsible metrics' be understood in five terms that frame the appropriate uses of quantitative indicators in assessing, governing and managing research. These include *robustness*, basing metrics on the best data in terms of scope and accuracy; *humility*, recognising that metrics should not replace peer review; *transparency*, keeping collection and analysis processes open; *diversity*, recognising variations by field and using a range of indicators to reflect this plurality of research; and *reflexivity*, recognising indicators' potential effects and consistently updating in response (Wilsdon *et al*. 2015, x).

In addition to calling for more careful design and application of indicators, the 2015 independent review made other recommendations including calls to improve data infrastructures that manage the collection and analysis of data and to better interlink the systems used by HEIs, funders and publishers (Wilsdon *et al*. 2015, viii - ix).

It also recommended extending the use of DOIs to include all research output and to promote the uptake of ORCID, a subset of the International Standard Name Identifier (ISNI), which identifies a specific scholar's contribution to scientific literature (Wilsdon *et al.* 2015). Ultimately, it indicated a need for more 'research on research' to answer questions arising from funders and HEIs about what to fund and how best to fund it, while also enlisting the scientometrics community in informing policy makers, researchers and funders on how to use quantitative indicators (Wilsdon *et al.* 2015, x).

Yet, empirical evidence demonstrates potential problems in reforming indicator practices more generally, that could also pose problems in promoting these specific recommendations. As Sarah de Rijcke and her colleagues argue, certain metrics become reified in research management and assessment contexts as formal and informal standards for judging the value and usefulness of research (De Rijcke *et al.* 2016, 11-12). Often, the narrow definitions that critics claim characterise indicators result from certain data being more readily available than other data (Wilsdon *et al.* 2015). Relatedly, Linda Butler (2003; 2005) points to a long standing- problem of metrics conservatism, whereby users display preference towards user-friendly measurements over adopting more state-of-the-art scientometrics (De Rijcke *et al.* 2016, 11). Ultimately, metrics-based assessments of research that have been developed and used form some of several alternative approaches (to REF) to assessing the impact of research in the UK and elsewhere, the focus of the next section.

4. Alternative approaches to assessing the impact of research

This section addresses alternatives to UK's REF, which employ various concepts and methodologies within comprehensive models and frameworks, typically designed at an organisational level to assess impact according to the needs of specific organisations and stakeholders (Penfield 2014). Before outlining these alternatives, we make two observations. First, research and its assessment needs to be understood in the broader context of national policy advisory systems (McDowall and Britchfield 2020). This presents challenges for making direct comparison of different approaches, but the literature does acknowledge the different methods that have been used and that policy-makers look to when informing their own approaches. As such, this sections presents the most commonly discussed approaches to assessing impact. Second, higher education institutions are not the only sites for research production (and assessment) since there are more impact evaluation methods for research that emerges from, for example, international organisations or government think tanks and not all these are addressed in this section.

a. Metric-based assessments

The "traditional" method of evaluating university research in the UK is the process of peer review, which focuses on the quality of research (Penfield 2014, 23); however, to assess academic 'impact', or the benefits of research inside academia, various bibliometric methods are employed. For example, the H index measures academic impact by focusing on the number of citations and publications (Penfield 2014, 23). Percentile indicators are offered by some scholars as an improvement on traditional bibliometric methods due to their ability to normalise for certain factors and account for citations' skewed distribution across publications (Bornmann and Marx 2013, 228).

All the above metrics-based approaches have been incorporated within broader perspectives, for example, with Australia's Excellence in Research (ERA) and the USA's Star Metrics, the latter of which assesses impact through quantified factors like research income, publications and citations. These bibliometric methods exclude impact on non-academic communities (Scoble *et al*. n.d., 3), and they are criticised for providing a narrow and incomplete picture of impact that some literature argues should not replace peer and expert review (Bornmann and Marx 2013, 229). Metrics-based indicators are also used to assess wider impact outside academia, for example through the commercial income it creates or registered intellectual property (Australian Research Council 2008). Claire Donovan (2019) notes that 'impact fatigue' from the work involved in developing REF case studies might lead to what she calls 'metricide', or an increased willingness to cede in allowing impact to be assessed through imperfect metric-based ways.

However, there is widespread scepticism towards metrics-based approaches, and some UK universities have signed up to The Declaration on Research Assessment (DORA) to reflect this (Wilsdon *et al* 2015).

b. The Payback Framework and BRIDE

The Payback framework, developed during the 1990s by scholars at Brunel University, has been adopted within various countries' health sectors to systematically link research with its benefits (Penfield *et al*. 2014). The model can be conceptualised in two parts: one that breaks down the research and dissemination process into subdivisions within which research impact is analysed. Second, the framework develops a multi-dimensional scheme of five categories for classifying "paybacks" including outputs, outcomes and impacts from research (Penfield *et al*. 2014; Wooding *et al*. 2008, 3; Donovan and Hanney 2011).

Brunel scholars subsequently broadened the Payback framework to assess impact across a wide array of a university's disciplines through the Brunel Impact Device for Evaluation (BRIDE). BRIDE aims to provide a systematic and multidimensional assessment matrix of research impact through three dimensions: the first classifies the origin of research impact, for example, through an academic's advisory role or a training program. The second categorises the impact itself into two categories: impact on academic versus non-academic communities. Within these two categories there are five sub-categories so that academic impact is further divided into "knowledge creation" and "impact on future research including capacity building and career development".

The non-academic category is sub-divided into "impact on the policies of public and corporate bodies and on product development", "impact on industrial practice" and "wider social economic impact" (all above from Scoble *et al*. n.d., 4). The third dimension is levels of "depth" and "spread" where depth indicates the "degree of change" research generated and "spread" indicates the change research generated across (one or many) communities (Scoble *et al*. n.d., 3-4). BRIDE also accounts for 'degrees of separation' or "how many times the research had to be integrated in further/other research before impact occurred" (Scoble *et al*. n.d., 3).

Pilot studies were run on Brunel's submission to RAE2008 without boundaries meaning that it did not assess origin or type of impact. (Scoble *et al*. n.d., 7). The main finding was that assessing research impact with BRIDE proved more feasible than presumed;

however, substantial difficulties still exist in converting this into a comprehensive framework that funders could use to assess university research. The matrix produced by BRIDE could more likely be used to identify areas where narrative accounts were needed to provide a more nuanced account of impact from a particular study or stream of research. The matrix could then be used as a guide by panels like the REF to assess the narratives (Scoble *et al*. n.d., 7).

c. RAND/ARC

The UK's RAND/ARC Impact Scoring System (RAISS) uses an indicator-based approach to track research impact for the Arthritis Research Campaign (ARC). As the fourth largest fund raiser for biomedical research in the UK, ARC wanted to improve end of grant reports that collected vast amounts of unstructured information.

Thus, RAISS was designed to be feasible, efficient and to allow easy analysis (Grant *et al*. 2010, 22). Designed as a web survey and questionnaire, it is comprised of 187 yes or no questions to quantify levels of impact in five categories: "knowledge production", "research targeting and capacity building", "informing policy and product development", "health and health sector development" and "broader economic benefit" (Grant *et al*. 2010, 22-23). Six months after a grant is completed, the grant's principal investigator completes the web survey, which typically takes under 60 minutes and depends on the accuracy and honesty of the grant holder (Grant *et al*. 2010, 29-30). ARC does not collect a description of the impacts achieved, and it does not value the impacts or assess processes or potential future impacts. Only impacts that have already occurred are captured (Grant *et al*. 2010, 23). Designed specifically for biomedical science, ARC is not considered to be easily extended across other fields (Grant *et al*. 2010, 30).

d. PART

A self-evaluation approach is used in the USA's Program Assessment Rating Tool (PART) to assess the outcomes/impact of all federal government program performance, including research and development programs (Grant *et al*. 2010, 33). Through a questionnaire of 25-30 yes or no questions about "purpose and design, strategic planning, programme management and programme results" (Grant *et al*. 2010, 36), programs are asked to assess themselves against their own goals with explanations and evidence. The Office of Management and Budget responds with a performance rating ranging from "effective", at the top end, to "ineffective", at the bottom end, and an improvement plan (Grant *et al*. 2010, 38).

Issues include difficulty attributing outcomes due to time lags between research output and impact and multiple causes of impact, incentivising programmes to choose outcomes that are achievable in a short time frame and easier to achieve (Grant *et al*. 2010, 44-45). Additionally, education programs are shown to have the largest share of poor performance, nearly half rated as "results not demonstrated", while national security programs and foreign affairs programs have high percentages rated at the highest 'effective' level (Norcross and McKenzie 2006, 14).

One suggested reason for this is that education programs tend to be grant programs, which tend to perform relatively worse than other programs; nonetheless, it suggests that performance information must be used alongside other information (Norcross and McKenzie 2006, 27). Lastly, PART is argued to be "politicised", favouring programmes that utilise competitive bidding and contracting out (Terman and Yang 2010, 412).

e. ERiC and SIAMPI

The Dutch higher education system developed Evaluating Research in Context (ERiC) through combining several methodologies like self-evaluation, an indicator- based approach and stakeholder analysis. ERiC combines quantitative and qualitative methods in a four-step process (Grant et al. 2010, 49). The first step is a self-evaluation where researchers identify their stakeholders and goals and then evaluate them in terms of importance.

The second stage involves gathering data to create 15 indicators in three categories ("science/certified knowledge", "industry/market" and "policy/societal") that reflect the research group's performance in various social domains, and this is used to create a Research Embedment Performance Profile (REPP). REPP maps output against several categories developed for different disciplines externally or in consultation with researchers at an earlier stage (Grant et al. 2010, 50-51). The third stage identifies productive interactions between researchers and representatives from policy, industry and society domains, and several external stakeholders are either contacted by telephone interview (the qualitative dimension) or survey (quantitative) to establish their role. The final stage entails feedback by comparing output in stages two and three against stated goals in the first stage to demonstrate relevance by matching self-perception with impact (Grant et al. 2010, 52). There is no direct link to funding.

Several European partners are developing ERiC as SIAMPI, Social Impact Assessment Methods for research and funding instruments through the study of Productive Interactions. SIAMPI focuses on the third stage of ERiC, capturing researchers' and stakeholders'

'productive interactions', defined as exchanges through which "knowledge is produced and valued that is both scientifically robust and socially relevant", and it analyses resulting networks that evolve (Spaapen and Drooge 2011, 212). Intended for learning rather than assessment, SIAMPI is designed to gain a better understanding of a process of exchange that is widely assumed a precondition to achieving impact.

For example, in countries such as Canada and the UK, 'productive interactions', understood as knowledge exchange, are enabled financially (though not documented and analysed) (Penfield et al. 2014). Tracing and analysing the process of exchange is also easier- involving less input compared to approaches attempting to capture the full path from research to impact (Penfield et al. 2014, 24)- while also avoiding linear logics that promote attempts to trace a path from research to impact (Molas-Gallart and Tang 2011, 225). Some literature identifies issues with SIAMPI in that it lacks inclusion of contextual information, ignores power differences (and their influences) in networks of exchange and lacks awareness of instances in which potential impact had or could have been made (Spaapen and Drooge 2011).

f. RQF

The Australian Research Quality Framework (RQF), developed by a Technical Working Group on Research Impact (WGRI) takes a case study-based approach. Based largely on conclusions of a literature review by Donovan (2005) that metrics are an 'underdeveloped' and insufficient as a proxy for impact (Williams and Grant 2018, 6), RQF requires research groupings to submit two statements. The first is a context statement, which relates the focus of research and its relationship to impact. The second is an

impact statement, addressing various aspects of impact including how end users are engaged, what products, policies, paradigms and outlooks have been newly adopted and the extent of research's benefit. Research groupings present up to four case studies illustrative of its statements and a roster of contactable end users.

A list of potential indicators was also presented as an option for evidence to support claims; however, these gained criticism as they could potentially "disenfranchise" some disciplines and even whole fields (Grant *et al.* 2010, 13). The quality of research is assessed separately according to a five-point scale (Commonwealth of Australia 2005, 17), and only research rated above 2 is considered (Grant *et al.* 2010, 15).

Due to a change in government, RQF was never implemented (Williams and Grant 2018, 8). However, a new framework was developed in Australia after consultations in 2016 with reference to UK REF, itself influenced by the original Australian RQF. Indeed, when the UK was developing what became the REF, Australia's RQF was determined the 'best fit' following an international review of other impact assessment frameworks including metrics-bases assessment systems such as RAND/ARC, PART and ERiC (Williams and Grant 2018, 13). Following the consultations, Australian Research Committee (ARC) piloted a mixed method approach in 2018 involving an indicator matrix with an accompanying narrative and case studies (Williams and Grant 2018, 22). The piloted approach differs from UK REF in three ways. First, it differentiates impact from engagement (the UK model includes both categories as 'impact'), and it assesses them independently. Second, processes of assessing engagement and impact differ from UK REF. Engagement is assessed

through metric-based indicators like "patent and patent citation data, co-authorship of research publication, and research income" and complemented by a narrative describing context and any other additional information, including quantitative information.

Impact is assessed mainly using qualitative 'impact studies' including the higher education institution's approach to supporting impact, the research itself and the research's impact (Williams and Grant 2018, 24 for above). Lastly, the Australian approach focuses on a higher education institution's approach to impact, specifically by evaluating the mechanisms it uses to facilitate impact, in contrast the UK REF which focuses on actual impact (Williams and Grant 2018).

g. UKRI Pathways to Impact

Funding bodies like UK Research and Innovation (UKRI) have put forth measures to channel funding into research with the potential for realising 'impact' which UKRI defines as 'the demonstrable contribution that excellent research makes to society and the economy' (Boulding *et al.* 2020). Over a decade ago, UKRI developed its 'Pathways to Impact' requirement, which was a section of the research grant application that required applicants — including the Research Councils — to include a plan or 'Impact Summary' as part of their grant applications. In an applicant's 'Impact Summary', they were required to 'detail the actions they will take to increase the chances of their research findings reaching key stakeholders' (UKRI 2020). This requirement was removed in March 2020 when UKRI announced that it would discontinue the 'Pathways to Impact' section of grant applications to pilot "simple, streamlined application and assessment processes" that reduced the "burden" on researchers (UKRI 2020). The National Co-

ordinating centre for Public Engagement questioned whether the "Pathways" should have been reviewed, rather than rejected outright; however, UKRI stated its preference for a 'fresh approach' over revising the existing one (NCCPE 2020).

Academics had been critical of 'Pathways' on the basis that impact was difficult to predict at the beginning of the research process, which led to a 'tick box mentality to completing the P2I statement' (NCCPE 2020). Additionally, peer review panels were not considered to have the expertise to effectively review Impact Summaries (NCCPE 2020). In January 2022, UKRI announced that it was launching consultation to review the effectiveness of its system for supporting impact and that, while 'Pathways to Impact' would not be revived, it wanted applicants to have guidance on how to 'address impact' (UKRI 2022a). The consultation closed on 22 February 2022 and UKRI is currently analysing the feedback. Currently, in place of a separate 'Impact Summary', UKRI directs applicants towards "embedding impact within the case for support" (UKRI 2022b). Some initial observations are that there are differences in how different research councils are guided toward embedding impact. Mainly, there are differences in how explicitly information is requested on both economic and social impact as well as scientific or academic impact and whether public engagement is specifically mentioned (Livingstone-Banks 2020).

5. Room for improvement

The challenges surrounding the UK's Impact agenda exist alongside a continuing perception – even by many critics of the current approach – that research should be encouraged to contribute to a wider community; thus, several scholars emphasise ways forward. James Wilsdon (2022) argues that 'the next REF' might be more amenable than ever to 'radical rethink' given increased public R&D spending through to 2025, renewed impetus to reduce bureaucracy and improve research cultures and quality-related and other funding that has been more closely interlinked through UK Research and Innovation. As such, the Future Research Assessment Program (FRAP) has been introduced at the request of funding bodies, devolved government ministers and the UK government to newly explore potential approaches to UK higher education research performance assessment (UKRI 2022c). Wilsdon (2022) states his hopes that four things will emerge from this: first, that the REF's aims will be clarified to assess which aims belong in the REF and which should be more widely included in university management. Second, that the REF's imprecise terminology, which leads to an "illusion of objectivity" around an activity that is negotiated and subjective, will be jettisoned (2022, 3). Third, he indicates a need to rethink whether assessing more than 30 units of research is the best approach, especially given the push for more interdisciplinarity by policy and funding. Fourth, he is hopeful for rewarding and incentivising improvements in research culture instead of conducting a retrospective audit of individual projects.

Some of these suggested ways forward align with those suggested by Smith and her colleagues (2020). They also propose rewarding "impactful environments" rather than singular successes (Smith *et al.* 2020, 200), which concurs with Wilsdon's fourth aspiration for REF as well as Australia's most recent approach to focus on institutional mechanisms for

supporting impact. For Smith *et al.*, this would involve mechanisms such as allocating work within HEIs for "outward-facing" work, thus signalling a recognition of this work's value and required time while also encouraging more effective practices. For example, this might include directing activities towards certain areas as informed by external dialogue rather than untested assumptions (Smith *et al.* 2020, 200). Relatedly, Matthew Flinders (2022) highlights the importance of connecting academic research with centres such as those established through the UK's What Works Network and scholarly networks like International Public Policy Observatory (IPPO) and UK in a Changing Europe, all of which aim to address pressing social problems but currently exist as 'isolated islands of excellence'. Doing so, he argues, is needed to improve the 'connective and catalysing capacity' to 'scale up and scale out the vast reservoirs of understanding that such initiatives develop about "what works" in policy engagement' (Finders 2022, 2).

Smith and her colleagues (2020) further suggest protecting funding and spaces for discovery-focused, critical academic scholarship (without obvious impacts) and knowledge synthesis, and they point out multiple examples and reasons that academic scholarship is valuable beyond impact (see also Oancea, *forthcoming*). Weakening the link between original research and impact would encourage (and reward) knowledge synthesis and collaboration instead of reinforcing the idea that each new research project should generate its own impact. They suggest developing a conversation about the ethics of impact instead of consistently strengthening assumptions that 'excellent' research necessarily leads to positive impact. Additionally, they propose avoiding crude and simplistic classifications of 'excellence', which tend to denigrate the local. Instead of current methods of ranking research as being either "locally", "nationally" and/or "internationally relevant", they suggest resisting tendencies to assess excellence according to proximity to external communities and to favour, instead, a thorough peer review and deliberation that considers research's relevance to specific communities that benefit from it. Additionally, they propose valuing a wider range of activities, such as recognising the local impacts universities can make through lifelong learning, widening participation and creation of open public spaces (Smith *et al.* 2020, 200).

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